IMPACT OF CREDIT ACCESS ON HOUSEHOLD POVERTY: A CASE OF SMALLHOLDER FARMERS IN MALAWI

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MA(ECONOMICS) THESIS

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DECLARATION

I the undersigned hereby declare that this thesis/dissertation is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used acknowledgements have been made.

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Full Legal Name

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Signature

31st May 2024

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Date

CERTIFICATE OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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DEDICATION

I dedicate this paper to my family.

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ABSTRACT

This study evaluates the impact that access to credit has on welfare of smallholder farmers in Malawi in order to address the gap left in previous studies concerning smallholder farmers access to credit. The study employed data from Malawi's Integrated Household Survey 2019/2020 and used the Heckman Selection model to examine the impact of credit access on welfare of smallholder farmers in Malawi. It employed the Heckman Selection Model, which was deemed applicable since the selection to participate in credit programmes is typically non-random. Natural log of daily households' consumption from the 2020 poverty report data by the National Statistics Office was used as a proxy for household welfare. The results of the study indicate that financial institutions, residential area, employment, distance to town and social cash transfers received per household of every smallholder farmers had an impact on the selection into the credit programme. It also established that household size, household head education and household head sex contribute to the state of household welfare poverty. In light of this, the study recommends that policymakers expedite the operationalisation of credit programmes with the intent to increase participation by improving policies such as the agricultural credit Policy and Action Plans. There should also be an increase in adult literacy programmes and development of credit institutions that target smallholder farmers in general.

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ABBREVIATIONS

ERS	Endogenous Regime Switching
FAO	Food and Agriculture Organisation
IFPRI	International Food Policy Research Institute
IHS5	Integrated Household Survey
IMR	Inverse Mills Ratio
IQ	Intelligence Quotient
MGDS	Malawi Growth and Development Strategy
MK	Malawi Kwacha
MM	Mobile Money
MSME	Micro, Small and Medium Enterprise
NGO	Non-Agricultural Organisations
SGDs	Sustainable Development Goals
GoM	Government of Malawi
NSO	National Statistics Office
MARDEF	Malawi Rural Development Fund
MRFC	Malawi Rural Finance Company
SACCO	Savings and Credit Cooperatives

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Smallholder farmers play a significant role in the agricultural sector in Malawi, with over 80% of the population relying on this sector for their livelihoods (Tuni et al., 2022). However, smallholder farmers in Malawi face numerous challenges, such as limited access to credit and financial services, which limits their ability to invest in their farms and increase their productivity. As a result, smallholder farmers in Malawi face persistent poverty, which undermines the country's efforts to improve individual household income and consumption levels and their overall standards of living (Rebecca & Kiggunduthe, 2021). It is also a critical issue, as it is closely linked to Malawi's pillar-1 of 2063 vision of reducing poverty and improving the standards of living for all Malawians through agricultural productivity and commercialisation.

Malawi's Vision 2063 is a long-term development strategy that aims at transforming Malawi into a prosperous and developed country by 2063 (GoM, 2020). The vision focuses on economic transformation, governance, human development, and regional integration. In order to achieve this vision, Malawi must address the challenges faced by its smallholder farmers and support their access to credit and financial services, enabling them to increase their productivity and resilience to shocks (NPC, 2020).

Food and Agriculture Organisation (FAO) defines smallholder farmers as small-scale farmers, pastoralists, forest keepers, fishers who manage areas varying from less than one hectare to ten hectares of land for agricultural purposes, and are characterized by family-focused motives such as favouring the stability of the farm household system, using mainly family labour for production and using part of the produce for family consumption (FAO, 2012).

According to the National Statistics Office (2020), the total land area under cultivation in Malawi is about 3.8 million hectares. Smallholder farmers cultivate small and fragmented land holdings of less than one hectare (on average 0.69 ha) under customary land tenure arrangements and produce lower crop yields than those produced in the estate subsector, and mong these smallholder farmers, female-headed households cultivate relatively smaller land holdings than their male-headed counterparts (0.84 ha compared to 1.61 ha) (IHS-5, 2019/2020).

Access to credit by smallholder farmers in Malawi refers to the ability of these farmers to secure loans and financial support from various sources such as banks, microfinance institutions, and government agencies to invest in their agricultural activities (Argaw, 2017). This access is critical for the financial stability and growth of smallholder farmers in the country, allowing them to purchase inputs, upgrade their production technologies, and improve their livelihoods. Agricultural credit schemes have the potential to provide smallholder farmers with the necessary financial boost to increase their yields and in turn reduce poverty, but unfortunately, smallholder farmers in Malawi face various challenges in accessing credit, including limited access to formal financial institutions, low levels of financial literacy, and lack of collateral (Salima et al., 2023).

In Malawi, there have been various initiatives aimed at increasing access to credit for smallholder farmers, including government-led programs and private sector initiatives. For example, Malawi government through the Ministry of Agriculture has established strategies and policies like the financial inclusion policy, agricultural credit schemes and Malawi Growth and Development Strategy that play crucial roles in promoting farmers' access to credit in Malawi.

Financial inclusion policy is aimed at increasing access to financial services by the unbanked and underserved population, including farmers, to enable them to access credit facilities (GoM, 2014). Agricultural credit schemes, on the other hand, are designed specifically to support the agriculture sector by providing farmers with credit facilities that are essential for their livelihoods. The Malawi Growth and Development Strategy (MGDS

I, II and III), also recognizes the importance of agriculture in the country's economy and aim at increasing the productivity of the sector by promoting the development of agriculture-based industries and providing farmers with credit facilities (GoM, 2017).

Despite the Government efforts discussed above, poverty still remains a persistent problem for smallholder farmers in Malawi. The new World Bank Poverty Assessment Report finds that over half of the Malawian population (50.7%) are still poor, almost no different from a decade ago and our high reliance on rain-fed smallholder agriculture is one of the core drivers of these stagnant poverty levels (Caruso et al., 2022). Furthermore, out of 15 million smallholder farmers in Malawi, very few farmers have access to credit from formal financial institutions in Malawi, which is the only formal alternative of our limited government subsidies in securing modern farm inputs like seeds, fertilizers, technologies and machinery required to improve farm outputs as a step towards poverty reduction (Obreque, 2022; FinMark et al., 2019).

1.2 Problem Statement

In Malawi, smallholder farmers make up nearly 80% of the population, and 50.7% of them are still living in poverty, not different from a decade ago (Caruso et al., 2022; Tuni et al., 2022). This occurred during the transition from MGDS I to MGDS III, whose goal was to align with Malawi's long-term development vision of transforming the agricultural sector and reducing poverty in Malawi. It is therefore a major mystery why the MGDS failed to achieve these goals. This makes it doubtful that poverty will be reduced by the year 2063. According to Kunyenje, (2019), the main reason why the majority of Malawians find it difficult to enhance their economic wellbeing is lack of financial boosts like credit facilities to cushion them in times of unfavourable conditions. It is the same case with smallholder farmers in Malawi (Salima et al, 2023).

Government and non-governmental organizations have made a lot of efforts to reduce poverty among smallholder farmers in Malawi, and such interventions include farm input subsidies, agricultural training, and civic education campaigns on modern agriculture.

However, there hasn't been much done in terms of financial inclusion (credit access to smallholder farmers).

There has been limited research conducted using the current IHS5 data that analysed the direct causal relationship between credit access and poverty. The available literature only stresses the relationship that credit access have on food security, and not poverty which is a broad and dominant variable, hence the need for further research (Chilimba et al., 2020; Salima et al, 2023).

1.3 Main Objective

The main objective of this study is to analyse the effects of smallholder farmers' access to credit on household poverty in Malawi.

1.4 Specific Objectives

1. To analyse the factors that affect smallholder farmers access to credit in Malawi.
2. To estimate the impact of smallholder farmers access to credit on poverty.

1.5 Hypotheses Tested

Based on the above objectives, the study will test the following null hypotheses:

1. There are no factors that affect smallholder farmers access to credit in Malawi.
2. Smallholder farmers access to credit does not affect poverty.

1.6 Significance of the Study

Linking smallholder farmers access to credit and their poverty in Malawi contribute to policy processes for all stakeholders (the Government, policy makers, development practitioners, Financial Service providers and Mobile Network Operators) in the country, and the results of this study will contribute to the body of existing literature.

