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Financial Development and Poverty Reduction in South Africa

A Dissertation

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Master of Commerce in Development Finance

by

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DECLARATION

I, GERTRUDE MOKETE BOPAPE, hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

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ABSTRACT

South Africa has high levels of financial development yet experiences significant and persistently high levels of poverty. Intrinsically, this research examines the relationship between financial development and the reduction of poverty in South Africa. The research employed the Vector Error Correction Model (VECM) technique based on annual data from 1980 to 2019. Using the financial depth indicator as a measure of financial development and household final consumption expenditure per capita growth, income per capita and infant mortality rate as proxies for poverty, three models were developed.

The results show that in the long run, financial development – as measured by the financial depth indicator – has a positive impact on poverty reduction, yet the findings are insignificant. This is consistent across all measures of poverty. In the short run, the growth in Gross Domestic Product (GDP) was found to be beneficial in reducing poverty, but only when household final consumption expenditure per capita growth and income per capita growth were used as proxies for poverty. GDP growth has also been found to Granger-cause poverty reduction when household final consumption expenditure per capita growth and income per capita growth were used.

The study recommends designing policies that will ensure that financial sector development translates to impact at grassroots level. Furthermore, a recommendation is made for further studies in effective measurements of poverty, positing that measuring poverty on an annual basis is key in the fight to reducing the incidence of poverty in South Africa.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive distributed lag
BDMA	Bank deposit money assets
FID	Financial institution depth
GDP	Gross domestic product
GFDD	Global Financial Development Database
GMM	Generalised methods of moments
HFCE	Household final consumption expenditure
HQC	Hannan Quinn Criterion
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund
IMR	Infant mortality rate
IPC	Income per capita growth
IRF	Impulse response function
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
LBPL	Lower bound poverty line
MENA	Middle East and North African
NFA	Net foreign assets
OLS	Ordinary least squares
PP	Phillips-Perron
SBIC	Schwarz Bayesian Information Criterion
SDG	Sustainable Development Goals
SSA	Sub-Saharan Africa
VAR	Vector Autoregression Model
VDA	Variance decomposition analysis
VECM	Vector Error Correction Model

Chapter 1: Introduction

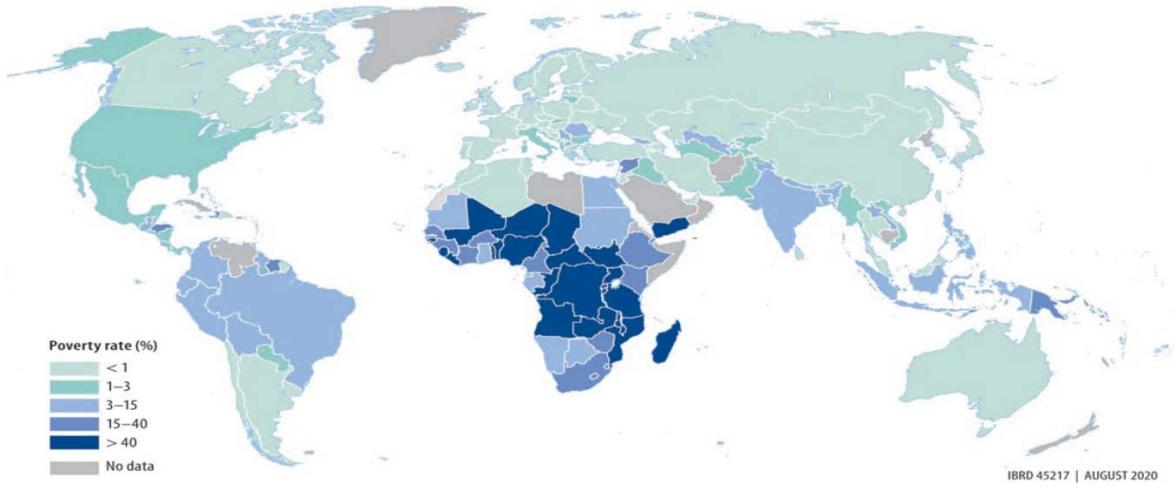
1.1. Background of the Study

"*Endemic and widespread poverty continues to disfigure the face of our country*." (Mbeki, 2004).

A challenge facing the African continent is the prevalence of poverty and income inequality (Tita & Aziakpono, 2016). Globally, progress has been made in the reduction of poverty and extreme hunger post 1990 (World Bank, 2018d) but this reduction has not been seen in Sub-Saharan Africa (SSA). The impact of the Covid-19 pandemic further exacerbated global poverty conditions, plunging between 88 million and 115 million people into poverty (World Bank, 2020), with half living in SSA (Ofori, Armah, Taale, & Ofori, 2021). The percentage of the SSA population living in extreme poverty has reached 41%, with 27 out of 28 of the world's poorest countries being in SSA (World Bank, 2020).

Figure 1. 1: below maps the rates of poverty globally, with darker hues of blue indicating an increased level of poverty. As can be seen, SSA has experienced the worst increase in poverty rates in the world and, consequently, is unlikely to reach the goal of having the absolute rate of poverty at the 3% threshold by 2030 as outlined by the United Nations' Sustainable Development Goals (World Bank, 2020).

Figure 1. 1: Poverty rate at the US$1.90-a-day poverty line, Sub-Saharan Africa, 2018.

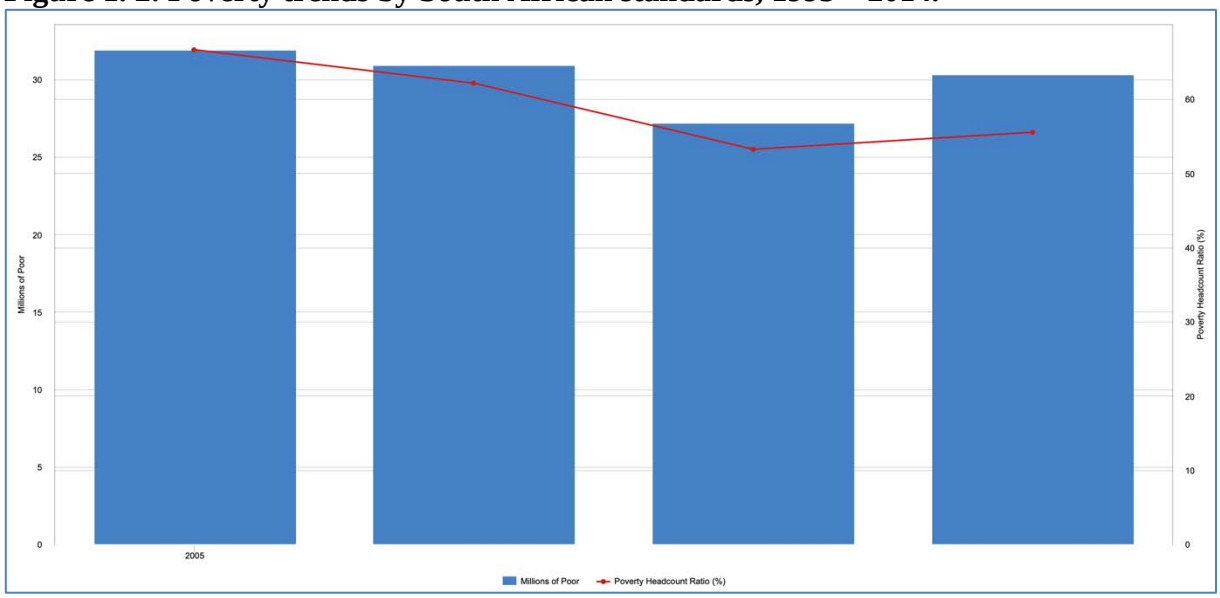


Source: World Bank (2020, p. 46)

Figure 1.1 above also shows that although South Africa has among the highest structural unemployment and inequality levels in the world, the country is not unique on the African continent. Hence, the eradication of extreme poverty and inequality has been one of the key developmental policy principles since the country's political liberalisation in 1994.

Figure 1.2 below depicts South Africa's poverty trend using the lower bound poverty line (LBPL) as a base, where 40% of the South African population is living in poverty (Statistics South Africa, 2018) as measured by R890 income per month. Although the levels of poverty show an improvement overall from 1996 to 2015, there was an increase in poverty levels between 2011 and 2015 from 36.4 to 40% (World Bank, 2018c) and poverty levels further worsened to an estimated 59% in 2021 (World Bank, 2021a) due to the Covid-19 pandemic.

Figure 1. 2: Poverty trends by South African standards, 1993 – 2014.



Source: Adapted from World Bank (2019)

In addition to income inequality, the World Bank (2018) considers a multidimensional view of poverty that includes a lack of income and insufficient consumption, as well as a lack of access to basic infrastructure, education, healthcare and security (World Bank, 2018d). The World Bank (2018) measures an extreme poverty level as below $1.90 (America Dollars) a day. Statistics South Africa defines poverty in relation to the poverty line at a specific level of consumption and income, thereby classifying any individual or household who earns or consumes below this point as poor and thus living in poverty (Statistics South Africa, 2018).

South Africa is a middle-income country (World Bank, 2018c) with a population of 57.73 million people (Statistics South Africa, 2019). However, the South African economy grew by just 0.8% in 2018, 0.2% in 2019 and registered negative growth of 7% in 2020 (Statistics South Africa, 2021a). The legacy of apartheid coupled with a decade of stagnant economic growth has led the country to be rated the most unequal in the world (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018) with the top 10% of income earners earning two-thirds of the national income. Additionally, despite the focus on poverty alleviation policies, post-1994, inequality has increased, particularly along racial lines (Alvaredo et al., 2018).

Finance can shape the degree to which inequality persists across generations, and the quantum of the gap between the wealthy population and the poor can be shaped by finance. Financial development can be beneficial to the poor to the extent that it reduces the fixed costs associated with accessing financial services (Demirguc-kunt & Levine, 2009). Unemployment has been a key challenge for the South African government post-1994 (World Bank, 2018c), registering a record rate of 32.6% of the working-age population being out of work (Statistics South Africa, 2021c).

Some challenges facing the South African labour market include slow job creation; disparities along gender and racial lines; a weak education system, which translates into a misalignment in terms of skill supply versus labour market skills needs; the effect of spatial inequality's significant contribution on the cost of transportation needed to access labour markets; and the inability to access finance by small enterprises (World Bank, 2018b). These challenges are further exacerbated by the Covid-19 pandemic. All these unemployment-related challenges exacerbate poverty and influence social cohesion and economic growth (Stewart, 2000).

Financial development occurs when there is a concerted effort made to reduce market imperfections by mitigating the effects of transaction costs, asymmetrical information and limited enforcement of contracts through financial instruments, markets and intermediaries (Čihák, Demirgüç-Kunt, Feyen, & Levine, 2012). That is, the efficacy of financial systems would be apparent in the provision of savings, risk management, credit and payment products to several people and thus ensuring financial inclusion (Demirgüç-kunt & Klapper, 2012). This benefit is based on the view that financial systems function to provide five functions: the facilitation of trade, management and diversification of risk; the mobilisation and pooling of savings; the production of information to assist in capital allocation by identifying possible

investment opportunities; the monitoring of investments and corporate governance post the provision of capital; and the easing of the exchange of goods and services (Levine, 2005). Financial system characteristics – namely financial depth, access, efficiency and stability – serve as proxies for financial development (Čihák et al., 2012).

Functioning financial systems influence multiple facets of an economy such as increased demand for labour through directing the allocation of capital; and encouraging the entrants of new firms (Čihák et al., 2012). Various studies have further found that financial systems and institutions support economic development and the alleviation of poverty (Akhter & Liu, 2010; Čihák et al., 2012; Demirgüç-Kunt & Levine, 2008; Donou-adonsou & Sylwester, 2016; Rewilak, 2017). South Africa is considered relatively financially inclusive (National Treasury, 2020), yet the percentage of the population living below the poverty line has increased in the last decade (Statistics South Africa, 2018). Hence, this study sought to understand the effects of financial development on poverty reduction.

1.2. Research Problem and Research Questions

The promotion of an inclusive financial sector will support South Africa in its developmental need to reduce the levels of poverty plaguing the country (National Treasury, 2015). A means of eradicating poverty and inequality is financial development. Extensive research shows that the development of the financial sector (financial institutions and financial markets) leads to financial development. Research also shows that improving the quality of key financial functions leads to an expansion in economic opportunities, and reduces inequality and poverty (Ahmed & Masih, 2017). Financial access is described as the degree to which households and firms can access financial services. A financial system that allocates financial resources such as capital to projects on the basis of the quality and expected returns is well functioning one (Čihák et al., 2012).

Assessing the development of the financial sector is a measure of financial development (World Bank, 2018a). Financial development encompasses the combined improvement of these key financial sector functions such as depth, access, efficiency and stability (Čihák et al., 2012).

This research aimed to investigate the relationship between financial development and the reduction of poverty in South Africa, using the financial depth indicator as a measure of

financial development and household final consumption expenditure per capita growth, income per capita and infant mortality rate as proxies for poverty.

Based on the above, the main research question that this study explores is:

Is there an inverse relationship between financial development and poverty levels in South Africa?

In addition to the primary research question, the study also explored the following related sub-questions:

i. What are the significant short-run and long-run effects of financial development shocks on poverty reduction?
ii. Is there a unidirectional causal relationship between financial development and poverty levels?

1.3. Justification of the Study

This study aimed to examine the relationship between financial development and the reduction of poverty in South Africa. Although there is extensive literature that investigates the financial development-growth nexus, the relationship between financial development and poverty reduction is still relatively limited (Kheir, 2018) and the channels through which financial development can alleviate poverty is an area of ongoing research (Demirgüç-kunt, 2008). This study thus undertook to understand the association between South Africa's high levels of financial development yet significant and persistent poverty levels.

Chapter 2: Literature Review

2.1. Introduction

This section provides an overview of financial development, poverty and the interplay between these two concepts in South Africa. Furthermore, the section reviews the empirical literature on financial development and the reduction of poverty.

2.2. Definition of Terms and Concepts

2.2.1. Financial Development

According to Čihák et al. (2012) and the World Bank (2020), financial development includes financial instruments, intermediaries, and markets when there is a reduction in the costs of acquiring information, in the enforcing of contracts and transaction costs. Financial development thus occurs when there are improvements in financial functions performed by financial intermediaries, instruments and markets (Levine, 2005). These functions include the facilitation of risk management, the provision of information about possible investments and the monitoring thereof, the implementation of corporate governance, facilitation of trading and diversification, the ease of exchanging goods and services as well as the mobilising and pooling of financial resources (Čihák et al., 2012; Demirgüç-kunt & Klapper, 2012; Levine, 2005; Svirydzenka, 2016)

Jeanneney and Kpodar (2011) further define financial development in terms of access to microfinance institutions and traditional banks. Hence the International Monetary Fund (2017) argues that financial inclusion is dependent on the provision of credit facilities to low-income households but also small firms. Financial access has thus been found to be associated with increased competition, and the promotion of income equalisation and improvement in the living standards of the poor (Agnello, Mallick, & Sousa, 2012; Beck, Demirgüç-kunt, & Levine, 2004; Dewi, Majid, Aliasuddin, & Kassim, 2018).

The World Bank (2012) contends that the characteristics of financial institutions and markets can be broken down into four categories:

1. Financial access: The extent to which individuals have access to financial institutions and markets and the degree to which services offered are used.
2. Efficiency: The efficiency of financial institutions and markets in the provision of financial services.
3. Depth: The size of the financial institutions and markets.

4. Stability: The extent to which financial institutions and markets are stable.

Figure 2.1 below outlines the different characteristics of the financial institutions and financial markets. Included in the matrix are the candidate variables that serve as proxies for financial development. The review of the empirical literature shows how the different proxies are used in various studies.

Figure 2. 1: Matrix of financial system characteristics.

	FINANCIAL INSTITUTIONS	FINANCIAL MARKETS
DEPTH	**Private sector credit to GDP** Financial institutions' assets to GDP M2 to GDP Deposits to GDP Gross value-added of the financial sector to GDP	**Stock market capitalization plus outstanding domestic private debt securities to GDP** Private debt securities to GDP Public debt securities to GDP International debt securities to GDP Stock market capitalization to GDP Stocks traded to GDP
ACCESS	**Accounts per thousand adults** (commercial banks) Branches per 100,000 adults (commercial banks) % of people with a bank account % of firms with line of credit (all firms) % of firms with line of credit (small firms)	**Percent of market capitalization outside of top 10 largest companies** Percent of value traded outside of top 10 traded companies Government bond yields (3 month and 10 years) Ratio of domestic to total debt securities Ratio of private to total debt securities (domestic) Ratio of new corporate bond issues to GDP
EFFICIENCY	**Net interest margin** Lending-deposits spread Non-interest income to total income Overhead costs (% of total assets) Profitability (return on assets, return on equity) Boone indicator (or Herfindahl or H-statistics)	**Turnover ratio** (turnover/capitalization) for stock market Price synchronicity (co-movement) Private information trading Price impact Liquidity/transaction costs Quoted bid-ask spread for government bonds Turnover of bonds (private, public) on securities exchange Settlement efficiency
STABILITY	**Z-score** (or distance to default) capital adequacy ratios asset quality ratios liquidity ratios other (net foreign exchange position to capital etc)	**Volatility** (standard deviation / average) of stock price index, sovereign bond index Skewness of the index (stock price, sovereign bond) Vulnerability to earnings manipulation Price/earnings ratio Duration Ratio of short-term to total bonds (domestic, int'l) Correlation with major bond returns (German, US)

Source: Čihák et al. (2012, p. 9)

a) Financial Stability

Financial stability plays a vital role in the broader macroeconomic stability (Čihák et al., 2012). The definition of financial stability is subject to changes over time and is considered as a spectrum rooted in the fundamentals of finance (Schinasi, 2006).

A simplified definition of financial stability is that in terms of outcomes, a financial system would have to be void of disproportionate volatility, stress and crises to be considered

financially stable (Gadanecz & Jayaram, 2009). Sahay et al. (2015) contend that the effect that crises have on financial systems is lessened when financial systems are deep and liquid with a wide range of financial instruments.

These definitions of financial stability used above focus on the absorptions of shocks in the financial system and do not encompass the broader meaning of financial stability. One such definition that attempts to encompass multiple facets of the financial systems is coined by Schinasi (2006) as the financial system's ability "to facilitate and enhance economic processes, manage risks, and absorb shocks" (p. 77). The European Central Bank defines financial stability as requiring financial intermediaries and markets to absorb volatile shocks, efficient facilitation and the allocation of financial resources as well as the assessing, correctly pricing and mitigation of financial risks (European Central Bank, 2005).

