STUDIA UNIVERSITATIS BABEȘ-BOLYAI OECONOMICA
VOLUME 67, ISSUE 2, 2022, pp. 50-66
DOI: 10.2478/SUBBOEC-2022-0009

THE IMPACT OF ACCESS TO CREDIT ON WELFARE INEQUALITY IN MALAWI

Fatso E. MAKULUNI

Hannah Mayamiko DUNGA*
University of South Africa, Pretoria South Africa

Abstract This study evaluates the implications that access to credit has on welfare inequality in Malawi in order to address the gap left in previous studies concerning credit. The study employed data from Malawi's Integrated Household Survey 2017 and used the propensity score analysis to examine what impact access to credit may have on the welfare of Malawian households using consumption per capita as a proxy for household welfare. The study further proceeded to use the generalized Lorenz curve, the Theil indexes as well as the Gini to examine the inequalities present in welfare among the households that access credit and those that do not. The results showed a positive impact of access to credit on welfare as households with access to credit experience lower levels of inequality than those without. However, a closer examination of the Theil's indexes found that factors unrelated to access to credit had a stronger effect on inter-household inequalities than access to credit. The results imply that the impact that access to credit has on welfare inequality is a positive one, but its effect is substantially small. Thus, implying that policies aimed at enhancing distribution of credit should continue. Simultaneously, a more holistic approach on reducing inequality should be included at both household level and national level to achieve a desired result.

JEL classification: I390
Keywords: access to credit; Households; inequality; Theil index; Lorenzo curve. IHS2017

1. Introduction

The rise in welfare inequality over the years has led to many governments incorporating the use of credit to alleviate and if at all eradicate its existence among its citizens. United Nations (2015) defines the welfare inequality as the state of being unequal in rights, status, or opportunities. Mussa and Masanjala (2015) further describe the term as an occurrence when there is an unequal or unjust distribution of resources and opportunities among members of a given population and can exist across a range of dimensions. Ibid further describes these

*Corresponding author: Address: University of South Africa, Department of Economics and management, Preller Street Muckleneuk Ridge, Pretoria South Africa, e-mail: dungahm@unisa.ac.za

dimensions to include health, education, wealth, and welfare. Credit on the other hand, is simply the provision of financial resources by an individual, corporation, or government, with an established claim for repayment often with interest (Barroso, 2022). This credit can either be in terms of formal or informal credit; the latter is credit that is issued without any supervisory body and is usually driven by the profit motive with high interest rates (Notes on Formal and Informal Credit - Cbse Class 10 Economics, n.d.). Formal credit is the credit that is acquired from formal financial institutes, regulated by government.

Over the years, concerns regarding inequality have increased due to research uncovering its associations with unsustainable economic development for many countries (Nguyen et al., 2020). Studies have shown that economic progress can be eroded by the effects of inequality (Nguyen et al., 2020). High levels of inequality have been attributed to reductions in innovation and productivity within countries; lessening efforts made to eliminate poverty making societies more unstable and harder to manage (Corak, 2013). Thus, with these unsustainable effects of inequality several countries, international bodies and research institutions have sought ways in which to reduce inequality in all its forms and dimensions (United Nations, 2021). This can be linked to the Sustainable Development goals where one of the goals outlined is the Reduction of inequalities within and among counties (United Nations, 2018, 2021).

In a report by van de Meerendonk (2016) on the address of micro finance programs in Malawi, ibid, tackled several aspects including the address of the development of the financial sector which is believed to have become an important means in addressing not only issues of inequality but also poverty and economic development in the country. According to Gambetta et al. (2021) well developed financial institutions have played a substantial role in ensuring financial inclusion and sustainable economic development. Through empirical analysis, it has been shown that developed financial markets contribute to an economy's growth through increased efficiency in capital allocation and that poverty and inequality is also lessened through the alleviation of restrictions on credit acquisition that are mostly faced by the poor (Adebowale and Dimova, 2017). The alleviation of restrictions on credit acquisition is achieved through financial inclusion which is an output of a well-developed financial sector, encompassing the ease of access and equal opportunities to accessing financial services (van de Meerendonk, 2016). This entails that individuals have access to suitable and affordable financial products that not only meets their needs in a responsible way but also sustainable (World Bank, 2021b).