1.7 Organisation of the Study

The remaining parts of the study are organised as follows: Chapter Two reviews the theoretical and empirical literature on credit access and poverty. Chapter Three presents

the methodology used in this study. Chapter Four presents the results and discussions and lastly Chapter Five provides conclusion and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses key theories of credit access, economic growth and how they all help to alleviate household poverty. It further discusses some empirical findings on the same.

2.2 Credit Access

Nearly all scholars and decision-makers agree that it is very important for poor people to have access to financial services. As a result, many nations have committed to increasing their people' financial access. One such pledge is the Maya Declaration. Developing and emerging nations had signed the declaration as of 2018, pledging to achieve 80 quantifiable goals to expand financial inclusion which represents credit access in the case of this study. In addition, eight of the United Nations' 17 Sustainable Development Goals (SGDs) include financial inclusion as a goal. It is promoted as a facilitator for the eradication of poverty, the reduction of hunger, improved gender equality, economic empowerment of women, as well as the development of industry, innovation, and infrastructure (Alliance for Financial Inclusion, 2011).

Different definitions of credit access exist. First, according to some academic writing, credit access refers to the accessibility and equality of chances for all financial services including credit (Svitlana et al., 2019). Measures like the quantity of bank branches per specified population are employed in these situations. Additionally, the number of Banks and microcredit providers in a given region are considered. The quality, appropriateness, timeliness, and affordability of financial services are occasionally added to this description (Nkoa & Song, 2020). A more new but crucial component of measuring credit access is the measurement of quality. Eight quality indicators, including affordability, transparency,

convenience, fairness, customer protection, financial education, indebtedness, and choice, have been included as well. These policies deal with the majority of the barriers that prevent populations especially the poor from participating in the financial markets, which are primarily caused by various forms of societal exclusion.

The definition of credit access has lately begun to place a strong emphasis on usage as well. Evidence seems to indicate that even in areas where services are offered, usage is occasionally low. For instance, the *Mzansi plan* resulted in the opening of about 6 million bank accounts in South Africa. Only 3.7 million of these were still online in 2011 ((World Bank, Financial inclusion,, 2014). Therefore, the use of additional metrics to assess financial inclusion including credit levels is growing. The addition of mobile money (MM) accounts in the measurement of financial inclusion and credit access is one such significant development. The information counts how many people make use of a specific service over the course of a year. Up to 40% of adults in developing countries only use MM accounts that are not linked to bank accounts (ibid). The measurements would be severely skewed if such an important dimension is not included. Particularly in Africa, where other avenues of financial access are severely constrained, mobile money has been hailed as a crucial player in boosting financial inclusion and credit access. According to a study conducted in 2018, the emergence of mobile money (MM) services may have sparked a new kind of entrepreneurship that has led to a rise in employment creation (Koblanck, 2018).

2.3 Theoretical Foundations for the relationship between poverty and access to finance

Generally speaking, there are two ways that finance can impact poverty. Firstly, it can affect poverty through growth, which is an indirect channel. Financial intermediaries are the primary source of this impact, by combining savings and offering loans to entrepreneurs, these financial intermediaries boost their output and, in turn, economic growth. As the financial industry matures, more sophisticated goods that go beyond basic intermediation, like those offered by stock markets, can effectively provide monitoring and risk mitigation services to ensure that businesses run profitably. The advantages of the ensuing economic expansion should flow down to poor people in the form of more

employment and better resource distribution. This is therefore the first indirect channel of impact on poverty (Simatele, 2021).

The second channel is a more direct one, the one that helps the poor to have easier access to financing. Poor people are able to expand their consumption, make profitable investments, engage in human capital, and manage risks if they have access to savings, credit, and effective payment systems. In turn, this lessens their vulnerability and increases their access to better job possibilities and in turn reduce poverty among them (ibid).
The impact of finance on poverty is depicted diagrammatically in Figure 1.

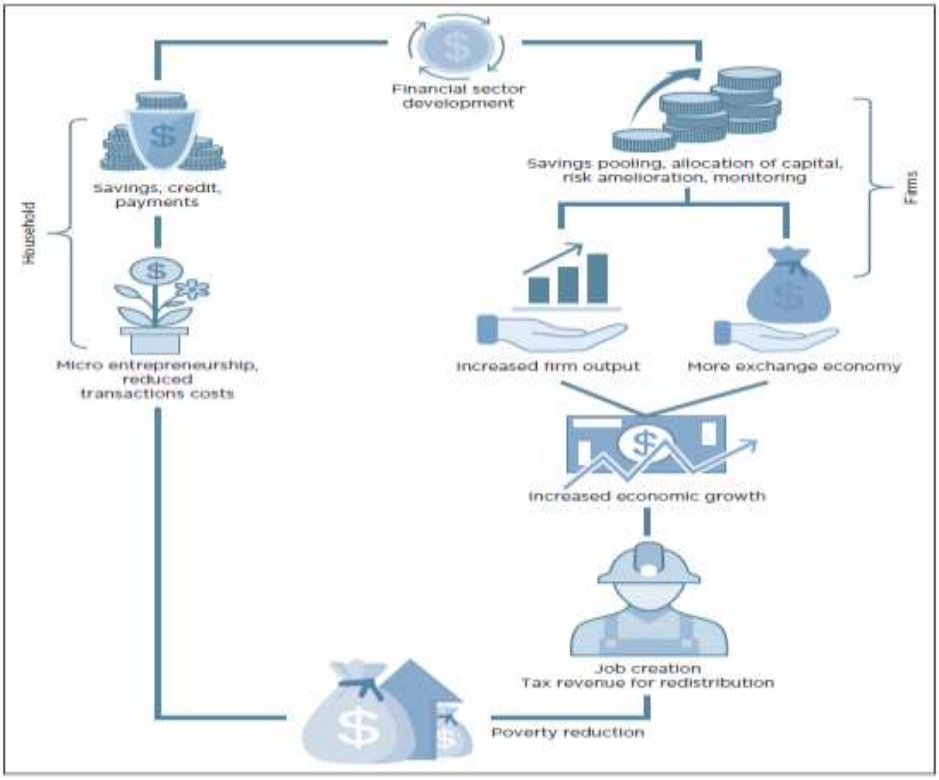

Figure 1: Finance–Poverty Nexus

Source: ***(Simatele, 2021)***

2.4 Indirect Channels of Finance to Poverty Reduction

It is possible to think of the impact of money on poverty through the growth channel as a two-tiered process. Through a number of sub-channels, finance influences development in the first tier. Poverty is impacted by economic development in the second tier. This is

commonly referred to as the finance-growth nexus in most literatures. Using classification of (Levine, 2005), we continue to talk about the different ways that finance can influence expansion.

2.4.1 From Finance to Growth

2.4.1.1 Production of Information and Allocation of Capital

Most economic and investment theories explain that capital is efficiently allocated when it is directed towards the most profitable investment possibilities. This correlation, however, assumes that investors have access to the necessary data to make choices. But there are numerous knowledge asymmetries in the financial markets that are expensive to correct. However, the price of obtaining this knowledge can be extremely high, discouraging savers from making investments (Levine, 2005). Financial intermediaries can offer information on businesses, possible returns, and market conditions, which lowers the cost of information gathering and processing. This results in decreased transaction costs for investments that boost productivity and encourage development.

Financial markets that can better provide information will almost certainly lead to better capital allocation and consequent development in an economy. In their model, (Levine & King, 1993) demonstrate how established financial systems provide data on potential business owners and then make use of this data to identify the most likely ones and provide funding to them. Furthermore, according to Brainard, (1963), financial intermediation can promote growth by reducing borrowing costs and enabling investors to take out loans with favourable conditions.

The information advantage that financial markets have allows them to identify innovative entrepreneurs with new goods and processes, which promotes economic development. By providing information and reducing agency issues, the models quoted by (Simatele, 2021) show how financial development impacts innovation. For instance, moral hazard issues are brought on by risk aversion and knowledge asymmetries.

