ANALYSING THE EFFECT OF FINANCIAL INCLUSION ON INCOME INEQUALITY IN NAMIBIA

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ABSTRACT

While there is growing evidence on the effect of financial inclusion on household income and well-being, much is not known about the distributional effects across the different income quintiles. This study contributes to the literature by examining the effect of financial inclusion on household well-being and income inequality in Namibia, using the 2017 nationally representative household financial inclusion survey. Household per capita income and household asset index were created using the UNDP approach and considered as proxies for household income and well-being respectively. Financial inclusion is proxied by access and use of formal bank accounts, savings**,** and credit accounts. The study employed a two-stage least squares (2SLS) regression to estimate the effect of financial inclusion on household well-being and a quantile regression to investigate to estimate the effect of financial inclusion on income inequality. The study elicits some interesting results. First, the study finds that financial inclusion has a positive and significant effect on household income and well-being. Second, the magnitude of the effects was found to vary between rural and urban households with effects generally higher among urban than rural households. Third, financial inclusion was found to have a positive and significant effect across all quantiles of the income distribution, with greater effects in the higher quantiles when access to formal credit is considered and greater effects in the lower quintiles when access to formal banks and savings accounts is considered. Finally, the study finds that household socioeconomic characteristics such as education and gender of the household head, urban residence, and household size are important determinants of household income and well-being. The study recommends that national and international agencies continue improving access to formal financial services to narrow the gap between the wealthy and the poor, primarily in rural areas and low-income quintile households.

Keywords: Financial inclusion, Income Inequality, Well-being, Namibia

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Your prayers and encouragement have carried me, and I will forever be grateful.

DEDICATION

I dedicate this thesis to my daughter, Ndapandula Ntomwa. Thank you, baby girl, for adding meaning to my life; continue being a blessing to the world.

DECLARATION

I, Tsheya Napandulwe Beata Shimueoshili, hereby declare that the work being presented in the thesis entitled "ANALYSING THE EFFECT OF FINANCIAL INCLUSION ON INCOME INEQUALITY IN NAMIBIA**"** in partial fulfilment of the requirement for the award of the degree of **Master of Science in Economics** and submitted at the UNIVERSITY OF NAMIBIA.

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Tsheya NB Shimueoshili **Date**

LIST OF ABBREVIATIONS AND ACRONYMS

2SLS	Two-stage least squares
HDI	Human Development indices
OLS	Ordinary least squares
NFIS	Namibia Financial Inclusion Survey
NFSS	Namibia Financial Sector Strategy
NSA	Namibia Statistics Agency
SDGs	Sustainable Development Goals
UNDP	United Nations Development plan

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CHAPTER ONE : INTRODUCTION

1.1. Background of the Study

According to the World Bank's most recent Global Findex database, released in 2021, approximately 1.7 billion adults worldwide are still unbanked, accounting for 22 percent of the global population aged 15 and above. This number decreased from 1.7 billion adults in 2014 to 1.2 billion in 2017 and then increased to 1.7 billion in 2021, partly due to economic setbacks from the COVID-19 pandemic (Demirguc-Kunt *et al*, 2022). Additionally, the report shows that globally, 69 percent of adults have a formal bank account, up from 62 percent in 2014 (Demirguc-Kunt *et al*, 2022). Arguably, inclusion in formal financial institutions is important for economic growth, poverty reduction, and inequality (Park & Mercado, 2015; Neaime & Gayset, 2018). Neaime and Gayset (2018) argued that there is a need to improve access and use of formal financial services to address inequality. According to the Global Findex database (2021), households and businesses with access to financial services exhibit greater resilience to financial shocks than those lacking such access. Thus, pursuing financial inclusion to draw the 'unbanked' population into the formal financial system is a preoccupation for policy makers worldwide and in many developing countries (Peace, 2011).

Relative to many African countries, Namibia has one of the highest levels of financial inclusion (World Bank Group,2021). Among many others the reasons for the exclusion of people especially in the rural areas are due to too many documents and requirements that need to be provided to qualify for a formal saving, credit facility or formal bank account which leads to people opting to do it the informal way (Koomson *et al*., 2020).

According to the most recent world bank report Namibia ranks as on of the world's most unequal countries with a Gini coefficient of 59.1 percent in 2015 only second to South Africa (with a much higher population density). The high level of inequality as experienced over the years resulted in starkly different poverty rates across different groups. Thus, the study being Namibian based is motivated by the fact that it being a middle-income country with all its resources but still have such such a gap when inequality is in equation. Studies of this kind will help policy makers to include ways to make financial literacy a priority in everyday education. As Financially literate persons are essentially informed about the benefits of using the formal financial system and are more likely to use them.

Numerous benefits are derivable from financial inclusion, ranging from micro to macro (Demirguc-Kunt & Klapper, 2013; Dupas & Robinson, 2013; Karpowicz, 2014). Among others, the micro benefits include the ability to start and expand businesses, investment in education, risk management, and absorption of financial shocks (Dupas & Robinson, 2013; Kapowicz , 2014). In addition, the benefits are extended to employment generation and wealth creation, reduction in income inequality and stimulating economic growth, increased savings, and improved general welfare of the population (Dupas & Robinson ,2013; Kapowicz,2014). Financial inclusion remains an essential mechanism for poverty reduction, thereby attaining national progress and prosperity (Koomsoon *et al*, 2022). This is because finance is necessary for economic growth, and a well-functioning financial system is fundamental to achieving universal financial inclusion (Dogani & Guler, 2021; Omar & Inaba, 2020; Ouechtati, 2020; Zhang & Naceur, 2019; Kipo, 2019; Le, Ho & Mai, 2019). Inclusion can be formal or informal but for this cause the the researcher

concentrated on inclusion from formal institutions as a bench by having a formal bank account, being able to get a credit facility, and having a formal savings account.

According to the Namibia Financial Inclusion Survey (NFIS) conducted in 2017, 78 percent of adults in Namibia are financially included (Namibia Statics Agency [NSA], 2017). Of this financially included population, 70.9 percent are formally served, with 66.8 percent being served by commercial banks and 23.4 percent being served by non-banking institutions. Additionally, 23.9 percent of the financially included population make use of informal financial mechanisms (Bank of Namibia [BON], 2018). For urban and rural areas comparison, 82.5 percent of the eligible urban population is financially included compared to 72.9 percent of the eligible rural population. In terms of gender, 76.1 percent of the eligible male population is financially included, as compared to 79.8 percent of the eligible female population. The proportion of the financially excluded population decreased from 51 percent reported in 2007 to 22.0 percent in 2017 (NFIS, 2017).

Financial inclusion is generally defined as providing affordable, convenient, and timely financial services to all members of society, especially poor and vulnerable people (Chu & Chu, 2018). The benefits of promoting financial inclusion can be wide-ranging since access to and usage of formal financial services can help promote economic growth, reduce poverty and income inequality (Demirgüç-Kunt *et al.*, 2015). Evidence suggests that with limited access to financial services, the poor find it difficult to accumulate savings and investments - which is detrimental to economic growth and poverty alleviation (Neaime & Gayset, 2018). On the other hand, access to finance increase entrepreneurs' probability to take risk, invest more, and contribute to

economic growth. Much of the evidence on the effect of financial inclusion on income inequality is macro-related, with little evidence known about financial inclusion and income inequality between households and individuals (Neaime & Gayset, 2018). However, macro-level studies overlook the impressive heterogeneity across households and communities regarding access to financial services (Wooldridge, 2020). Understanding the relationship between financial inclusion and welfare in the context of individuals and households would be crucial for designing effective policy interventions (Iddrisu & Danquah, 2021). Although financial inclusion is critical to tackling socioeconomic issues such as slow economic growth, poverty, and income inequality, there is limited empirical work on financial inclusion and income inequality in many developing countries – mainly sub-Saharan African (SSA) countries. This study contributes to the literature by examining the effect of financial inclusion on income inequality in Namibia.

According to Dabla-Norris *et al.* (2015), income inequality stems mainly from the unequal distribution of employment rewards to individuals, and these have to differ depending on educational attainment, entrepreneurship, productivity, etc. The research indicates that income disparities among communities can drive motivation for work, promote investment in education, encourage the accumulation of human capital, and provide incentives for innovation and entrepreneurship, all of which can spur economic growth. This is in line with significant theories on the impact of financial inclusion on inequality. For instance, "Occupational Decisions and The Distribution of Wealth" by Banerjee and Newman (1993) demonstrated a negative correlation between financial development and inequality. The Wealth Distribution in Macroeconomics by Galor and Zeira (1993), which found that the effect of financial

inclusion on inequality is positive, have both been opposed by some of the empirical studies conducted. For example, some studies have shown that financial inclusion does not significantly affect income inequality (Ali *et al.,* 2021; Sari & Falianty, 2021; Park & Mercado, 2018; Aslan *et al.* 2017), while others have shown that financial inclusion has a negative impact on income inequality (Dogani & Guler 2021; Omar & Inaba 2020; Ouechtati, 2020; Zhang & Naceur, 2019; Kipo, 2019; Le, Ho & Mai, 2019; Lan & Thuong, 2019; Garcia-Herero & Turegano, 2015). However, studies by Tita and Aziakpono (2017) and Salazar-Cantu *et al.* (2015) showed that financial inclusion has a positive relationship with income inequality. In development economics, the latter could be linked to the various approaches regarding finance for development and resource mobilization that various countries take to pursue equality. The inconsistency in findings also suggests that region and country-specific studies are necessary for better policy options.

1.2. Financial Inclusion and Inequality in Namibia

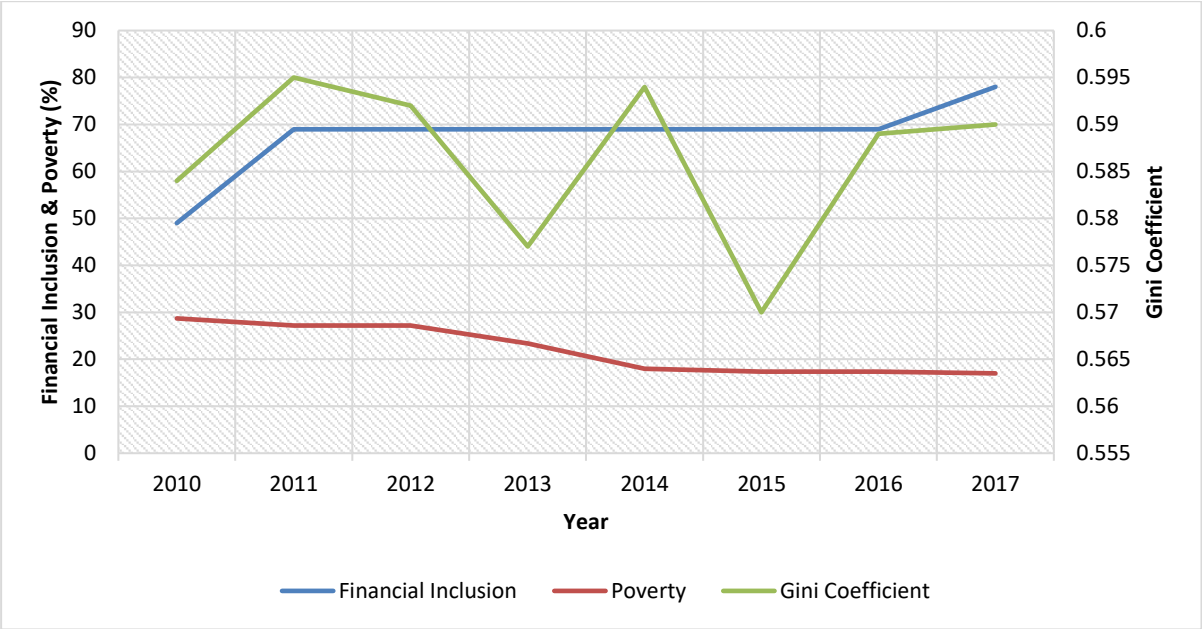
Financial inclusion is essential on the national agenda in the Namibia Financial Sector Strategy (NFSS), where the government identifies it as a critical driver for inclusive economic growth and prosperity (Namibia Statistics Agency [NSA], 2017). However, the World Bank (2017) described financial inclusion as the percentage of adults that have or use financial products, both formal and informal mechanisms, to manage their lives through products such as savings accounts, extended credit, and insurance policies. There are a number of factors as to why some individuals are financially excluded – including the location where financial products are located, among other factors. According to the Namibia Financial Inclusion survey NFIS (2017), of the 80.5 percent of the eligible adult population in Namibia, only 60 percent are saving, a

decline from 63 percent in 2011. On the other hand, 67.9 percent of the adult population have bank accounts, and 42.1 per cent have credit accounts - an increase from 32 percent reported in 2011.