In Malawi, however, a study done by Diagne (1998) revealed that the accessibility of credit did not improve but rather worsened the welfare of poor smallholder farmers and in turn widened the welfare gap between the rich and poor. A report made on the study further explained that the reason to this was because the credit provided by microfinance institutions did not accommodate the poor's demands (Diagne and Zeller, 2001). Over the years, significant changes have occurred in the financial sector with the Malawian government taking an interest in its development because of global neoliberalism (van de Meerendonk, 2016; Vellucci, 2021). With the rise in demand for credit, especially in rural areas by those involved in agriculture, the government realized the importance of an inclusive financial system to the development of Malawi and efforts to improve its level were employed by the government itself, Nongovernmental Organizations,

and other international organizations (van de Meerendonk, 2016.). Government through the National Social Support Policy has included microfinance to alleviate poverty and promote welfare in Malawi by ensuring individuals are able to access finance so to increase their income base (Government of Malawi, 2012). Programs such as these have led to the growth of microcredit in Malawi with over 200 million borrowers over the last three decades and with the total number of microloans accessed by ultra-poor households at over 137 million in 2010 (van de Meerendonk, 2016). This growth in financial inclusion has led many to believe that by ensuring poor households have access microfinance, investments in health, education and women empowerment will increase and in turn raise their welfare. However other parties disagree and believe that the growth of the microcredit will only worsen the condition of poor Malawians.

A considerable amount of research has examined credit and its impact on welfare, poverty, and inequality (Adebowale and Dimova, 2017; Chowdhury et al., 2005; Diagne and Zeller, 2001) bringing in mixed results. Whilst some studies have found that access to credit by the poor had a positive effect on their living standards others uncovered that it only makes the poor people poorer and by doing so it worsened the welfare gap that exists among the rich and the poor (Chowdhury et al., 2005). A study conducted by Diagne (1998) on Malawi showed that access to formal loans had a positive effect on household income, one of the measures of welfare but an analysis of the study by Diagne and Zeller (2001) showed that households were made worse off after the loan was repaid thus making the poor worse off at the end of the day. However, this was attributed to the undeveloped financial sector at the time. Overtime, significant improvements in the financial sector have occurred with loan packages that consider individual demands and circumstances and policies directed at ensuring all individuals especially those considered vulnerable have access to credit (van de Meerendonk, 2016). This showed the need for a revaluation of the topic as to whether access to credit has aided in the reduction of welfare inequality which was the purpose of this study.

Nevertheless, since the improvement of the financial sector in Malawi, studies have attempted to address the prevalence of access to credit and welfare inequality. However, it is argued that these studies mainly focused either on the development in the financial and microfinance sectors or the prevalent inequalities in Malawi (Kwengwere, 2011; Mussa and Masanjala, 2015). Thus, though studies exist around the topic none address the direct impact access to credit may have on welfare inequality in Malawi.

2.1. Theoretical Literature

There exist some general economic theories that explain the impacts that access to credit has on welfare inequality (Kling et al., 2020). Others propose a positive relationship between the two whilst others suggest a negative relationship. A few theories will be discussed in the subsequent section in economics that explore this relationship.

2.1.1. The theory of Utility and Consumer Behavior

This theory proposes a positive relationship between access to credit and welfare but suggests a negative impact on welfare inequality by creating disparities in welfare among those that have access to credit and those that do not (Delis et al., 2021). The concept of welfare historically has often been associated with an

individual's state of happiness and prosperity (Greve, 2008). In economics the concept of welfare is defined under the utility theory as the satisfaction one derives from consuming a product or service (Ragan and Lipsey, 2011). Under this theory and the consumer behavior theory, an individual is said to maximize their utility (or welfare) when their indifference curve is tangent to their budget line (Ragan and Lipsey, 2011).

An indifference curve is simply a curve that depicts the combinations of consumption bundles an individual is indifferent to or rather provides the same utility. A budget line shows all combinations of consumption bundles available to an individual given his level of income (Ragan and Lipsey, 2011). This suggests an individual's utility is constrained by their budget line and a rise in income would be one way in which an individual can shift to another optimal point that is on a much higher indifference curve. Given this theory, access to credit is one of the ways in which individuals can raise their nominal income and enjoy consumptions bundles on a higher utility curve (Delis Et Al., 2021; Ragan and Lipsey, 2011). This in turn creates disparities in welfare between those that have access to credit and those that do not (Delis et al., 2021).