It is very expensive to solve these issues in the financial markets. By offering insurance and better monitoring, financial intermediaries can greatly reduce these costs. This then encourages creative thinking and commercial expansion (ibid). Furthermore, the author wrote that continued financial development is essential for maintaining economic growth in addition to the beneficial effects that it has on growth. They further explained that unless financiers innovate, "technological innovation and economic growth will ultimately cease.

2.4.1.2 Risk Improvement

Information asymmetries and transaction costs raise the degree of risk and uncertainty in investments. Financial intermediaries offer risk sharing and hedging, allowing investors to engage in potentially risky but high-return investments. Investors can manage risk in three different methods using financial markets. In the first place, financial markets give buyers the chance to diversify their holdings. Investors can spread out their assets as a result. According to Díaz & Esparcia, (2019), investors are usually risk averse. However, riskier investments generally have larger returns. Financial markets can cause a portfolio change toward higher yielding investments by giving investors the chance to diversify their investments across projects, regions, and nations (Gurley & Shadow, 1955). According to Acemoglu & Zilibotti, (1997), financial systems provide chances for the diversification of risky projects, which encourages the reallocation of resources toward high-return investments and is likely to lead to increased economic development.

Secondly, financial markets give investors the chance to protect themselves from danger brought on by macroeconomic shocks. Projects and regions are apt to be equally impacted by such shocks. The worldwide financial crisis of 2007–2008 is an excellent example. Financial markets, particularly intermediaries, can present chances for the intertemporal smoothing of risk in such circumstances.

By enabling investments with a long-term view and influencing returns that react to economic cycles, they offer hedging, financial middlemen can do this to get rid of non-diversifiable risks (Allen & Gale, 1997).

Thirdly, by lowering liquidity risk, financial markets can boost economic development. When an investor's ability to convert assets into liquid resources like cash and its equivalents at reasonable prices is unclear, there is an increase in liquidity risk. It results from a mismatch between investor and saver tastes. On the one hand, savers place short-term deposits because they prefer a high level of liquidity. Higher return investments, on the other hand, require a longer period to pay off and necessitate long-term financing. Financial markets provide maturity transformation, particularly through middlemen, to reduce liquidity risk.

Households would typically avoid engaging in high-yielding non-liquid investments without financial market intermediation out of concern for short-term liquidity shocks. Banks can eliminate the maturity mismatch by pooling short-term deposits and creating long-term loans, which boosts capital output and spurs economic expansion. (Diamond & Dybvig, 1983) describe how banks carry out this function, and (Levine, Stock Markets, Growth, and Tax Policy, 1991) expands this to include stock markets.

Furthermore, with well-developed financial markets, it is less likely that the quasi-rents that the financial markets take will be used successfully. Financial markets will take a portion of the resources from individuals and businesses by charging a lending interest rate above the deposit rate in order to effectively provide intermediation and risk pooling services. The resulting quasi-rents, which can be used for private consumption when financial markets are underdeveloped, can lead to ineffective investments and slow development. Investors are encouraged to put their money in non-liquid assets with higher returns and greater positive effects on economic development when financial markets are developed enough to offer opportunities to convert non-liquid assets into liquid ones at low costs.

2.4.1.3 Pooling of Savings

Due to the indivisibility of non-liquid investments, increased development necessitates the availability of significant sums of capital. By combining savings from various sources, financial growth enables intermediaries to accumulate investment capital. Because of the

informational and scale advantages of intermediaries, this procedure lowers transaction costs. One of the first growth models to ever propose the importance of financial intermediaries as a catalyst for invention, growth, and development is the Schumpeterian growth model.

According to Schumpeter, (1911), intermediaries make deals easier, encourage the use of savings, and improve risk and entrepreneur management. This means that while enhancing procedures for monitoring them, financial intermediaries enable the collection of deposits from households that are then pooled together to finance entrepreneurial initiatives.
In order for capital to accumulate and loanable funds to be available, a saver's desire to part with their money is a major factor. For this to occur, savers must be adequately compensated for forgoing the immediate use of their savings and feel confident entrusting their savings to reputable borrowers. The cost of finding these loans can deter people from saving. The solution is for financial middlemen to offer a positive deposit rate. As a result, there will be less need for financial precautions, which will encourage families to save more money.

The nature of risk aversion and the strength of the income impact relative to that of the substitution both play a role in how a greater savings rate will affect economic growth. Higher deposit rates generate more interest revenue, which can stimulate more spending and consequently boost the economy. This is the income effect. At the same time, increased savings rates mean that savers are reducing their consumption rate opting to deposit their money in a financial intermediary. This withdrawal of funds from the circulation into savings would dampen the economic growth rate. This is the substitution effect. The net effect on growth, therefore, depends on whether the substitution or the income effect is stronger.

2.4.1.4 Easing trade and exchange

The role of money as a medium of trade is one of its fundamental purposes. Money, which is essential to the growth of the finance sector, makes trade and exchange possible and easier. Trade depends on bartering when there is no money, but this method is expensive

because it requires analysing the qualities of different goods. A medium of exchange can exist thanks to developed financial markets, which can result in more commerce and exchange. Additionally, because developed financial markets make commerce more affordable, they can promote more specialization.

According to Levine, (2005), the decrease in transaction costs brought on by financial growth is a continuing phenomenon. Thus, ongoing financial progress can further translate specialization into increased technological and creative output exchange.

2.4.1.5 Monitoring

Financial institutions can boost economic development by enhancing cooperative governance with the aid of market surveillance systems. This is so that they will initially be ready to save or invest when they can monitor how businesses allocate and use capital. Boards of directors can be used to oversee a company indirectly or directly through voting processes. Managers, however, can engage in activities that may not always align with those of the owners and in ways that cannot be successfully monitored by boards because they have considerable discretion over information.

2.4.2 From Growth to Poverty Reduction

By boosting job prospects and real wages, growth can reduce poverty. Additionally, higher economic development leads to capital accumulation. The poor may have access to more investable money as a result, which may raise their incomes and lower poverty. Higher tax revenues provide a second pathway, increasing the government's capacity to boost social spending.

2.4.2.1 Increased Jobs and Wage equalities

The trickle-down theory, which contends that any increases in output will ultimately reach the poor, was widely used in early literature. The trickle-down effect is insufficient, as demonstrated by (Aghion & Bolton, 1997), to accomplish a fair distribution of resources that benefits the underprivileged. Redistributive procedures should improve how the benefits of economic development are distributed. They demonstrate that capital markets

are less distorted in the presence of redistribution, giving the poor less distorted chances for profitable investment.

In addition to reducing inequality and poverty, economic growth also creates more job possibilities. The wage gap between expert and unskilled labour may narrow as a result. However, evidence suggests that growth alone is insufficient to generate employment that help the poor. The growth's structure and character are important. According to the International Labour Organization, the effect of economic growth on job creation is influenced by both the rate of growth and the effectiveness with which growth is converted into profitable employment. The sector composition of development and the capital/labour intensity are two examples of variables that affect growth efficiency. Because the poor frequently have extremely low skill levels, growth that is biased towards labour-intensive sectors will typically have a substantial effect on poverty (Simatele, 2021).

The trickle-down theory's limitations were thus recognized in later attempts, and terms like *pro-poor* growth and, more recently, *inclusive growth*, are now more prevalent in the literature. Although the two terms have a comparable focus, there are important distinctions that demonstrate the development of knowledge about how growth affects poverty. On the one hand, pro-poor development favours growth that disproportionately benefits the poor and places a heavy emphasis on them. Even though this growth might not entirely benefit the pertinent industries, it can boost tax revenues and other forms of government funding. Through transfers and greater government spending, this can then be distributed. Contrarily, inclusive growth focuses on fostering entrepreneurship and productive employment in order to help larger portions of the population. As skills and socioeconomic factors improve, labour productivity usually rises as well. It follows that improved financial access, which can increase skill investment, will not only improve the lives of the poor but also help the economy develop sustainably (ibid).

2.4.2.2 Human capital and government spending

Increased taxation and expenditure by the government can also reduce poverty. One body of writing emphasizes the importance of investing in human capital as a source of growth.