The Namibian government, acknowledging the importance of being financially included, has approved a policy strategy to accelerate financial inclusion (Namibia Statistics Agency [NSA], 2017). An example is the Financial Literacy Initiative for individuals and businesses. This has significantly improved financial literacy and the financial sector has recorded a significant increase in financial inclusion and efficiency in the financial system. The Financial Literacy Initiative aims to enhance financial education for individuals and small businesses and narrow the financial exclusion gap (Seshamani, 2018). The strategy established a goal for Namibia to reduce financial exclusion from 51 percent in 2007 to 26 percent by 2021 (Namibia Statistics Agency [NSA],2017). According to the NFIS of 2017, there has been significant progress: the percentage of the financially excluded dropped to 31 percent in 2011 and further to 22 percent in 2017 (Bank of Namibia [BON],2018). Moreover, adults holding a bank account grew from 51 percent in 2011 to 64 percent in 2017. These statistics underscore an encouraging trend in Namibia: more people are accessing financial services, a shift that can contribute to reducing income inequality in the nation.

A reduction in financial exclusion for Namibia has been impeccable, but its effect on poverty and inequality in the country, to the researcher knowledge, is unknown. World Bank (2017) highlighted that poverty and income inequality remain prominent features of Namibian society. Figure 1.1 analyses trends in financial inclusion, poverty, and inequality in Namibia over the years.

Figure 2.1. Trends in financial inclusion, poverty, and inequality in Namibia over the years



Source: Author construction with data from the NSA.

Figure 1.1 indicates a consistent rise in financial inclusion in Namibia, increasing from 49 percent in 2010 to 78 percent in 2017. The Gini coefficient, which gauges income inequality, has seen some fluctuations but generally remains elevated. It peaked in 2011 at 0.60, dropped slightly to 0.57 in 2015, and rose to 0.59 in 2017. Additionally, there's been a notable reduction in Namibia's poverty rate, declining from 28.7 percent in 2010 to 17 percent in 2017. This decrease in poverty can be linked to various government initiatives and policies targeting poverty alleviation. In essence, the decline in poverty could be attributed to Namibia's actions, such as resource mobilization efforts of increasing royalties from mining licenses. This might have made the country earn more revenues for the government to be involved in public transfers and, in turn, decrease poverty and, thus, lower the poverty rate. Finally, in 2017, financial inclusion stood at 78 percent, and the Gini Index stood at 0.59 (59

percent), with the poverty rate at 17 percent. This means that the state's tax revenues from the higher-earning economic activities may have been directed to social causes such as pension grants, veterans' grants, and orphan and vulnerable children grants, thus decreasing income inequality and poverty. This indicates that the rise of financial inclusion in the country might have decreased both income inequality and poverty. However, whether this relationship is significant requires an empirical study investigating the impact of financial inclusion on income inequality.

1.3. Statement of the Problem

Low financial inclusion rates partly explain why, despite the relatively high returns on investments, growth in many African countries remains low while poverty and income inequalities are relatively high (Masiyandima & Nyarota, 2017). In Namibia, financial inclusion is an essential thrust in the bank's developmental role in achieving the goals of Vision 2030. Namibia's Vision 2030 aims to achieve sustainable economic growth and reduce income inequality by developing a more diversified economy, increasing investment in education and skills development, and increasing financial inclusion, more over SDGs aim to eliminate poverty and hunger, promote good health and wellbeing for all, promote quality education to all citizens, promote gender equality, Access to clean water and sanitation, affordable clean energy, good industry ,innovation and infrastructure and reduced inequalities among the nations. This can only be better achieved if the community is formally financial included. According to the most recent world bank report Namibia ranks as on of the world's most unequal countries with a Gini coefficient of 59.1 percent in 2015 only second to South Africa (with a much higher population density). The high level of inequality as experienced over the years resulted in starkly different poverty rates across different groups. Thus

the study being Namibian based is motivated by the fact that it being a middle income country with all its resources but still have such a gap when inequality is in equation. In the last decade, there has been a significant increase in the level of financially included adults in Namibia from 49 percent in 2007 to 78 percent in 2017 (Namibia Statistics Agency [NSA], 2017). Despite this progress, Namibia is still ranked among the most unequal nations globally, with a Gini coefficient of 0.59 and a gradual decline in poverty (Demirguc-Kunt *et al.*, 2022). This slow pace is concerning, especially given the proposed direct correlation between financial inclusion and poverty alleviation, as suggested by studies from Park & Mercado (2021, 2015), Demirguc-Kunt *et al.* (2018), Allen *et al.* (2013), Brune *et al.* (2011), and Burgess & Pande (2005). According to Neaime and Gaysset (2018), financial inclusion is a pivotal mechanism for reducing poverty, enhancing the welfare of at-risk communities, promoting inclusive growth, and mitigating inequality.

Generally, financial inclusion has been argued to be relevant in reducing both income inequality and poverty. However, there is a need for a formal empirical analysis to test this relationship in Namibia and its distribution effects since existing empirical evidence on the impact of financial inclusion on income inequality has been mixed and inconclusive. Some studies have found a positive relationship (Park & Mercado, 2021; Demirguc-Kunt *et al.*, 2018; Tita and Aziakpono, 2017; Salazar-Cantu *et al.*, 2015), while others have found a negative (Dogani & Guler, 2021; Omar & Inaba, 2020; Duvendack & Mader, 2020; Ouechtati, 2020; Zhang & Naceur, 2019; Kipo, 2019; Le, Ho & Mai, 2019; Lan &Thuong, 2019) and others found no significant relationship (Ali *et al.*, 2021; Sari & Falianty, 2021; Aslan *et al.*, 2017). The

inconsistency in findings also suggests the need for region and country-specific studies.

A study by Beck *et al.* (2007) found a positive impact of financial inclusion on income inequality, highlighting that access to financial services can enable households to increase their income and wealth and reduce their vulnerability to economic shocks. However, the impact may be more substantial for the middle class than the poorest households. Another study by Demirguc-Kunt and Klapper (2012) found that while financial inclusion can contribute to poverty reduction, it may not necessarily lead to a significant decrease in income inequality. However, the relationship was weaker in countries with higher levels of corruption. While some evidence suggests that financial inclusion can contribute to reducing income inequality, the relationship is complex and may be influenced by various factors, such as the level of economic development, governance, and regulatory frameworks. Hence, a Namibia-specific as well as a micro-based study is needed for better policy intervention.

1.4. Objectives of the Study

This research examines the impact of financial inclusion on income disparity in Namibia. Specifically, the study seeks to:

- ✓ Examine how access and use of financial services affect household income disparity in Namibia.
- ✓ Estimate the effect of financial inclusion on income inequality between rural and urban households in Namibia.

1.5. Hypothesis of the Study

- ✓ H_{0a}: Access and use of financial services have no significant effect on household income disparity in Namibia.
- ✓ H_{1a}: Access and use of financial services significantly affect household income disparity in Namibia.
- ✓ $H0_b$: Financial inclusion does not significantly influence income inequality among rural and urban households in Namibia.
- ✓ $H1_b$: Financial inclusion significantly influences income inequality among rural and urban households in Namibia.

1.6. Significance of the Study

While the level of financial inclusion in Namibia has increased over the years, broadening access to several financial services remains a challenge. Financial inclusion is an enabler that ensures that those at the bottom of the pyramid participate in the formal economy and economic growth and development. There is vast evidence on the impact of financial inclusion on income inequality. However, existing empirical evidence has been mixed and inconclusive. For example, while some studies have found a positive relationship (Park & Mercado, 2021; Demirguc-Kunt *et al.,* 2018; Tita & Aziakpono 2017; Salazar-Cantu *et al.,* 2015), some have found a negative (Dogani & Guler, 2021; Omar & Inaba, 2020; Duvendack & Mader, 2020; Ouechtati, 2020; Zhang & Naceur, 2019; Kipo, 2019; Le, Ho & Mai, 2019; Lan & Thuong, 2019) and others found no significant relationship (Ali *et al.,* 2021; Sari & Falianty, 2021; Park & Mercado, 2018; Aslan *et al.,* 2017). In addition, most studies have looked at the role of financial inclusion on income inequality at the macroeconomic level with little micro-level evidence. Such evidence is, however, limited in several African

countries, including Namibia. Thus, this study contributes to the controversies shrouded by current literature on financial inclusion and income inequality. The study provides new knowledge on the impact of financial inclusion on income inequality in Namibia. Evidence from this study is useful to policymakers and scholars as they may use the findings to formulate policies or as the basis of further research.

1.7. Limitations of the Study

This study could not consider all aspects of financial inclusion and all well-being indicators due to the limited or unavailability of information and data. For instance, financial inclusion encompasses three dimensions: (i) accessibility to financial services, (ii) utilization of financial services, and (iii) the quality of the goods and service delivery. However, the data utilized for this research lacked comprehensive information regarding the usage and quality of these services. However, it is essential to note that such limitations do not undermine the contribution of this study, and it is recommended that future surveys should include such variables.

1.8. Delimitations of the Study

The study is restricted to individuals aged 16 years and older because this is the legal age at which individuals are eligible to be financially included. Data from the NSA was collected in 2017, and quantitative methods were used for the study**.** The researcher concentrated on formal inclusion as this was the dataset available measured by having a formal bank account, by the availability of getting credit from a formal institution and by having a saving account in a formal institution.

1.9. Organization of the Study

The study is structured as follows: Chapter one provides the background of the study, introduces the statement of the problem, the objectives of the study, the hypotheses, the significance of the study, and the limitations and delimitations of the study. Chapter two focuses on the theoretical literature and empirical literature review on financial inclusion and income inequality all around the globe. Chapter three presents the methodology by outlining the data types and sources, measurements of variables and estimation techniques employed in the study. Chapter four is dedicated to data analysis and discusses the empirical findings. Chapter five highlights vital conclusions and policy implications and provides areas for future research considerations.

1.10. Ethical consideration

The study examines the impact of financial inclusion on income disparity in Namibia. It specifically seeks to examine how access and use of financial services affect household income disparity in Namibia and estimate the effect of financial inclusion on income inequality between rural and urban households in Namibia. The variables in questions were measured as described in the Chapter 3. The methods used to get the desired results are OLS,2SLS quintile regressions respectively. It's beneficial to examine the impact financial inclusion has on income inequality in Namibia as Namibia being the most unequal country raised a concerned issue around the globe and the research will be beneficial as it will add new knowledge to the topic and help policy makers make informed decisions. The research is not sponsored by any organisation , all resources used are self-funded. The ethics clearance certificate is attached with the paper meaning the research is approved for examination. The researcher can be contacted at shimueoshilinapandulwe@gmail.com.

1.11. Summary

Relative to many African countries, Namibia has one of the highest levels of financial inclusion (World Bank Group,2021). Among many others the reasons for the exclusion of people especially in the rural areas are due to too many documents and requirements that need to be provided to qualify for a formal saving, credit facility or formal bank account which leads to people opting to do it the informal way (Koomson *et al*., 2020).Generally, financial inclusion has been argued to be relevant in reducing both income inequality and poverty. However, there is a need for a formal empirical analysis to test this relationship in Namibia and its distribution effects. This study contributes to the controversies shrouded by current literature on financial inclusion and income inequality. The study provides new knowledge on the impact of financial inclusion on income inequality in Namibia. Evidence from this study is useful to policy-makers and scholars as they may use the findings to formulate policies or as the basis of further research. The researcher concentrated on formal inclusion as this was the dataset available measured by having a formal bank account, by the availability of getting credit from a formal institution and by having a saving account in a formal institution.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter consists of the theoretical and empirical literature. Mounting inequality is the most controversial issue in countries today, where access to economic resources seems to cause this discrepancy. This chapter reviews theories and some empirical studies by comparing and contrasting theories and empirical findings.