2.1.2. Theory of Inequality of Opportunities

Sen (1993) capability framework created a new way in which an individual's well-being could be defined, measured, and compared (United Nations, 2015). According to Sen the freedom to achieve well-being is of primary moral importance in development and is linked to what an individual can do and be with the commodities they have at their disposal (Centeno, 2021). This theoretical approach defined well-being in two broad concepts namely, functioning and capability. Where *functioning* is described as what an individual does with the commodity of characteristics that they come to possess, and *capabilities* is defined as the freedom that individuals have given their command over these commodities (Todaro and Smith, 2009). The theory emphasizes welfare or well-being as a choice between one type of life over another (United Nations, 2015). Under this framework, equalizing the variables of welfare (for example health, education, income, consumption) among individuals should not be the target to reduce inequalities because not all individuals assimilate these variables into well-being and freedom the same way but rather the actual opportunities that give individuals the liberty to pursue a life of their own choosing should be the ones equalized (United Nations, 2015).

Under this study, Amartya Sen's capability approach suggests that, to reduce the inequality in welfare in Malawi, equal opportunities for individuals to obtain credit must be created. That is to say that access to credit acts as the commodity that is useful and gives individuals the freedom to lead a certain life. Another theory in support of this notion is the public good theory of financial inclusion which argues that if financial inclusion is treated as a public good then it will generate benefits for all (Ozili, 2020). Thus, the availability of credit in the economy has the possibility of positively affecting growth and inequality reduction of human welfare.

2.1.3. Economic Theory

According to Kling et al. (2020), Economic theory offers contradictory predictions about the implications that credit as a byproduct of financial inclusion has on welfare inequality. This is shown and explained through a series of

theoretical models which restrict the measure of welfare in terms of individuals' income. Rather than credit considered as the main variable in these models, the variable access to finance was preferred instead and encompassed several financial variables including credit. Thus, these models may be a bit restricted in fully understanding the relationship that access to credit and welfare inequality share. Regardless, they provide some understanding on the topic. In the model developed by Galor and Zeira, access to finance and income inequality (used as a proxy to welfare inequality) were shown to have a more negative linear relationship whilst Greenwood and Jovanovic's model predicted to a more non-linear, inverted u-shaped relationship between the two dependents on the level of economic development (Kling et al., 2020). Access to finance either has negative implications on welfare inequality (as access to finance increases the level of welfare inequality decreases) or a non-linear u-shaped relationship with welfare inequality (where increase in financial inclusion reduces welfare inequality to a certain point after which its effects become counterproductive). Kling et al., (2020) argues that not all individuals benefit from financial inclusion and depending on the parameter values financial inclusion can increase or decrease welfare inequality. Other models argue that financial inclusion leads to a reduction in welfare inequality by increasing opportunities to invest in education or entrepreneurship (Kling et al., 2020).

2.2. Empirical Literature

There exist numerous literatures on welfare inequality bringing in mixed results, some studies have suggested that welfare inequality exists between those who have access to credit and those who do not. (Delis et al., 2021; Kling et al., 2020). Delis et al., (2021) examined how access to credit for small business owners affected the growth and inequality of their future income. The results showed that those that did get a loan were able to increase their income five years later by more than 10 percent compared to those that did not manage to get a loan. These results suggest that access to credit does in fact grow welfare inequalities between those that access credit and those that do not. Kling et al., (2020) on the other hand, revealed that evidence shows that access to credit can widen or decrease income gaps between the rich and the poor. The study referred to other empirical studies that showed through empirical evidence that income inequality (welfare inequality) worsens if households are dependent of credit and that formal loans do not necessary contribute to the reduction of under-investment of education (Kling et al., 2020).

However, results obtained from a study on China revealed that financial inclusion, measured by credit, savings, account ownership and insurance, has a positive relationship on households' income growth especially those at lower quintiles of income distribution indicating that it does reduce income inequalities (Kling et al., 2020). The study conducted by Kling et al., (2020) examined the impact of financial inclusion on income through its impacts on education and human capital accumulation. By using a continuous variable like investments in education, the study sought to expose the disparities of welfare in terms of income within the country of China.

Nonetheless, a study done by Adebowale and Dimova (2017) suggests otherwise. The study used a treatment effect model, decomposition analysis and representative household data from Nigeria to examine the implications of formal

finance on welfare and the disparities that exist in welfare. The results found a positive effect of credit on household welfare and increasing inter-house inequalities despite enhancing educational investments. Thus, revealing a more negative relationship between access to credit and welfare inequality.