This claim asserts that human capital is an outcome of spending. (McKinnon, 1973) asserted that such a commitment is, however, indivisible. Due to the distortions in the financial market, not everyone has equitable access to the credit market, which would enable such investment. As a consequence, the poor have limited credit options and are unable to borrow money to fund their education (Semmler et al., 2016). Governments can redistribute the benefits of increased economic development, for example, by taxing the richer people and spending money on education. To some degree, such redistribution will always affect the poor, and if it has a significant impact, the poor will qualitatively alter the way they invest in education. Over time, this will lead to an accelerated decrease in poverty and inequality. Early childhood education and skill development investments frequently have a significant influence on economic growth (Hanushek & Woessmann, 2020).

2.5 The Direct Effect of Finance on Poverty Reduction

2.5.1 The Basic McKinnon–Shaw Hypothesis

The McKinnon-Shaw Hypothesis serves as the foundation for the direct impacts of finance on poverty. The main tenet of the hypothesis is that financial markets will operate in a way that makes it possible for the underprivileged to have access to more effective and pertinent services when financial markets are well-developed and real interest rates are positive. According to the complementarity theory put forth by (McKinnon, 1973), physical and financial assets complement one another. The two presumptions that support the theory. The first is that economic agents can only finance themselves, and the second is that those profitable ventures have a lot of indivisibilities. The algorithm does not differentiate between investors and savers. Due to the indivisible nature of investments, a prospective investor must accumulate funds until they are adequate to make the intended investment. As a consequence, financial and physical capital are intertemporally complementary. The availability of profitable chances for saving and consequently accumulating can help the poor by financial services. In this manner, the savings channel, or "conduit effect," of financial services can have an impact on poverty. In order for savers to be motivated to save based on the prospect of interest income, interest rates must be liberalized and

permitted to be determined by the market. McKinnon's Hypothesis is occasionally referred to as an outside money paradigm because it relies on self-financing.

Like McKinnon, Shaw supports financial market liberalization and claims that higher interest rates will boost savers' incomes and provide more chances to diversify domestic asset portfolios. Shaw's theory does not demand that investors be self-financing, in opposition to McKinnon. According to his debt-intermediation theory, a "collection of financial marketplaces" that act as intermediaries connect savers and investors (Shaw, 1973). It is an inside money strategy as a result. These middlemen draw assets, which raises the amount of money available for loans. Shaw's debt intermediation theory thus adds a credit channel of financing to poverty in addition to the focus on saving.

Shaw further contends that by giving knowledge about returns on savers' deposits to those who, in his view, are "working under a handicap of ignorance," financial intermediaries increase the effectiveness of the financial system and decrease allocative waste. Financial markets are fragmented as a consequence of perceived information as being expensive and incomplete. Similar to this, these marketplaces show severe credit rationing. This fragmentation is minimized by financial development, which also lowers borrowing costs and improves access to credit for the poor.

According to Shaw,(1979) money is a debt owed to the monetary system, and its main function is to be used as a method of exchange. He contends that the amount requested is closely related to the use of money as a form of payment. Along with the savings and credit channels mentioned in both McKinnon and Shaw's hypotheses, this adds the payments channel through which finance can have an impact on the poor. The financial industry can contribute to the reduction of poverty by offering dependable and affordable payment services for regular transactions and remittances. An accommodating payment method fills a crucial exclusionary gap for the impoverished, who are typically on the margins. This makes it easy and affordable for them to engage in mainstream finance. As they send and receive payments at reasonable rates, it becomes simpler for them to trade, which has an immediate effect on their day-to-day activities.

2.6 Dealing with Poverty through Finance

2.6.1 Access to Savings Services

Increasing access to savings services can aid the underprivileged in managing risk, reducing spending, and investing in the development of human capital. They may be able to collect as well for profitable investments. By expanding access to bank accounts, offering alternative delivery channels like digital finance, and connecting informal savings organizations to formal financial services, savings services can be improved.

2.6.2 Increasing Access to Credit

Credit, in addition to saving, can improve the likelihood that the poor will take advantage of opportunities to generate income. According to the literature, increased entrepreneurship is favourably correlated with poorer people having greater access to credit. Because they are likely to have very little savings, people in poverty cannot take advantage of economic chances because of their low incomes.

Similar to this, because of market frictions, the impoverished also tend to save in kind. Access to the credit market can lessen these frictions and enable the poor to engage in micro and small businesses, which may lead to a decline in poverty. Increasing microcredit, largely based on the Grameen Bank Plan, has been the strategy that has received the most widespread adoption (Simatele, 2021).

2.6.3 Facilitating Payments

Payment systems are crucial for financial equality and have a variety of effects on poverty. For example, effective payment services can increase credit access by lowering transaction costs, handling cash, and facilitating money transfers. Digital payments have significantly lowered the price of giving the poor access to financial services. As a result, many households have reduced their journey times to service locations and have avoided paying expensive bank fees.

Even though digital payments are more and more common, the impoverished still rely heavily on cash for day-to-day transactions. This is primarily due to the low acceptance of

digital payment methods in unregulated markets, where the majority of the impoverished trade. The expense of transactions can significantly rise in an unstable payments system. Additionally, payment systems can reduce poverty by supplying marketplaces where money can be transferred that are competitive.

2.7 Empirical Review

Access to credit for smallholder farmers is a critical element for the economic development of rural communities in Malawi and all sub-Saharan African countries, where agriculture remains a key sector for livelihoods and poverty reduction. In Malawi, like many other countries in the region, smallholder farmers face significant challenges in accessing credit due to limited financial infrastructure and low levels of financial literacy like alluded to earlier on. The consequences of limited access to credit for these farmers are often dire, including reduced investment in agricultural production, lower productivity, and a cycle of poverty.

Empirical studies have explored the relationship between credit access and poverty reduction among farmers in sub-Saharan Africa, including in Malawi. These studies have examined the effects of different types of credit programs, including microfinance, agricultural credit, and government-supported programs, on farmers' income, productivity, and well-being.

In Malawi Salima et al., (2023) conducted research on how credit availability affected family food security. This observational study looks at how access to formal or informal credit affects family food security in Malawi, a developing nation with a credit crunch. In light of possible endogeneity between credit access and food security, the research uses the fifth Integrated Household Survey (IHS5) and the Endogenous Regime Switching (ERS) method as well as the Tobit regression model. Indicators of informal credit access include access to extension services, size of landholdings, household size, and vulnerability to shocks, according to regression findings. Key determinants of access to formal credit include education level and household size. According to the research, while having access to formal credit raises household food security, having access to informal credit lowers

food security overall. Different policy repercussions are inferred from these findings. This paper therefore lacked evidence on how poverty is directly affected, hence the need for further research.

Another researcher also analysed the impact of microfinance programme participation on household food security in Malawi (Chilimba et al., 2020). The study used cross-sectional data that was collected in Malawi for the Third Integrated Household Survey in 2010-2011. It employed the Heckman Selection Model, which was deemed applicable since the selection to participate in credit programmes is typically non-random. The study established that households that participated in microfinance programmes experience improvements in their status of food security. Their paper therefore lacked evidence on how poverty is directly affected, hence the need for further research that we embarked on. Another research in Nigeria examined how small-scale farmers' access to credit could reduce their poverty in Kwara State Agba et al., (2018). Under the guidance of the Landmark University economics department, a study was performed in 2018 on the use of credit by small-scale farmers and its effects on the reduction of poverty in the state of Kwara. The Cobb-Douglas production function, which was modified for use in the study, was used to calculate the productivity of small-scale farmers using the conventional least square technique. The research assessed both borrowers and non-borrower's poverty levels as well as profitability and net farm income. The difference between credit users and non-users was found to be insignificant, despite the fact that credit users had greater productivity, profitability, and Net farm income. Additionally, it was discovered that farmers who had recourse to credit experienced poverty at a lower rate than farmers who did not. Hence, the study concludes that credit can ensure poverty reduction and also assist to include small scale farmers in the development process if it is made available in sufficient quantities. Because credit can have a positive effect on reducing poverty, the study suggests that formal financial institutions and the government work together to increase the amount of credit accessible to small-scale farmers.