2.1. Theoretical literature

2.1.1. The Theory of occupational decisions and the Distribution of Wealth.

According to Banerjee and Newman (1993), the occupational choices of individuals are limited by the initial endowments. The models show that when there are no opportunities to access finance, it can generate persistent income inequality, poverty traps, and lower growth. The essence of this model is that financial inclusion reduces inequality. They advocate that inequality declines linearly with increasing financial development. The studies argued that the effect of financial market imperfections prevents the efficient allocation of resources to people experiencing poverty to carry out human and physical capital investments, indicating that financial development helps reduce income inequality.

2.1.2. The theory of wealth distribution in macroeconomics.

According to Galor and Zeira (1993), the impact of inequality on the growth process is governed by unequal access to education due to imperfect capital markets on human capital formation and economic growth. The initial income distribution determines whether an economy converges to a low-education, low-income steady-state equilibrium or a high-income, high-education steady-state equilibrium. Precisely, the

model forecasts that inequality negatively impacts human capital development and economic growth, except in the poorest economies. Additionally, it suggests that while increased inequality adversely affects GDP per capita in wealthier nations, it positively impacts less affluent countries.

The model highlights that it is because of financial market frictions that poor people cannot invest in their education despite their high marginal productivity of investment. The authors suggest that while individuals may be equal in ability, they differ in inherited wealth. Thus, inheritance determines the investment that heirs will make in their assets. The initial endowment is then a determinant of inequality reduction. The model concluded that reducing financial constraints will benefit the poor and reduce inequality.

2.1.3. The inverted U-shape theory.

The correlation between financial inclusion and income inequality follows an inverted U-shaped curve. Greenwood and Jovanovic (1990) determined that financial inclusion tends to exacerbate inequality during the initial phases of a country's progression. However, as the country develops, inclusion contributes to a more equitable wealth distribution and poverty reduction. Greenwood and Jovanovic (1990) explored whether everyone, despite their social background, benefited equally from the process of financial development, and the model proposed an inverted U-shaped non-linear association between financial development and income inequality. Financial development helps capital allocation, increases total growth and assists the poor during all stages of economic development. The theory suggests a distributional influence of financial development; the net effect on the poor depends on the level of economic

development. At the beginning of economic development, the rich enjoyed access to financial markets and the benefits from financial services and acquired more wealth. As the economy advanced, the number of persons accessing the financial market also increased shortly after that, resulting in financial development supporting the public.

2.1.4. Finance led growth theory ,Growth led finance theory and Theories Linking Financial Development to Welfare, Economic Growth, and Poverty.

Finance led growth theory

According to Schumpeter (1911), a well-functioning financial sector is necessary to facilitate growth in the real sector which resultantly leads to economic growth. In other words, economic growth is reliant on how well the financial sector is deepened or developed. As the financial sector deepens, there is increase in the supply of financial services it assumes that causality flows from financial sector development to economic growth and not the other way round.

Another dimension to the link between financial deepening and economic growth was propounded by Patrick (1966). This is referred to as "stage of development" hypothesis which incorporates the supply-leading and demand-following hypotheses. It posits that the causal link between financial development and economic growth alternates as the economy develops. According to Patrick (1966), the supply-leading hypothesis holds in an economy in the early developmental stage, and as the economy grows, it fades away and the demand-following hypothesis prevails

Growth Led finance Theory

A contradictory view on the supply-leading hypothesis was pioneered by Robinson (1952) who stated that financial deepening is dependent on growth that occurs in the economy. This stance is embedded in the demand following or growth-led finance hypothesis. It suggests that causality is from economic growth to financial development. Increasing demand for financial services deepens the financial sector as the economy progresses (Calderón and Liu, 2002). Singh (1999) opines that when an economy expands, there is a rise in macroeconomic activities which resultantly develops the financial sector.

Financial Development and Economic Growth Theory - This theory suggests that financial development, including financial inclusion, can lead to economic growth by increasing investment, savings, and productivity (Levine, 1997). The theory argues that financial development can improve resource allocation, promote technological innovation, and reduce transaction costs. Transaction costs such as costs involved to acquire a credit facility, the bank charges one have to endure to have a running bank account and the opportunity cost involved in keeping money on a saving accounts, if its reduced plus having being taught to be finacial literate at a tender age will push many if not everyone to be fianacial included. The theory suggest that the more people are formally financial included the inequality among the communities will be less, leading to instant Economic growth. The more the community is financial included the more income equality will be established within the nation.

Additionally, it indicates that robust and efficient financial structures, including banks, equity markets, and bond markets that direct capital to its optimal applications positively influence economic growth.

Social Capital Theory- The theory contends that social relationships act as resources that can foster the growth and accumulation of human capital. For instance, a prosperous family is more inclined to produce a highly skilled generation because they're more likely to invest in their family's education. This theory argues that financial inclusion can enhance social capital, which refers to society's norms, networks, and trust (Putnam & Robert, 1995). Social capital can improve access to information, reduce transaction costs, and increase the effectiveness of collective action, all of which can contribute to welfare and poverty reduction. The theory further emphasizes that more economic growth and business success come with more social capital.

Poverty Reduction and Inclusive Growth Theory - This theory emphasizes the importance of financial inclusion in reducing poverty and promoting inclusive growth (Neaime & Gaysset, 2018). The theory argues that financial inclusion can increase access to credit, savings, and insurance, improving households' ability to manage risk and invest in human capital. This can lead to higher incomes, better health and education outcomes, and a reduction in poverty and inequality.

Capability Approach – According to Sen (1999), the capability approach presents a theoretical framework that emphasizes two main points: firstly, the freedom to achieve well-being holds primary moral significance, and secondly, well-being should be conceptualized in terms of an individual's capabilities and functioning. Central to this theory is expanding individual freedoms and capabilities, including accessing financial services. It posits that financial inclusion can uplift and enhance an individual's well-

being by providing broader choices and avenues to shape their lives. The fundamental premise of the capability approach is that societal structures should be oriented towards broadening individuals' capabilities, thereby fostering their freedom to pursue or realize valuable states of being and actions. An essential test of development is whether people have greater freedoms today than they did in the past. Thus, it can be concluded that despite the different definitions, financial inclusion means that finance should be accessible to all citizens, in particular, the lowest people within the segment. It should be affordable and available on time. The essence of the model is thus that financial inclusion increases inequality (Sen,1999).

2.2 Empirical literature

A considerable volume of empirical literature evidence emanating from developing nations with regard to financial inclusion and income inequality exists. The evidence of these investigations has grown over time, and these can be traced way back to the 1980s, but we will concentrate on more recent evidence. However, empirical literature studies on the effect of financial inclusion and income inequality in Namibia are rare to find. Although there is consensus on how financial inclusion is defined, there is no standard way to measure it. The study reviews empirical literature conducted by researchers around the globe.

Iddrisu and Danquah (2021) investigated the welfare effects of financial inclusion in Ghana. This research utilizes a household survey dataset from Ghana that is nationally representative. Initially, a multidimensional financial inclusion index was calculated. Subsequently, the impact of financial inclusion on household well-being was analyzed. The findings indicate that households experiencing financial exclusion have

diminished well-being compared to those that are financially included. A significant observation was that financially disadvantaged households benefit more significantly from financial inclusion in terms of welfare than their advantaged counterparts, highlighting the potential of financial inclusion in mitigating income disparity.

In their paper, Park and Mercado (2021) wrote on understanding financial inclusion: What matters and how it matters. A new financial inclusion index was developed for 153 countries, spanning advanced, emerging, and developing economies. This index was crafted using a broad spectrum of novel indicators. These indicators were grouped into four dimensions: financial access, usage, financial development, and fintech infrastructure, with the categorization accomplished using Principal Component Analysis. The study included economy-fixed effects and used clustered standard errors at the economy level. To address endogeneity further, the study lagged the regressors by 1 year. Empirical findings suggest that enhanced access and fintech infrastructure contribute to a reduction in income inequality. Furthermore, these two dimensions, when combined with usage, bolster entrepreneurship.

Mukong and Amadhila (2021) did a study scrutinizing the impact of financial inclusion on household well-being in Namibia; the data was extracted from the 2017 Namibia Financial Inclusion Survey. A UNDP approach for computing human development indices was used to generate a wellbeing index was used. Two-stage least squares regression analysis addressed the potential endogeneity associated with financial inclusion. The results suggest financial inclusion's positive and significant effects on household well-being. It further indicates that household characteristics, such as education, income, and financial decisions, are important determinants of household welfare. However, this study did not examine the distributional effects of financial

inclusion across the different income quintiles. The current study addresses this evident gap by examining the effect of financial inclusion on income inequality in Namibia.

Ali *et al.* (2021) undertook a study to assess financial inclusion and its influence on income inequality across a panel of 18 Asian countries from 1997 to 2017. They utilised the Generalized Method of Moments (GMM) for their empirical examination. Their findings suggest that financial inclusion at the micro-level has a mildly negative but statistically significant impact on income inequality. However, the macro-level index and all individual financial inclusion indicators didn't show a notable effect on income inequality within the chosen set of countries. In a separate study, Sari and Falianty (2021) delved into the impact of financial inclusion on income inequality, considering the financial structure. Their research hinted that various factors might influence the relationship between financial inclusion and income inequality. Utilizing a static panel data model, they analyzed annual data from 2010 to 2020 for Indonesia's 33 provinces. Their results indicated that, in general, financial inclusion and structure didn't have a substantial impact on income inequality. Yet, in provinces with a high Human Development Index (HDI), financial inclusion and structure demonstrated significant negative correlations with income inequality.

Sawadogo and Semedo (2021) in their research, delved into the relationship between financial inclusion, income inequality, and institutional structures within sub-Saharan Africa, focusing on cross-country disparities. Employing a finite mixture model, they analyzed data from 28 sub-Saharan African nations from 2004 to 2016. Their hypothesis posited that the influence of financial inclusion on income inequality might vary among clusters of countries, sharing certain unseen similarities. The results

revealed two unique groupings of countries based on their response to financial inclusion. Notably, nations with superior institutional frameworks were more prone to experience reduced income inequality due to enhanced financial inclusion. This underscores the importance for sub-Saharan African countries to foster more democratic contexts and robust institutions to harness financial inclusion's benefits fully. Gravina and Lanzafame (2021) investigated how financial development, globalization, and technology affect income inequality using data for 90 economies from 1970-2015 and panel estimation techniques. The found significant non-linearities, consistent with either U-shaped or inverted U-shaped relationships. It further suggests that, depending on whether a certain threshold value is attained, the same determinants of income distribution employ opposite effects in different countries.

Chima *et al.* (2021) examined the interplay between financial inclusion and income inequality in 48 Sub-Saharan African countries from 1995 to 2017. Utilizing the GMM technique, the results demonstrated that financial inclusion diminishes inequality in the short term, a finding that contrasts with the Kuznets curve hypothesis. There was a discernible negative relationship between financial access and income inequality. However, the research also identified a positive overall effect of financial inclusion in tempering the influence of income inequality on economic growth. In a related study, Dogani and Guler (2021) probed the repercussions of financial inclusion on income inequality in the "Fragile Five" countries: Colombia, Mexico, South Africa, Turkey, and Indonesia. For this purpose, a holistic financial inclusion index was formulated specifically for these countries. The study employed data from 2005 to 2008 and leveraged econometric techniques, including Principal Component Analysis, the

Parks-Kmenta Estimator, and the Dumitrescu and Hurlin Panel Granger Causality test. Consistent with the previous study, their findings indicated a negative association between financial inclusion and income inequality.

Omar and Inaba (2020) undertook a study to understand if financial inclusion plays a role in mitigating poverty and income inequality in 116 developing nations. Using an unbalanced annual panel dataset from 2004 to 2016, they introduced a unique financial inclusion index formulated from various financial sector outreach indicators. The results compellingly revealed that financial inclusion has a notable effect in decreasing poverty and income inequality in these developing countries. In a separate study, Demir *et al.* (2020) delved into the interplay between FinTech, financial inclusion, and income inequality across a broad spectrum of 140 countries. Drawing from the Global Findex survey data waves of 2011, 2014, and 2017, the researchers examined how FinTech, directly and indirectly, impacts inequality via financial inclusion. Utilizing a quantile regression approach, they explored if the effects varied based on countries' existing levels of income inequality. The research unearthed new insights: financial inclusion emerged as a pivotal conduit through which FinTech curtails income inequality. Furthermore, while financial inclusion was found to diminish inequality across all levels of the inequality spectrum consistently, such effects were more pronounced higher income countries. The researcher seek to see how a country such as Namibia specific study will differ or have the same results as the above study to see the relevance of the finance and inequality growth policy in existence.