Some of the key indicators used to measure financial stability include the assets of the top three banks in relation to the total banking assets, credit to deposit, the bank Z-score, and capital adequacy ratios (Čihák et al., 2012; Guru & Yadav, 2019; Meniago & Asongu, 2018; Svirydzenka, 2016).

b) Financial Access (Inclusion)

Financial access is defined as the degree to which financial systems are open and accessible to individuals (Čihák et al., 2012). Jeanneney and Kpodar (2011) define financial development in terms of access to financial services. Microfinance institutions and traditional banks provide access to these financial services (Jeanneney & Kpodar, 2011). The South African National Treasury's (National Treasury) draft policy paper on financial inclusion defines financial inclusion as access to a wide range of financial services, at an affordable cost, to under-served members of society (National Treasury, 2020). These financial services include but are not limited to savings and credit facilities, payment services, insurance products, as well facilitation of remittance services (Inoue, 2019).

Demirgüç-kunt and Klapper (2012, p. 2) define financial access as "allowing broad access to financial services, without price or nonprice barriers to their use". The authors further add that inclusive financial systems are to the benefit of impoverished and disadvantaged members of society (Demirgüç-kunt & Klapper, 2012).

c) Financial Depth

The concept of financial depth or financial deepening was, traditionally, the basic tenet of financial development (Inoue, 2019). The common measure is that of bank credit in relation to the gross domestic product (GDP). Financial depth measures the size and liquidity of financial institutions and financial markets in a country in relation to the country's economy (Demirgüç-Kunt & Levine, 2008; Levine, 1997).

The most common measure of financial depth is captured by the percentage of the financial system intermediaries' liquid liabilities as a percentage of GDP (Čihák et al., 2012; Guru & Yadav, 2019).

d) Financial Efficiency

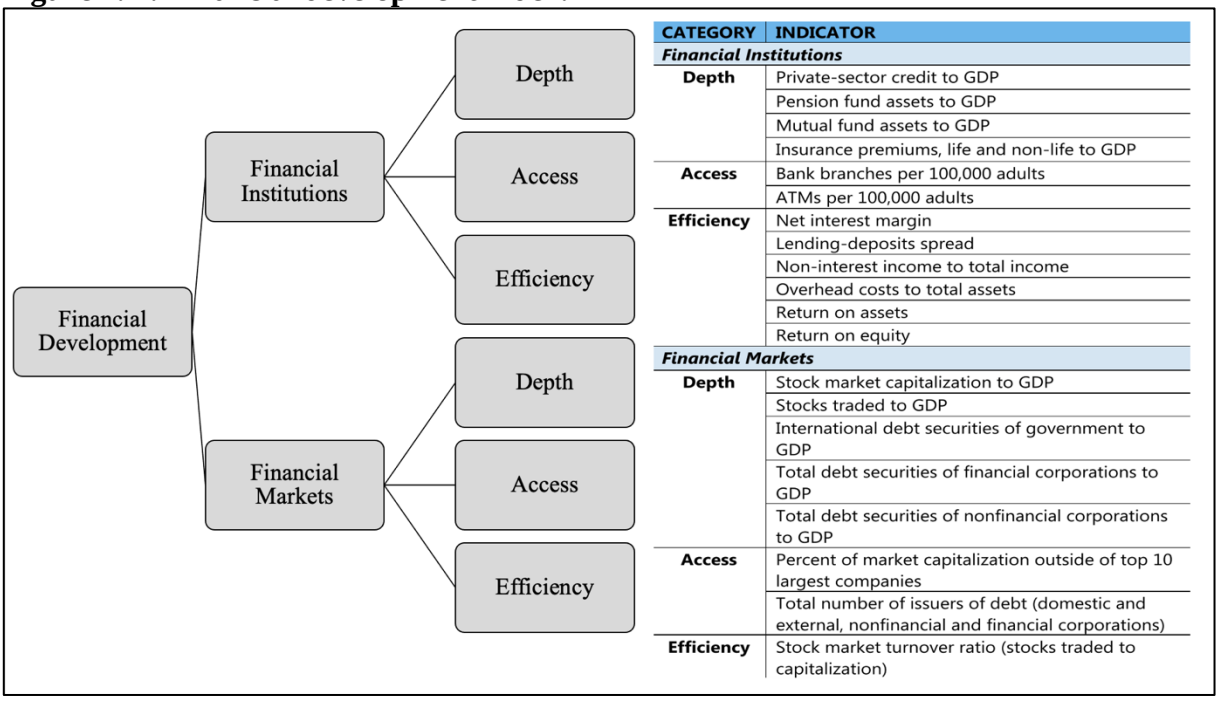
The costs associated with the granting of credit by financial intermediaries and costs such as non-interest income fixed costs and transactions costs are some of the measurements used for financial efficiency (Čihák et al., 2012). Rewilak (2017) defines financial efficiency as the facilitation of financial services at a low cost. Financial efficiency has been linked with economic growth (Jalilian & Kirkpatrick, 2005).

e) Composite Indices

Svirydzenka (2016) introduced a set of nine indicators that encapsulate the development of financial markets and institutions. These indicators, as shown in Figure 2.2 are primarily based on the characteristics of the financial system as outlined in Figure 2.1 above and thus, are multidimensional. The financial development index is split between financial institutions and financial markets. Furthermore, within financial institutions and financial markets, the split is made to cover access, depth and efficiency.

The introduction of a composite set of indices used to measure financial development with respect to financial institutions and financial markets gives the opportunity to use one indicator that encapsulates the overall characteristics of the financial system. Furthermore, the use of a composite set of indices makes it possible to hone in on specific aspects of the financial system or investigate financial development overall (Svirydzenka, 2016). Nguyen (2020) argues that composite indices are especially important in developing nations as they incorporate not only banking-related indicators but cross-cut to include insurance and pensions.

Figure 2. 2: Financial development index.



CATEGORY	INDICATOR
Financial Institutions	
Depth	Private-sector credit to GDP
	Pension fund assets to GDP
	Mutual fund assets to GDP
	Insurance premiums, life and non-life to GDP
Access	Bank branches per 100,000 adults
	ATMs per 100,000 adults
Efficiency	Net interest margin
	Lending-deposits spread
	Non-interest income to total income
	Overhead costs to total assets
	Return on assets
	Return on equity
Financial Markets	
Depth	Stock market capitalization to GDP
	Stocks traded to GDP
	International debt securities of government to GDP
	Total debt securities of financial corporations to GDP
	Total debt securities of nonfinancial corporations to GDP
Access	Percent of market capitalization outside of top 10 largest companies
	Total number of issuers of debt (domestic and external, nonfinancial and financial corporations)
Efficiency	Stock market turnover ratio (stocks traded to capitalization)

Source: Adapted from Svirydzenka (2016)

2.2.2. Poverty

Lang and Lingnau (2015) theorise that it is important to have an in-depth understanding of poverty and how it should be measured. This argument stems from the view that the correct understanding and measurement of poverty can potentially lead to its alleviation (Lang & Lingnau, 2015). Understanding poverty as multi-faceted and complex in nature allows for the appropriate analysis of the concept (Gweshengwe & Hassan, 2020); and one that leads to the effective formulation of policy directed at its [poverty] alleviation (Sherwood & Denty, 2017).

The United Nations (1998), in a statement communicating the commitment to alleviate poverty, defines poverty as the lack of necessities needed to successfully function in society and a lack of opportunities. The statement further recognises the multidimensional nature of poverty and the complexities involved in the attempt to eradicate it (United Nations, 1998). Gweshengwe and Hassan (2020) highlight the important dimensions of poverty; namely, social, political, economic, health, financial, environmental, and seasonal. The financial dimensions of poverty focus on the lack in terms of income, whilst the economic dimension relates the lack of gainful employment and the deprivation of resources required for an acceptable standard of living (Gweshengwe & Hassan, 2020).

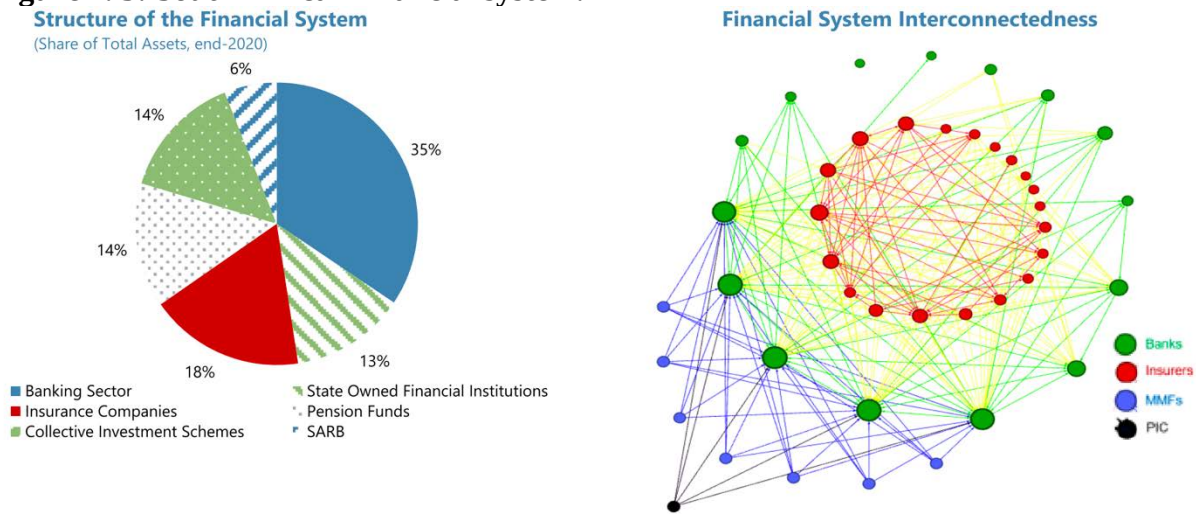
2.3. Overview of Financial Development and Poverty in South Africa

South Africa was already in a weakened position prior to the global pandemic with subdued growth, increasing levels of unemployment and increasing levels of poverty; creating an environment that cannot advance social inclusion (International Monetary Fund, 2020; South African Reserve Bank, 2021). The pandemic exacerbated issues, with real GDP at a negative 6.4% in 2020 (South African Reserve Bank, 2021). The year 2021 saw improved growth of 4.9%, with the finance sector contributing 0.9 percentage points (Statistics South Africa, 2022). The below section provides an overview of financial development and poverty in South Africa.

2.3.1 South African Financial Sector

The South African financial sector is large and sophisticated, with high levels of interconnectedness (International Monetary Fund, 2022a) as demonstrated in Figure 2.3.

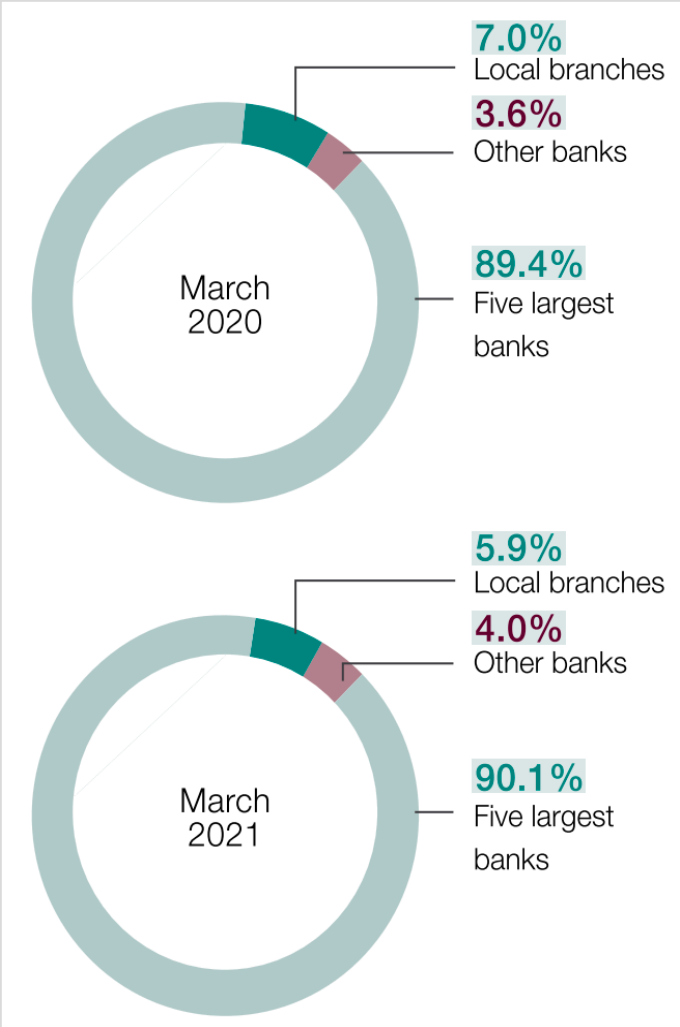
Figure 2. 3: South African financial system.



Source: International Monetary Fund (2022a, p 12)

The banking sector has a total of 31 banks, four mutual banks and 29 institutions in the co-operative sector (Prudential Authority, 2021). The Prudential Authority (2021) reports that five of the largest banks account for 90.1% of the total banking sector assets, with the remainder made up of local branches of foreign banks and other smaller banking entities as shown by Figure 2.4 below. Demirgüç-Kunt and Levine (2008) found that a developed banking sector is conducive to growth and industrial expansion.

Figure 2. 4: South Africa's total banking sector assets.



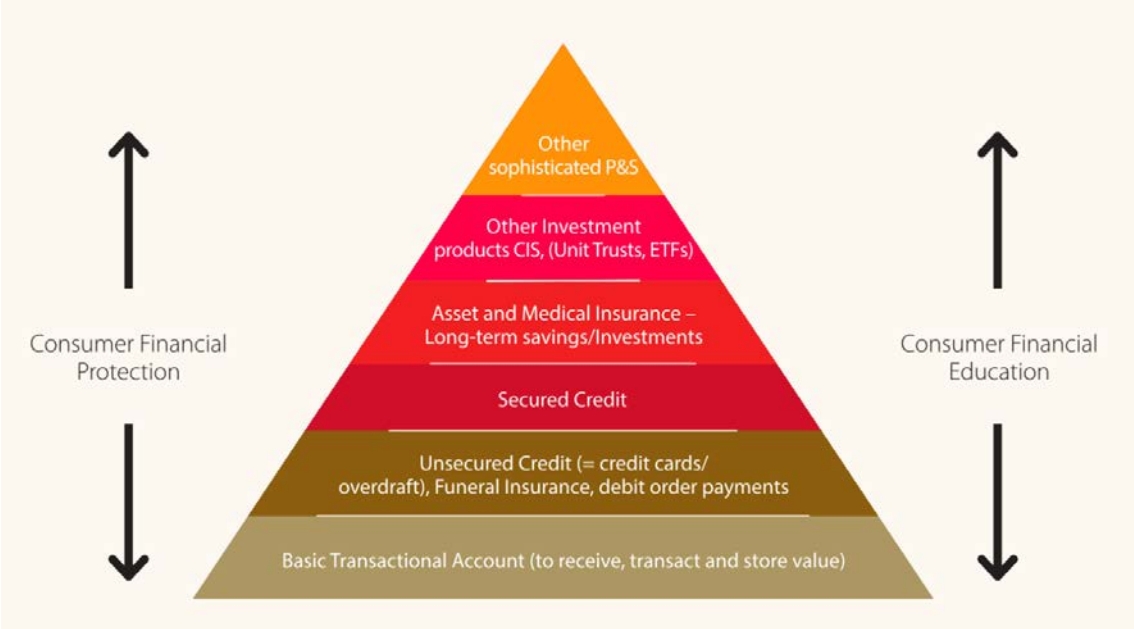
Source: Prudential Authority (2021, p. 27)

The regulations governing the South African financial sector are found to be good and continually improving according the International Monetary Fund (2022b). As a banking sector regulator, one of the Prudential Authority's key areas of focus is the promotion of financial inclusion through the vehicle of member-based financial entities such as mutual banks. Further, the Financial Sector Conduct Authority (2019) has formulated a strategy to promote financial inclusion initiatives such as increased financial education, the supporting of innovative technology and the creation of an enabling regulatory environment.

By market capitalisation, the Johannesburg Stock Exchange (JSE) is the largest in Africa, creating value through a complex and diversified revenue stream. In 2021, the stock exchange had 1108 securities available, with 288 listed companies. The JSE is positioned a facilitator of capital and a financial market provider of products and services (Johannesburg Stock Exchange, 2022).

Financial development in the South African context focuses on financial inclusion of the population. The establishing of a policy framework for financial inclusion is steered by the National Treasury (National Treasury, 2020). The National Treasury defines financial inclusion as the provision of financial services for the vast population, with a particular focus on underserved markets. Financial inclusion is seen by the National Treasury as a tool used to address the historical impact of apartheid and lift the masses out of poverty. The pathways to financial inclusion as envisioned by the National Treasury encompass both components of the financial system characteristics outlined in Figure 2. 5 below such as access to credit, transactional accounts, asset acquisition etcetera.

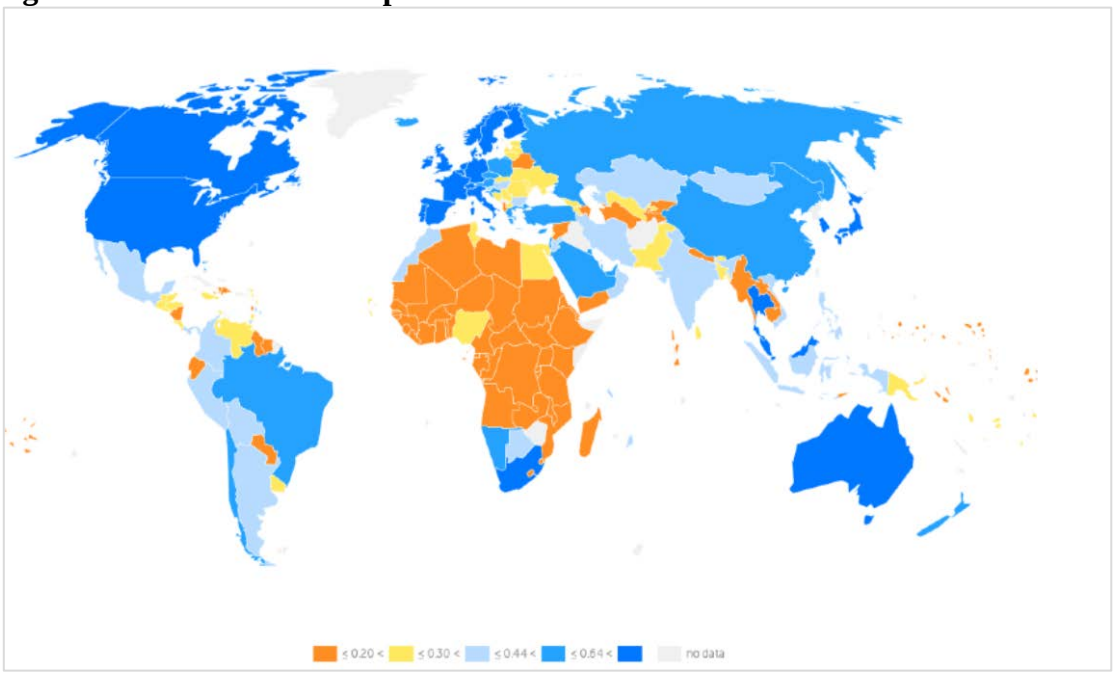
Figure 2. 5: National Treasury financial inclusion pathways.