Recently in 2022, Dunga et al., (2022) examined the effect of credit availability on welfare disparity in Malawi. In order to fill the gap left by earlier studies on credit, this research

assesses the effects that access to credit has on welfare inequality in Malawi. The research used data from Malawi's 2017 Integrated Household Survey and propensity score analysis to look at how access to credit may affect household welfare in Malawi by using consumption per capita as a stand-in. The research went on to investigate the welfare disparities between households that access credit and those that do not using the generalized Lorenz curve, Theil indices, and the Gini coefficient. The findings indicated that households with access to credit experience lower levels of inequality than those without, which has a beneficial effect on welfare. However, a deeper look at the Theil's indexes revealed that variables unrelated to credit access had a greater impact on inter-household disparities than credit access itself. The findings suggest that access to credit has a beneficial influence on welfare inequality, though this impact is relatively small. Consequently, it is implied that policies aimed at improving credit distribution should persist. To get the desired outcome, a more comprehensive strategy for reducing inequality should be implemented simultaneously at the household and national levels.

Ampah et al., (2017) also added to the body of knowledge by analysing how the central area of Ghana's access to credit and financial services affected the reduction of poverty in that year. The goal of the research was to ascertain, from the viewpoints of Micro, Small and Medium Enterprises (MSME's), how access to credit and financial services affected the reduction of poverty in Ghana's Central Region. In most nations, micro, small, and medium-sized businesses play a major role in efforts to combat poverty and promote economic growth. Many nations around the world have long acknowledged the significance of MSMEs. However, numerous studies have pointed to a lack of access to credit and financial services as the primary barrier to the expansion of MSMEs and the eradication of poverty in Ghana. This study's specific goal was to determine how financial services and credit availability impacted efforts to reduce poverty. Four sub-hypotheses were operationalized from one main hypothesis that covered the specific objective and the different indicators of poverty (growth in income, increase in consumption expenditure, acquisition of business assets and ability to educate children). This cross-sectional research sampled 370 owners of Micro Small and Medium Enterprises using cluster sampling methods. In an experiment that was conducted in November and December of 2016, a

questionnaire was used as the data gathering tool. Cross tabulations and multiple regression analysis were carried out using SPSS. According to the research, having access to credit and financial services had a negligibly positive impact on income growth, consumer spending growth, and the purchase of corporate assets. However, the research discovered that the ability to educate children as a measure of poverty had a significant impact on access to credit and financial services. As a result, the research disproved the relevant null hypotheses. Along with pointing out limitations, the study draws conclusions and suggests ideas for additional research in light of the results.

Now adopting Grameen Bank Model, which is a microfinance lending model developed by Nobel Peace Prize winner Muhammad Yunus in the 1970s in Bangladesh. This research has separated access to formal credit through banks from the microfinance institutions credits which are of difference in nature to analyse their impact on smallholder farmers poverty. This model provides small loans, or microcredit, to impoverished individuals who lack access to traditional banking services. The loans are often used to start or expand small businesses, such as selling goods in a market or starting a small farm. The model places a strong emphasis on empowering poor people, who often face greater barriers to accessing credit and other financial services. As a result, over 90% of Grameen Bank's borrowers are women and the poor (Simatele, 2021).

The Grameen Bank Model has been widely praised for its success in alleviating poverty, promoting entrepreneurship, and empowering women. It has inspired the development of microfinance institutions around the world and has helped millions of people in poverty to improve their lives through access to credit and financial services.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter is organised in four sections. Section 3.2 contains the data sources used, Section 3.3 presents the theoretical econometric specification, while 3.4 presents the empirical modelling. Section 3.5 include the descriptions of both the dependent and independent variables used in this study and lastly, section 3.6 presents diagnostic tests.

3.2 Data Sources

The study has used the Fifth Integrated Household Survey (IHS5) and Poverty Report 2019/2020 data which are all secondary data from National Statistical Office (NSO) which was compiled from April 2019 to March 2020. The household questionnaire, which gathered detailed information on household characteristics, served as the primary source of information for the main variables of this research (poverty and access to credit) as many researchers have also used them in a similar manner Salima et al., (2023). The secondary data used in this research has no ethical issues and is openly accessible by the general public.

3.2.1 Identifying Smallholder Farmers from the IHS5 Data

Smallholder farmers cultivate small and fragmented land holdings of less than one hectare (on average 0.69 ha) under customary land tenure arrangements and produce lower crop yields than those produced in the estate subsector, and mong these smallholder farmers, female-headed households cultivate relatively smaller land holdings than male-headed households with (0.84 ha compared to 1.61 ha) respectively (IHS-5, 2019/2020). Based on the above definition, the study identified smallholder farmers from the data by capturing all households who owned a total land of less than 2.6 acres and less which is equal to the stated average of 1 hectare of land or less.

3.3 Theoretical Modelling Framework and Econometric Specification

The study considered all smallholder farmers that responded 'yes' to the IHS5 household questionnaire which captured those who received credit for the previous 12 months from the time of the study as Chilimba et al., (2020) recommended.

Unfortunately, participation of those in the sample into the credit programmes was by choice and privileges hence our sample was not random. so our sample is not a true reflection of the large population of smallholder farmers that have access to credit in Malawi because there are a number of households that are subject to uncontrolled factors that do not change over time and eventually limit their access to credit by nature such as religious beliefs (*e.g. Muslims who do not borrow or lend on credit*), levels of their intelligence quotient (IQ), cultural and tradition beliefs and many more that put other people to a disadvantage of accessing credit than others who are not subject to such factors. These factors make the study sample not random or non-comparable, in other words, the sample is subject to sample selection bias. To correct and account for this sample selection bias, this study adopts the Heckman probit selection model as recommended by (Wooldridge, 2015; Heckman, 1988).

According to Heckman, (1988) the Heckman Probit selection model is a statistical model that is used to estimate the relationship between a binary outcome variable and a set of explanatory variables in the presence of sample selection bias. The model was developed by James Heckman, and it assumes that the sample selection bias arises from an unobserved variable, known as the selection variable.

In the Heckman Probit selection model, there are two equations: the selection equation and the outcome equation. The selection equation is a probit regression model that estimates the probability of selection into the sample. The outcome can be estimated using lin-log regression model to estimate the relationship between the binary outcome variable and the explanatory variables, after controlling for the selection bias.

The Heckman Probit selection model eliminates sample selection bias by accounting for the correlation between the selection variable and the outcome variable. The model estimates the impact of the selection variable on the outcome variable and corrects for this bias by incorporating the inverse Mills ratio, which is a function of the probit estimate from the selection equation, into the outcome equation.

The inverse Mills ratio is used as a correction factor in the outcome equation to adjust the coefficients of the explanatory variables for the selection bias. This correction factor ensures that the estimated coefficients reflect the relationship between the variables in the population, rather than the biased relationship that results from the sample selection.

The first stage, a probit model is estimated to determine participation in a credit programme. The probit model is given as follows:

pr $(d_i = 1) = \phi\ (y'Z_i)$ ……. i

Where d_i represents the smallholder farmers participation in credit, status of household i, and 1 if the household was involved in the credit programme and 0 if otherwise, ϕ stands for the cumulative standard normal distributions, y′ indicates the transpose of a vector y, the transpose of a vector y (*representing coefficients*) is a row vector and the vector Z_i contains variables thought to affect a household's decision to participate in a credit programme.

The models are then estimated using the following likelihood function:

$d_i = \phi\ (y'Z_i) + e_i$ ……ii

And in Probit model, we again observe only '*d'* such that

(d_i = 1) if the smallholder farmers had access to credit

(d_i = 0) if otherwise

Where d_i represents smallholder farmers access to credit, being d_i = 1 if the smallholder farmers had access to credit and (d_i = 0) if otherwise, ϕ (.) represents the cumulative standard normal distribution, y′ indicates the transpose of a vector y, the transpose of a vector y (*representing coefficients*) is a row vector and the vector Z_i includes elements that may influence a smallholder farmers' choice to take an initiative of accessing credit or not and e_i captures the error term.

In order to have differences in welfare outcomes attributed to credit access, a necessary condition is that those with access match with those without access except for treatment (Masanjala, 2006). When this happens the welfare outcome, poverty, is statistically independent of treatment status, and then the equation can be estimated as in equation (iv) below. But it has been noted that selection in access to credit is non-random, such that the dummy variable capturing credit access d_i may end up being correlated with an error term e_i *and E (*e_i d_i*)* $\neq 0$.