Ouechtati (2020) conducted a study on the role of financial inclusion in diminishing poverty and income inequality in developing nations. Using dynamic panel data

analysis, the research spanned from 2004 to 2017 and encompassed 53 developing countries. The study found that financial inclusion effectively reduces income inequality and poverty. It was observed that the number of bank branches per 100,000 people and the number of commercial banks per 1,000 people influence income inequality more than other financial inclusion variables at 1% and 5% significance levels. It was concluded that the variables of commercial banks per 1,000 people and number of commercial banks per 1,000 people are more effective in the financial inclusion index at 1% and 5% significance levels on the poverty axis. Ratnawati (2020) examined the influence of financial inclusion on aspects like economic growth, poverty, income inequality, and financial stability across various Asian countries. Financial inclusion was gauged through banking penetration, accessibility to banking services, and usage. The study used the national poverty line's poverty ratio and the Gini coefficient to indicate poverty and income inequality. Financial stability was represented using the Bank Z-Score and bank nonperforming loans. The outcomes revealed that all financial inclusion dimensions collectively affected economic growth, poverty, income inequality, and financial stability. However, the impact of financial inclusion on these aspects in ten Asian countries was less than satisfactory.

Asongu *et al.* (2019) explored the potential of financial access to counterbalance the effects of income inequality on gender economic participation. This study, spanning from 2004 to 2014, covered 42 sub-Saharan African (SSA) nations and employed the Generalised Method of Moments (GMM) and Fixed Effects (FE) regression methods. The FE regressions didn't exhibit notable results, with financial access displaying net negative outcomes on the Gini coefficient and the Palma ratio in relation to female employment. Naceur and Zhang's (2019) presented insights into the connection

between financial evolution and income distribution. Drawing from data from 143 countries from 1961 to 2011, their findings highlighted that four of the five financial development dimensions could considerably diminish income inequality and poverty. The only exception was financial liberalization, which appeared to amplify them.

Kipo (2019) concentrated on financial inclusion as a vehicle to mitigate inequality. This dynamic panel study on Sub-Saharan African nations between 2004 and 2018 employed the generalized method of moments (GMM) on a subset of 27 countries. The outcomes suggested that the computed financial inclusion index negatively influenced income inequality. Key findings indicated that an expansive network of commercial bank branches and active usage of bank accounts curtailed income inequality. Le, Ho, and Mai (2019) delved into the repercussions of financial inclusion on income inequality within transitioning economies. They argued that financial inclusion is pivotal in diminishing income disparities. Utilizing a two-stage least squares (2SLS) model and two disparate financial inclusion indices, their study spanned 22 transitioning economies over 11 years from 2005 to 2015. A negative association between the financial inclusion index and the GINI coefficient was discerned. Correspondingly, the relationship between income inequality and financial inclusion was analyzed in the study by Lan and Thuong (2019) using a two-stage least squares analysis for 22 transition countries between 2005 and 2015 using two different financial inclusion indices. The result shows a negative correlation between financial inclusion and income inequality.

Mushtaq and Bruneau (2019) investigated the influence of Information and Communication Technologies (ICT) on reducing poverty and inequality through enhancing financial inclusion. From 2001 to 2012, their study encompassed sixty-two

countries and distinguished between financial inclusion through commercial banks and microfinance institutions (MFIs). While traditional financial entities cater to an affluent clientele, MFIs position themselves as the champions of the underprivileged. Their initial analysis revealed a positive correlation between ICT adoption and financial inclusion, alongside a negative correlation with poverty and inequality. Chu and Chu (2018) delved into the implications of financial inclusion on income disparities. Using the Global Financial Inclusion database by the World Bank, they formulated a financial inclusion index and dissected its two primary components. Their evaluation of 69 nations indicated that heightened financial inclusivity corresponds to reduced income inequality. Their findings illuminated a non-linear relationship between financial markets and income distribution, emphasizing that countries can minimize income disparities by promoting financial inclusion without necessarily expanding their financial market size. For developing nations, their findings echoed the Kuznets' hypothesis, whereas in developed countries, the correlation between income and inequality manifested as a U-shape.

Zia and Prasetyo (2018) probed the interplay between financial inclusion and its repercussions on poverty mitigation and income inequality within Indonesia. They derived their financial inclusion metric from the Index of Financial Inclusion (IFI), examining the availability of banking services, banking penetration, and usage. Utilizing time-series data from 2014-2016 and cross-sectional data across 33 Indonesian provinces, they discerned that most provinces displayed moderate levels of financial inclusion. Their findings indicated that while financial inclusion exhibited a substantial negative correlation and influence on poverty, it also significantly curbed income inequality. Neaime and Gayset's (2018) analysed the ramifications of financial

inclusion on facets like income inequality, poverty, and financial stability. By deploying the Generalized Method of Moments (GMM) and Generalized Least Squares (GLS) methodologies, their study covered eight MENA countries over the 2002-2015 timeframe. The outcomes highlighted that financial inclusion acts as a deterrent to income inequality. However, variables such as population size and inflation were found to exacerbate income disparities.

A study by Seshamani and Tounkara (2018) empirically tested the impact of financial inclusion on income inequality in selected sub–Saharan African countries. Data on financial inclusion were disaggregated into formal and informal financial inclusion. The hypothesis is that formal financial inclusion improvements will likely significantly impact inequality reduction. The methodology used to test the hypothesis is the calculation of the Concentration Index using Convenient Covariance and Convenient Regression. The study found that in order to reduce income inequality in the selected countries, it would be necessary to significantly raise the levels of financial inclusion in the formal sector. Agyemang-Badu *et al*. (2018) researched to understand the influence of financial inclusion on certain macroeconomic factors using a fixed-effect panel regression estimator. They crafted a financial inclusion index based on country-specific indicators covering 48 African nations. Their findings suggested that financial inclusion negatively correlates with poverty and income inequality in the continent.

Park and Mercado (2018) delved into the varying financial inclusion impacts on poverty and income inequality across different income groupings of countries. They formulated a new financial inclusion index for 151 countries, utilizing principal

component analysis (PCA) and a cross-sectional method. Their research revealed that higher financial inclusion is associated with increased economic growth and reduced poverty for high and upper-middle-income countries, but this was not the case for lower-middle and low-income nations. Moreover, financial inclusion appeared to have no tangible influence on income inequality regardless of the income bracket. Masiyandima and Nyarota (2017) set out to gauge Zimbabwe's level of financial inclusion, its driving factors, and its impact on access to essential services like basic income, food, health, and education. They discovered that enhanced financial inclusion facilitates increased access to these vital household services. The effect is more pronounced when focusing solely on banking inclusion rather than a broader understanding of inclusion.

Tita and Aziakpono (2017) explored the nexus of financial inclusion and income inequality in sub-Saharan Africa. Drawing from the World Bank Global Findex 2011, they aimed to pinpoint which aspects of financial inclusion most profoundly affect income inequality. They observed that having accounts for business purposes, engaging in electronic payments, and participating in formal savings were positively linked with income inequality. Aslan *et al.* (2017) examined the relationship between gender disparities in financial inclusion and overall income inequality. Their research harnessed microdata from over 146,000 individuals across 140 countries. They created new indices capturing the extent of financial inclusion at individual and national levels. While charting the distribution of individual financial access scores, they noticed a "Kuznets"-like curve in financial inclusion patterns. Their study found a significant link between financial access inequality and income inequality, though the correlation was relatively weak.

Jong-Hee (2016) studied how financial inclusion mediates the interplay between income inequality and economic growth. The research revealed that income inequality profoundly hampers GDP growth, especially in low-income nations. Furthermore, in countries with high fragility, the dampening effect of income inequality on growth is more pronounced. The study also found that progressive measures aren't particularly effective in curbing income inequality in low-income or high-fragility nations. Financial inclusion appears to mend the strained relationship between income inequality and economic growth. The usually adverse correlation between income inequality and growth can be transformed into a positive association by mitigating income inequalities through financial inclusion. This trend is stronger in high-fragility countries than in low-fragility countries. In addition, Bangoura *et al.* (2016) studied the impact of microfinance on poverty by analyzing the causal links between the intensity of microfinance and poverty and inequality indicators (Gini and poverty measures). Heterogeneous panel causality techniques on a sample of 52 developing countries over the period 1996-2011 were used. The results of this macroeconomic analysis show that access to microcredit through the increase in the number of active borrowers improves the income of the poor and reduces inequality.

Dabla-Norris *et al.* (2015), on the causes and consequences of income inequality, posits a conditional relationship between financial inclusion and income inequality. The research methodology utilizes a straightforward model that assesses variations in inequality within individual countries. The study uses five-year panel data from 1980 to 2012 to account for inter-country disparities. Less-regulated labour markets, financial deepening, and technological progress largely explained the rise in market

income inequality. The study found that financial inclusion can reduce income inequality if inclusion focuses on increasing access to the poor. Garcia-Herrero and Turegano (2015) empirically evaluated the role of financial inclusion in diminishing income inequality, considering other crucial determinants like economic development and fiscal policy. Their findings underscored that financial inclusion notably reduces income inequality, whereas the mere size of the financial sector doesn't. They advocated for prioritizing financial inclusion in government strategies to mitigate income disparity within economies. On a different note, Salazar-Cantu *et al.* (2015) delved into the effects of financial inclusion on income distribution inequality, focusing on regional data from Mexico. Their findings revealed a complex relationship: an initial surge in income inequality followed by a significant decline as financial inclusion expanded within the country.

Park and Mercado (2015) conducted a study targeting financial inclusion and its impacts on poverty and income inequality in developing Asia. They developed financial inclusion metrics, analyzing macroeconomic factors and country-specific elements for 37 selected Asian developing economies. Their investigation revealed factors like per capita income, rule of law, and demographics as significant drivers of financial inclusion in the region. More importantly, their study indicated that financial inclusion plays a pivotal role in reducing poverty, with some evidence pointing towards its potential to lower income inequality. A study by Karpowicz (2014) examining financial inclusion, growth, and inequality: an application to Colombia used simulations from a general equilibrium model to identify the most binding financial sector frictions that preclude financial inclusion of enterprises and study the effects on growth and inequality of efforts to remove these frictions. The study finds

that lowering constraints on collateral promises higher growth, while inequality is better tackled through measures that lower the financial participation cost.

2.3 Summary

The literature review shows that various studies employed diverse datasets, including cross-sectional data, panel data, and time series, utilizing distinct models to achieve their objectives. Most existing literature on financial inclusion and income inequality has revealed that financial inclusion can influence income inequality positively or insignificantly through various channels. The review suggests that there is limited empirical evidence in Namibian. Second, the majority of the evidence is macro-based, suggesting the need for more micro-level evidence. This study contributes to the literature by examining the effect of financial inclusion on household income inequality in Namibia.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

In the preceding chapter, the study delved into a literature review examining financial inclusion's impact on income inequality. In this chapter, the research methodology used in the study is described. The first section describes the suitable research design and steps involved, followed by dataset representation and description. The third part describes the empirical techniques used.

3.2. Data Type and Sources

The data used in this study was obtained from the NFIS (2017), conducted between 2016–2017. This is data cross-sectional data. The NFIS data was obtained from the Namibia Statistics Agency. The 2017 NFIS is a nationally representative household survey with detailed information collected at the individual and household levels. The data contains detailed information on a number of socio-demographic and economic characteristics of individuals and households, including, for example, the age and sex of individuals, educational attainment, household size, household income, household consumption expenditures, and access to financial services such as credit, savings accounts, bank accounts, and insurance facilities.

The survey considered individuals aged 16 years and older, the legal age that allows individuals to own formal financial products in Namibia. Three-stage stratified sampling techniques were used. The first stage units were the Constituency, the second stage units were the households, and the third stage was eligible individuals who resided in the selected household for at least 6 months before the survey. NFIS 2017

covered a sample of 1 862 individuals. The national sampling frame was used to select the first-stage units (PSUs). The national sampling frame is a list of small geographical areas called Primary Sampling Units (PSUs) created using the enumeration areas (EAs) of the 2011 Population and Housing Census. A total of 151 PSUs were selected randomly from all 14 regions, and to be eligible, one needed to be 16 years or older, which is a legal age to participate legally in financial activities.