Source: National Treasury (2020, p. 11)

South Africa's financial development indices reveal a developed country which contends with first-world countries (Figure 2. 5) (World Bank, 2021b). South Africa is especially impressive in terms of financial development when compared to other emerging markets (International Monetary Fund, 2017). The overall financial index for South Africa is 0,64 compared to 0,15 for the African continent.

Figure 2. 6: Financial development index.



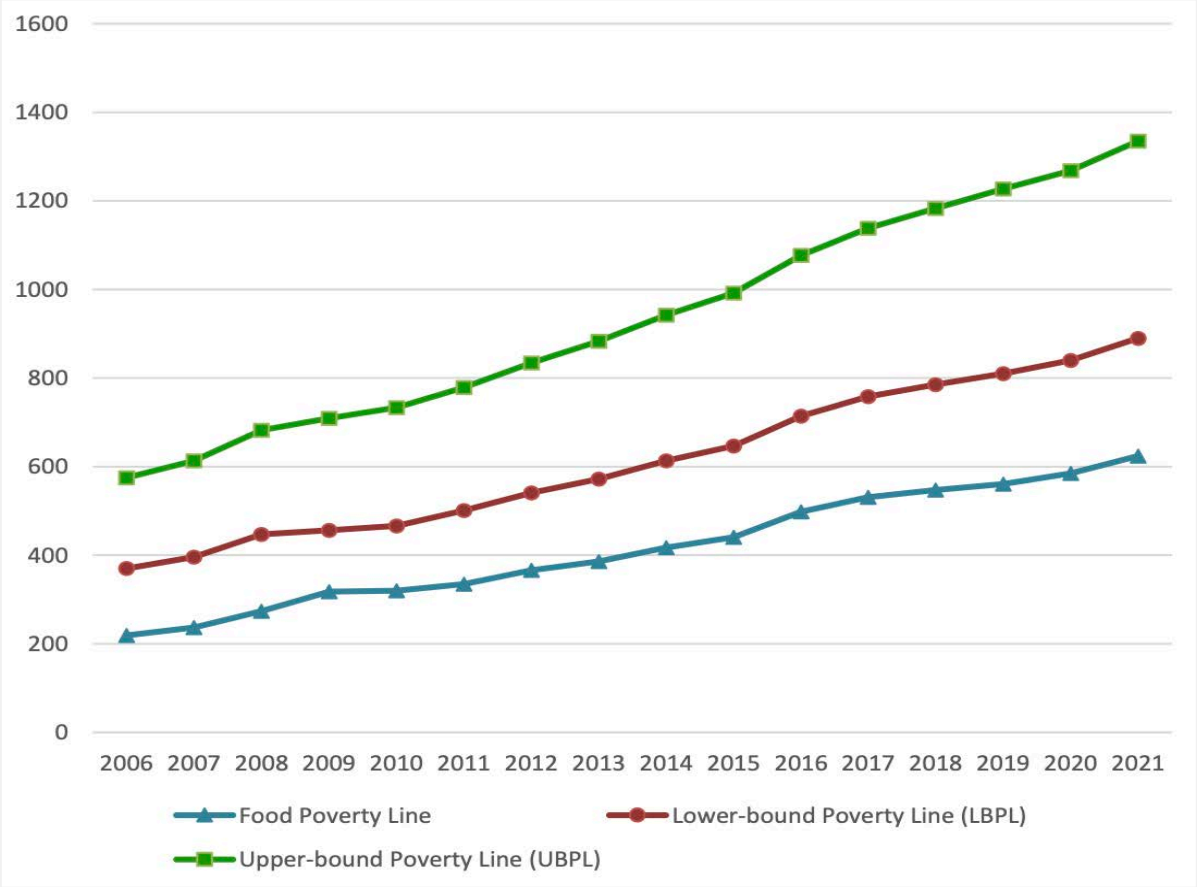
Source: Adapted from World Bank (2021b)

Although South Africa has an advanced financial system and is considered financially developed, the levels of poverty are particularly rife with half of the South African population considered chronically poor (Schotte, Zizzamia, & Leibbrandt, 2018).

2.3.2 Poverty in South Africa

The incidence of poverty in unique to each country highlighted stark differences in each country's prevalence of poverty (Beck, Demirgüç-Kunt, & Levine, 2007). Statistics South Africa defines poverty in terms of poverty lines. These benchmarks are expressed in monetary terms (South African Rand). The construction of the poverty lines – the food poverty line (FPL), the lower-bound poverty line (LBPL) and the upper-bound poverty line (UBPL) – is informed by the cost of basic goods (Statistics South Africa, 2021b), and are mainly used to for targeted policies aimed at the eradication of poverty, amongst other uses. Figure 2.7 below shows the inflation-adjusted poverty lines in South Africa since 2006.

Figure 2. 7: National poverty lines, adjusted for inflation (South African Rands, per person monthly).



Source: Statistics South Africa (2021, p. 5)

Statistics South Africa measures the food poverty line as the minimum required nutritional supplement needed to survive monthly; otherwise known as the extreme poverty line. The lower- and upper-bound poverty include the food-poverty line and non-food items (Statistics South Africa, 2021b).

Although poverty lines are updated annually, the number of people living below the poverty lines, i.e. living in poverty, is captured quinquennially, with the latest figures in South Africa dating back to 2015 (Statistics South Africa, 2018). This is a common occurrence in developing nations (Keho, 2017; Kheir, 2018; Odhiambo, 2009).

2.4. Theoretical Framework: Financial Development and Poverty Reduction

Research on the impact of financial development on poverty reduction is still relatively limited and inconclusive (Akhter & Liu, 2010; Jeanneney & Kpodar, 2011; Zhang & Ben Naceur,

2019). Studies looking at the impact of financial development on economic growth are vast and readily available (Muyambiri & Odhiambo, 2018); whilst the literature looking at the development finance and poverty nexus is scant (Uddin, Shahbaz, Arouri, & Teulon, 2013) and ambiguous (Rashid & Intartaglia, 2017).

The current literature on the effects of financial development on the reduction of poverty can be divided into two strands. One strand reports a positive relationship between financial development and the reduction of poverty (Zhang & Ben Naceur, 2019). A second strand shows that financial development can contribute to the reduction of poverty directly (through the provision of credit and access to financial services) (Schumpeter, 1942) or indirectly (by impacting economic growth) (Sehrawat & Giri, 2016; Seven & Coskun, 2016). A third strand argues, however, that poverty alleviation is primarily dependent on sustained economic growth rather than on financial development because poverty is the result of market failure, particularly high fixed costs associated with the extension of credit (Jalilian & Kirkpatrick, 2002; Stiglitz, 1994).

2.5. Transmission Channels: Financial Development and Poverty (Reduction)

The commonly identified channels through which financial development may impact poverty are through economic growth and changes in the income distribution (Beck et al., 2007). Levine (2005) indicated that financial development occurs when there are improvements in the functioning of the financial system. These functions, as earlier indicated, include the facilitation of trade, management and diversification of risk; the mobilisation and pooling of savings; the production of information to assist in capital allocation by identifying possible investment opportunities; the monitoring of investments and corporate governance post the provision of capital; and the easing of the exchange of goods and services. These functions act as a conduit for economic growth as they have an effect on factors that are determinants of economic growth- accumulation of physical as well as human capital and total factor productivity; which then leads to poverty reduction (Levine, 2005).

Beck et al., (2007) accept that relationship between financial development and economic growth is a causal one. Rashid and Intartaglia (2017) note that financial sector development leads to decreased transaction costs and mitigation against asymmetric information, thereby

leading to the optimal allocation of resources as access to financial services will be enhanced. This increased access to financial services is particularly beneficial to the poor (Levine, 2005).

The current body of knowledge does not give a definitive indication as whether financial development benefits the poor; admittedly, the development of the financial sector is understood to be pro-growth but not necessarily pro-poor (Beck et al., 2004). The role of financial development in the reduction of poverty is also direct through increased access to financial services (Zhuang et al., 2009).

2.6. Empirical Studies of Financial Development and Poverty Reduction

2.6.1. Cross-Country Studies

De Janvry and Sadoulet (2000) examined the determinants of changes in poverty and inequality levels in 12 Latin American countries spanning 1970 to 1994. The results show that income growth reduces poverty in urban and rural areas, but that the growth of income is more effective in reducing poverty at the lower levels of income equality. Jalilian and Kirkpatrick (2002) investigated the poverty-reducing benefits of financial sector development in developing and developed countries. In contrast to De Janvry and Sadoulet (2000), ordinary least squares (OLS) analysis finds no significant evidence that financial sector development reduces poverty, suggesting that the poverty-reducing benefits may be regionally specific. Dollar and Kraay (2002), however, showed that the average income of the poor grows in line with the average income and will thus be poverty-reducing in the long run.

Jalilian and Kirkpatrick (2005) investigated the causal indirect links between financial development and the reduction of poverty in developing countries over the period of 1960 to 1995. Regression analysis shows that financial sector development improves economic growth, which positively impacts the income of the poor. Additionally, the results show that the impact of financial development on income inequality is dependent on the level of development, as financial development has a greater inequality reducing benefit at lower levels of development.

Beck, Demirgüç-Kunt and Levine (2007) assessed whether financial sector development had a positive impact on the poor in 68 developing countries over the period of 1980 to 2005. The results of OLS analysis show that financial intermediary development augments the average income and disproportionately that of the poor and, in turn, reduces poverty levels. Akhter and

Liu (2010), however, found that the poverty-reducing benefit is dependent on the stability of the financial system.

Perez-Moreno (2011) employed a modified Granger causality test in 35 developing nations covering the 1970s and 1980s. Poverty was proxied by the percentage of the population living below a specified poverty line and liquid assets as a percentage of GDP was used as a proxy for financial development. The study found no causal relationship between financial development and the level of poverty (Perez-Moreno, 2011). Contrastingly, Jeanneney and Kpodar (2011) found that financial development, through the provision of transactional accounts and savings opportunities, is beneficial to the poor. Additionally, the availability of credit is found to have little benefit to the poor. The study covered 65 developing countries over the period 1966 to 2000 and employed an OLS regression.

Chemli (2014) examined the relationship between financial development and the alleviation of poverty in 8 Middle East and North African (MENA) countries. Autoregressive distributed lag (ARDL) analysis found significantly that financial sector development is beneficial to the poor, and thus accords with Beck, Demirgüç-Kunt and Levine (2007).

More recently, Dollar, Kleineberg, and Kraay (2016) investigated the effect of financial sector development on poverty reduction in 121 countries over the period 1967 to 2010. The results found that the poverty-reducing benefits of financial sector development are not universally applicable, and are most pronounced in South Asia and Latin America (Dollar, Kleineberg, & Kraay, 2016).

Donou-Adonsou and Sylwester (2016) investigated the extent to which financial sector development reduces poverty in 71 developing countries from 2002 to 2011. The results show that the provision of credit has poverty-reducing effects, particularly bank loans.
Sehrawat and Giri (2016) examined the poverty-reducing effects of financial sector development in 11 developing South Asian economies. Cointegration analysis finds that the existence of a long-run relationship between financial development and the reduction of poverty as hypothesised by Dollar and Kraay (2002).

Seven and Coskun (2016) used dynamic panel generalised-methods-of-moments (GMM) for 45 emerging countries covering the period of 1987 to 2011. They found that although financial

development leads to economic growth, in contrast to many of the prior studies, this channel does not translate into the reduction of poverty.

Boukhatem (2016) assessed the impact of financial development on the reduction of poverty in 67 low and middle-income countries over the period 1986 to 2012. The study used multiple indicators for both poverty and financial development, similar to Seven and Coskun (2016). The results of dynamic panel GMM found that financial development leads to the reduction of poverty regardless of the indicators used for financial development but that the association is negatively affected by financial instability and liquidity constraints. Rewilak (2017) further reported that access to physical financial access and financial depth positively affect poverty reduction but in contrast to Boukhatem (2016), found no significant evidence that financial instability and inefficiency negatively affect poverty reduction.

Rashid and Intartaglia (2017) investigated whether financial sector development leads to the reduction of poverty in 60 developing countries covering the period 1985 to 2008. Two-step system GMM found that financial sector development significantly reduces absolute poverty but that this interaction is dependent on institutional quality and GDP growth. Inoue (2018) studied the impact of domestic financial sector development and international remittance on poverty reduction in 120 developing countries over the period 1980 to 2013. The results of the dynamic GMM estimator showed that in developing nations, remittances have a greater effect on the alleviation of poverty than financial sector development.

Thus, in summary, the cross-country studies show that there is no consensus of whether financial development positively contributes to the reduction of poverty. Furthermore, a number of the studies show that the relationship between financial development and poverty is dependent on factors such as the stability of the financial system, liquidity levels, the proxies used for financial development and poverty reduction, and varies regionally.

2.6.2. Cross-Country Studies of Africa

Aremo and Ayoola (2016) examined the relationship between financial development, economic growth and levels of poverty in 12 low-income SSA countries over the period from 1980 to 2012 using panel vector autoregression analysis. The study found that financial sector development leads to a reduction in economic growth, and this then translates into increased

levels of poverty. Hence, Aremo and Ayoola (2016) suggest that economic growth is an unreliable conduit for financial development and poverty reduction.

Using the ARDL technique, Keho (2017) investigated the relationship between financial sector development, economic growth and poverty reduction in nine African countries covering the period 1970 to 2013. The results of ARDL analysis show that economic growth and financial sector development have a positive effect on the reduction of poverty in Benin, Cameroon, Cote d'Ivoire, Gabon and South Africa whereas poverty reduction has a positive effect on economic growth in Ghana, Nigeria and Senegal.

Bolarinwa, Adegboye, and Vo (2021) examined whether there is a threshold of financial development that must be reached before poverty levels on the African continent are reduced. Using a dynamic panel threshold model for 40 African countries with data spanning from 1996 to 2015, the results evidenced a threshold where levels of financial development reduce poverty.

Nsiah, Yusif, Tweneboah, Agyei, and Baidoo (2021) similarly investigated whether there is a threshold effect of financial inclusion on poverty. GMM analysis covering the period 2010 to 2017 found that, in accordance with Bolarinwa et al. (2021), there is a threshold value above which financial inclusion is found to lead to higher consumption expenditure and reduced poverty.

Thus, in summary, the cross-country African studies show that similar to the cross-country studies, there is no consensus as to whether financial development leads to poverty reduction in SSA. However, empirical studies report that there is a threshold where financial development contributes to the reduction of poverty.

2.6.3. Developing Country-Specific Studies

With regards to studies devoted to Asia, Uddin, Kyophilavong, and Sydee (2012) investigated the causal relationship between financial sector development and poverty reduction in Bangladesh from 1976 to 2010. ARDL analysis found that there is a long-term equilibrium relationship between banking sector development and the reduction of poverty. In contrast, Uddin, Shahbaz, Arouri, and Teulon (2013) found that the reduction in poverty leads to financial sector development, and that economic growth and financial development do not

contribute to the reduction of poverty in Bangladesh. Azra, Khan, Ahmad, and Jan (2012) examined the association in Pakistan over the period 1981 to 2010 and reported that there is significant evidence that financial depth and domestic credit to private sector leads to poverty reduction.

The association between financial development and the reduction in poverty in Indonesia was explored by Dewi, Majid, Aliasuddin, and Kassim (2018). The results of ARDL analysis found that the presence of a long run relationship between financial development, economic growth and poverty reduction.

Erlando, Riyanto, and Masakazu (2020) analysed the effect of financial sector development on economic growth, poverty alleviation, and income inequality in 12 provinces in Eastern Indonesia over the period of 2010 to 2016. In common with Dewi et al. (2018), the study found that financial sector development and inclusion lead to lower levels of poverty.

Ho and Odhiambo (2011) investigated the casual relationship between the reduction of poverty in China and financial sector development. The study covered the period from 1978 to 2008. The Granger causality tests showed that bidirectional causality exists between financial sector development and poverty reduction in the short run but there is evidence of a unidirectional association from poverty reduction to financial sector development in the long run.

Li (2018) investigated whether financial inclusion leads to wealth accumulation or drives poor households into a dept trap, thus increasing poverty in China. The results found that relatively lower income households are more likely to apply for credit, and that the households that do apply for credit spend a significantly higher amount on education and training than households that do not apply. The results thus suggest that accessing credit will leads to poverty reduction in China.

Inoue (2019) investigated the effects of financial sector development on poverty in India from 1973 to 2004. The GMM analysis found that financial access and financial depth are complementary in the process of poverty reduction.

Churchill and Marisetty (2020) studied the effects of financial inclusion on poverty in India from September 2016 to January 2017. Consistent with findings of Inoue (2019), the results showed that financial inclusion has a positive effect on the reduction of poverty in India.

In the case of North Africa, Kheir (2018) investigated the impact of financial development on poverty reduction in Egypt covering the period from 1980 to 2015. ARDL analysis showed the relationship between financial development and poverty is bidirectional.

With regards to Africa, Dauda and Makinde (2014) investigated the relationship between financial sector development and poverty reduction in Nigeria for the period 1980 to 2010. Vector autoregressive analysis found that the relationship between financial depth and poverty is significant and negative, thus indicating that the provision of credit to the private sector has failed to reduce poverty levels in Nigeria.

Saidu and Marafa (2020) examined the effects of financial service and credit provision in poverty reduction in Nigeria over the period of 1980 to 2018. ARDL analysis found that the improvement in financial services is more likely to benefit the poor than the provision of credit facilities, which accords with Dauda and Makinde (2014). In addition, Saudi and Marafa (2020) reported that in the long run there is no significant association between credit growth and the reduction of in poverty, and that financial instability arising from credit booms disproportionately disadvantages the poor.

Quartey (2005) investigated the associations in Ghana over the period 1970 to 2011 using causality analysis. The results show that the association between financial sector development and poverty reduction is insignificant. Odhiambo (2009) investigated the relationship between financial sector development, economic growth and poverty reduction in South Africa, covering the period from 1960 to 2006. The study employed a trivariate Granger causality test. The results showed that financial sector development Granger-causes poverty reduction. Odhiambo (2010a) examined the associations in Zambia over the period 1969 to 2006. The ARDL analysis showed the result is dependent on the proxy used for financial sector development. Financial development, as proxied by domestic credit to the private sector and domestic money bank assets, leads to reduction in poverty; whereas the reverse is the case when broad money supply is used as a measure of financial development (Odhiambo, 2010a). Odhiambo (2010b) employed a trivariate causality model to study the associations in Kenya

over the period 1968 to 2006. The results indicated that there is bidirectional causality between poverty reduction and savings.

Thus, in summary, the country-specific studies show that in general, financial development has a poverty reducing benefit for most emerging countries, including South Africa.

2.7. Summary

This review of the cross-country and country-specific literature finds that although the cross-country studies have found little consensus that financial development positively contributes to the reduction of poverty, the country-specific studies show that in general, financial development has a poverty reducing benefit for most emerging countries including South Africa. The variations between the results of the cross-country studies versus the country-specific studies are shown to arise from the varied stability of the financial system and liquidity levels; the proxies used for financial development and poverty reduction; and geographic variations.