In order to correct for the correlation between the error term and the dummy variable, (Heckman, 1988) suggests incorporating the expected value of the selection error term into the equation of the welfare outcome, poverty. The correction error term is found by computing the Inverse Mills Ratio (Mills or IMR) given by:

$$\lambda_i = E\ (e_i |\ d_i\ ) = \frac{-\ \phi\ (y'Z_i)}{1-\ \phi\ (y'Z_i)} \quad \text{..... iii}$$

The dummy variable for credit participation is then estimated and included in the main welfare function below that will capture welfare (poverty).

Secondly, the study adopted (Mukherjee & Benson, 1998) in its approach to analyse poverty, and to do that, the study used the natural log of total daily consumption from National Statistics Office (NSO) poverty data, our household welfare indicator. This is our dependent variable. As the distribution of the logged welfare indicator better approximates a normal distribution than does that of the simple welfare indicator, we use the logged welfare indicator in computing our model.

The model can be specified as follows:

$$lnY_i = \beta_0 + \beta_i{}'X_i + \lambda_i\Delta + \mathcal{E}_i \quad \text{.....iv}$$

where lnY_i is natural log of total daily consumption of household 'i' in real Malawi Kwacha (MK), X_i is a set of exogenous determinants of poverty in Malawi (Mukherjee & Benson, 1998) and $\lambda_i\Delta$ capturing the access to credit through the inverse mills ratio in (3) above and finally $\mathcal{E}_i$ to represent the error terms in the model.

3.4 Empirical Modelling

Now borrowing a leaf from (Masanjala, 2006), the Probit model on smallholder farmers access to credit is specified as below:

The model has been modified to accommodate other variables:

$$\Pr\left(cred\_acce_i^d\right) = \phi\left(a_0 + a_1 Financial\_Inst_i + a_2 Reside_i + a_3 Employment_i + a_4 Non\_Agric\_Enterprise_i + a_5 Urban\_distance_i + a_6 Cash\_Trans\_Received_i + a_7 Livestock\_Ownership_i + a_8 Livestock\_Total_i + a_9 Fisp_i + e_i\right) \quad \ldots\ldots\ldots\ldots\ldots \text{v}$$

The welfare model adopted from (Mukherjee & Benson, 1998) is then modelled as follows:

$$lnY_i = \beta_0 + \beta_1 Total\_Land_i + \beta_2 hhsize_i + \beta_3 Head\_Age_i + \beta_4 Age\_SQ_i + \beta_5 Dependency_i + \beta_6 Education_i + \beta_7 IMR_i + \mathcal{E}_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{vi}$$

An empirical problem that is common in this model is finding appropriate identification variables (Masanjala, 2006). Estimation of participation is only possible when variables in the selection model and in the second welfare function are not common. In this case, the variables in the two models are different; thus, the model can be estimated.

3.5 Definition of Variables

3.5.1. Dependent Variables

lnY_i : representing the natural logarithm of total *daily consumption* to measure welfare/poverty. This is in a continuous variable format. The more the households spends, the better their welfare.

$\Pr\left(cred\_acce_i^d\right)$: represents both formal and informal *credit access*, these are all the households that actually received loans both from the Banks, loan institutions and money lenders.

3.5.2. Independent Variables

$Financial\_Ist.$: This is a community variable that describes the availability of any financial institution in the community. It is expected that households who live in communities that have these financial institutions will have an upper hand in accessing credit than those that literally don't have them in their communities.

Residence (rural=1 and 0 otherwise): According to Kadale, (2009) Malawi's rural regions receive poor bank branch service, which limits their access to bank credits and other financial services. It is anticipated that location and credit access will have a negative association. It is also anticipated that there will be a negative relationship between location and poverty reduction in rural areas because of such limitations on access to credit.

IMR: Inverse mills ratio is a variable that has been incorporated in the welfare function to capture the selected/estimated credit access. This study will use this main variable to see if it has impact on poverty or not as used by Chilimba et al., (2020).

$Tota\_Land$: This variable measures all land that the households own in the community. It is expected that it will have a positive relationship with credit access.

$Livestoc\_Total$: This variable captures all livestock in total that the household own. It has a positive relationship with credit access.

Household Size: This variable captures the total number of people in a household. The larger the size of the household, the more they will spend and the higher will be their daily consumption, so as long as daily consumption is concerned, their relationship will be positive. Households of more people are likely to be well-off.

Head_Age: This variable captures the age of the household head. As the household age increases, there are more chances of being accepted and being able to access credit and so the relationship will be positive.

Age_i^2: Captures the potential non-linearity in the connection between age and credit availability (Fungáčová & Weill, 2015). The likelihood that someone will have access to credit increases as age does. However, there comes a point where an increase in age no longer increases the likelihood of reducing poverty or increasing access to credit, resulting in a negative relationship.

Education: This variable capture years of schooling to represent levels of education for the household head. For the purposes of this study, education levels have been reclassified into four categories: no education, primary education, secondary school education, and tertiary education. The IHS5 has given education details of smallholder farmers in Malawi. The probability of obtaining credit is predicted to rise with educational attainment. Additionally, it is anticipated that, all other things being equal, higher levels of education will improve a household head's human capital, which will have a positive impact on welfare. So, for all households who fall in the four categories of education, they will assume the value of 1 and 0 if otherwise.

Dependency ratio: The household dependency ratio captures the number of dependent individuals in a household, such as children or elderly persons, compared to the number of working-age adults who are responsible for supporting them. A negative relationship of the dependent variable to welfare of the household is expected.

Livestock_Ownership: This variable was added to the adopted model to capture if the household has livestock or not. This variable is expected to have a positive relationship to credit access in a household since it will boost their wealth for collateral.

Employment: This variable explains whether the household head is employed or not. Employment as per the definition of (IHS-5, 2019/2020) is any pierce of work that earn the household some earnings, e.g. ganyu. It is expected that this variable will have a positive impact on the wealth of the household to access credit easily.

Non-agricultural enterprise: This variable captures a number of enterprises that a household runs apart from agriculture, these are in a form of profit-making side businesses which include shops, or any individual business per household. This variable is expected to have a positive relationship with credit access as it will boost the householder’s wealth for collateral.

Social cash transfer: This variable captures all householders who had the privilege of receiving any money from any social programme to sustain them in any way during the period that the data was collected. This variable is expected to have a negative relationship as those receiving them will not have the willingness to reach out to either formal or informal credit.

Urban Distance: This variable captures the distance from the communities to the nearest urban or town. It is expected that those areas who are closer to the urban areas will be privileged with so many benefits in both their knowledge about credits and welfare. This variable is expected to have a positive effect to credit access (the shorter the distance, the better positive impact it has on the dependent variable).

3.6 Diagnostic Tests

We run the multicollinearity tests and the correct model specification on our results. In analysing the impact of credit access on household poverty using a Heckman selection model, it is essential to conduct tests for multicollinearity and correct model specification to ensure the robustness and validity of the results.

Firstly, conducting a multicollinearity test is crucial because high correlations among the independent variables can inflate the standard errors of the coefficient estimates, leading to unreliable and unstable results. By identifying and addressing multicollinearity, we enhance the precision and interpretability of our model, ensuring that the estimated effects of credit access on household poverty are not distorted by redundant information.

Secondly, ensuring correct model specification is fundamental in a Heckman selection model, which addresses sample selection bias. This involves including all relevant variables, specifying the correct functional form, and incorporating appropriate interaction terms. Correct model specification reduces bias, enhances the consistency and efficiency of the estimates, and ensures valid inferences about the relationship between credit access and household poverty.

3.6.1 Multicollinearity

Arises when all or some of the explanatory variables in a regression model have a perfect or nearly perfect linear relationship, resulting in infinite standard errors and indeterminate regression coefficients. One has two options for handling this issue: either do nothing or adhere to some general guidelines (Gujarati, 2004). If multicollinearity is discovered in our data, the study will not do anything as done by (Kaluwa & Kunyenje, 2019). Multicollinearity is basically a data deficiency issue, and sometimes there is no way around the data that are available for empirical analysis, claimed (ibid). Furthermore, a linear combination of the regression coefficients can be estimated reasonably effectively even if one or more of them cannot be estimated with higher accuracy.