In Malawi studies have revealed that access to credit may have positive or negative implications on welfare inequality depending on surrounding factors such as the financial market. To begin with, the study done by Diagne and Zeller (2001) unveiled the negative effects that credit access had on welfare distribution in Malawi but when analyzed it was seen that the poor households that obtained loans only experience a short-term boom in welfare caused by a rise in their income but later suffered losses in welfare after repaying the loan. However, Diagne and Zeller (2001) explained that the results may have been influenced by undeveloped financial markets at the time that did not cater for the demands of poor household farmers.

A review report on Malawi's financial sector by Meerendonk et al. (n.d.) revealed some major developments in the financial market over the years since the study done by Diagne and Zeller (2001). The report showed that the efforts to enhance economic development and reduce poverty through the promotion of financial inclusion was a success with the poor having accessibility to credit that is designed to suit their demands. However, studies examining inequality still recorded large welfare gaps despite the developments in the financial sector and the availability of loans (Matita and Chirwa, 2009; Mussa and Masanjala, 2015) A study investigating rural-urban welfare inequalities by Matita and Chirwa (2009) revealed that 59% of this welfare gap could be explained by differences in characteristics, specifically physical assets and education showing that expected investments in education due to an increase in financial inclusion did not occur. Unfortunately, this study did not examine if at all the reason to this is due to access to credit, thus may not be proxy to examine access to credit effects on welfare outcomes.

Sebu (2017) on the other hand, examined how credit constraints among farm households in rural areas affect welfare inequality among them. The study indirectly revealed how good credit systems would affect welfare inequality in Malawi. Its sample focused on discouraged borrowers that were often ignored by past studies and a three-step sequential estimation model following a trivariate probit model with double sample selection was employed. The finding revealed that there were more people who were discouraged to borrow than they were those were denied credit and among these many were women, drawing attention to the significance on cross-examining those that are discouraged in accessing credit. Capturing this variable as a credit constraint its impact was assessed against consumption inequality, a measure welfare inequality. The results revealed more prominent inequalities within the groups than between them which were explained to be a result of mainly household size and the value of the assets. According to Demirgüç-Kunt and Levine (2009) there seems to be a shortage of empirical evidence surrounding the issues to do with credit access implications on welfare inequality.

A study done by Sebu (2017) came close to establishing the relationship between access to credit and welfare inequality in Malawi by examining how credit constraints affect consumption inequality (a proxy of welfare inequality) among rural farm households in Malawi. The results of the study showed that consumption inequalities were more prominent within the two groups credit constrained and

unconstrained households than they were between them. This study, however, was focused on credit constraints, and not credit itself, which was the central focus of this study.

The reason as to why this study was important was to not only fill the gap in research but also because of its contribution to information available on issues to do with welfare among Malawian households. Researchers and policy makers generally agree that poor households in rural areas in developing countries such as Malawi are deficient of adequate access to credit (Diagne and Zeller, 2001). This in turn is said to have a negative impact on these households through aggregate and household-level outcomes, including technology adoption, agricultural productivity, food security, nutrition, health, and the overall households' welfare; putting a strain on inter-household welfare inequality at large. Access to credit affects household welfare inequality by easing the restrain on income and consumption within households by providing a source of capital for these activities and therefore increases a households' risk-bearing ability by modifying its risk coping mechanisms. With the many credit schemes put in place by different organization in Malawi, there is a variety and diversity of loan packages extended to all types of people in the country (Diagne and Zeller, 2001). Therefore, there is a need to weigh the role this form of finance has in lessening the ever-growing disparities in Malawian's welfare to bring sustainable development as per objectives outlined in Malawi's Vision 2063.

As seen in this section, there are disparities between what theory may suggest and actual outcomes shown by empirical studies.

3. Methodology

This study used cross-sectional data from Malawi's 2017 Integrated Household Survey (IHS4) which was a part of the Living Standard Measurement Surveys (LSMS) project of the World Bank. The survey was conducted by Malawi's National Statistical Office (NSO) with collaboration from the World Bank and was designed to provide information on the various aspects of the socio-economic status of households in Malawi (National Statistical Office, 2005). It contained information on consumption, income, and demographics of about 12000 households (World Bank, 2021a) including information on agriculture and labor, activity of households, as well as details on credit and loans, financial resources, household assets and welfare indicators (National Statistical Office, 2012). The first and second Integrated Household Surveys (IHS1 and IHS2) were implemented to provide information for policy making (World Bank, 2021a). The third Integrated Household Survey expanded on the agriculture content of IHS2 and introduced the Integrated Household Panel Survey, which had a sample size of over 3000 households. The fourth and Fifth Integrated Household Survey's followed the same setup as the previous IHS (World Bank, 2021a).