Table 2.1 below summarises the empirical literature.

Table 2. 1: Summary of empirical literature.

Authors	Study	i. Countries ii. Period	Financial Development Indicator(S)	Poverty Indicator(S)	Findings
Jaliliani & Kirkpatrick (2002)	Examining the effects of financial development on poverty reduction in low-income countries.	i. 26 countries ii. 1960 – 1995	• Bank deposit money assets over GDP • Net foreign assets over GDP	• Growth of GDP • Change in Gini Coefficient • Change in inflation • Change in government general expenditure	Financial development is found to have a positive effect on the reduction of poverty.
Jaliliani & Kirkpatrick (2005)	Investigating the association between financial sector development and the reduction in poverty in developing countries.	i. 42 countries ii. 1960 – 1995	• Private credit to GDP	• Income growth of the poor	Financial sector development is found to improve growth prospects and this is more pronounced a lower levels of income.
Honohan (2004)	The links between financial development, growth and poverty.	i. 70 countries ii. 1961 – 2002	• Private credit to GDP	• Headcount poverty	Financial development, as measured by financial depth, is negatively correlated to headcount poverty.
Beck, Demirgüç-Kunt, & Levine (2007)	Examining the impact of financial development of poverty reduction through growth enhancing effect.	i. 68 countries ii. 1980 – 2005	• Private credit to GDP	• Headcount poverty ratio growth	Financial development affects the average growth of income.
Jeanneney & Kpodar (2011)	Investigating how financial development assists in the reduction of poverty.	i. 65 countries ii. 1966 – 2000	• Liquid liabilities to GDP • Private credit as a share of GDP	• Average per capita income of the poorest 20% of the population	Financial development benefits the poor, with strong direct effects as opposed to through economic growth.
Rashid & Intartaglia (2017)	Analysing whether financial development leads to poverty reduction.	i. 60 countries ii. 1985 – 2008	• Liquid liabilities to GDP • Private credit as a share of GDP • Commercial bank asset ratio • Stock market capitalisation to GDP • Turnover ratio	• Headcount poverty • Poverty index • Income share of the lowest 20% quintile	Financial development leads to a reduction in poverty. The financial development-poverty nexus results are dependent on the proxies used.

Authors	Study	i. Countries ii. Period	Financial Development Indicator(S)	Poverty Indicator(S)	Findings
Seven & Coskun (2016)	Examining whether financial development results in the reduction of income inequality and poverty in emerging countries.	i. 45 (banking sector), 38 (stock markets analysis) ii. 1987 – 2011	• Liquid liabilities to GDP • Private credit as a share of GDP • Bank deposits to GDP • Stock market capitalization to GDP • Turnover ratio	• Average income share of the lowest 20% quintile • Headcount poverty	Financial development is found not to be beneficial to low-income populace. Development in the banking sector is shown to increase income inequality in the emerging countries.
Boukhatem (2016)	Assessing the impact of financial development on the reduction of poverty.	i. 67 low and middle-income countries ii. 1986 – 2012	• Private credit by deposit money banks to GDP • Liquid liabilities as a percentage of GDP • Banks concentration	• Income of the poorest quintile • Poverty gap	Financial development leads to the reduction of poverty.
Bolarinwa, Adegboye & Vo (2021)	Investigating whether there exists a threshold between financial development and poverty in African countries.	i. 40 African countries ii. 1996 – 2015	• Private credit to GDP • Boone indicator • Z-score • Account ownership • Financial development index	• Poverty headcount index at $1.90 • Poverty gap at $1.90 • Poorest quintile	A threshold exists where levels of financial development addresses poverty.
Sehrawat & Giri (2016)	An examination of how financial development contributes to poverty reduction.	i. 11 South Asian countries ii. 1990 – 2012	• Domestic credit to private sector as a % of GDP • Liquid liabilities as a percentage of GDP	• Per capita consumption	A long-run association between financial development and poverty reduction exists and a strong and positive relationship between financial development, trade openness, inflation and poverty reduction.
De Janvry & Sadoulet (2000)	An analysis of the determinants of poverty in both rural and urban areas.	i. 12 Latin American countries ii. 1970 -1994	• Average income growth	• Headcount poverty growth • Growth rate of Gini coefficient	The study shows that aggregate growth in income has positive effect on the reduction of poverty in both urban and rural areas.
Akhter & Liu (2010)	Investigating the relationship between financial development and poverty.	i. 54 developing countries ii. 1993 – 2004	• Credit-GDP ratio • Liquid liabilities as a percentage of GDP	• Head count index (the percentage of the population living under a dollar a day)	Financial development contributes to the reduction of poverty and financial development is especially effective in assisting the poor in countries that are financially stable. Furthermore, the results show political instability and corruption have a detrimental effect on the poor.

Authors	Study	i. Countries ii. Period	Financial Development Indicator(S)	Poverty Indicator(S)	Findings
Donou-Adonsou & Sylwester (2016)	The extent to which microfinance institutions and banks can reduce poverty.	i. 71 developing countries ii. 2002 – 2011	• Credit to GDP	• Headcount poverty • Poverty gap	When the poverty gap and headcount ratios are used as proxies for poverty, banks are shown to reduce poverty. Microfinance institutions have no impact on poverty.
Kheir (2018)	Investigating the impact of financial development on poverty reduction.	i. Egypt ii. 1980 – 2015	• Domestic credit to GDP • Liquid liabilities as a percentage of GDP	• Household final consumption expenditure per capita growth	In the long run, financial development and poverty are complementary as bidirectional and in the short run, the bidirectional causality between financial development and poverty reduction.
Quartey, P. (2005)	Investigating the relationship between financial sector development and the reduction of poverty in Ghana.	i. Ghana ii. 1970 – 2001	• Private credit to GDP • Broad money stock to nominal GDP	• Per capita income	Financial sector development Granger-causes poverty reduction.
Odhiambo, N. (2010)	Investigating the relationship between financial development and the reduction of poverty in Kenya.	i. Kenya ii. 1968 – 2006	• Broad money stock to nominal GDP	• Per capita consumption	Causal flow from financial development to poverty reduction.
Odhiambo, N. (2009)	An investigation of the relationship between financial development, economic growth and poverty reduction in South Africa.	i. South Africa ii. 1960 – 2006	• Broad money stock to nominal GDP	• Per capita consumption	Economic development and financial development Granger-causes poverty reduction.
Odhiambo, N. (2010)	Investigating the relationship between financial development and the reduction of poverty in Zambia.	i. Zambia ii. 1969 – 2006	• Broad money stock to nominal GDP • Domestic credit to the private sector	• Per capita consumption	Financial development leads to poverty reduction when domestic money bank assets and domestic credit to the private sector are used as measures for financial development. When broad money supply is used as a proxy, the study finds that poverty reduction is shown to cause the development of the financial sector.
Uddin, Shahbaz, Arouri, and Teulon (2013)	Investigating the relationship between financial development, economic growth and poverty reduction.	i. Bangladesh ii. 1975 – 2011	• Natural log of financial deepening	• Private household consumption per capita	Economic growth and financial development do not lead or contribute to the reduction of poverty in Bangladesh.

Authors	Study	i. ii. Countries Period	Financial Development Indicator(S)	Poverty Indicator(S)	Findings
Uddin, Kyophilavong & Sydee (2012)	Investigating the relationship between economic growth, financial development and poverty reduction in Bangladesh.	i. Bangladesh ii. 1976 – 2010	• Domestic credit to the private sector	• Per capita consumption	The study found that there is a long-run association between banking sector development and the reduction of poverty.
Saidu and Marafa (2020)	Investigating the effects of financial services and credit provision on the reduction of poverty.	i. Nigeria ii. 1980 – 2018	• Private sector credit to GDP • Broad money stock to nominal GDP	• Per capita income	The study found that in the long run no relationship exists between credit growth and the reduction of in poverty.
Aremo and Ayoola (2016)	Examining the relationship between financial development, economic growth and levels of poverty.	i. 12 low-income Sub-Saharan countries ii. 1980 – 2018	• Broad money stock to nominal GDP	• Per capita consumption	The study found that increases in financial development leads to a reduction in economic growth and this translate into increased levels of poverty.
Keho (2017)	Investigating the relationship between financial development, economic growth and poverty reduction in nine African countries.	i. 9 African countries ii. 1970 – 2013	• Private sector credit as a share of GDP	• Final consumption per capita	Mixed results
Inoue (2018)	An analysis of the impact of financial development and remittances on the reduction of poverty.	i. 120 developing countries ii. 1980 – 2013	• Domestic credit to GDP	• Poverty headcount ratio	Financial development and remittances lead to the reduction of poverty.
Azra, Khan, Ahmad, & Jan (2012)	An analysis of the impact of financial development and remittances on the reduction of poverty in Pakistan.	i. Pakistan ii. 1980 – 2010	• Broad money stock to nominal GDP • Domestic money bank assets • Domestic credit to private sector	• Private per capita consumption	Long-run relationship exists between financial depth – as measured as broad money stock to nominal GDP and domestic credit to private sector- and poverty reduction.
Chemli (2014)	An examination of the financial development and poverty reduction relationship.	i. Middle East and North Africa ii. 1990 – 2012	• Domestic credit to private sector as a % of GDP • Liquid liabilities as a percentage of GDP	• Household final consumption expenditure per capita	Financial development benefits the poor.

Authors	Study	i. Countries ii. Period	Financial Development Indicator(S)	Poverty Indicator(S)	Findings
Dauda and Makinde (2014)	Investigating the relationship between financial development and the reduction of poverty in Nigeria.	i. Nigeria ii. 1980 – 2010	• Broad money stock to nominal GDP	• Poverty headcount ratio	The relationship between financial depth and poverty in Nigeria is negative and significant.
Erlando, Riyanto, & **Masakazu (2020)**	Analysing the effect of financial development to economic growth, the alleviation of poverty and income inequality.	i. Eastern Indonesia ii. 2010 – 2016	• Number of banking offices divided by the adult population • Number of deposit accounts in the bank divided by the adult population • Proportion of credit and deposits towards GRDP	• Poverty level (percentage)	The higher the financial development, the lower the levels of poverty.
Inoue (2019)	Investigating the effects of financial development on poverty reduction.	i. Eastern Indonesia ii. 2010 – 2016	• Credit to GDP	• Poverty line	Financial access and financial depth are complementary in the process of poverty reduction in India.
Dewi, Majid, Aliasuddin & Kassim (2018)	Investigating the association between financial sector development and poverty reduction.	iii. Indonesia over the period of iv. 1980- 2015	• Money supply • Domestic credit to the private sector to GDP ration	• Per capita household consumption expenditure	The study finds that there is a long run relationship between economic growth, financial development and poverty reduction.
Churchill & Marisetty (2020)	Examining the effects of financial inclusion on poverty reduction in India.	i. India: 45,000 households ii. 2016 – 2017	• Access to credit • Access to insurance • Access to insurance	• Poverty probability index • Poverty line • Deprivation score	Financial inclusion contributes to the reduction of poverty.
Nsiah, Yusif, Tweneboah, Agyei & Baidoo (2021)	Investigating threshold of financial inclusion on poverty using GMM in SSA.	i. 15 SSA countries ii. 2010 – 2027	• Automated teller per 10,000 adults • Domestic credit to GDP ratio • Depositors of commercial banks per 1,000 adults	• Household consumption expenditure	The study found the threshold value for financial inclusion index is 0.356, at this value financial inclusion is shown to lead to increases in consumption expenditure and thus reduction in poverty

Chapter 3: Methodology

3.1. Introduction

This chapter outlines the research design and methodology for the purposes of analysis and to answer the questions posed by this research paper.

3.2. Research Philosophy

A foundational aspect of research is the philosophy underlying the research undertaking. There are four philosophical underpinnings of research in literature: post-positivism, constructivism, transformative and pragmatism (Creswell & Creswell, 2018). Post-positivism is described by Cresswell and Cresswell (2018, p. 44) as a philosophy "which causes (probably) determine effects or outcomes" and is essentially an empirical means of determining the results. This philosophy combines deductive logic with empirical research (Antwi Kwadwo & Hamza, 2015). This philosophical perspective recognises the gradual and probabilistic nature of understanding a subject matter. The philosophical paradigms that this research was based on was a postpositivist worldview, as it seeks to answer research questions posed in the first chapter of whether financial development leads to the reduction of poverty in South Africa.

3.3. Research Approach

Research approach is grouped into three main types, namely: inductive, deductive, and abductive. The approach employed in a research study is determined by the reasoning adopted by the researcher (Saunders, Lewis, & Thrornhill, 2016). Inductive reasoning is used when there is limited information about the subject, where the researcher does not begin with predetermined theories and thus requires an exploration of data and development of theories (Saunders et al., 2016). Ultimately, the inductive approach draws conclusions about the greater population from a sample size (Leedy & Ormond, 2016).

Conversely, deductive reasoning makes use of existing research to identify and test the validity of theories/hypotheses. This approach starts with a theory and either builds on the existing theory or tests it (Saunders et al., 2016).

The abductive approach is a combination of the inductive and deductive approaches where the researcher moves between data to theory and theory to data. This approach begins with observations that are incomplete and attempts to build a plausible theory (Leedy & Ormond, 2016; Saunders et al., 2016). This study explored whether a relationship exists between a set of variables (financial development and poverty reduction) and thus used an empirical deductive approach.

3.4. Research Design

Leedy and Ormond (2016) define research design as the framework that outlines the procedures, data collection and analysis undertaken by the researcher with the aim of answering the research question. Research design is defined by Creswell and Creswell (2018) as an inquiry that employs either quantitative, qualitative, or mixed methods approaches to determine the specific processes in the study. Essentially, research design should outline the specific details regarding how the method employed in the study is applied to answer the research question.

3.4.1. Data Source and Research Period

This study used secondary data from the Global Financial Development Database (GFDD) of The World Bank for South Africa. The study covered the period 1980-2019. The data is recorded on an annual basis and the chosen period is limited by data availability.

3.4.2. Regression

The regression models is formulated to predict the value of the dependent variable from the independent variables. The regression equations for the three models are outlined below.

$$\text{HFCE}_t = \mu_1 + \beta_1 FID_t + \beta_2 GDP_t + \beta_3 MONEY_t + \varepsilon_t \quad (1)$$

$$\text{IPC}_t = \mu_1 + \beta_1 FID_t + \beta_2 GDP_t + \beta_3 MONEY_t + \varepsilon_t \quad (2)$$

$$\text{IMR}_t = \mu_1 + \beta_1 FID_t + \beta_2 GDP_t + \beta_3 MONEY_t + \varepsilon_t \quad (3)$$

3.4.3. Measurement and Variable Description

3.4.3.1. Dependent Variable: Poverty

Poverty time series data is not readily available in developing countries and in certain cases the data cannot form a time series (Keho, 2017; Kheir, 2018; Odhiambo, 2009). South African poverty data is available on a quinquennial basis, with the last comprehensive report on poverty (the Living Conditions Survey) conducted in 2015.

It is important to highlight the multidimensional nature of poverty in indices (Knight, 2017). A number of proxies for poverty have been introduced in literature, ranging from single-dimensional measures to multidimensional indices (Meyer & Sullivan, 2012). In line with studies conducted on African countries,[1] where proxies that speak to the multidimensional nature of poverty were chosen, this study used household final consumption expenditure, income per capita growth and infant mortality rate to measure poverty.

a) Household final consumption expenditure

The utilisation of resources, goods and services, is defined as consumption. The accumulation these resources ranges from purchases made, household production or through an outside source such as relatives or the state (World Bank, 2017a). Household final consumption expenditure has been found to be a more reliable measure of poverty in comparison to income (Kheir, 2018; Odhiambo, 2009; Quartey, 2005). The household financial consumption expenditure describes the household's welfare and all the related factors that affect it (World Bank, 2017b). The annual growth is calculated using 2010 constant prices, whilst all the cost of all goods and services purchased by households are based on their market value, including durable products (such as cars, washing machines, and home computers). This measure has also been used in a number of studies – Chemli (2014), Dewi et al. (2018), Kheir (2018), Nsiah et al. (2021), Uddin et al. (2013) – as a proxy for poverty.

b) Income per capita growth

Income per capita is defined by the World Bank (2021b) as the national income divided by the country's population (as estimated by the World Bank) less the "consumption of fixed capital

[1] Keho (2017), Kheir (2018), Magombeyi and Odhiambo (2018), Odhiambo (2009, 2010b), Quartey (2005), Sehrawat and Giri (2016).

and natural resources depletion". Monetary poverty is one of the indicators in the Multidimensional Poverty Indicator (MPI) according to the World Bank. This measure of poverty has been used in other studies (De Janvry & Sadoulet, 2000; Jalilian & Kirkpatrick, 2002; Rashid & Intartaglia, 2017; Saidu & Marafa, 2020; Seven & Coskun, 2016).

c) Infant mortality rate

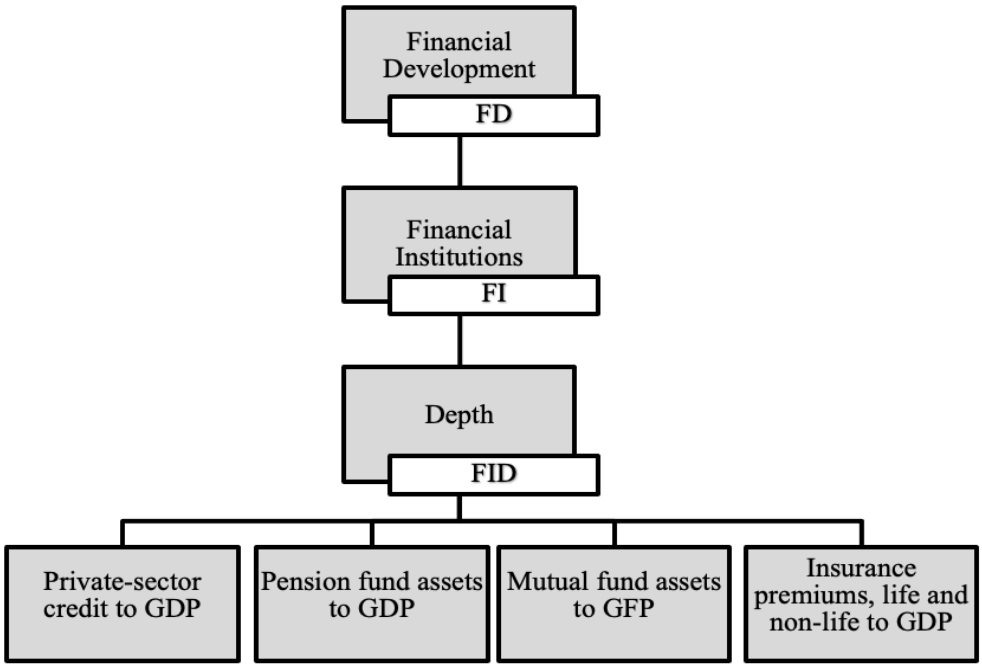
Infant mortality rate gives the yearly number of infants dying per 1,000 births before reaching the age of one. This indicator covers the health aspect of the MPI, as absolute poverty is also characterised by a high rate of infant mortality (World Bank, 2017a). Beck, Demirgüç-kunt, & Levine, (2004) found that better financial development led to social improvements, with increased reductions in the infant mortality rate. The assumption of using this proxy is that impoverished communities will most likely spend on reducing the risk of infant mortality should there be an improvement in their lot (Beck, Demirgüç-Kunt, & Levine, 2004). This study made use of infant mortality rate as proxy for poverty as in Magombeyi and Odhiambo, (2018).