3.3. Measurement of Variables

3.3.1. Measures of Financial Inclusion

Financial inclusion entails the level of access to and usage of basic financial services through formal financial institutions (Atta-Aidoo *et al*., 2022). Financial inclusion is defined as enhancing access to useful financial services and products that vulnerable individuals require at affordable costs and transparently and fairly (Mallick & Zhang 2019). Notably, policies on financial inclusion aim to integrate the unbanked segment of the population into the formal financial ecosystem, granting them access to essential financial services, including payments, savings, transfers, credits, and insurance (Atta-Aidoo *et al.,* 2022). Building on the works of Atta-Aidoo *et al.* (2022) and Mukong and Amadhila (2020), this study uses access to savings facilities, access to credit facilities, and bank account ownership as proxies for financial inclusion. Mukong and Amadhila (2020) found a positive and significant effect of financial inclusion on household well-being in Namibia. However, the study did not examine the distribution effects across different income quintiles. The saving decision, bank account ownership and access to credit are binary variables equivalent to one if the individual had each of them at the time of the survey when they could and zero otherwise (Table 3.2).

3.3.2. Measures of Household Income

This study used two measures of household income commonly used in the literature (Atta-Aidoo *et al.*, 2022; Mukong and Amadhila, 2020). These measures include namely household asset index and household per capita income. A household asset index is a welfare composite index generated from specific underlying assets of a particular household (Johnston & Abreu, 2013). This study adopts the UNDP (2014) approach to computing human development indices (HDIs) to create the household asset index. This approach standardizes indicators measured on different scales into indices. The study used living standards, health and education - objective outcomes for evaluating household assets across the international community (Mukong & Amadhila, 2021). The different dimensions and indicators used in computing the household asset index are presented in Table 3.1. The selected indicators, measured into different scales, are summarised into a composite index. The HDIs are computed as follows:

$$x_{ik} = \frac{(\widetilde{x_{ik}} - x_k^{min})}{(x_k^{max} - x_k^{min})} \tag{3.1}$$

Where $\widetilde{x_{ik}}$ is the actual value in indicator *k* for household *i*, x^{min}_k and x^{max}_k are the minimum and maximum values of the indicator *k* in the whole data set (e.g., 1 and 4 respectively for education, Table 3.1). The generated indices are standardized and free of measurement units and are expected to range from 0 to 1, indicating low to high scores, respectively. After standardisation, the values of the dimensions with more than one indicator are derived by averaging the values of the different indicators as follows:

$$C_i = \frac{\sum_{i=1}^{n} IndexA_i}{n} \tag{3.2}$$

Where C_i is one of the dimensions for household *i*, $IndexA_i$ is the indicators that make up a given dimension, and *n is* the number of indicators in each dimension. After obtaining the values of all dimensions, the composite well-being score is computed by averaging all the dimensions as follows:

$$W_i = \frac{\sum_{i=1}^{n=} C_i}{N} \tag{3.3}$$

Where W_i represents the composite score measuring the well-being of household *i*, and *N* is the total number of dimensions contributing to the well-being index (3 dimensions in our case). The composite score ranges from 0 to 1, with high values indicating a high level of well-being.

Table 3.1. Indicators used in computing the household asset index

Dimensions of well-being	**Indicators**	**Not deprived if maximum**	**Weight**
Education	Child schooling	Unable to send children to school	¼
Health/Healthcare	Nutrition	Can't afford food for the household	¼
	Health care	No access to medical care	¼
	Access to safe drinking water	Household sources of drinking water are protected	1/6
	Access to improved sanitation	Household sanitation facility improved.	1/6
Standard of living	Type of cooking fuel	The household cooks with coal, wood, gas or electricity.	1/6
	Assets ownership	Access to more than one radio, TV, telephone, bike,	1/2 for each
		Access to motorbike, refrigerator, microwave,	
		Access to the washing machine, furniture and a car or truck.	

Note: For education and health, the value of 1 indicates that the household always has challenges accessing education, food and health services, and 4 indicates that the household has never had these challenges. The value of 1 for sanitation, safe drinking water and cooking fuel suggests access to the poorest facility, and 6 indicates access to the cleanest facility. For asset ownership, the value of 1 indicates no access and 2 shows access to each of the listed items.

Household per capita income is measured by dividing total income by household size. The researcher tested the significance of financial inclusion proxies in reducing income inequality as net savers can enhance wealth accumulation by accessing their funds in times of need (Iddrisu & Danquah, 2021; Koomson *et al*., 2020). Various household and individual socio-demographic variables have been utilized in existing literature. These include the age of the household head, household size, gender of the household head, the highest education level attained by the household head, and contextual factors like urban residence (Atta-Aidoo, 2022; Iddrisu & Danquah, 2021; Churchill & Marisetty, 2020; Danquah *et al.*, 2017). These variables are all represented as described in Table 3.2.

Table 3.2: The measurement of variables

Variable	**Proxy**	**Measure**
Income Inequality	Household Income per capita	Total income divided by household size
	Household Asset Index	UNDP approach
Financial Inclusion	Access to savings facilities	1 for "Yes" and 0 otherwise
	Access to credit facilities	1 for "Yes" and 0 otherwise
	Ownership of a bank account	1 for "Yes" and 0 otherwise
Other c**ontrol Variables**	Household size	Number of members in the household
	Age of household head	Age is measured in years.
	Education of household head	0: less than primary, 1: Primary and 2: at least secondary.
	Gender	1 for "Male" and 0 otherwise

	Location	1 for “Urban” and 0 otherwise
	Marital status of household head	1 if married and 0: otherwise

3.4. Model specification

Drawing from the methodologies of Iddrisu and Danquah (2021), Park and Mercado (2021), and Mndolwa (2017), the study employed the Ordinary Least Squares (OLS) modelling technique to assess the impact of financial inclusion on household income empirically. Moreover, the study followed Cull, Demirgüç-Kunt, and Martínez-Pería (2018) and employed a 2SLS regression technique to control for possible endogeneity when estimating the effect of financial inclusion on income. In addition, a quintile regression has also been employed to estimate the effect of financial inclusion on income inequality which is the main focus of this study (Demir *et al*., 2020).

3.4.1. Ordinary Least Squares (OLS) Model

OLS, short for Ordinary Least Squares, is a linear regression method to ascertain the relationship between a dependent variable and one or more independent variables. It achieves this by minimizing the totality of squared differences among the observed and predicted values, (Wooldridge, 2016). OLS is commonly used for its simplicity and ease of interpretation. However, it assumes that the error term is uncorrelated with the independent variables and may produce biased estimates if this assumption is violated. The OLS model is specified as follows:

$$y_i = \beta_0 + \beta_1 X_i + \beta_2 R_{\mathrm{i}} + \mu_i \qquad (3.4)$$

Where y_i is household income, X_i present measures of financial inclusion, R_i are other control variables, β_0 (the constant term). The error term, μ_i, captures unobserved factors that affect income inequality but are not included in the model. β_1 and β_2 represent the average change in income for a one-unit variation in the corresponding independent variable, holding all other variables constant. The subscript *i* represent the individual household. Iddrisu and Danquah (2021), Churchill and Marisetty (2020), and Danquah *et al*. (2017) also used R_i to represent a vector of demographic variables such as the age of household head, gender of household head, educational achievement of household head, marital status of household head, household size and household location.

3.4.2. Two-Stage Least Squares (2SLS) Model

Evidence suggests that estimates of the effects of financial inclusion on household well-being are likely to be biased if endogeneity is ignored (Koomson *et al.*, 2020). Control variables used in the study such gender (being male), residential area(urban), marital status(married), household size, and educational attainment can all lead to the endogeneity problem due to its nature. To mitigate potential bias arising from endogeneity, this study extends its analysis. The endogenous regressor, financial inclusion, is binary, and the likelihood ratio test is utilised to evaluate the independence of the equations. The likelihood ratio test of independence in all models is significant, suggesting that the null hypothesis of no endogeneity is rejected (Cameron and Trivedi, 2010). This implies that the standard Ordinary Least Square (OLS) estimates inconsistently explain the effect of financial inclusion on well-being, and therefore, there is a need to interpret the instrumental variable estimates. The 2SLS is an extension of OLS used to address endogeneity issues in regression analysis, particularly when there is simultaneity or omitted variable bias (Angrist & Pischke,

2008). This method was adopted because the financial inclusion variable is potentially endogenous (Iddrisu & Danquah, 2021; Koomson *et al.*, 2020; Demir *et al.*, 2020). Endogeneity stems from unobserved heterogeneity and the possible reverse causality between financial inclusion and household well-being.

Distance to the nearest financial institution (measured in hours) is used as an instrumental variable to address the endogeneity problem, as it satisfies the conditions of a valid instrument as follows: First, distance to the nearest financial institution has a direct relationship with the endogenous variable (financial inclusion) but not with household income (see Koomson *et al.,* 2020). The longer the distance to the nearest bank, the higher the financial in-kind and psychic costs and the lower the level of access to financial services. The first-stage regression results confirm this relationship. Second, distance to the nearest financial institution only influences household income through its influence on the financial inclusion indicators. Demir *et al.* (2020) observed that a valid instrument must have a direct relationship with the potentially endogenous variable but not a direct relationship with the dependent variable. Thus, equation 3.4 can be estimated using the 2SLS regression techniques. In the initial phase, an instrumental variable (IV) is employed to estimate the value of the endogenous independent variable. In the second stage, the predicted values from the first stage are used as an explanatory variable in the primary regression. The first stage of the 2SLS model is specified as follows:

$$X_i = \pi_0 + \pi_1 IV + \pi_2 R_{\mathrm{i}} + v_i \ldots\ldots\ldots (3.5)$$

The second stage is specified as follows:

$$y_i = \beta_0 + \beta_1 \hat{X}_i + \beta_2 R_{\mathrm{i}} + \mu_i \ldots\ldots\ldots (3.6)$$

Where $\hat{X}_i$ represents the predicted values of financial inclusion from the first stage. In the 2SLS model, the interpretation of the second-stage coefficients (β_1 and β_2) is similar to that of the OLS model. However, the 2SLS coefficients represent the causal effect of the independent variables on income, assuming that the instrumental variable (IV) is valid.

3.4.3. Quantile Regression Model

Introduced by Koenker and Bassett in 1978, quantile regression is a technique that determines the association between independent variables at distinct quantiles (or percentiles) of the dependent variable. Unlike the OLS method, which centres on the conditional mean, quantile regression offers a fuller perspective by analyzing the complete distribution of the dependent variable. The model for Quantile Regression can be articulated as follows:

$$Q\_y_i(\tau) = \beta_0(\tau) + \beta_1(\tau) X_i + \beta_2(\tau) R_{\mathrm{i}} \ldots\ldots (3.7)$$

Where ($Q\_y_i(\tau)$ represents the τ^{th} quantile of the income. In equation 3.7, the coefficients $\beta_i(\tau)$ represent the change in the τth quantile of income for a unit change in a corresponding independent variable, holding all other variables constant. The interpretation differs from the OLS model in that it provides insights into the effect of the independent variables on different quantiles of the dependent variable (e.g., low, middle, or high-income inequality) rather than just the average effect (Koenker & Bassett, 1978). This allows for a more comprehensive understanding of the

relationship between the independent and dependent variables across the entire distribution of income.

The quantile regression model is instrumental in analysing the influence of household socio-economic and demographic traits on income inequality in Namibia. This approach estimates the conditional distribution of the dependent variable across various quantiles of the independent variables' distribution. It provides insights into how the impact of financial inclusion on income fluctuates across diverse income distribution quantiles. As Koenker and Hallock (2001) pointed out, quantile regression doesn't necessitate a specific functional relationship between the dependent and independent variables. Moreover, it adeptly manages heteroscedasticity and outliers within the dataset.

3.5. Diagnostic Tests

3.5.1. Endogeneity

The OLS Models are prone to the problem of endogeneity bias (simultaneous causality or omitted variable bias), which may lead to asymptotically biased, inefficient and inconstant estimates. Therefore, using alternative techniques like 2SLS, which rely highly on instrumental variables to address endogeneity problem, was key in the study.