The sampling frame included households from all regions of Malawi namely, the Northern, Central and Southern; and was arranged into the rural and urban strata. The urban strata include Lilongwe, Blantyre, Mzuzu and Zomba. All the other areas were considered as rural areas (World Bank, 2021a).

4. Data Analysis

4.1. Econometric Method

The study divided the main objective into two sub objectives which are to examine the relationship between access to credit and household welfare and to evaluate the disparities in welfare among households that have access to credit and those that do not. To satisfy the main objective, data analysis was carried out in two parts as well. Firstly, the first specific objective was satisfied using a well-developed econometric model which is discussed below. Lastly, the second specific objective was fulfilled using appropriate analytic tools.

Econometric Model

To address the first specific objective, this study adopted the Treatment effect model which is useful in assessing causal effects of binary variables such as access to credit on outcomes variables of scientific or policy interest (Angrist, 2008). These treatment effects were estimated using propensity score matching analysis. The effect that access to credit has on household welfare was examined using per capita consumption as a measure of welfare and access to credit was treated as a dummy variable, taking the value of 1 if a household accessed credit and 0 otherwise. Consumption per capita (or per capita consumption) was opted for as a measure of welfare since it is a common measure of welfare and preferred by households rather than income according to (Attanasio and Pistaferri, 2016). Hence the following system of equation was developed for estimation:

$$\boldsymbol{C_i = \beta_0 + \beta_1 Credit_i + \beta_2 Emp_i + \beta_2 Age_i + \beta_3 N_i + \beta_4 Educ_i + \beta_5 S_i + \beta_6 Gender_i + \beta_6 MarrSta_i + \beta_8 R_i \varepsilon_i} \quad (1)$$

Where $\boldsymbol{C_i}$ was denoted as per capita consumption, $\boldsymbol{\beta_0}$ as the intercept, $\boldsymbol{credit_i}$ as access to credit, $\boldsymbol{Emp_i}$ as employment status of the household head, $\boldsymbol{Age_i}$ as the age of the household head that year, $\boldsymbol{N_i}$ as the household size, $\boldsymbol{Educ_i}$ as the education level of the household head, $\boldsymbol{S_i}$ as the region of residence, $\boldsymbol{Gender_i}$ as the gender of the household head, $\boldsymbol{MarrSta_i}$ as the marital status of the household head, $\boldsymbol{R_i}$ as the place of residence and $\boldsymbol{\varepsilon_i}$ as the disturbance errors that follow normal distribution.

To capture the impact that access to credit has on household welfare the households who accessed credit *(F = 1)* were to be compared to those who did not *(F = 0):*

$$Impact = E(C|F = 1) - E(C|F = 0) \ldots\ldots\ldots\ldots (2)$$

However, this could have provided a misleading treatment effect due to selection bias, where other factors aside from the impact of access to credit may influence results (Angrist, 2008). To cater for this, propensity score matching was used to assign a score to the observations in the study based on their likelihood to be treated, after which those who are treated (accessed credit) were matched against those were not based on the score. This was done to enable valid estimation of the counterfactual group based on the assumption that the source of selection bias in this model stemmed from a set of observed characteristics that influence whether an observation acquires treatment or not (covariates) a requirement for matching methods (Angrist, 2008).

To satisfy the second specific objective, the Generalized Lorenz curve along with Theil Indexes and the Gini index were used. The Generalized Lorenz curve much like the Lorenz curve is a curve that is mostly used to show the degree of inequality in each population (Haughton and Khandker, 2009). The closer it is to the equality line the closer the population is to a state of equality. The Theil indexes, on the other hand, are statistics that measure the entropic distance the population is away from the ideal state of equality (Haughton and Khandker, 2009). The closer it is to zero the closer it is to equality. Whilst the Gini index measures the extent to which the distribution within an economy deviates from a perfectly equal distribution of resources and takes the value 0 to represent perfect equality and 1 to represent perfect inequality (Haughton and Khandker, 2009).