3.4.3.2. Independent Variable of Interest

a) **Financial institution depth indicator**

The IMF introduced a set of composite indices which are used as a measure of financial development with respect to financial institutions and financial markets (Svirydzenka, 2016). The index covers the period from 1980 to 2019 and uses data from multiple sources. The use of composite indices is especially important with the evolution of the financial sector over time and as other types of financial institutions increasingly contribute to the market (Sahay et al., 2015).

Figure 3. 1: Adapted financial institution depth indicator.



Source: Adapted from Svirydzenka (2016)

Several studies have used financial depth as a proxy for financial development (Bolarinwa, Adegboye, & Vo, 2021; Donou-adonsou & Sylwester, 2016; Inoue, 2019; Jalilian & Kirkpatrick, 2005; Kheir, 2018; Odhiambo, 2010b; Sehrawat & Giri, 2016; Seven & Coskun, 2016), particularly in studies where the proxies for financial development and poverty reduction are studied. Hence, in accordance with the relevant literature, this study made use of the financial institution depth indicator (*FID*). The use of this composite indicator, which aggregates the multiple individual measures for financial depth, cements the view that composite indicators are becoming increasingly important as they are more reflective of a diverse financial system (Sahay et al., 2015).

As depicted in Figure 3.1, the FID indicator is constituted by four sub-indexes, namely: the traditionally used private sector credit to GDP, insurance premiums (life and non-life to GDP), mutual fund assets to GDP, and pension fund assets to GDP (Svirydzenka, 2016). The expectation is that financial depth, as proxied by FID, leads to poverty reduction. Seminal research has shown that the provision of credit and the accessing of financial services has been shown to be impactful in reducing poverty (Schumpeter, 1942).

3.4.3.3. Control Factors

This study included the following standard control variables as used in literature: GDP growth and money supply growth. These macroeconomic variables have been found to exert direct and indirect influences on financial development and poverty (Amjad & Kemal, 1997; Sehrawat & Giri, 2016; Seven & Coskun, 2016). Below is a brief description of the control variables.

i. GDP growth

GDP growth represents the percentage growth in GDP. The economic growth (GDP growth) and poverty nexus is found to have a positive relationship, for the most part, in literature. Jalilian and Kirkpatrick (2002) found that economic growth positively influences the lower income levels through the development of the financial sector. Erlando et al. (2020) and Saidu and Marafa (2020) reached the same conclusion as Jalilian and Kirkpatrick (2002) whose study found that GDP growth leads to higher consumption expenditure. Furthermore, Saidu and Marafa (2020), highlight GDP growth as an important channel in the reduction of povety, which is used as a control varibale in the study. Honohan (2004) found that financial development has led to poverty redution, suggesting that a direct relationship exists, independent of GDP Growth.

ii. Money

Broad money supply refers to the sum of money (currency) outside of banks, and consists of savings, demand deposits outside of the central bank and other securities (World Bank, 2021b). According to the Keynesian theory, money supply impacts economic activities and credit facilities (Keynes, 1936); increases in the supply of money lead to declines in interest rates and increased income through improvements in employment opportunities bring about increased investment opportunities (Nsiah et al., 2021).

Table 3. 1 below provides a high-level summary of the control variables.

Table 3. 1: Definitions and sources of control variables.

Variables	Description	Sources
GDP	GDP growth represents the percentage growth in GDP.	World Development Indicators (2021)
Money	Broad money supply refers to the sum of money (currency) outside of banks. It consists of	

	savings, demand deposits outside of the central bank and other securities.	

Source: Adapted from Boukhatem (2016)

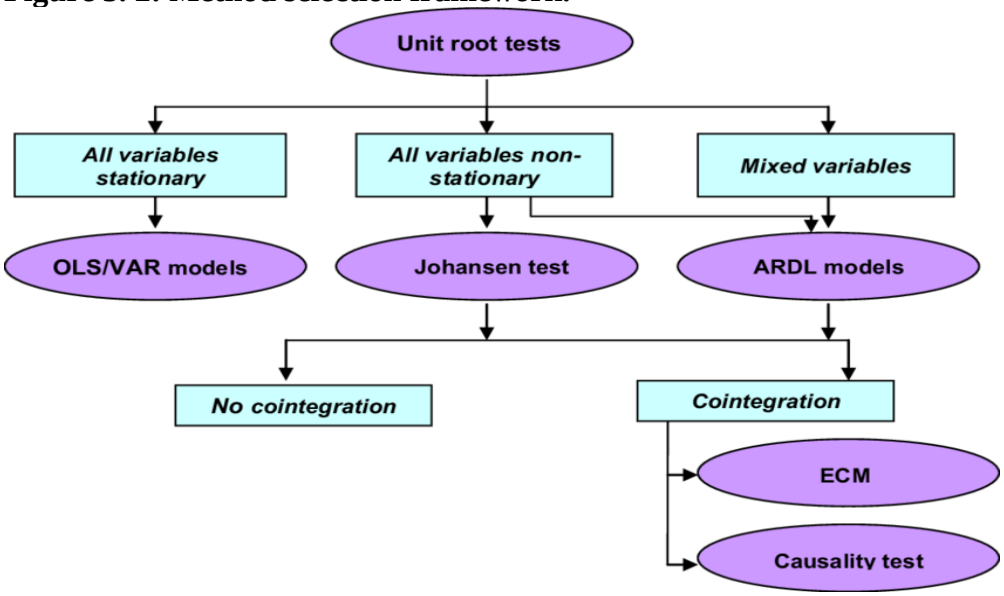
3.4.4. Estimation Approach

The estimation approach in this study made use of the Vector Error Correction Model (Johansen, 1988) to examine the effects that financial development has on poverty in South Africa using the following eight steps:

i. Unit root tests
ii. Cointegration tests
iii. Model formulation
iv. Optimal lag identification
v. Diagnostic tests
vi. Impulse response analysis
vii. Variance decomposition analysis
viii. Granger causality analysis

The VECM estimation approach allows for the short-run and the long-run relationships to be jointly obtained (Brooks, 2019). The basic framework for estimation approach selection is as outlined in the figure 3.2 below (Shrestha & Bhatta, 2018).

Figure 3. 2: Method selection framework.



Source: Shrestha & Bhatta (2018)

i. Unit root testing

To assess the data properties of the data and to verify the stationarity of the variables, unit root tests were conducted. A stationary time series is one where the statistical properties such as mean, variance and covariance do not change over time and thus remain constant (Brooks, 2019). The testing strategies employed in this study are the augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) and Phillips-Perron (PP) (Phillips & Perron, 1988) unit root tests to assess the stationarity conditions of each series and to ensure that none of the series are second-difference stationary, *I*(2). In addition, where the ADF and PP tests derived contradictory results, then the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) stationarity test was applied (Kwiatkowski, Phillips, Schmidt, & Shin, 1992).

The ADF adjusts for possible serial correlation in the error term and assesses the stationarity conditions of the time series using the following equation (Brooks, 2019):

$$\Delta\gamma_t = \beta + \delta\gamma_{t-1} + \sum_{i=1}^{p} \propto_i \Delta\gamma_{t-1} + \mu_t \quad (4)$$

H_0: $\delta = 0$

H_1: $\delta < 0$

where $\delta = \propto -1$, So, Ho: $\delta = 0$, for nonstationary series and H1: $\delta < 0$.

The Phillips-Perron (PP) test for unit roots is similar to that of ADF in that it adjusts for serial correlation and heteroskedasticity (Brooks, 2019) but adjusts for serial correlation by incorporating a non-parametric technique (Azra, Khan, Ahmad, & Jan, 2012). The PP test is as below:

$$\Delta\gamma_t = \beta' D_t + \pi\gamma_{t-1} + \mu_t \quad (5)$$

One of the shortcomings levelled against the PP and the ADF unit root test is low power of the tests if the process is stationary but close to the non-stationary boundary (Brooks, 2019). This shortcoming is caused by the fact that the null hypothesis is either rejected or not rejected; this shortcoming is overcome by the use of stationary tests such as the KPSS test outlined below.

Whilst the null hypothesis of the ADF and PP unit root tests hypothesise that the time series contains a unit root, a stationary test has the opposite null hypothesis and thus hypothesises that

the data is stationary (Brooks, 2019). A commonly applied stationarity test is the KPSS (Kwiatkowski *et al*., 1992), which solves for the bias towards the acceptance of the null hypothesis (Shrestha & Bhatta, 2018) using the following equation:

$$\gamma_t = x_t + \beta_t + \varepsilon_t \qquad \text{where } x_t = x_{t-1} + \mu_t \tag{6}$$

This test is divided into three parts: deterministic trend (β_t), a random walk (x_t) and a stationary error (ε_t), with the null hypothesis being that the random walk has a zero variance (Kwiatkowski *et al*., 1992) and thus:

H_0: $\delta^2 = 0$
H_1: $\delta^2 > 0$

ii. Cointegration testing

Cointegration is where a combination of two or more non-stationary time series have a long-run equilibrium relationship, and thus tend to move together (Engle & Granger, 1987). Some variables that are non-stationary independently may share the same stochastic trends and thus their linear combination may be stationary and cointegrated. In the event that the unit root testing finds that time series are first-difference stationary, I(1), then the next step is to test for cointegration among these non-stationary series. The commonly used methods in testing for cointegration are the Engle and Granger (1987) two-step procedure and the multivariate test of Johansen (1995).

Engle and Granger (1987) developed a two-step test for cointegration whereby the first step is to determine the order of integration of the variables. In the event that the variables are found to be non-stationary, then the second step proceeds with the below cointegration regressions using OLS. The residuals are then tested for stationarity, which determines whether the factors share a cointegrating relationship or not (Brooks, 2019).

$$\Upsilon_t = \mu + \beta_1 \varkappa_1 + \varepsilon_t \tag{7}$$

$$\varepsilon_t = \Upsilon_t - \mu - \beta_1 \varkappa_1 \tag{8}$$

This method of cointegration testing however can only identify one cointegration relationship and requires that all variables are I(1) (Engle & Granger, 1987). An alternative cointegration testing strategy that can identify more than one possible cointegrating relationship is the multivariate test developed by Johansen (1995). The Johansen cointegration test makes use of two test statistics: the trace statistic and the maximum eigenvalue statistic which are formulated as follows:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln(1 - \lambda_i) \quad (9)$$

and

$$\lambda_{max}(r, r+1) = -T \ln(1 - \lambda_{r+1i}) \quad (10)$$

The trace statistic hypothesises that the number of cointegrating vectors is $r = r^* < g$ and the alternative being that $r = g$ (Johansen, 1995) while the max eigen test hypothesises that r cointegrating vectors against the alternative of $r + 1$ cointegrating vectors (Lütkepohl, Saikkonen, & Trenkler, 2001).

iii. Model formulation

Having examined the stationarity conditions of the time series, and determined whether cointegration is present or not, the next step of the empirical strategy is to formulate the empirical models that will be used to conduct the analysis. If no significant cointegration is identified, then the empirical analysis will make use of a vector autoregression model (VAR) (Sims, 1980). If significant cointegration is identified, then the empirical analysis will make use of vector error correction models (VECM) instead (Johansen, 1988).

Vector autoregression are typically formulated using the following equation:

$$y_t = \mu + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \cdots + \beta_p y_{t-p} + \varepsilon_t \quad (11)$$

Where: $\mathbf{y_t} = (y_{1t}, \ldots, y_{Kt})$ is a *(n × 1)* random vector; $\boldsymbol{\mu_t} = (\mu_1, \ldots, \mu_K)$ is a fixed (n × 1) vector of intercept terms; $\boldsymbol{\beta_i}$ are fixed *(n* x *n)* coefficient matrices; $\boldsymbol{\varepsilon_t} = (\boldsymbol{\varepsilon}_{1t}, \ldots, \boldsymbol{\varepsilon}_{Kt})$ is an *(n* x *1)* unobservable, zero mean innovation process.

This basic vector autoregression model of order $\boldsymbol{\rho}$ (VAR ($\boldsymbol{\rho}$)), analyses the relationship between system of variables (Lütkepoh, 2005) as well as the capturing of reverse causality between the dependent and independent variable (Shrestha & Bhatta, 2018).

For measuring three different time series, the VAR model can be summarised as follows:

$$y_{1t} = \mu_1 + \beta_{11}\, y_{1t-1} + \beta_{12}\, y_{2t-1} + \beta_{13}\, y_{3t-1} + \varepsilon_{1t} \quad (12)$$

$$y_{2t} = \mu_2 + \beta_{21}\, y_{1t-1} + \beta_{22}\, y_{2t-1} + \beta_{23}\, y_{3t-1} + \varepsilon_{2t} \quad (13)$$

$$y_{3t} = \mu_3 + \beta_{31}\, y_{1t-1} + \beta_{32}\, y_{2t-1} + \beta_{33}\, y_{3t-1} + \varepsilon_{3t} \quad (14)$$

The above equations can thus be expressed in the following stochastic form:

$$y_t = \mu + \sum_{i=0}^{\infty} \beta_1^i + \varepsilon_t \quad (15)$$

However, if it is found that the data used is stationary and cointegration exists, then a vector error correction model (VECM) is more appropriate (Lütkepoh, 2005). In contrast to VAR models, VECMs are formulated by the following equation:

$$\Delta y_t = \mu + \prod Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i\, \Delta Y_{t-1} + \varepsilon_t \quad (16)$$

Where: $\boldsymbol{\Delta}$ is the differencing operator, where $\Delta y_t = y_t - y_{t-1}$; $\boldsymbol{\varepsilon_t}$ is the vector residuals; $\mathbf{Y_{t-1}} = (y_{1t}, \dots, y_{Kt})$ is a K-dimensional vector of endogenous variables; $\boldsymbol{\mu}$ is the vector of intercept terms; and $\prod = \alpha\beta'$ is the cointegration matrix.

Hence, the basic form of the models to be used in this research are as follows:

- Model 1: Financial institution depth indicator (*FID*) and household final consumption expenditure per capita growth (HFCE):

$$\Delta HFCE = P_0 + \sum_{i=1}^{n} \theta_{1i}\, \Delta HFCE_{t-i} + \sum_{i=1}^{n} \theta_{2i}\, \Delta FID_{t-i} + \theta_3\, \Delta HFCE_{t-i} + \theta_4\, \Delta FID_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (17)$$

$$\Delta FDI = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\, \Delta FDI_{t-i} + \sum_{i=1}^{n} \delta_{2i}\, \Delta HFCE_{t-i} + \delta_3\, \Delta HFCE_{t-i} + \delta_4\, \Delta FDI_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (18)$$

- Model 2: Financial institution depth indicator (*FID*) and income per capita growth (IPC):

$$\Delta IPC = \mathrm{P}_0 + \sum_{i=1}^{n} \theta_{1i}\ \Delta IPC_{t-i} + \sum_{i=1}^{n} \theta_{2i}\ \Delta FID_{t-i} + \theta_3\, \Delta IPC_{t-i} + \theta_4\, \Delta FID_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (19)$$

$$\Delta FDI = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\ \Delta FDI_{t-i} + \sum_{i=1}^{n} \delta_{2i}\ \Delta IPc_{t-i} + \delta_3\, \Delta IPC_{t-i} + \delta_4\, \Delta FDI_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (20)$$

- Model 3: Financial institution depth indicator (*FID*) and infant mortality rate (IMR):

$$\Delta IMR = \mathrm{P}_0 + \sum_{i=1}^{n} \theta_{1i}\ \Delta IMR_{t-i} + \sum_{i=1}^{n} \theta_{2i}\ \Delta FID_{t-i} + \theta_3\, \Delta IMR_{t-i} + \theta_4\, \Delta FID_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (21)$$

$$\Delta lnFDI = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\ \Delta FDI_{t-i} + \sum_{i=1}^{n} \delta_{2i}\ \Delta IMR_{t-i} + \delta_3\, \Delta IMR_{t-i} + \delta_4\, \Delta FDI_{t-i} + \theta_5\, \pi_{t-i} + \mu_t \quad (22)$$

Where Δ denotes the first difference operator and μ_t denotes the error term and θ are a set of control variables.

iv. Optimal lag length selection

In order to ensure that the VAR or VECM are correctly identified, it is first necessary to determine the optimal number of lags to be used in the model because using the incorrect lag length can affect the derivation of the impulse responses and variance decompositions (Braun & Mittnik, 1993). However, choosing a lower than optimal lag length will render the model prone to autocorrelation whilst choosing a higher than optimal lag length may increase the coefficient standard errors and thus bias the findings (Lütkepoh, 2005; Emerson, 2007).

The most commonly used lag length selection criteria are the Schwarz Bayesian Information Criterion (SBIC) (Schwarz, 1978), Hannan Quinn Criterion (HQC) (Hannan & Quinn, 1979) and the Akaike Information Criterion (AIC) (Akaike, 1973; Shrestha & Bhatta, 2018). However, the AIC tends to identify longer lags whereas the HQC and SIC tend to identify the lower lag lengths. There is thus a need to balance the risks of over versus under-fitting the optimal lag. The three applicable equations are as follows:

$$AIC = ln(\sigma^2) + \frac{2k}{T} \quad (23)$$

$$SBIC = ln(\sigma^2) + \frac{k}{T} lnT \quad (24)$$

$$HQC = ln(\sigma^2) + \frac{2k}{T} \ln(ln) \quad (25)$$

Where σ^2 denotes residual variance, *T* is the sample size and $k = p + q + 1$ is the total number of estimated parameters (Brooks, 2019).

v. Diagnostic tests

Diagnostic tests assess the models in order to confirm their adequacy and stability (Lütkepoh, 2005). This study tested for residual autocorrelation, non-normality and heteroscedasticity. The following tests were employed in assessing the validity of the models: Durbin-Watson (DW) statistic for autocorrelation, Breusch-Pagan/Cook-Weisberg test for heteroscedasticity, and Jarque-Bera test for normality of the residuals.

Normality test

The Jarque-Bera test is used to determine whether the time series is normally distributed. The test is based on the OLS residuals and tests for the normality of the error terms. The underlying logic of this test is examining whether the values of the skewness coefficient (0) and kurtosis coefficient (3) depart from the norm (Brooks, 2019; Gujarati & Porter, 2009).

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \quad (26)$$

where *n* is the sample size, *S* and *K* are the estimated residuals from the OLS regression. The null hypothesis for this test is that the residuals are normally distributed.