3.5.2. Weak instruments and exclusion restriction in 2SLS

Using the 2SLS Model can lead to weak instruments, which cause biased estimates and incorrect inferences (Stock *et al*., 2002; Hahn & Hausman 2003). Therefore, the study used the F-statistic from the first stage regression to test for the relevance of the instrumental variable. The instrument is strong when the F-statistic is greater than 10

(Stock *et al.,* 2002). Additionally, if the instrumental variable correlates with the error term of the primary equation, it may breach the exclusion restriction's validity. As such, over-identification tests such as the Sargan or Hansen test are conducted to check the validity of the instrumental variable (Baum *et al.,* 2007).

3.6. Research Ethics

All sources used in this study have been appropriately referenced through the APA style and thus have not been passed as the researcher's work. The study has used the Namibia 2016-2017 financial inclusion survey data set. The data to use in the study has been treated with confidentiality and was not be distorted, fabricated, or falsified.

3.7. Summary

Chapter 3 in a nutshell described the methodologies used in the study. The data used is obtained from NSA in a NFIS country survey for 2017. This study wishes to answer the literature gap of how income is distributed across different income quintiles in Namibia. The variables in question were measured as indicated see Table 3.2. To obtain the desired results the study employed OLS to empirically address the question. To address the problem of endogeneity due to the nature of the control variables in question 2SLS came into effect, Quantile regression was addressed to know the distribution effect among the income quintiles.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1. Introduction

To reiterate, this study aimed to investigate the impact of financial inclusion on income inequality in Namibia. This chapter outlines and interprets the findings in alignment with the study's objectives, building upon the methodology discussed in Chapter 3. The initial section of this chapter offers a descriptive analysis of the principal variables incorporated in the study. The second and third parts of the chapter present the results of the ordinary least square (OLS) and the two-stage least square (2SLS), while the fourth part presents results from the quantile regression. A post-estimation test and conclusion then follow this.

4.2. Descriptive Statistics

The summary statistics on household and individual characteristics, including household income and the level of financial inclusion across the different income quintiles, are displayed in Table 4.1. The different quintiles presented households according to the 25^{th} (low-income), 50^{th} (low-middle-income), 75^{th} (upper-middle income) and 100^{th} (high-income) households (Demir *et al*., 2020). The findings suggest that 75% of the respondents possess accounts at recognized financial institutions, and households with higher incomes exhibit increased levels of financial inclusion. Specifically, the level of account ownership ranges from 57% for the first quintile to 93% for the fourth quintile. The results further indicate that 62% of the sample have access to savings services, with only 41% of low-income households compared to 86% of high-income households having access to savings services. Only 16% of households have access to formal credit, with only 4% of low-income

households compared to 40% of high-income households. Generally, the results indicate that the level of financial inclusion varies significantly with income.

Table 4.1: Description statistics for the full sample and by quintiles

	Full		Q1		Q2		Q3		Q4	
Variable	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
Household per capita income	3,202	41,132	82	50.7	331	106	905	252.6	11,641	81,982
Household asset index	0.61	0.20	0.50	0.17	0.57	0.17	0.61	0.17	0.76	0.17
Household size	4.15	3.01	6.59	3.68	4.45	2.14	2.90	1.98	2.32	1.70
Age of respondent	38.8	16.3	36.75	16.39	40.19	18.72	40.82	17.19	38.13	12.02
Have a formal bank account	0.75	0.43	0.57	0.50	0.71	0.46	0.81	0.39	0.93	0.25
Have a formal savings account	0.62	0.49	0.41	0.49	0.57	0.50	0.69	0.46	0.86	0.35
Have a formal credit account	0.16	0.37	0.04	0.20	0.09	0.28	0.15	0.36	0.40	0.49
Urban resident	0.47	0.50	0.33	0.47	0.42	0.49	0.43	0.50	0.70	0.46
Respondent is male	0.43	0.50	0.29	0.45	0.37	0.48	0.53	0.50	0.56	0.50
The household head is married	0.33	0.47	0.33	0.47	0.37	0.48	0.28	0.45	0.34	0.47
No education	0.11	0.31	0.16	0.37	0.12	0.33	0.14	0.34	0.03	0.17
Completed primary	0.25	0.44	0.31	0.46	0.33	0.47	0.24	0.43	0.12	0.32
Completed secondary	0.54	0.50	0.51	0.50	0.52	0.50	0.61	0.49	0.53	0.50
Tertiary education	0.10	0.30	0.01	0.11	0.04	0.19	0.02	0.14	0.32	0.47

Notes: Standard deviation in parentheses. Full Columns present statistics for the entire sample; columns (Q1)–(Q4) present statistics in quantiles Q1=25th, Q2=50th, Q3=75th and Q4=90th income inequality by household characteristics

The average per capita income for Namibian households is N$3,202. This ranges from N$82 for households with lower incomes to a high of N$11,641 for those with substantial incomes, highlighting a pronounced disparity between Namibia's affluent and the less affluent households. The average composite score for the household asset index is 0.61, ranging from 0.50 for low-income households to 0.76 for high-income households. There are four persons per household, with the average number ranging from 7 in low-income households to 2 in high-income households. This suggests that the level of fertility is higher among poorer than rich households. The average age of the household head in the sample is 39 years. The results demonstrate that 47% of the

households reside in urban areas, with 70% of high-income households and 42% from low-middle-income households from urban areas.

On average, 33% of the household heads are married, and interestingly, the distribution among the quintiles is unevenly ranging from 33% in the 25th quintile, 37% in the 50th quintile, 48% in the 75th quintile, and 34% in the fourth quintile. It is worth noting that about 43% of the households are headed by men, and for low-middle-income households, the average stands at 37% and 56% for high-income households. Concerning the educational level of the household head, 11% have no formal education. This breaks down to 3% for those in the fourth quintile and 16% for those in the first quintile. On average, about 25% have completed primary education, with 31% in the 50th quintile and 12% in the 90th quintile. Approximately 54% have completed secondary education, with about 51% of the low-income households and 53% of the upper-income households having completed secondary education. Only 10% of household heads have completed tertiary education, with only 1% of those from low-income households compared to 32% for high-income households.

4.3. The effect of financial inclusion on household income.

4.3.1. Ordinary Least Squares Results

The OLS regression estimates for the aggregated and the rural-urban disaggregated sub-samples are reported in Table 4.2. The results show that having a formal bank account, having a formal savings account, having a formal credit account, gender (being male), residential area(urban), marital status(married), household size, and educational attainment are all critical determinants of the household's wellbeing. Generally, the effects are significantly higher in the urban than in the rural

specification. However, household size and gender do not significantly impact the urban sample.

Table 4.2: The effect of financial inclusion on household well-being

Variables	Full sample	Rural	Urban
Household size	-0.004***	-0.006***	-0.0001
	(0.001)	(0.001)	(0.002)
Age of individual in years	-0.004	-0.004	-0.001
	(0.010)	(0.012)	(0.017)
Have a formal bank account	0.055***	0.048***	0.085***
	(0.012)	(0.014)	(0.021)
Have a formal savings account	0.030***	0.027*	0.032*
	(0.011)	(0.014)	(0.017)
Have a formal credit account	0.078***	0.072***	0.075***
	(0.010)	(0.017)	(0.013)
Individual resides in urban areas	0.097***		
	(0.007)		
Individual is male	0.015**	0.030***	-0.004
	(0.007)	(0.009)	(0.011)
Individual is married	-0.017**	-0.029***	0.001
	(0.008)	(0.010)	(0.013)
Completed primary education	0.022*	0.014	0.035
	(0.012)	(0.014)	(0.024)
Completed secondary education	0.111***	0.090***	0.152***
	(0.012)	(0.015)	(0.022)
Completed tertiary education	0.232***	0.166***	0.285***
	(0.017)	(0.027)	(0.026)
Constant	0.435***	0.462***	0.445***
	(0.039)	(0.047)	(0.067)
Observations	1,845	977	868
R-squared	0.437	0.253	0.367

*Notes: Standard errors are given in parentheses. The main results (rural and urban sub-samples combined) are presented in the first column, results from rural households are in the second column, and results from urban households are in the third column. * Denotes statistical significance at 10%, ** denotes significance at the 5% level and *** denotes significance at the 1% level.*

Having a formal bank account increases the household well-being index by 0.06 units. However, the effect varies between 0.09 units for the urban sample and 0.05 units for the rural sample. A formal savings account can improve the household well-being index by 0.03 units in the full sample, with a higher effect among urban than rural dwellers. Having access to credit significantly improves the household well-being index by 0.08 units, which aligns with previous findings - noting that access to credit

facilitates investment in human capital and business ventures, which can lead to wealth accumulation (Galor and Zeira, 1993; Mukong & Amadhila, 2021; Atta-Aidoo *et al.,* 2022). The results show that individuals in urban areas are more likely to have a higher well-being index than those in rural areas. Being an urban resident increases the asset index by 0.10 units. These results are in tandem with the findings of Mallick and Zhang (2019), who found that overall welfare grew due to financial inclusion, even though such growth in welfare was greater in urban households than rural households. According to the literature, rural areas often experience higher poverty than urban areas. This disparity is attributed to limited job opportunities, restricted access to financial services, inadequate access to necessities, and a scarcity of tertiary education opportunities (Koomson *et al.,* 2020).

The education of the household head has a positive and significant effect on the household asset index. Completing primary education increases the asset index by 0.02 units, whereas completing secondary education increases the asset by 0.11 units and having some tertiary education increases the asset index by 0.23 units. This resonates with Psacharopoulos and Patrinos's (2004) findings on the varying returns to different levels of education. Regarding the control variables, the effects are largely as expected. Like previous studies, the study finds that together with financial inclusion, household size (Iddrisu & Danquah, 2021; Churchill & Marisetty, 2020) and education attained for the household head (Churchill & Marisetty, 2020) play a significant role in reducing income disparity. However, these results can be biased because of the problem of endogeneity associated with financial inclusion, and thus, to rule it out, the study proceeds to estimate unbiased effects using 2SLS.

4.3.2. Two-stage Least Squares Results

The results presented in Table 4.3 are obtained using the two-stage least square estimation. The instrumental variable is the distance to formal financial institutions. Results from the first stage suggest that distance to formal financial institutions significantly determines access to a bank account, savings and credit. The findings align with the OLS outcomes shown in Table 4.2, indicating that financial inclusion significantly and positively affects household well-being. The result implies that the standard OLS model is inconsistent in explaining the effect of financial inclusion on household income, hence the need to interpret estimates from the two-stage least squares model. Compared to the estimates of the endogenous OLS estimates in Table 4.2 and the two-stage least squares model in Table 4.3, the results show that the OLS model underestimates the effect of financial inclusion on household well-being.