3.6.2 Correct Model Specification

A '*link'* test will be used to determine whether the model has been correctly specified. Any instruction for single-equation estimation can be followed by a link test. In this test, the squared independent variable is added, and the non-squared model is contrasted for relevance. In comparison to the un-squared form, a model without a link error will have a non-significant t-test result.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results of this study. First, Section 4.2 explain the results of smallholder farmers' analysis in Table 1, followed by Table 2 that is showing the analysis of those that accessed credit. 4.3 displays the descriptive statistics of the variables used in this study in Table 3 while 4.4 captures the diagnostic tests results of the model. The regression results were then presented under 4.5 in Table 4.

4.2 Smallholder Farmers

Table 1 below shows the number of smallholder farmers that were identified by analysing all households that had a total land size of less than 2.6 acres as per their definition from the (IHS-5, 2019/2020) explained in chapter 3. The study identified a total number of 23,724 households to be smallholder farmers in Malawi.

Table 1: Identification of smallholder farmers

	Freq.	Percentage
Non-smallholder Farmers	3,397	12.53
Smallholder Farmers	23,724	87.47
Total	27,121	100.00

Source: (IHS-5, 2019/2020)

Following the identification of the above farmers, we further identified a number of these smallholder farmers that received loans/credit from different sources for the past 12 months from the date of the IHS5 survey, this study found that there were 4,738 smallholder farmers that accessed credit in that period as shown in Table 2.

Table 2: Smallholder farmers that accesses credit

Source of Credit	Freq.	Percent
Relative	1,338.00	5.64
Neighbour	776.00	3.27
Grocery/Local Merchant	65.00	0.27
Money Lender (Katapila)	445.00	1.88
Employer	53.00	0.22
Religious Institution	25.00	0.11
MARDEF	21.00	0.09
MRFC	45.00	0.19
SACCO	57.00	0.24
Commercial Banks	71.00	0.30
NGO	160.00	0.67
Village Banks	1,515.00	6.39
Others	167.00	0.70
Credit Access Total	**4,738.00**	**19.97**
No Credit Access Total	**18,986.00**	**80.03**
Total	**23,724.00**	**100.00**

Source: (IHS-5, 2019/2020)

4.3 Descriptive Statistics

The descriptive statistics in Table 3 below capture variables for both the first and second regression models that were run in the study. The descriptive statistics show that the average household size was 4 people per household and that the average household head age is 39. At least 68% of the communities had financial institutions like Banks, Sacco, Finca Microloan and microfinance institutions in their community and 32% did not have them in their communities. The descriptive statistics also show that 42% of household had other enterprises and businesses other than those related to agriculture. As for education, 81% of household heads attended school. In addition, those that had livestock were around the average of 70% and 69% of these receive farm input subsidies. Table 3 explain in detail.

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ln of Daily Consumption	4,736	7.3	1.0	2.0	13.1
Total Land per Household	4,736	1.2	0.7	0.0	2.6
Household Size	4,736	4.4	2.1	1.0	22.0
Household Head Education	4,736	0.8	0.4	0.0	1.0
Household Head Age	4,736	39.8	10.9	18.0	70.0
Household Head Sex	4,736	0.5	0.5	0.0	1.0
Household Head Age Squared	4,736	1703.6	852.4	324.0	4900.0
Dependency Ratio	4,736	360.2	389.0	0.0	1400.0
Credit Access Merge	4,736	0.6	0.5	0.0	1.0
Community Financial Institution	4,736	0.7	0.5	0.0	1.0
Residence (urban/rural)	4,736	0.2	0.4	0.0	1.0
Household Head Employ (Yes/No)	4,736	0.8	0.4	0.0	1.0
Non-Agriculture Enterprises	4,736	0.4	0.5	0.0	1.0
Distance to nearest Urban Centre	4,736	45.3	30.3	0.0	89.0
Cash transfer received	4,736	0.6	0.5	0.0	1.0
Livestock ownership	4,736	0.8	0.4	0.0	1.0
Total Livestock Owned	4,736	6.6	7.8	0.0	30.0
Farm inputs subsidies received	4,736	0.7	0.5	0.0	1.0

4.4 Diagnostic Test Results

Before presentation and interpretation of the results, it is necessary to give the diagnostic results for the correct model specification and multicollinearity which were carried out to verify the appropriateness of the model. Application of these tests makes the results appear consistent without the researchers intentional or unintentional data mining process.

To test the likelihood of the incorrect model specification, the link test was used. The results show that all the models are properly specified as the results suggest that the model is statistically significant, with the predictors and the constant term having significant effects on the dependent variable. The R-squared value indicates that the model explains a moderate amount of the variance in the dependent variable, and the coefficients provide information about the direction and magnitude of the relationships between the predictors and the dependent variable (see Appendix C).

In addition, multicollinearity test shows that there is no any correlation between the variables (see Appendix D). Adding age squared to age allows modelling more accurately the effect of different ages, rather than assuming the effect is linear for all ages. The effect of nonlinearity of age squared accounts for the effect of older individuals' decision in all the models.

4.5 Regression results

Due to the nature of the model, the coefficients cannot be interpreted directly to represent probabilities (Gujarati, 2004). In order to interpret them, they have to be at the margin, that is to say, the derivatives are used, and these can be directly interpreted. Table 4 presents the marginal effects results.

Table 4: Twostep Heckman Model Marginal Results

Variable	**dy/dx**	**z**	**P>z**
Total Land per Household	0.01	0.450	0.656
Household Size	0.08	7.840	0.000
Household Head Education	0.27	4.660	0.000
Household Head Age	0.01	0.650	0.516
Household Head Sex	0.07	2.200	0.027
Household Head Age Squared	0.00	-1.190	0.234
Dependency Ratio	0.00	-0.370	0.710
Community Financial Institution	0.98	21.650	0.000
Residence (urban/rural)	-0.25	-4.190	0.000
Household Head Employ (Yes/No)	0.51	9.560	0.000
Non-Agriculture Enterprises	0.10	1.280	0.199
Distance to nearest Urban Centre	0.02	21.270	0.000
Cash transfer received	-0.14	-2.220	0.026
Livestock ownership	-0.02	-0.390	0.695
Total Livestock Owned	0.00	-0.430	0.665
Farm inputs subsidies received	0.03	0.560	0.576
mills			
lambda	0.41	9.070	0.000
rho	0.45		
sigma	0.91		
Wald chi2(7)	181.76		
Prob >chi2	0.00		

4.5.1 Joint Significance of the Heckman Selection Equation:

In terms of model fit, the sigma (σ) value is 0.9092036, which represents the standard deviation of the error term in the outcome equation and the Wald chi-square test statistic result of 181.8 with 7 degrees of freedom, resulting in a significant p-value of 0.000 suggests that the Heckman Twostep Selection model as a whole is statistically significant.

The rho (ρ) value of 0.4502300 represents the estimated correlation between the error terms in the credit selection equation and the outcome equation of poverty. It means that there is 0.4502300 degree of association between the unobserved factors affecting the selection process and those influencing the outcome variable.

The positive rho value suggests a positive correlation between the error terms in the credit selection model, indicating that unobserved factors that affect the credit selection process also tend to influence the poverty outcome variable in the same direction.

The lambda estimated value of 0.4093481, with a z-score of 9.070 and a significant p-value of 0.000 indicates that the lambda parameter is statistically different from zero, providing evidence of selection bias. The lambda parameter represents the correlation between the selection equation and the outcome equation. A significant lambda suggests that the selection variable included in the model plays a significant role in determining the outcome variable, indicating the presence of selection bias.

4.5.2 Credit Access Regression Results

Table 4 above presents the results of the both the credit access selection model and the second model that is measuring outcome of welfare. The following are the detailed explanation of the selection variables' results:

4.5.2.1 Community Financial Institution

This variable came out to be very significant with a p value of 0.000 and a positive relationship with credit access, which means that, holding other factors constant, introducing a financial institution in a community will bring almost 97% chance of

smallholder farmers to access credit. This is what is practically expected, and also in line with many empirical findings that have been conducted before Ampah et al., (2017).