To further access, the relationship between access to credit and consumption per capita inequality (welfare inequality) a decomposition of the Theil index was done where the between group and within group inequalities were compared. If the between group inequality index appeared to be greater than the within group inequality then, access to credit would be shown to play role in the disparities in welfare among households in Malawi (Adebowale and Dimova, 2017).

4.2. Definition of variables, measurement and apriori expectations

In this study, the variable per capita consumption as a welfare measure was used as the dependent variable. This was because consumption is regarded as a better measure of welfare and welfare inequality compared to others such as income. The reason to this was due to the volatile nature of income, that may give misleading picture on households' welfare as consumption may exceed current income due to acquisition of loans which is the case in the presence of the variable credit (Attanasio and Pistaferri, 2016).

Access to credit was the main explanatory variable in the model and was defined as a dummy variable as discussed earlier. Due to the nature of the study and the methodology employed the other explanatory variables in this study were used as variables that influence whether an individual accesses credit (a covariate). The variables included were education level, marital status, gender, employment status, age, household size, region, and place of residence (urban or rural). All the covariates except household size were computed as categorial variables taking the values 0 and 1.

In accordance with literature, the apriori expectation of this study was that access to credit has a positive impact on per capita consumption. This is because, access to credit is expected to raise an individual's income and therefore increase consumption. Access to credit is also expected to reduce welfare inequalities by improving welfare for the less vulnerable through the widening their income pool or financial sources (Diagne and Zeller, 2001). Hence household who had accessed credit were expected to consume more along with households that were large in size, located in urban areas, with older household heads and those which had high levels of education and are employed (Hone and Marisennayya, 2019).

4.3. Diagnostics Issues

The econometric model as discussed above was subject to selection bias thus to ensure that valid estimates were acquired the two propensity score matching conditions (the balancing condition and the availability of the common support) were verified (Austin, 2011). Firstly, balancing diagnostics were carried out to ensure a balanced covariate distribution between those that accessed credit (treated group) and those that did not (untreated or control group).

Secondly, the overlap condition was computed using a density distribution graph that was plotted against the propensity score. Through the common support that verifies whether there was an appropriate overlap in the observed characteristics (denoted by the covariates) of the treated and untreated, was identified (Austin, 2011).

5. Results and discussions

This section discusses the results of the study as follows:

Table 1 provides descriptive results for both continuous variables presented as the mean, minimum and maximum value of per capita consumption expressed in its natural log form, access to credit and the covariates used in this study.

Table 1: continuous variables

Variables	Mean	Minimum	Maximum
Log of consumption per capita	11.97	9.91	18.54
Household size	4.33	1	17

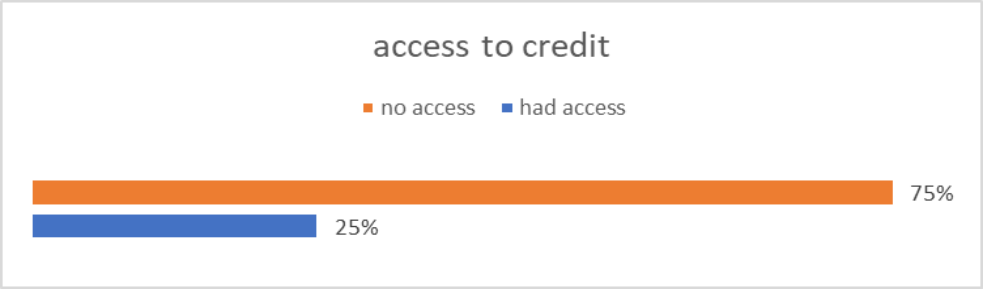
Table 1 presents results for continuous variables of the study, as indicated. The dependent variable per capita consumption was a continuous variable with a mean of 220,641.90. In the table 1, the natural log of consumption per capita is presented instead since it is used in most of this study's analysis. On the other hand, about 25 % of the participants in this study accessed credit. The other continuous variable was household size the minimum number of people in a household was 1 and maximum of 17.

Table 2: Categorical Variable

VARIABLE	male	female
GENDER	75%	25%
MARITAL STATUS		
Married	93%	7%
Not married	7%	93%

The other variables in the study categorical variables shown in table 2 below It shows that according to gender there were more male headed household (75%) as compared to the counterparts' women at 25%. The marital status of household head indicates that from those who indicated to be married males had a higher percentage of being married 93% as compared to females. The descriptive of access to credit is shown in figure 1 that a smaller percentage of the population (25%) had access to credit as compared to 75% who had no access to credit.