Table 4.3: The effect of financial inclusion on household well-being using 2SLS estimation

	Second stage results			First stage results		
	(1)	(2)	(3)	(4)	(5)	(6)
Household size	-0.003**	-0.002	-0.005***	-0.045***	-0.048***	-0.015
	(0.001)	(0.001)	(0.001)	(0.011)	(0.011)	(0.015)
Age of individual in years	-0.029**	-0.052***	0.009	0.898***	1.060***	0.435***
	(0.014)	(0.014)	(0.010)	(0.097)	(0.094)	(0.118)
Individual residing in urban areas	0.091***	0.087***	0.091***	0.241***	0.189***	0.283***
	(0.009)	(0.009)	(0.008)	(0.081)	(0.073)	(0.086)
Individual is male	0.016**	0.016**	0.016**	-0.002	-0.023	-0.079
	(0.008)	(0.008)	(0.008)	(0.071)	(0.066)	(0.078)
Individual is married	-0.011	-0.014*	-0.026***	-0.043	0.024	0.290***
	(0.008)	(0.009)	(0.009)	(0.080)	(0.074)	(0.086)
Completed primary education	0.011	0.008	0.025*	0.334***	0.312***	0.394*
	(0.014)	(0.014)	(0.013)	(0.111)	(0.111)	(0.215)
Completed secondary education	0.077***	0.064***	0.116***	1.166***	1.150***	1.112***
	(0.019)	(0.017)	(0.013)	(0.113)	(0.110)	(0.201)

Completed tertiary education	0.220***	0.184***	0.191***	1.719***	1.838***	1.896***
	(0.023)	(0.023)	(0.020)	(0.233)	(0.195)	(0.220)
Distance is more than an hour				0.442***	0.455***	0.522***
				(0.074)	(0.066)	(0.090)
Have a formal bank account	0.206***					
	(0.037)					
Have a formal savings account		0.225***				
		(0.026)				
Have a formal credit account			0.247***			
			(0.022)			
Constant	0.460***	0.567***	0.430***	-	-	-
				3.473***	4.460***	4.093***
	(0.045)	(0.049)	(0.042)	(0.393)	(0.381)	(0.507)
Rho	-	-	-			
	0.455***	0.567***	0.560***			
	(0.122)	(0.076)	(0.062)			
Sigma	0.156***	0.163***	0.158***			
	(0.005)	(0.005)	(0.004)			
Observations	1,845	1,845	1,845	1,845	1,845	1,845

*Notes: Standard errors are given in parentheses. Results from the second stage least squares are in columns (1) to (3), and outcomes from the first stage resat squares are in columns (4) to (6). Control variables include the age of the household head, household size, household per capita income log, urban residence, gender, marital status of the household head, financial decisions within the household, and dummies for the education of the household head. *Denotes statistical significance at 10%, **denotes significance at the 5% level and ***denotes significance at the 1% level.*

Overall, an increase in the level of financial inclusion improves household well-being. The results are consistent across the different methodological approaches and measures of financial inclusion. The results indicating the welfare-enhancing effect of improved financial inclusion align with previous studies (Atta-Aidoo *et al.*, 2022; Mukong and Amadhila, 2021; Koomson *et al.*, 2020; Mohammed *et al.*, 2017). However, in terms of the magnitude of the effects, it is observed that they are significantly higher when the 2SLS than the OLS is used. For instance, the OLS estimates indicate that having a bank account increases the household well-being index by 0.06 units, but the 2SLS estimates show that it increases the well-being asset index by 0.21 units. On the other hand, having a savings account increases the well-being asset index by 0.03 units for the OLS and 0.23 units when 2SLS is used. Access to credit increases index by 0.08 units when OLS is used and by 0.25 units when 2SLS

is used. It indicates that OLS regress results are biased downward – consistent with evidence from previous studies (Iddrisu & Danquah, 2021; Koomson *et al.,* 2020; Demir *et al.,* 2020).

The estimated results according to geographical location are shown in Table 4.4. The effects of formal bank account and savings account ownership are significantly higher in rural households than in urban households. The results show that bank accounts improve household well-being by 0.239 units in rural areas and 0.237 units in urban areas. A formal savings account can improve the household asset index by 0.25 units in rural households and 0.22 in urban households. This contradicts findings by Atta-Aidoo *et al. (*2022) that financial inclusion among urban households has a greater effect than their rural counterparts and that urban households are more financially included than rural households.

Table 4.4: 2SLS estimates of financial inclusion and household wellbeing by location.

	Rural Sample			Urban sample		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Household size	-0.005***	-0.004**	-0.006***	0.003	0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age in years	-0.055***	-0.070***	0.019	-0.007	-0.034	-0.011
	(0.016)	(0.016)	(0.012)	(0.019)	(0.022)	(0.019)
Reside in urban areas	0.027***	0.026**	0.032***	-0.003	-0.002	-0.004
	(0.010)	(0.011)	(0.010)	(0.011)	(0.012)	(0.012)
Individual is male	-0.028**	-0.030**	-0.034***	0.010	0.005	-0.016
	(0.011)	(0.012)	(0.011)	(0.013)	(0.013)	(0.014)
Completed primary education	-0.003	-0.004	0.021	0.026	0.029	0.029

	(0.016)	(0.017)	(0.015)	(0.026)	(0.027)	(0.028)
Completed secondary education	0.031	0.024	0.104***	0.131***	0.127***	0.134***
	(0.019)	(0.019)	(0.015)	(0.027)	(0.028)	(0.025)
Completed tertiary education	0.112***	0.079**	0.118***	0.284***	0.261***	0.216***
	(0.033)	(0.035)	(0.034)	(0.030)	(0.033)	(0.031)
Have a formal bank account	0.239***			0.237***		
	(0.029)			(0.044)		
Have a formal savings account		0.252***			0.219***	
		(0.025)			(0.040)	
Have a formal credit account			0.254***			0.287***
			(0.039)			(0.027)
Constant	0.574***	0.654***	0.403***	0.379***	0.525***	0.559***
	(0.056)	(0.060)	(0.049)	(0.068)	(0.076)	(0.076)
Rho	-	-	-	-	-	-
	0.776***	0.889***	0.671***	0.429***	0.508***	0.807***
	(0.139)	(0.126)	(0.173)	(0.165)	(0.157)	(0.110)
Sigma	-	-	-	-	-	-
	1.867***	1.823***	1.930***	1.820***	1.790***	1.731***
	(0.044)	(0.044)	(0.031)	(0.031)	(0.038)	(0.036)
Observations	977	977	977	868	868	868

*Notes: Standard errors are given in parentheses. Results from the rural specification are in columns (1) to (3), and results from the urban specification are in columns (4) to (6). Control variables include household size, age of household head, urban specification, gender (individual being male), marital status of household head, and dummies for the education of household head. *Denotes statistical significance* p<0.1, ***denotes significance at the* p<0.05 *and ***denotes significance at the p<0.01.*

Although access to formal credit accounts is more prevalent in urban areas than rural ones, the influence on household well-being is notably greater for households in rural areas (0.254 units) than urban regions (0.219 units). This substantiates the presumption that access to credit can furnish households with the resources to engage in productive endeavours, facilitating wealth accumulation and the potential for diminishing income inequality. This echoes the findings of Galor and Zeira (1993), who found that credit constraints significantly impact wealth distribution. It's also in line with previous findings, which demonstrate that financial inclusion reduces the poverty level of rural

households by 38% compared to 22% for urban households and future risk of poverty by 39% and 22%, respectively (Koomson *et al*.,2020). It also corroborates the discoveries of Park and Mercado (2021), who found that financial inclusion notably diminishes poverty and provides evidence of its role in lowering income inequality.

4.3.3 Quantile regression of the effect of financial inclusion on income inequality.

This study expands upon the current body of evidence, specifically within the Namibian context, to offer a more comprehensive understanding of the association between financial inclusion and household income. It achieves this by scrutinizing the complete distribution of the dependent variable (per capita income) through quantile analysis. Specifically, the study investigates how financial inclusion influences the income level of households with low-, medium-, and high-income (income inequality). In other words, the subsequent sections of the model gauge the impact of the independent variables on the conditional distribution at various quantiles within the dependent variable's distribution. This approach aids in comprehending how the influence of financial inclusion on income inequality varies across different income distribution quantiles. Additionally, it addresses a gap in the current literature by providing insights into how the impact of financial inclusion on income inequality varies across different quantiles of the income distribution.

Table 4.5: Quantile regression results and the OLS results

Variables	OLS	0.25	0.50	0.75
Household size	-0.243***	-0.283***	-0.263***	-0.239***
	(0.010)	(0.013)	(0.010)	(0.011)
Log of age of respondent	0.275***	0.488***	0.350***	0.210**
	(0.083)	(0.113)	(0.083)	(0.094)
Have formal bank account	0.218**	0.278**	0.083	0.209*
	(0.100)	(0.137)	(0.101)	(0.115)
Have formal saving	0.366***	0.428***	0.335***	0.157
	(0.091)	(0.125)	(0.092)	(0.105)
Have formal credit	0.772***	0.682***	0.756***	0.766***
	(0.085)	(0.116)	(0.086)	(0.097)
Urban resident	0.393***	0.341***	0.373***	0.472***
	(0.062)	(0.084)	(0.062)	(0.070)
Male headed household	0.471***	0.521***	0.476***	0.379***
	(0.058)	(0.080)	(0.059)	(0.067)
Household head is married	-0.065	-0.116	-0.091	-0.045
	(0.065)	(0.089)	(0.065)	(0.074)
Primary education	0.180***	0.006***	0.060***	0.149***
	(0.103)	(0.140)	(0.103)	(0.117)
Secondary education	0.325***	0.123***	0.305***	0.442***
	(0.102)	(0.140)	(0.103)	(0.117)
Tertiary education	1.683***	1.432***	1.769***	1.904***
	(0.140)	(0.191)	(0.141)	(0.160)
Constant	4.948***	3.869***	4.994***	5.951***
	(0.325)	(0.445)	(0.327)	(0.372)
Observations	1,802	1,802	1,802	1,802
R-squared	0.515			

*Note**:** This table presents quantile regression outcomes concerning the effect of financial inclusion on income inequality. The dependent variable is household income inequality, quantified by per capita income. Financial inclusion is assessed through three indicators: Account (holding an account at a formal financial institution), Savings (making savings at a formal financial institution), and Credit account (borrowing from a financial institution). Control variables include the respondent's age, household size, residence, gender, marital status per household head, and*

*Education attained. Standard errors are in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1.*

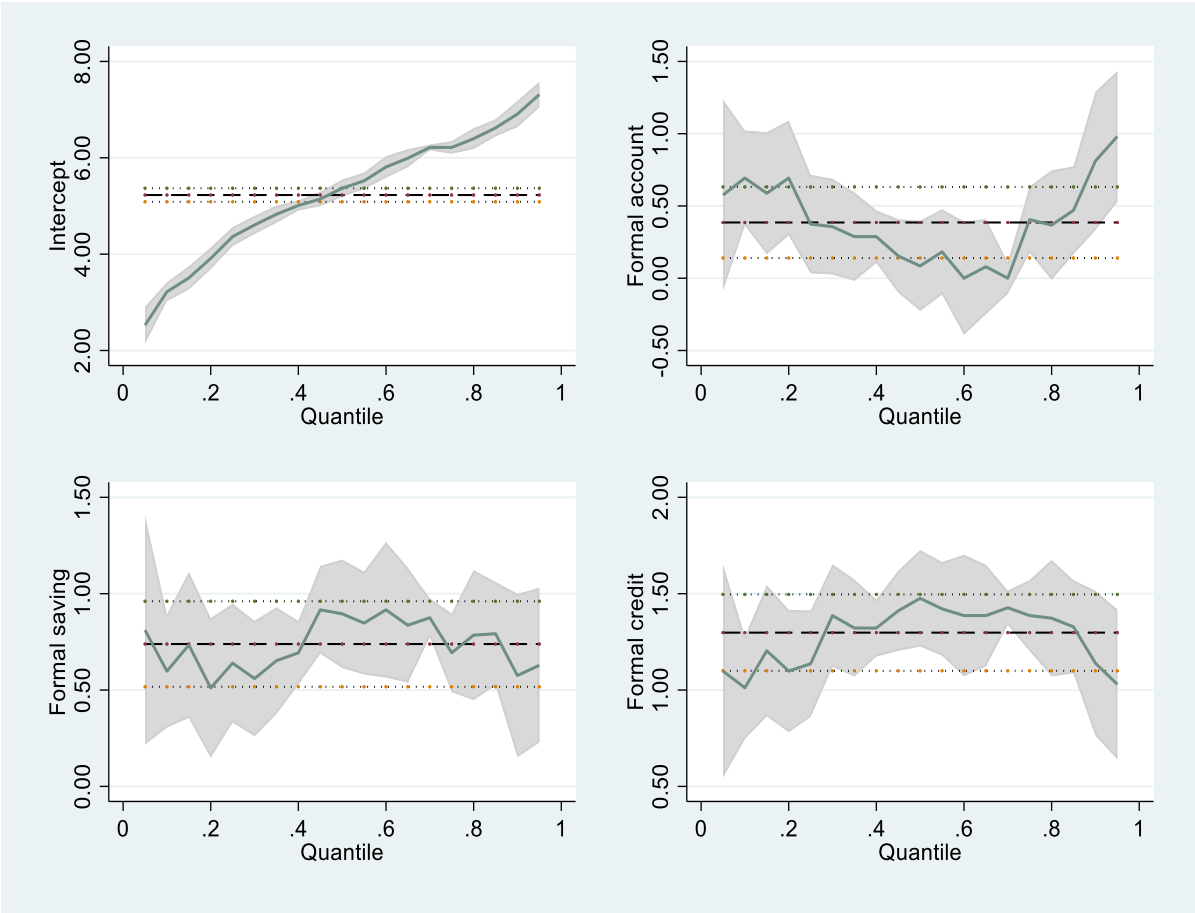
The study examines whether the inequality-reducing impact of financial inclusion varies across different income quintiles, a question that, to the best of our knowledge, has not been fully addressed in Namibia. In Table 4.5, factors such as possessing a formal bank account, maintaining a formal credit account, holding a formal savings account, the age of the respondent, the residential area, the marital status of the household head, the educational level of the household head and the gender of the household head all exhibit positive and statistically significant associations with household per capita income when OLS is taken into account across all quintiles. Different variables affect the per capita income differently, and the distributional effects vary across the income quintiles.