4.5.2.2 Residence

The second variable is residence or location, which was found to be significant at 1% (p-value 0.000). The study shows that there is a negative relationship between the residence of the household and credit access. Holding other regressors constant, credit access status for a household located in the rural area was lower by 24.8% compared to urban based households. This is also in line with theoretical and logical expectation that most people living in rural areas are always disadvantaged when it comes to credit access. These findings are also similar with what Chilimba et al., (2020) found in his study in Malawi.

4.5.2.3 Household Head Employment

A third variable in credit access selection model is the employment status of the household head. This variable is significant, with a positive relationship with credit access, which means that holding other variables constant, there is 51% possibility that the household head who is employed will access credit than those who are not employed. (Khan & Khandker, 1998) also found the same results in 1998 when he was studying the Income and employment effects of micro-credit programmes. At the beginning of our study, this result was also what we expected to find, as people with employment tend to have more knowledge about credits, and for the sake of smallholder farmers, employment gives them collateral for creditworthiness as well.

4.5.2.4 Distance to nearest Urban Centre

Another variable is the distance of the household communities to any nearest big urban centre of Blantyre, Lilongwe, Mzuzu or Zomba. The reasoning behind this variable is that people who live near these areas, even though they might be living in rural areas, they tend to enjoy and benefit from the civilisation effects of these areas, so their knowledge and exposure gives them an advantage in being creditworthy than those staying very far from these urban areas. This variable is significant with a p values of 0.000, the variable's

relationship with credit access is positive, this is contrary to our expectation of negative relationship with credit access in the study.

Further, the study found out that what the analysis above find is actually reasonable according to Hodson, (2014). In his analysis, Hodson found out that these households that live near urban areas do not mostly own the land, houses or properties they have because they are middle class, but rather they borrow them, which makes it difficult to use these as collateral in order to access such formal loans. The study continues to say that these middle-class people living near urban areas fail to bear hidden costs of unsecured loans hence the longer the distance to the nearest urban areas, the easy the smallholder farmers find it to access credit due to ownership of their property which can be used as collateral and also for them not to have problems with hidden costs of unsecured loans and credit.

4.5.2.5 Cash transfer received

Social cash transfer that the households in our sample received from donors and governments played another bigger role in influencing these farmers to access credit or not. The variable is significant with a p-value of 0.02 representing 2% and their relationship is negative. This means that almost 14% of people who were privileged enough to be receiving these social cash found no reason to seek credit, hence, they did not participate in both formal or informal credits. These results are in line with the study expectations.

All variables which are insignificant in this study were omitted for interpretation.

4.5.3 Poverty Regression Results

Table 4 also presented the results of the second part of the regression model. In this regression, impact of credit access on poverty was estimated by calculating the Inverse Mills Ratio (IMR) and Table 4 shows the results in the form of lambda under mills results.

4.5.3.1 Inverse Mills Ratio (IMR) – Credit Access

This variable accounts for participation in the credit programme and corrects credit access for selection bias. Holding other regressors constant, IMR shows that there is a significant

P-value of 0.000 on smallholder farmers welfare. As interpreted by Chilimba et al. (2020), a positive IMR shows that those who participated in the program (credit) experienced higher levels of consumption than those who did not take credit. This implies that the mean total real daily consumption per household is likely to be higher for households that participated in the credit programmes than those that did not participate in them. This is in line with the findings of Chilimba et al. (2020) who conducted a similar study in Malawi and found that households that participated in microfinance programmes high levels of consumption (high food security), as measured by real daily consumption than those who did not participate, which is mirroring our current findings.

4.5.3.2 Household Size

The second significant variable in the outcome welfare model is the size of the household with a p-value of 0.000. The relationship with daily household consumption is positive, meaning to say that holding all other factors constant, any increase in a member of the household will have a positive increase of 7.5% in their daily consumption which is this study's measure of welfare. This is according to theory and also what this study was expecting to find out of this variable.

4.5.3.3 Household Head Education

This variable is significant in this study model of welfare of the household with a p-value of 0.000 which is approximately 1% and its relationship with daily consumption is positive. Holding all factors constant, if a household head is educated, the study found out that there is almost a 26% chance that their daily consumption growth. This is in line with the study expectations and other findings from other researchers (Mussa, 2017).

4.5.3.4 Household Head Sex

Last significant variable on the welfare function is the sex of the household head. This variable has a significance of 2% with a positive relationship to daily consumption which is the me measure of poverty in this study. This means that holding other factors constant, household headed by men have a 7% chance of increasing their daily consumption than households headed by women. This is usually because of gender issues in such

communities that hinder women to participate in many innovations and activities to improve the welfare of their households.

CHAPTER FIVE

CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter outlines the conclusions, policy implications, limitations, as well as possible areas for future research.

5.2 Conclusions

The main objective of the study was to analyse the impact of credit access on household poverty in the case of smallholder farmers in Malawi, and the results confirmed that there is indeed a positive causal relationship between the two. This confirms with a priori expectation and corroborate with other previous studies (Chilimba et al., 2020).

The variable representing credit access for smallholder farmers was the inverse mills ratio and our analysis found out that it was highly significant and had a positive relationship with daily consumption, and as interpreted by (Chilimba et al, 2020), a positive IMR shows that those who participated in the program (credit) experienced higher levels of consumption than those who did not take credit. This implies that the mean total real daily consumption per household is likely to be higher for households that participated in the credit programmes than those that did not participate in them. This is in line with the findings of (Chilimba et al., 2020) who conducted a similar study in Malawi and found that households that participated in microfinance programmes experienced low levels of poverty, as measured by real daily consumption than those who did not participate.

5.3 Policy Implications

Undeniably, credit access reduces poverty aside the traditional approaches to economic growth and development. However, given the insufficient use of basic credit services by smallholder farmers in Malawi, the need to scale-up financial operations among the

smallholder farmers in Malawi is more important as a complementary approach to achieve sustainable economic growth and development. The empirical findings from this study suggest various policy recommendations required to strengthen the credit-poverty reduction nexus.

The study also finds that smallholder farmers living in or near urban areas experience improved and better welfare than those living in the rural areas. This is mainly because of easy access to Banks, Microfinance Institutions that give them easy access to financial services like the loans and credit. Another reason might be the availability of improved markets and innovations, better roads and even knowledge gaps between people in rural areas and urban with regards to credit and loans.

It is therefore essential for various stakeholders including the government to make sure that they introduce Banks and Microfinance Branches countrywide including the rural areas to make sure that even those living in the rural areas have access to financial services. Financial education among these smallholder farmers can also be an option. A better chunk of these smallholder farmers that accessed credits came from Village bank groups, this study also recommends that commercial Banks continue working together with these village banks to ensure that many smallholder farmers link their needs to bank services to formalise their transactions for affordable credit facilities.

5.4 Direction for Future Research

Recent advances in analysing the level of credit access on smallholder farmers and how they affect poverty, including the discussion in this paper, have provided insight from the demand side (the smallholder farmers) only, the side of the story from the supply side itself (the financial institutions) remains unattended to. There is therefore a need for more studies to analyse and investigate the challenges, limitations and problems that these financial institutions face in dealing with the smallholder farmers in particular that hinders the advancement of agricultural financial services here in Malawi and the rest of sub-Saharan African countries.

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APPENDICES

APPENDIX A: Model Specification (Link Test)

Source	**SS**	**df**	**MS**		**Obs**	= 4,732
Model	1,040.5	2.0	520.2		**F(2,4729)**	= 704.31
Residual	3,492.9	4,729.0	0.7		**Prob>F**	= 0.0000
Total	4,533.4	4,731.0	1.0		**R- Squared**	= 0.2295
					Adj R-Squared	= 0.2292
					Root MSE	= 0.85944
ln Daily Consumption	**Coefficient**	**Std Errors**	**t**	**P>t**		
_hat	3.8***	0.8	4.9	0.000		
_hat Squared	-0.2***	0.05	-3.58	0.000		
_constant	-10.4***	2.9	-3.58	0.000		

APPENDIX B: Multicollinearity Test (VIF)

Variable	**VIF**	**1/VIF**
Household Head Age SQ	6.75	0.15
Household Head Age	6.74	0.15
Household Size	1.01	0.98
Residence	1.01	0.99
Education	1.00	0.99
Employment	1.00	0.99
Credit Access	1.00	0.99