Heteroscedasticity test

Heteroscedasticity testing is employed to examine whether the error terms are homoscedastic, i.e. have the same variance (Shrestha & Bhatta, 2018). One of the commonly used tests is the Breusch-Pagan test. The null hypothesis is of homoscedasticity, where the variance of the residuals is the same, and therefore homoscedasticity is present; and the alternative being that heteroscedasticity is present (Gujarati & Porter, 2009).

Autocorrelation test

The Durbin-Watson (1950) tests for serial autocorrelation in the residuals, e_t:

$$e_t = \rho e_{t-1} + v_t \quad (27)$$

The Durbin-Watson hypothesises that H_0: $\rho = 0$ or H_1: $\rho \neq 0$ using the following test statistic:

$$d = \frac{\sum_{t=2}^{n}(z_t - z_{t-1})^2}{\sum_{t=1}^{n} z_t{}^2} \quad (28)$$

where $z_0 = z_n$, n is the number of observations. The possible outcomes are then as follows (Shrestha & Bhatta, 2018):

d = 2, no autocorrelation

d > 2, error terms are negatively correlated

d < 2, evidence of positive autocorrelation

vi. Impulse response analysis

Having ensured that the empirical models are correctly specified and stable, impulse response analysis will be conducted to determine the effect that a shock from the independent variables has on the factor of interest. Impulse response analysis investigates the response of one variable to an impulse in another variable (Lütkepoh, 2005). Calculating impulse response functions assumes the independence of the error terms in all equations but this can be an unrealistic assumption. Hence, in order to overcome this challenge, orthogonalised impulse responses are commonly derived from a Cholesky decomposition (Koop, Pesaran, & Potter, 1996).

If a VAR representation is written in the following vector moving average (MA) form (Lütkepoh, 2005)…

$$\gamma_t = \mu_i + \sum_{i=0}^{\infty} \phi_{i,} u_{t-i} = \mu_i + \Phi\,(B)u_t, \quad \Phi_0 = \mathrm{I_K} \quad (29)$$

... then the moving MA can be represented as below:

$$\gamma_t = \sum_{i=0}^{\infty} \emptyset_i \; v_{t-i} \quad (30)$$

where the coefficient $\emptyset_i$ is the impulse response function (IRF) at horizon *i* and $\upsilon_t = (\upsilon_{1t}, \ldots, \upsilon_{Kt})$ are orthogonal residuals.

vii. Variance decomposition

Variance decomposition analysis (VDA) shows the extent to which a shock to one variable contributes to the variance in the other variables in the system (Lütkepoh, 2005). VDA is similar to the IRFs but VDA provides the proportion of variations in the dependent variable that are a result of their own shocks (Brooks, 2019).

The forecast error variance of the j^{th} variable is given by the $\varpi_{jk,h}$ innovations in the following equation:

$$\varpi_{jk,h} = \sum_{i=0}^{h-1} (e'_j \theta_i e_k)^2 / MSE[y_{j,t}(h)] \quad (31)$$

viii. Block exogeneity Wald test/Granger causality

Finally, the study used the Granger causality analysis to determine the direction and significance of the possible causal associations between the factors. Granger-causality was first introduced by Granger (1969) and it is a technique which aims to detect the causality between variables (Lütkepoh, 2005).

Consider the bivariate VAR(p) process:

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \sum_{i=1}^{p} \begin{bmatrix} \propto_{11,i} & \propto_{12,i} \\ \propto_{21,i} & \propto_{22,i} \end{bmatrix} \begin{pmatrix} y_{1,t-i} \\ y_{2,t-i} \end{pmatrix} + \mu_t \quad (32)$$

H_0: $\propto_{12,i} = 0$ for each i = 1,2,...,p

H_1: $\propto_{12,i} \neq 0$ for at least one i = 1,2,…,p

Thus based on equation 24, it can be stated that y_{2t} does not Granger-cause y_{1t} if and only if $\propto_{12,i}$ = 0, i = 1,2,...,p (Lütkepoh, 2005).

Chapter 4: Data Analysis and Discussion of Results

4.1. Introduction

This chapter presents the analysis of the time series data to examine the effect of financial development on poverty in South Africa. The methods applied are as described in the previous chapter.

4.2. Descriptive Statistics

The variables of interest were based on annual time series data which were sourced from the world development indicators. The independent variable of interest is the financial institution depth indicator (FID), which measures the level of financial development. The control independent variables include the percentage growth in GDP (GDP), and broad money annual percentage growth (MONEY). The dependent variables that serve as proxies for poverty includes household final consumption expenditure per capita growth (HFCE), infant mortality rate (IMR) and income per capita growth (IPC). The descriptive statistics are summarised in Table 4.1 below.

Table 4. 1: Descriptive statistics.

	HFCE	IPC	IMR	FID	GDP	MONEY
Mean	1.132	1.029	43.503	0.456	2.226	13.275
Median	1.026	0.969	44.950	0.468	2.442	13.581
Maximum	7.410	7.823	67.000	0.648	6.621	27.016
Minimum	-5,930	-8.865	27.500	0.299	-2.137	1.761
Std. deviation	2,744	3.204	10.298	0.118	2.258	6.456
Skewness	-0.180	-0.462	0.081	0.181	-0.152	0.122
Kurtosis	3.321	4.020	2.614	1.505	2.208	2.022
Jargue-Bera	0.387	3.159	0.292	3.944	1.198	1.692
Probability	0.824	0.206	0.864	0.139	0.549	0.429
Sum	45.283	41.177	1740.100	18.243	89.028	530.984
Sum	293.613	400.572	4135.770	0.544	198.910	1625.506
Observations	40	40	40	40	40	40

Notes: HFCE = household final consumption expenditure per capita growth; IMR = infant mortality rate; IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews results.

The variable with the highest mean is IMR at 43.50 followed by MONEY at 13.28; while FID records the smallest mean. The values spread, as indicated by the minimum and maximum

values, reveal that there are no significant outliers in the series. The skewness of all the variables is of a magnitude less than one, which indicates that they are normally distributed. The Kurtosis for all the variables, with the exception of HFCE and IPC, are below 3 suggesting that these factors are short-tailed or platykurtic (Gujarati & Porter, 2009) whereas HFCE and IPC are more leptokurtic. Lastly, the Jarque-Bera statistics indicate that the variables are normally distributed ($p > 0.05$).

4.3. Correlation Analysis

The correlation coefficient measures the strength of linear association between variables (Gujarati & Porter, 2009). Table 4.2 presents the correlation matrix for all variables. The strength of the relationship is measured by how close the calculated figure is close to 1, as the values should be between -1 and +1 (Brooks, 2019); with figures greater 0.7 being indicative of a strong correlation. The table shows no evidence of multicollinearity as the correlation coefficient amongst the independent variable and the control variables.

Table 4. 2: Correlation Matrix.

	FID	GDP	MONEY	HFCE	IMR	IPC
FID	1.000					
GDP	0.0401 0.8085	1.000				
MONEY	-0.4623 0.0030	0.5721 0.0001	1.000			
HFCE	0.0879 0.5947	0.5771 0.0001	0.5243 0.0006	1.000		
IMR	-0.5828 0.0001	0.2482 0.1276	0.6220 0.0000	0.2095 0.2005	1.000	
IPC	0.0998 0.5456	0.6151 0.0000	0.2910 0.0723	0.6553 0.000	0.0765 0.6435	1.000

Notes: HFCE = household final consumption expenditure per capita growth; IMR = infant mortality rate; IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews results.

4.4. Unit Root Tests

The ADF and PP unit root tests were conducted to assess the stationarity of the variables. The ADF and PP unit root tests test the null hypothesis that the time series contains a unit root, with

the alternative hypothesis being the stationarity of the variables (Brooks, 2019). According to Gujarati and Porter (2009), stationarity of a variable is observed when the absolute value of the PP or ADF statistic exceeds the critical value at varying levels of significance. Should the case be found to be true, the null hypothesis is rejected, and the variables are stationary. The unit root test results presented in Table 4.2 and Table 4.1 below confirm that HFCE, IPC, MONEY and GDP are stationary at level i.e. I (0), based on both ADF and PP unit root tests whereas FID and IMR are stationary after first difference, I(1).

Table 4. 3: Augmented Dickey-Fuller (ADF).

UNIT ROOT (ADF)							
	At Level						
		HFCE	**IPC**	**IMR**	**FID**	**MONEY**	**GDP**
With Constant	t-Statistic	-4.4066	-6.0288	-1.3195	0.2071	-3,4554	-4.4176
	Prob.	0.0012***	0.0000***	0.6103	0.9696	0.0148***	0.0011***
With Constant & Trend	t-Statistic	-4.4977	-6.1755	-2.476	-2.8967	-3,9698	-4.3915
	Prob.	0.0049***	0.0000***	0.3374	0.1751	0.0182	0.0063***
Without Constant & Trend	t-Statistic	-3.6702	-5.7619	-1.6493	2.2278	-1,7545	-3.1788
	Prob.	0.0005***	0.0000***	0.0929*	0.9928	0.0754*	0.0022***
	At First Difference						
		d(HFCE)	**d(IPC)**	**d(IMR)**	**d(FID)**	**d(IMONEY)**	**d(GDP)**
With Constant	t-Statistic	-5.0457	-9.0945	-2.8337	-5.6191	-6,6072	-7.3902
	Prob.	0.0002***	0.0000***	0.0633*	0.0000***	0.0000***	0.0000***
With Constant & Trend	t-Statistic	-4.9619	-8.9531	-2.8035	-5.5582	-6,5142	-7.2925
	Prob.	0.0015***	0.0000***	0.2051	0.0003***	0.0000***	0.0000***
Without Constant & Trend	t-Statistic	-5.1192	-9.229	-2.4826	-4.979	-6,6823	-7.4628
	Prob.	0.0000***	0.0000***	0.0145**	0.0000***	0.0000***	0.0000***

Note: HFCE = household final consumption expenditure per capita growth; IMR = infant mortality rate; IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

Table 4. 4: Phillips–Perron (PP) unit root tests.

UNIT ROOT (PP)							
	At Level						
		HFCE	**IPC**	**IMR**	**FID**	**GDP**	**MONEY**
With Constant	t-Statistic	-3.706	-6.0272	-1.7515	0.1545	-4.4291	-3,5473
	Prob.	0.0078***	0.0000	0.3983	0.9659	0.0011***	0.0118***
With Constant & Trend	t-Statistic	-3.7135	-6.1674	-2.1777	-2.9002	-4.3965	-3,9092
	Prob.	0.0332**	0.0000***	0.4881	0.1735	0.0062	0,021
Without Constant & Trend	t-Statistic	-3.5816	-5.7764	-2.7028	2.1369	-3.1043	-1,6197
	Prob.	0.0007***	0.0000***	0.0082***	0.9910	0.0028***	0.0985
	At First Difference						
		d(HFCE)	**d(IPC)**	**d(IMR)**	**d(FID)**	**d(GDP)**	**d(MONEY)**
With Constant	t-Statistic	-11.5921	-21.6343	-2.0986	-5.6191	-9.4128	-16,0637
	Prob.	0.0000***	0.0001***	0.2463	0.0000***	0.0000***	0.0000***
With Constant & Trend	t-Statistic	-11.3648	-25.6274	-2.0313	-5.5561	-9.0737	-16,7983
	Prob.	0.0000***	0.0000***	0.5660	0.0003***	0.0000***	0.0000***
Without Constant & Trend	t-Statistic	-10.944	-23.7647	-2.0281	-5.057	-9.5319	-11,5119
	Prob.	0.0000***	0.0000***	0.0421**	0.0000***	0.0000***	0.0000***

Note: HFCE = household final consumption expenditure per capita growth; IMR = infant mortality rate; IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

4.5. Optimal Lag Selection

The optimum lags for the three models is chosen using the commonly used criterion: AIC, SIC and HQC. The results of the lag length criteria are presented in Table 4.5 below. The optimal lag length of one is chosen for Model 3 (FID and IMR) and Model 2 (IPC and HFCE); whilst a lag of two is chosen for Model 1 (FID and HFCE).

Table 4. 5: Optimal lag selection.

Lag	LogL	LR	FPE	AIC	SIC	HQC
MODEL 1: FID and HFCE						
0	-221.1798	NA	2.2715	12.1719	12.3460	12.2333
1	-142.1337	136.7284	0.0757	8.7640	9.6347*	9.0710
2	-120.1860	33.2181*	0.0567*	8.4425*	10.0099	8.9951*
3	-112.7602	9.6336	0.0982	8.9056	11.1699	9.6041
MODEL 2: FID and IPC						
0	-242.3195	NA	7.1215	13.3146	13.4887	13.3760
1	-160.9927	140.6735*	0.2098*	9.7834*	10.6542*	10.0904*
2	-147.7041	20.1124	0.2511	9.9299	11.4973	10.4825
3	-136.7655	14.1906	0.3596	10.2035	12.4675	11.0017
MODEL 3: FID and IMR						
0	-267.6145	NA	27.9498	14.6819	14.8560	14.7432
1	-141.2907	218.5061	0.0723	6.6406*	8.2080*	9.0254
2	-86.8506	82.3958*	0.0094*	8.7184	9.5892	7.1931*
3	-78.2847	11.11246	0.0152	7.0424	9.3064	7.8406

Note: LR = Sequential modified LR test statistic (each test at 5% level); AIC = Akaike information criterion; SIC = Schwarz information criterion; HQC = Hannan-Quinn information criterion. * Indicates lag order selected by the criterion. Source: Author's computation based on EViews.

4.6. Cointegration Tests

The unit root testing found four of the variables are first-difference stationary thus necessitating testing for cointegration. The results of the Engle-Granger test (Engle & Granger, 1987) and the Johansen multivariate cointegration test are presented in Table 4.6 and Table 4.7 below, for the three models, using lag lengths as identified in the preceding section. The results confirm the existence of a long-run relationship. The implication of the findings is that there is a cointegrating relationship between variables, necessitating the use of a vector error correction model (VECM).

4.6.1. Engle-Granger Cointegration Test

The ADF statistic is greater than the critical values at all levels of significance, which indicates that residuals are stationary at level. The null hypothesis of no cointegration is rejected at 5% level of significance against the alternative of cointegration relationships.

Table 4. 6: Augmented Dickey Fuller Test on residual.

Model	Variable	ADF Statistics	Critical Value	P-value	Order of Integration
FID and HFCE	Residual	-6.0849	1%= -2.63 5% =-1.95 10%= -1.61	0.0000	I (0)
FID and IPC	Residual	-7.1586	1%= -2.63 5% =-1.95 10%= -1.61	0.0000	I (0)
FID and IMR	Residual	-2.7737	1%= -2.63 5% =-1.95 10%= -1.61	0.0068	I (0)

Note: FID = financial institution depth indicator; HFCE = household final consumption expenditure per capita growth; IPC = income per capita growth; IMR = infant mortality rate. Source: Author's computations based on EViews.

4.6.2. Johansen Cointegration Test Results

The Johansen Cointegration test results are summarised in Table 4.7 for Models 1, 2 and 3. In Model 1 (**FID and HFCE)**, the Trace Statistic test indicated at least one cointegrating equation at the 5% level of significance; whilst the Max-Eigen Statistics test indicated at least no cointegrating equation at the 5% level of significance. The Trace Statistic and the Max-Eigen Statistics tests indicated at least two cointegrating equations at the 5% level of significance for Model 2 (**FID and IPC)**. Finally, similar to Model 2, both the Trace Statistic and the Max-Eigen Statistics tests indicated at least two cointegrating equations at the 5% level of significance Model 3 (**FID and IMR**). This implies the rejection of the null hypothesis of no cointegration is rejected at 5% level of significance in all three models, hence the estimation of the VECM.

Table 4. 7: Trace and Max-Eigenvalue test statistics

No. of CE(s)	Eigenvalue	Trace Statistic	5% Critical Value	Prob**	No. of CE(s)	Eigenvalue	Max-Eigen Statistics	5% Critical Value	Prob**
MODEL 1: FID and HFCE									
None*	0.4572	50.5145	47.8561	0.0275	**None***	0.4572	22.6064	27.5843	0.1909
At most 1	0.3748	27.9081	29.7971	0.0813	**At most 1**	0.3748	17.3770	21.1316	0.1550
At most 2	0.2449	10.5312	15.4948	0.2421	**At most 2**	0.2449	10.3924	14.2646	0.1874
At most 3	0.0037	0.1388	3.8415	0.7095	**At most 3**	0.0037	0.1388	3.8415	0.7095
Note: Trace test indicates 1 cointegrating equation at the 0.05 level.					Note: Max-eigen value test indicates no cointegration equation at the 0.05 level.				
MODEL 2: FID and IPC									
None*	0.6374	77.0713	47.8561	0.0000	**None***	0.6374	38.5460	27.5843	0.0013
At most 1*	0.4781	38.5253	29.7971	0.0039	**At most 1***	0.4781	24.7127	21.1316	0.0150
At most 2	0.3044	13.8126	15.4947	0.0882	**At most 2**	0.3044	13.7919	14.2646	0.0593
At most 3	0.0005	0.2071	3.8415	0.885	**At most 3**	0.0005	0.0207	3.8415	0.8855
Note: Trace test indicates 2 cointegrating equations at the 0.05 level.					Note: Max-eigen value test indicates 2 cointegration equations at the 0.05 level.				
MODEL 3: FID and IMR									
None*	0.6409	77.7712	47.8561	0.0000	**None***	0.6409	38.9191	27.5843	0.0012
At most 1*	0.5116	38.8522	29.7972	0.0035	**At most 1***	0.5116	27.2313	21.1316	0.0061
At most 2	0.2629	11.6209	15.4947	0.1760	**At most 2**	0.2629	11.5887	14.2646	0.1271
At most 3	0.0008	0.0322	3.8415	0.8575	**At most 3**	0.0008	0.0322	3.8415	0.8575
Note: Trace test indicates 2 cointegrating equations at the 0.05 level.					Note: Max-eigen value test indicates two cointegration equations at the 0.05 level.				

Note: FID = financial institution depth indicator; HFCE = household final consumption expenditure per capita growth; IPC = income per capita growth; IMR = infant mortality rate. Source: Author's computations based on EViews. *denotes the rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values.

4.7. Vector Error Correction Model

Having examined the stationarity conditions of the time series, and determined whether cointegration is present or not, the VECM for Model 1 (**FID and HFCE)** and Model 3 (**FID and IMR)** was estimated with two lags, whilst the VECM for Model 2 (**FID and IPC**) was estimated with one lag. The VECM models allows for inferences to be made on short-run, long-run and strong causal effects. The long-run co-integrating association is provided by the error term, whereas short-run dynamic forces are represented by the explanatory variable coefficients. The Error Correction Terms coefficients identify the outcome variables' departure from the long-run equilibrium. The analysis below presents the VECM estimates.

4.7.1. Model 1: FID and HFCE

The impact of FID on HFCE is extracted from the model that includes FID as the main independent variable and previously stated control variables.