Interestingly, the results show that households with a formal bank account increase household well-being by 0.28 units for those at the lower quintile (25 percentile), 0.22 units for those at the 75 percentile and 0.08 units for those at the middle quintile. The effects of having a credit account, being an urban resident and education attained are higher among high-income households, with estimates at 0.766 units, 0.472 units, and 1.904 units, respectively than in the lower quintiles - 0.682 units, 0.341units, and 1.432 units respectively. The effects of having a formal saving account, male and age, are higher among low-income households – with estimates at 0.428 units, 0.521 units, and 0.488 units, respectively and lower among high-income households (0.157 units, 0.379 units, and 0.210 units, respectively). The findings indicate that access to bank and savings accounts exerts a more significant impact on the impoverished segments of the population than the wealthier segments, suggesting their importance in alleviating

poverty and income inequality. However, access to credit reduces poverty but does not have a similar impact on income inequality, as its effects are more pronounced among the affluent rather than the less affluent. Consequently, financial inclusion can be considered a pro-poor policy. These results align with those of Altunbas and Thornton (2019), who found that an augmentation in financial development correlates with heightened income across all quantile levels.

Household size is negatively significant to per capita income, ranging from -0.28 for the low quintiles to -0.26 units for the middle quintiles and -0.24 units for the higher quintile and full sample. This indicates that the effect of household size on per capita income is greater at the higher quantiles and the entire sample but reduces as we move to lower quantiles. This is consistent with the notion that larger families have more individuals sharing a similar income level, reducing per capita income and contributing to income inequality. Similar findings were reported by Alesina and Giuliano (2011), who found a negative relationship between household size and per capita income. Although further research is required, these outcomes can indicate that financial inclusion and development yield divergent distributional consequences. Our results indicate that financial inclusion – whether proxy by formal account ownership, savings, or access to credit accounts – plays a crucial role in reducing poverty, but only savings and account ownership reduces income inequality. Altunbas and Thornton (2019) also proposed that various facets of financial inclusion exert distinct effects on reducing inequality. This concurs with the findings of Demir *et al.,* (2020). Although financial inclusion notably diminishes inequality across all quantiles of the inequality distribution, these impacts are predominantly pronounced within the higher-income quintiles.

Figure 4.1: Quantile regression coefficients



Note: The quantiles of the dependent variable are denoted on the horizontal axis, while the magnitude of coefficients is depicted on the vertical axis. The OLS coefficient is illustrated as a horizontal line encompassed by two horizontal lines denoting the confidence interval. Notably, the OLS coefficient remains consistent across quantiles.

In Figure 4.1, the quantile regression coefficients are graphically presented as lines that fluctuate across the quantiles, accompanied by confidence intervals surrounding them. It is essential to highlight that when the quantile coefficient falls outside the confidence interval of the OLS, it signifies a significant disparity between the quantile and OLS coefficients. In Figure 4.1, the quantile coefficients for the level of financial inclusion (the independent variable) on household income per capita (the dependent variable) are significantly different from the OLS coefficients. Moreover, the effect of having a formal bank account increases for households with lower income by 0.25

quintiles, higher income households by 0.75 quintiles, and lastly, with middle-income households by 0.50 quintiles. Having a formal saving account affects income inequality in that the lower quintiles (0.25) have higher distribution effects, and the higher quintiles (0.75) have lower distribution effects. Having a credit account effect is distributed highly from the higher quintiles to the lowest with lower quintiles; this is similar to the conclusion in Table 4.5.

4.4. Diagnostic Tests

4.4.1. Heteroscedasticity test

In Table 4.6, the significant p-value of 0.0002, less than the conventional significance level of 0.05, suggests that the Breusch-Pagan test statistic significantly differs from zero. This provides evidence of heteroscedasticity in both the OLS and 2SLS models. Heteroscedasticity's existence implies that the errors' variance in the model is not consistent across all levels of the independent variables, thus contravening the assumption of homoscedasticity, which presupposes a uniform variance of errors. Heteroscedasticity can lead to inefficient and biased coefficient estimates in the OLS and 2SLS models.

Table 4.6: Heteroscedasticity - Income per Capita Model

Breusch-Pagan/Cook-Weisberg test for heteroscedasticity	
H0: Constant variance	
Chi2(1)	Prob>Chi2
13.52	• 0.0002***
Household asset index specification	
53.23	0.0000***

*NB: In the table above, *** represents a significantly different regression coefficient from zero at the 5% significance level.*

Given the presence of heteroscedasticity, it is justified to consider alternative modelling approaches, such as quantile regression, which is robust to heteroscedasticity (Katchova, 2013). Quantile regression enables the exploration of the relationship between variables at various quantiles of the distribution of the dependent variable, offering more robust and precise results, particularly in the presence of heteroscedasticity (Katchova, 2013; Wooldridge, 2018).

4.5. Conclusion

The analysis in this chapter provides valuable insights into the factors affecting household income and well-being, mainly focusing on the role of financial inclusion. The results generally show that the effect of financial inclusion and socioeconomic characteristics on income inequality is not uniform across income distributions in Namibia, as evidenced by different coefficients across OLS, 2SLS, and quantile regressions.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

In the preceding chapters, the study conducted a comprehensive study on financial inclusion and income inequality in Namibia. This concluding chapter summarizes the essential findings and presents actionable recommendations for policymakers, financial institutions, and stakeholders. The study aims to contribute to literature on Namibia's more inclusive and equitable economic landscape. Through data-driven insights and strategic guidance, the study provides a roadmap for fostering financial inclusion and reducing income inequality in this unique socio-economic context.

5.2. Conclusions

This study investigates the influence of financial inclusion on household income inequality and well-being in Namibia, utilizing data from the nationally representative household survey NFIS 2017. Household per capita income and household asset index created using the UNDP approach are proxies for household well-being. Thus, the study empirically investigates the impact of financial inclusion proxy by formal bank account ownership, access to savings accounts and access to credit on household per capita income and the well-being index. The distributional effects of financial inclusion across the different income quintiles in Namibia was one of the literature gaps that was addressed in this study. In addition, the magnitudes of the estimates were expected to vary significantly between rural and urban areas and across the different measures of financial inclusion. The study elicits a number of interesting results.

Financial inclusion estimates were found to be positive and significant, and the magnitude of the effects was found to vary between rural and urban households and with the inclusion of household socioeconomic characteristics. The results indicate that the degrees are generally larger among urban than they are in rural households and get lower when household characteristics are included. The effects are significant across the different measures of financial inclusion. Financial inclusion leads to reduced inequality across all quantiles of the inequality distribution. When examining access to formal credit, its impact is more pronounced in the higher quantiles. In contrast, when assessing access to formal banks and savings accounts, the effects are more substantial in the lower quintiles. This can be attributed to high income earners being able to borrow more than low income earners due to requirements that are put in place such as having collaterals that low income earners do not possess and thus tend to strive to save as they do not have the privileges to acquire credit facilities. The above conclusion goes in hand with Banerjee and Newman (1993) that argues that the effect of financial market imperfections prevents the efficient allocation of resources to people experiencing poverty to carry out human and physical capital investments, indicating that financial development helps reduce income inequality.

Household characteristics chosen for this study following similar studies (Iddrissu and Danqhah, 2021 and Danquah *et al.*, 2017) included household size, marital status, geographical location, highest education attained, age of household head, which have all been proven to be vital in determining the level of inequality measured by household asset index and income. As indicated, the results are higher in urban households than in rural households. These findings are consistent with previous financial inclusion research, which suggests that formal account ownership, formal

savings and formal access to credit reduce inequality (Demir *et al*., 2020; Park & Mercado, 2018; Turégano & Herrero., 2018). These findings contribute to a growing cross-country literature on financial inclusion's role in combating income inequality at different household levels. However, the findings above are what (Mukong and Amadhila,2020) obtained, thus in this study we extend the findings of the existing Namibian based study by (Mukong and Amadhila, 2020) that while an increase in financial inclusion is associated this a decrease in income inequality all levels of inequality, the effects are particularly driven by high income earners financial inclusion pronounced more in higher income quintiles when having acces to credit in pronounced and more in low income quintiles when having a formal bank and savings accounts is pronounced . This findings are consistent with (Demir *et al*., 2022; Altunbas and Thornton , 2019). The study's findings conclude that to achieve the most effective reduction in inequality through financial inclusion, there must be enhanced access to formal financial services. This includes access to credit, formal bank accounts, and formal savings accounts. While financial inclusion is an effective policy for reducing poverty, its impact is more pronounced in low-income households compared to higher-income households.

5.3. Recommendations

Based on the main findings of this study which is finacial inclusion being pronounced more in high income quintiles when having access to credit is in question and pronounced more in low income quintiles when considering having a formal bank and saving account is pronounced, it is recommended that policymakers focus their efforts on creating a conducive environment for financial inclusion. This should involve implementing regulations and institutional frameworks promoting policies for low-

income group such as letting individuals with no collaterals to obtain credit facilities up to a certain amount and give better options for them to pay back, if for instance not being able to payback on time they should work on public projects to pay pay their dues. This may have a positive impact on household . In particular, by obtaining access to credit, household can invest in education, health and proper nutrition, engage in new business creation or expand an existing business, with potentially positive impacts on household welfare

Both public and private financial services should be encouraged to grow and expand to reach these underserved populations.

To reduce income disparities and bridge the wealth gap, especially among vulnerable groups in rural areas and low-income households, national and international agencies should remain committed to improving access to financial services. This can be achieved through policies that offer attractive saving options for lower-income households, provide incentives for low-income individuals, create favourable conditions for interest on loans or microcredit options, and support financial literacy programs to enhance individuals' understanding of financial matters.

Furthermore, policies should address the socioeconomic challenges of larger households, married households, and younger individuals. Initiatives such as family planning and socioeconomic support for larger, low-income families can help reduce income inequality. Policies that provide study loans, bursaries, and scholarships, particularly to low-income households, can contribute to levelling the playing field and promoting economic equality.

5.4. Area for Future Researchers

This study mainly focuses on financial inclusion, socioeconomic factors and income inequality. For this study, only the indicators of the objective household asset index were used due to the available data; future researchers should consider incorporating the subjective aspect of it. Further research could also investigate the complex dynamics identified in this study, such as the mixed effects of savings on income and asset ownership or the counter-intuitive findings about bank account ownership and explore additional factors contributing to income disparity in Namibia, such as gender aspects and job market discrimination. Longitudinal studies might also be helpful to understand the long-term effects of financial inclusion and household characteristics on income disparity. It can also provide insights into how these relationships evolve.

5.5. Summary

In conclusion financial inclusion estimates were found to be positive and significant, and the magnitude of the effects was found to vary between rural and urban households and with the inclusion of household socioeconomic characteristics. The results indicate that the degrees are generally larger among urban than they are in rural households and get lower when household characteristics are included. The effects are significant across the different measures of financial inclusion. Financial inclusion leads to reduced inequality across all quantiles of the inequality distribution. When examining access to formal credit, its impact is more pronounced in the higher quantiles. The study recommended based on the main findings of this study which is financial inclusion being pronounced more in higher income quintiles when having acces to credit in pronounced and more in low-income quintiles when having a formal bank and savings accounts is pronounced, it is recommended that policymakers focus their efforts on creating a conducive environment for financial inclusion. This should involve implementing regulations and institutional frameworks promoting policies for low-income groups such as letting individuals with no collaterals to obtain credit facilities up to a certain amount to accommodate the less fortunate and promote equality in Namibia.

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