Long-run Estimates

Table 4.8 presents the empirical results on the long-run effect of financial institution depth (FID) on household final consumption expenditure per capita growth (HFCE). The results show a negative but insignificant effect of FID on HFCE which indicates that a percentage increase in FID will result in a 0.0014% increase in household final consumption expenditure per capita growth. These results are consistent with other studies that found an advantageous relationship between financial development and the decrease in poverty, as proxied by the increase in household final consumption expenditure per capita growth (Chemli, 2014; Kheir, 2018; Nsiah et al., 2021; Uddin et al., 2012).

GDP growth is found to have a statistically insignificant inverse long-run relationship with poverty. The results show a percentage increase in GDP growth will lead to 0.2036% decrease in the household final consumption expenditure per capita growth. This finding contradicts a number of studies where economic growth positively affects income, particularly that of the poor (Erlando et al., 2020; Jalilian & Kirkpatrick, 2002; Saidu & Marafa, 2020).

Table 4. 8: VECM Results (HFCE as a dependent variable)

Dependent Variable: HFCE				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
FID	-0.0014	0.0046	-0.2926	0.7704
GDP	0.2036	0.4874	0.4179	0.6769
MONEY	-1.1292	0.9957	-1.1341	0.2593
Constant	-2.4671			

Note: HFCE = household final consumption expenditure per capita growth; FID = financial institution depth indicator; INFLATION = inflation rate; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

A percentage growth in the broad money growth will lead to a 129% increase in household final consumption expenditure per capita growth, corroboratory with studies that have found the increase in money supply to reduce poverty (Rewilak, 2017). This result is insignificant at the 5% level of significance.

Short-run Estimates

The coefficient of the error correction term for this model – as presented in Table 4.9 – is negative and significant at a 10% level of significance, implying a long-run causality running from FID to HFCE. The error correction term shows that 0.966% departure from long-run equilibrium is corrected in the next period.

There is a significant short-run relationship between first difference HFCE and HFCE. A percentage increase in the first difference household final consumption expenditure per capita growth leads to a 0.918% increase in the household final consumption expenditure per capita growth. Contrary to Kheir (2018), the study found no significant relationship in the short run between financial institution depth and household final consumption expenditure per capita growth.

The relationship between first difference GDP growth and household final consumption expenditure per capita growth is significant. A percentage growth in GDP leads to a 1.52% increase in household final consumption expenditure per capita growth in the short run. This finding is in line with studies that have found growth in GDP to be beneficial in reducing

poverty (Erlando et al., 2020). All other associations in the short run are insignificant at the 1%, 5% and 10% level of significance.

Table 4. 9: HFCE short-run association.

Dependent Variable: HFCE				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
D(HFCE (-1))	0.9178**	0.3897	2.3549	0.0261
D(HFCE (-2))	-0.0655	0.4102	0.1597	0.8743
D(FID (-1))	9.6856	21.7949	0.4444	0.6603
D(FID (-2))	5.5840	19.8301	0.2816	0.7804
D(GDP (-1))	-1.5213**	0.6723	-2.2629	0.0319
D(GDP (-2))	-0.2479	0.5235	-0.4736	0.6396
D(MONEY (-1))	0.0540	0.1070	0.5046	0.6179
D(MONEY (-2))	-0.0543	0.0930	-0.5834	0.5645
Constant	0.2397	0.4572	-0.5243	0.6044
ECT	-0.9655*	0.5595	-1.7257	0.0958
R-squared	0.4052			
Adj. R-squared	0.2069			

Note: HFCE = household final consumption expenditure per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth; ECT = error correction term. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

Testing the causality between the variables involves determining whether the coefficients equate to zero or not, using the Wald test (Gujarati & Porter, 2009). The null hypothesis of the Wald test is that the average value of errors equates to zero (Brooks, 2019).

Table 4. 10: HFCE Wald test.

Variables	**Chi-square Statistic**	**Probability**
FID	0.3255	0.8498
GDP	10.7950***	0.0045
MONEY	1.1515	0.5623

Note: FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews.

The results of the Wald test, as set out in

above, show only one short run causality running from GDP growth to household final consumption expenditure per capita growth. The fitness of the first model is satisfactory, as illustrated by the modest R-square of 0.4052, implying that 40.52% of the variance in the HFCE is explained by the independent variables, collectively.

4.7.2. Model 2: FID and IPC

Long-run Estimates

The impact of FID on IPC is represented in the model that includes FID as the main independent variable and other control variables. Table 4.11 below presents the results.

Table 4. 11: **VECM results (IPC as a dependent variable).**

Dependent Variable: IPC				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
FID	-0.0020	0.0018	-1.1104	0.2689
GDP	0.5794***	0.1959	2.9575	0.0037
MONEY	-0.5385	0.5439	-0.9901	0.3240
Constant	-2.2641			

Note: IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

The relationship between the financial institution depth and income per capita is positive and insignificant. A percentage increase in financial institution depth will result in a 0.002% decrease in income per capital growth. This result is consistent with Bolarinwa et al. (2021), who found financial development (as proxied by private credit) to be insignificant in reducing poverty, for all measures of poverty.

A percentage change in the GDP growth will result in a 0.579% decrease in income per capita growth in the long run. Although this result is significant, it contradicts findings where economic growth positively affects the overall income, particularly that of the poor (Erlando et al., 2020; Jalilian & Kirkpatrick, 2002; Saidu & Marafa, 2020).

The increase in the supply of money has been shown in studies to lead to increased purchasing power of consumers which in turn leads to increased levels of employment (Nsiah et al., 2021).

This is supported by the findings presented in Table 4.16, albeit insignificant. A percentage growth in broad money growth leads to a 0.539% increase in income per capita growth.

Short-run Estimates

below shows that the coefficient of the error correction term is positive and insignificant at the 1%, 5% and 10% level of significance. The error correction term shows that 0.242% departure from long-run equilibrium is corrected in the next period.

There is only one short-run causality running from GDP growth to income per capita growth, significant at the 10% significance level. A percentage increase in GDP growth leads to a 0.673% decrease in income per capita growth. Although this finding is contradictory to many studies (Erlando et al., 2020; Jalilian & Kirkpatrick, 2002; Saidu & Marafa, 2020), it is in line with the findings of Omar and Inaba (2020) where GDP growth was found to increase poverty.

Table 4. 12: IPC Short-run association.

Dependent Variable: IPC				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
D(IPC (-1))	-0.0483	0.2620	-0.1843	0.8549
D(FID (-1))	37.4505	29.6234	1.2642	0.2153
D(GDP (-1))	-0.6726*	0.3823	-1.7595	0.0881
D(MONEY (-1))	0.0072	0.11590	0.0622	0.9508
Constant	-0.3820	0.6398	-0.5971	0.5547
ECT	-0.2419	0.3373	-0.7172	0.4785
R-squared	0.897586			
Adj. R-squared	0.8719824			

Note: IPC = income per capita growth**;** FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

The fitness of the first model is satisfactory, as illustrated by the R-square of 0.8976, implying that only 89.76% of the variance in the IPC is explained by the independent variables, collectively.

Table 4. 13: IPC Wald test.

Variables	Chi-square Statistic	Probability
FID	1.5982	0.2062
GDP	3.0958*	0.0785
MONEY	0.0039	0.9504

Note: FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

Similar to Model 1 (**FID** and **HFCE**), the Wald test result, as presented in Table 4.13 below, indicates one causal relationship running from GDP growth to income per capita growth, significant at the 10% level of significant. This is also consistent with the short-run outcomes as presented in Table 4.12.

4.7.3. Model 3: FID and IMR

Long-run Estimates

The impact of FID on IMR is presented in the model that includes FID as the main independent variable and control variables. Apart from the GDP independent variable coefficient, the independent coefficient relationships are insignificant.

Table 4. 14: VECM results (IMR as a dependent variable).

Dependent Variable: IMR				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
FID	-1.51E-06	8.6E-06	-0.1772	0.8589
GDP	-0.001	0.0011	-1.4742	0.1429
MONEY	-0.0095***	0.0021	-4.4656	0.0000
Constant	-2727.033			

Note: IMR = infant mortality rate; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

The relationship between the FID and IMR as well as FID and GDP are negative and insignificant. A percentage increase in financial institution depth will result in a 0.000% increase infant mortality rate. A percentage change in GDP growth will result in 0.002% increase in infant mortality rate, but as previously noted, the relationship is insignificant. The

noted negative effect of GDP growth on reducing poverty is contradicted by literature that finds that economic growth benefits the poor (Beck et al., 2004).

A percentage increase in broad money growth leads to a 0.0095% increase in infant mortality rate. This long-run relationship is significant at the 1% level of significance. This outcome is contradictory to findings that increased money supply translates to decreases in the levels of poverty through greater employment opportunities (Nsiah et al., 2021).

Short-run Estimates

The coefficient error correction term, as presented in Table 4.15, is negative and significant at the 1% significance level. This implies that there is presence of a causal long-run relationship between variables. The error correction term shows that a 0.0007% departure from long-run equilibrium is corrected in the next period.

Table 4. 15: IMR short-run association.

Dependent Variable: IMR				
	Coefficient	**Standard Error**	**T-Statistic**	**P-Values**
D(IMR (-1))	0.8689***	0.0680	12.7739	0.0000
D(FID (-1))	-7.4571	4.7635	-1.5655	0.1199
D(GDP (-1))	-0.0337	0.0495	-0.6802	0.4976
D(MONEY (-1))	0.0242	0.0225	2.0737	0.2850
Constant	0.0034	0.1258	0.0273	0.9783
ECT	-0.0007***	0.0002	-2.7444	0.0069
R-squared	0.8687			
Adj. R-squared	0.8481			

Note: IMR = infant mortality rate; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

There is a significant short-run relationship between first difference IMR and IMR. A percentage increase in the first difference infant mortality rate leads to a 0.869% increase in the infant mortality rate in the short run.

The fitness of the first model is good, as illustrated by the modest R-square of 0.8687, implying that 86.87% of the variance in the IMR is explained by the independent variables, collectively.

Table 4. 16: IMR Wald test.

Variables	Chi-square Statistic	Probability
FID	2.4507	0.1175
GDP	1.1529	0.2829
MONEY	0.0007	0.9782

Note: IMR = infant mortality rate; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. Source: Author's computation based on EViews.

Unlike the previous two models, the Wald test result, as presented in Table 4.16 above, indicates no causal relationships. This is also consistent with the short run outcome as presented in Table 4.15.

4.8. Diagnostic Tests

Diagnostic tests are used to assess the efficacy of the chosen model. The section below outlines the results.

4.8.1. The AR Roots Graph

An impulse response analysis requires VAR stability. It is expected that all AR polynomials will be below one, meaning that AR roots will lie inside the unit circle (Shrestha & Bhatta, 2018). Invertible VECM processes have all roots inside the unit circle. Figure 4.1 to Figure 4.3 below shows the AR polynomial's inverse roots.

Figure 4. 1: Inverse roots of AR characteristic polynomial, HFCE Model.

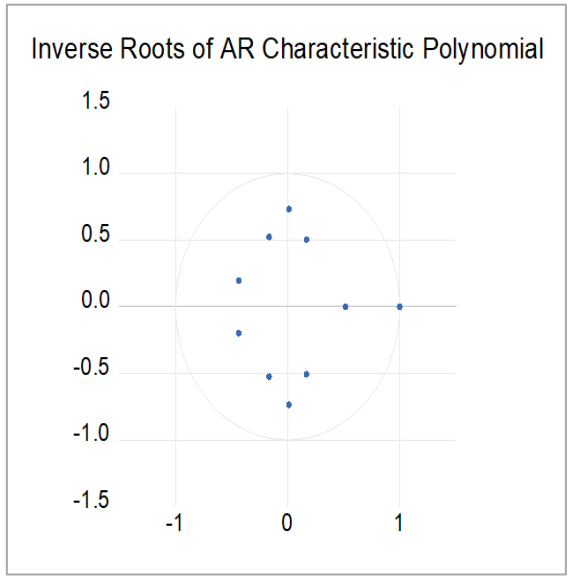


Figure 4. 2: Inverse roots of AR characteristic polynomial, IPC Model.

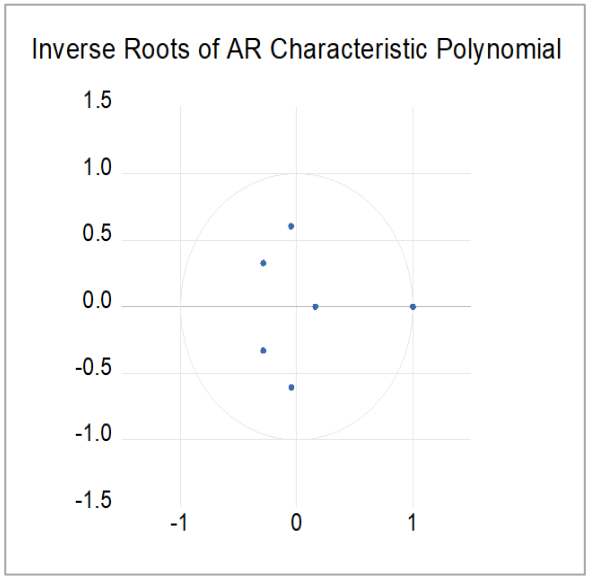
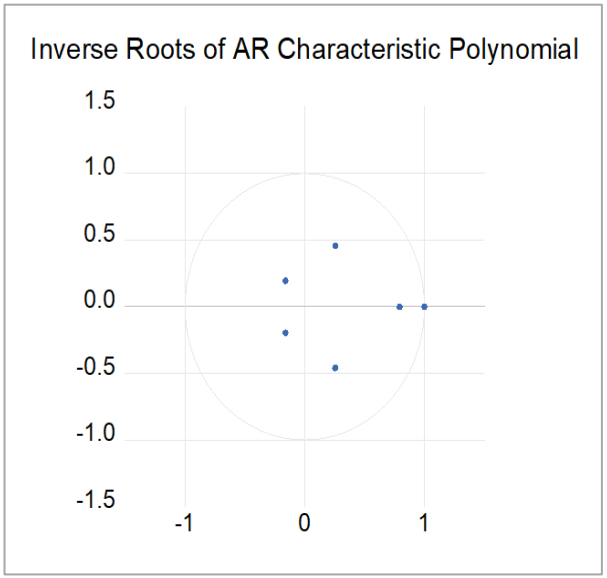


Figure 4. 3: Inverse roots of AR characteristic polynomial, IMR Model.



Note: FID = financial institution depth indicator; HFCE = household final consumption expenditure per capita growth; IPC = income per capita growth; IMR = infant mortality rate

As shown by Figure 4.1 to Figure 4.3 above, the estimated VECMs are stable because all roots have modulus smaller than one and are within the unit circle.

4.8.2. Normality, Autocorrelation and Heteroscedasticity Results

The results of the Durbin-Watson (DW) statistic for autocorrelation, Breusch-Pagan/Cook-Weisberg test for heteroscedasticity, and Jarque-Bera test for normality of the residuals are summarised in Table 4.17 below. As can be seen, there is no significant evidence of heteroscedasticity and non-normality in all three models. Model 1(**FID** and **HFCE**) and Model 2 (**FID** and **IPC**) show no sign of autocorrelation; whilst Model 3 (**FID** and **MIR**) has a Durbin Watson statistic value of 1.4268 shows signs of weak autocorrelation.

Table 4. 17: Diagnostic test results.

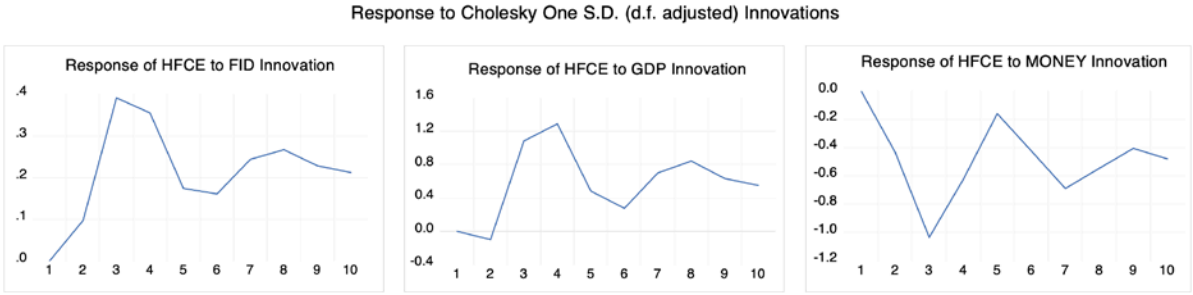
Model and its Variables		**MODEL 1: HFCE FID**	**MODEL 2: IPC FID**	**MODEL 3: IMR FID**
Heteroscedasticity	**P value for Chi squared**	0.5872	0.4951	0.3056
	Decision	No heteroscedasticity	No heteroscedasticity	No heteroscedasticity
Normality	**Jarque-Bera**	5.4340	8.3453	1.2757
	P value for Jarque-Bera	0.7103	0.4005	0.5284
	Decision	Normality	Normality	Normality
Autocorrelation	**Durbin Watson**	1.7969	1.7420	1.4268
	Decision	No autocorrelation	No autocorrelation	Autocorrelation
Model Significance	**F-statistics**	41.9209	7.5253	42.3303
	Prob(F-statistic)	0.0000	0.0005	0.0000
	Decision	Significant	Significant	Significant

Note: HFCE = household final consumption expenditure per capita growth; IPC = income per capita growth; IMR = infant mortality rate. Source: Author's computation based on EViews.

4.9. Impulse Response Analysis

An impulse response analysis was performed after ensuring that the empirical models were accurately defined and stable. Impulse response analysis examines how one variable responds to an impulse in another (Lütkepoh, 2005). The impulse is also called a shock or an innovation. Calculating impulse response functions assumes the error components are independent in all equations, which is often impractical. Orthogonalised impulse responses are often constructed using a Cholesky decomposition to avoid this difficulty (Gujarati & Porter, 2009). Figure 4.4 to Figure 4.6 below show the findings of the impulse response analysis.

Figure 4. 4: Impulse response analysis, HFCE model.



Source: Author's computation based on EViews.

The IRF reveals that a one-time positive shock to FID leads to a positive fluctuating effect in HFCE. HFCE starts at about zero, followed by sharp increases in period 1 and 2. This is followed by a decrease in period 3 and a sharp decrease in period 4. The decrease in the fifth period is stable. The fluctuating trend is follows through to the period 10, albeit in a less magnitude of sharpness.

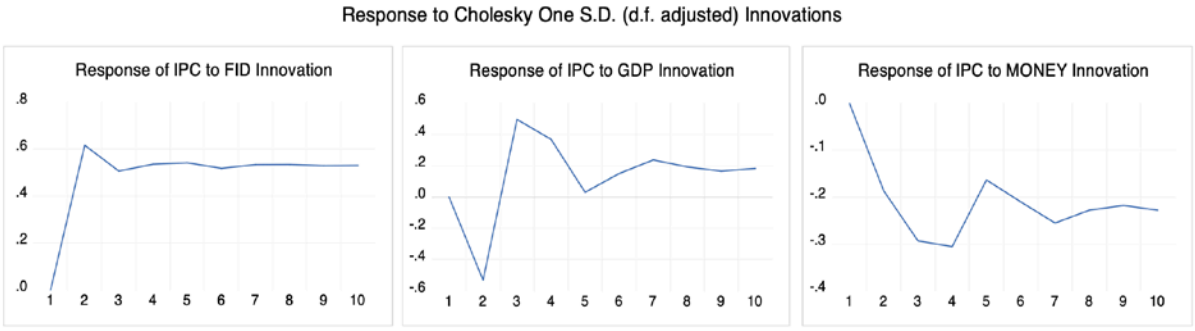
The IRF reveals that a onetime positive shock to GDP leads to a fluctuating effect in HFCE. The HFCE starts at about zero then has a sharp decrease to period 2 after which it increase to positives until period 4. After period 4 the HFCE drops sharply until period 6, but remains positive. Post period 6, there is another sharp increase until period 8, followed by a steady decrease, whilst remaining positive. Therefore, there is a seemingly fluctuating trend in the positive zone. Therefore, it can be inferred that there is a positively fluctuating relationship between HFCE and FID.

The IRF reveals that a onetime positive shock to MONEY leads to a negative fluctuating effect in HFCE. HFCE starts in the negative zone and then has a sharp decrease until period 3,

followed by a sharp increase until period 5. There is a sharp decrease from period 5 to 7, followed by an increase to period 9 and another decrease to period 10.

It can be inferred that there is a permanent negative relationship between HFCE and FID as well as between HFCE and GDP. It can also be inferred that there is a permanent negative relationship between HFCE and MONEY. Overall, the most permanent but positive relationship with HFCE is found in response to FID followed by GDP.

Figure 4. 5: Impulse response analysis, IPC model.



Source: Author's computation based on EViews.

The IRF in Figure 4.5 reveals that a onetime positive shock to FID leads to a positive effect on IPC. The IPC will increase sharply until period 2, decreasing slightly in period 3, followed by a stabilised positive relationship. Therefore, it can be inferred that there is positive relationship between IPC and FID.

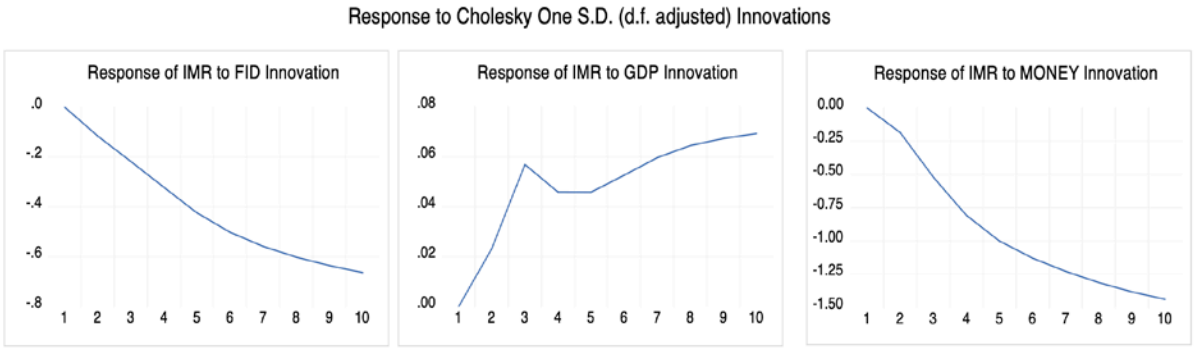
The IRF reveals that a onetime positive shock to GDP leads to a decrease in IPC until period 2, followed by a sharp increase in period 2 whereafter it remains in the positive zone. IPC will sharply decrease until period 5, thereafter increasing until period 7. IPC stabilises from period 7. This implies there is a permanent constant relationship between GDP and IPC.

The IRF reveals that a onetime positive shock to GDP leads to a sharp decrease in IPC until period 4, increasing to a lesser magnitude in period 5. Another sharp decrease is registered from period 5 to 7. IPC stabilises from period 7. This implies there is permanent constant, negative relationship between MONEY and IPC.

On FID, it can be inferred there is a permanent positive response of IPC to a one-time shock in trade. On GDP, it can be inferred there is a permanent positive response of IPC to a one-time

shock in GDP. On MONEY, it can also be inferred there is a fluctuating negative effect on of IPC to a one-time shock in inflation.

Figure 4. 6: Impulse response analysis, IMR model.



Source: Author's computation based on EViews.

The IRF reveals that a onetime positive shock to FID leads to a decrease in IMR, permanently. It can be inferred that there is a negative relationship between IMR and FID. A onetime positive shock to GDP extension leads an increase in IMR until period 3, where IMR deceases until period 4. No movement in MIR due to the shock occurs in periods 5 to 6, after which a stable increase pursues. It can be inferred that there is a fluctuating positive effect of IMR to a one-time shock in GDP.

On MONEY, it can be inferred there is a permanent negative response of IMR to a one-time shock in MONEY. IMR starts from zero in the first period and decreases steadily.

Overall, the most permanent but positive relationship with IMR is found in response to FID followed by MONEY. This relationship is positive as it is a decrease in the infant mortality rate, which serves as a proxy for poverty.

4.10. Variance Decomposition

The variance decomposition (VDA) is used to explain how a shock to one variable affects the other variables in the system. Unlike IRFs, VDA offers the proportion of changes in the dependent variable caused by their own shocks (Brooks, 2019). Results over 10 periods are presented in the tables below.

Table 4. 18:Variance decomposition of HFCE.

Period	S.E	HFCE	FID	GDP	MONEY
1	2.399	100.000	0.000	0.0000	0.0000
2	3.373	98.174	0.083	0.087	1.656
3	4.198	85.218	0.925	6.721	7.137
4	4.859	79.734	1.226	12.054	6.987
5	5.251	81.603	1.159	11.162	6.076
6	5.636	83.146	1.088	9.928	5.838
7	6.070	82.687	1.100	9.891	6.322
8	6.464	82.152	1.140	10.290	6.287
9	6.798	82.527	1.144	2.7969	6.039
10	7.122	82.944	1.131	9.970	5.955

Note: HFCE = household final consumption expenditure per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews.

The results of the HFCE model show the main source of variance in HFCE is own shock, which accounted for between 82.94% and 100% during the 10 periods. In Table 4.18 in the second period, the innovation or shock to HFCE accounts for 98.17% variation of the fluctuation in HFCE (own shock). Shock to FID can cause a 1.23% fluctuation in HFCE in period 4. Shock to GDP and MONEY can cause 12.05% and 6.99% fluctuation in HFCE in period 4, respectively. Therefore, in earlier periods, the own shock of HFCE caused greater fluctuation, followed by GDP.

Table 4. 19: Variance decomposition of IPC.

Period	S.E	IPC	FID	GDP	MONEY
1	3.644	100.000	0.000	0.000	0.000
2	4.224	96.085	2.135	1.584	0.196
3	4.621	93.967	2.987	2.478	0.568
4	5.111	93.086	3.542	2.549	0.823
5	5.552	93.098	3.955	2.163	0.784
6	5.940	93.018	4.217	1.954	0.811
7	6.296	92.760	4.472	1.882	0.886
8	6.632	92.642	4.668	1.775	0.915
9	6.973	92.593	4.812	1.667	0.928
10	7.285	92.522	4.940	1.590	0.948

Note: IPC = income per capita growth; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews.

In the second model (IPC and FID), own shock (IPC) caused greater fluctuations, with the magnitude being higher in earlier periods. FID caused fluctuations in the later periods. Similar observations are made with MONEY, to lesser magnitude. GDP caused greater fluctuations in period 4.

Table 4. 20: Variance decomposition of IMR.

Period	S.E	IMR	FID	GDP	MONEY
1	0.567	100.00	0.0000	0.000	0.000
2	1.380	97.453	0.706	0.028	1.182
3	2.424	93.700	1.037	0.064	5.199
4	3.569	91.136	1.291	0.046	7.526
5	4.726	89.643	1.542	0.036	8.780
6	5.853	88.775	1.742	0.031	9.452
7	6.940	88.220	1.888	0.030	9.862
8	7.984	87.824	1.994	0.029	10.154
9	8.988	87.519	2.073	0.028	10.379
10	9.950	87.279	2.136	0.028	10.557

Note: IMR = infant mortality rate; FID = financial institution depth indicator; GDP = the percentage growth in GDP; MONEY = broad money growth. Source: Author's computation based on EViews.

With regards to the third model (IMR and FID), MIR (own shock) caused greater fluctuations, with the magnitude being higher in earlier periods – 100%, 97,45% and 93.7%, respectively. FID and MONEY caused fluctuations in later periods, whilst GDP caused miniscule fluctuations.

4.11. Granger Causality Test

The final part of the analysis is to determine whether there is evidence of causality between the factors of interest. The results of using Granger block causality tests are presented in Tables 4.21 to 4.23 below.

4.11.1. Block Granger Causality Results

For the Model 1 (HFCE and FID), the results in Table 4.21 shows a bi-directional causality running between poverty, as proxied by household final consumption expenditure per capita growth and growth in GDP. The causality running from HFCE to GDP is significant at the 10% level of significance. This finding is consistent with studies that have found bi-directional

causality between economic growth, proxied by real GDP growth and poverty levels (Aremo & Ayoola, 2016; Dollar & Kraay, 2002).

Table 4. 21: HFCE Granger Causality test.

Dependent Variable: D(HFCE)					Dependent Variable: D(FID)				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**
D(FID)	0.3255	2	0.8498	No	**D(HFCE)**	0.2411	2	0.8864	No
D(GDP)	10.7950	2	0.0045***	Yes	**D(GDP)**	3.7400	2	0.1541	No
D(MONEY)	1.1515	2	0.5623	No	**D(MONEY)**	1.8306	2	0.4004	No
ALL	**13.1849**	**6**	**0.0402**		**ALL**	**11.4308**	**6**	**0.0759**	
Dependent Variable: D(GDP)					**Dependent Variable: D(MONEY)**				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**Df**	**Prob.**	**Granger-Cause**
D(HFCE)	5.1849	2	0.0748*	No	**D(HFCE)**	20.7858	2	0.0000***	Yes
D(FID)	0.0910	2	0.9555	No	**D(FID)**	1.8269	2	0.4011	No
D(MONEY)	0.3952	2	0.8207	No	**D(GDP)**	7.5390	2	0.0231**	Yes
ALL	**7.9276**	**6**	**0.2435**		**ALL**	**34.1863**	**6**	**0.000**	

Note: FID = financial institution depth indicator; HFCE = household final consumption expenditure per capita growth; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

Table 4. 22: IPC Granger Causality test.

Dependent Variable: D(IPC)					Dependent Variable: D(FID)				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**
D(FID)	1.5982	1	0.2062	No	**D(IPC)**	0.0671	1	0.7956	No
D(GDP)	3.0958	1	0.0785*	No	**D(GDP)**	1.4760	1	0.2244	No
D(MONEY)	0.0039	1	0.9504	No	**D(MONEY)**	2.6202	1	0.1055	No
ALL	**7.7607**	**3**	**0.0512**		**ALL**	**4.5171**	**3**	**0.2108**	
Dependent Variable: D(GDP)					**Dependent Variable: D(MONEY)**				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**Df**	**Prob.**	**Granger-Cause**
D(IPC)	0.4238	1	0.5151	No	**D(IPC)**	4.2014	1	0.0404**	Yes
D(FID)	1.8408	1	0.1749	No	**D(FID)**	0.0358	1	0.8499	No
D(MONEY)	0.3992	1	0.5275	No	**D(GDP)**	0.022	1	0.9622	No
ALL	**2.2568**	**3**	**0.5209**		**ALL**	**34.1863**	**3**	**0.000**	

Note: FID = financial institution depth indicator; IPC = income per capita growth; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

Table 4. 23: IMR Granger Causality test.

Dependent Variable: D(IMR)					Dependent Variable: D(FID)				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**
D(FID)	3.1810	2	0.2038	No	**D(IMR)**	2.5278	2	0.2826	No
D(GDP)	1.3151	2	0.5181	No	**D(GDP)**	9.4669	2	0.0088***	Yes
D(MONEY)	0.8408	2	0.6568	No	**D(MONEY)**	1.6782	2	0.4321	No
ALL	**3.6027**	**6**	**0.7303**		**ALL**	**14.8895**	**6**	**0.0211**	
Dependent Variable: D(GDP)					**Dependent Variable: D(MONEY)**				
Excluded	**Chi-sq**	**df**	**Prob.**	**Granger-Cause**	**Excluded**	**Chi-sq**	**Df**	**Prob.**	**Granger-Cause**
D(IMR)	1.1245	2	0.5699	No	**D(IMR)**	0.5042	2	0.7772	No
D(FID)	1.3519	2	0.5087	No	**D(FID)**	0.8572	2	0.6514	No
D(MONEY)	0.9121	2	0.8207	No	**D(GDP)**	1.7749	2	0.4117	No
ALL	**3.8539**	**6**	**0.6964**		**ALL**	**4.8392**	**6**	**0.5646**	

Note: FID = financial institution depth indicator; IMR = infant mortality rate; GDP = the percentage growth in GDP; MONEY = broad money growth. (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. Source: Author's computation based on EViews.

The results of Model 2 (IPC and FID) presented in Table 4.22 show a unidirectional causality running from GDP growth to poverty, as proxied by income per capita. This result is valid at the 10% level of significance. This is consistent with Keho's (2017) finding, where economic growth Granger-causes poverty reduction in Kenya. The results also show that poverty Granger-causes money supply, and this result is significant at the 5% level of significance.

A unidirectional causality running from GDP growth to financial development is noted for Model 3 (IMR and FID) and is significant at the 1% and 5% level of significance. The results are presented in Table 4.23. Kheir (2018) had similar findings where economic growth is found to Granger-cause financial development, supporting the demand-side hypothesis.

Chapter 5: Conclusions and Recommendations

5.1. Introduction

This chapter provides a summary of the findings in chapter 4. It serves to makes recommendations for policies and potential future studies.

5.2. Summary and Conclusions

This study analysed the relationship between financial development and poverty in South Africa from 1980 to 2019. Additionally, it aimed to identify any significant short- and long-run effects of financial development on poverty reduction and the direction of the relationship.

Financial development was proxied using the financial institution depth indicator (FID). Three proxies were used for poverty, namely: household final consumption expenditure per capita growth (HFCE), income per capita growth (IPC) and infant mortality rate (IMR). As such, the study contained three models. Control variables for all three models included GDP growth and broad money growth (MONEY). The cointegration test for all three models proved the existence of long-run relationships between the variables, thus necessitating the estimation of VECM analysis.

Overall, the study found no significant long-run relationship between financial development and poverty reduction. The study finds no significant associations in the short run between financial development and poverty reduction. Although not the focus of this study, results confirm GDP growth as an important channel in poverty reduction, particularly in the short run.

Knight (2017) suggests the ambiguity in the definitions of poverty means that policymakers are likely to pursue differing strategies in the attempt to alleviated it. The use of different proxies for poverty in this study revealed that findings are susceptible to the measures of poverty used. Rashid and Intartaglia (2017) similarly found that financial development's effect on the reduction of poverty is dependent on the measure of poverty used. Alternative and improved measures of poverty are key in the development of policy aimed at the reduction of poverty (Lang & Lingnau, 2015).

Financial development is multi-faceted in nature and indicators that measure the different facets of financial development should reflect the complexities contained in financial institutions and markets (Sahay et al., 2015; Svirydzenka, 2016). The study used a composite indicator in an attempt to capture the variation in the institutional depth.

5.2.1. Model 1: FID and HFCE

The VECM estimation found an insignificant long-run association amongst the variables. The analysis found GDP growth to lead to poverty reduction in the short run. The Granger causality analysis found a bi-directional relationship between GDP growth and household final consumption expenditure per capita growth in the short run, with causality running from HFCE to GDP significant at the 10% level of significance. The bidirectional nature of the relationship is consistent with finding of Kheir (2018), where the same proxy was used for poverty (HFCE per capita) as well as other studies that found a bidirectional relationship between financial development and economic growth (Adusei, 2013; Leitao, 2010). The impulse response analysis showed positive association between HFCE and FID as well as the relationship between HFCE and GDP. HFCE and MONEY indicated a negative association.

5.2.2. Model 2: FID and IPC

The VECM estimation showed a significant long-run association between IPC and GDP growth. The analysis also found that GDP growth leads to poverty reduction in the short run. The Granger causality analysis found a unidirectional causality running from GDP growth to IPC, significant at the 10% level of significance, as well as a unidirectional causality from IPC to MONEY. The impulse response analysis indicated negative association between IPC and FID as well as the relationship between IPC and MONEY; whilst IPC and MONEY indicated a negative association.

5.2.3. Model 3: FID and IMR

The VECM estimation revealed a significant long-run association between IMR and MONEY. The analysis also found a significant short-run negative association first difference IMR and IMR. The Granger causality analysis found a unidirectional causality running from GDP growth to IMR, significant at the 10% level of significance. The result corroborated with those made by Keho (2017), where economic growth Granger-causes poverty reduction in Kenya.

The study also found a unidirectional causality from GDP to IMR. The impulse response analysis showed positive association between IMR and FID as well as the relationship between IMR and GDP. IMR and MONEY indicated a negative association.

5.3. Policy Recommendations

South Africa is noted as having higher levels of financial development, ranked above advanced economies such as New Zealand (Svirydzenka, 2016), yet it remains the most unequal country globally (Alvaredo et al., 2018), with almost half the population living in poverty (World Bank, 2018c). Countries with similar levels of financial development have lover levels of poverty as access to resources is more equitable. The development of a regulatory framework that not only identifies the channels and conditions through which financial development reduces poverty but also to investigate how financial development can translate into long-lasting effects in terms of poverty reduction, as the study suggests financial institution depth has no long-lasting effect on poverty. GDP growth has shown to be an important conduit through which financial development can positively contribute to poverty reduction – the trickle-down effect. The results show, however, that although the GDP growth is an important channel – the effects on the reduction of poverty in the long-run are limited.

Furthermore, the data on poverty is limited in its frequency in South Africa, being updated every four years. The Studies in Poverty and Inequality Institute (2007) cautions against the "simplifying power of poverty measures", highlighting the limitations of using unidimensional poverty measurement in formulating policy. As such, the formulation of a country-specific multidimensional measure of poverty that can be measured at more frequent intervals is key in the process of policy formulations. The study is limited by the availability of poverty data in South Africa, prompting the use of proxy variables, which are limited in capturing the full multidimensional nature of poverty.

5.4. Avenues for Future Studies

Further studies can improve existing literature by assessing the effects of the different, composite measures of financial development on the reduction of poverty. Increased empirical research on the effects of financial development on poverty and the channels through which poverty can be reduced are essential to building an understanding and contribute to the

scholarship. This is especially important within the South African context as Policy recommendations would be better targeted by increased understanding through extensive literature.

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