Figure 1. Access to credit



To address the impact of access to credit on welfare, a treatment effect model was adopted and the propensity score matching (PSM) method was used. In this study, 6,124 observations were matched out of which 3,062 were in the treated and untreated groups (as shown in Table 1 in the Appendix). The standardized differences of the matched data were approaching zero and the Variation ratios were approaching 1 which is considered a sign of covariate balance (Austin, 2011).

Secondly, the overlap condition was verified, and a common support of the treatment group was identified. Figures 2 and 3 show the overlap condition where the observations in the treated group and untreated groups were plotted given their corresponding propensity score. The existence of common support is seen by the overlapping of the two curves in Figure 2 and in Figure 3 where the propensity score histogram shows the existence of observations in the treated and untreated groups with similar propensity scores.

Figure 2. Propensity Distribution Graph:

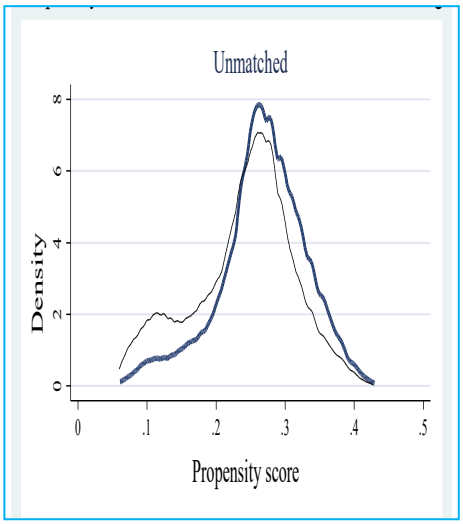
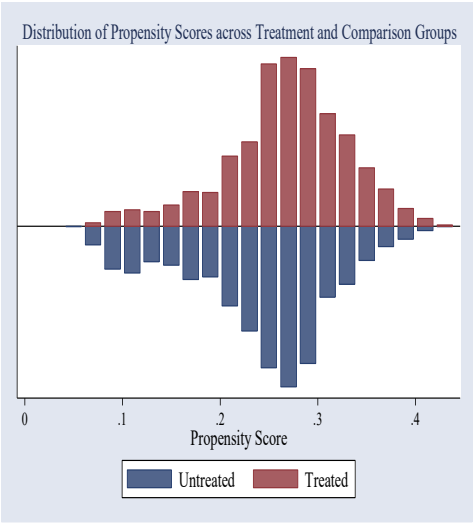


Figure 3. Histogram graph:



Source: Author's own calculation using IHS4 dataset and STATA program.

The results of the propensity score matching analysis are shown in table 3 below.

Table 3: Results on Propensity Score Matching

Log of Consumption Per Capita	Coefficient	P-Value
Average Treatment Effect on Treated		
Access to Credit	0.105*** (0.013)	0.000
Number of Observations	12447	

Source: Author's own calculation using IHS4 dataset.

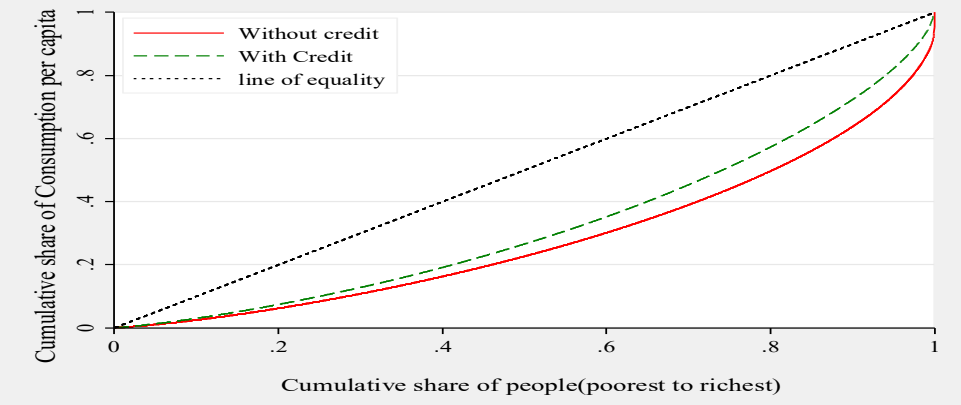
The estimated Average Treatment Effect on the Treated (ATET) was 0.105 with a standard error of 0.023 and this result was statistically significant. This means that access to credit on average increases the consumption per capita of those that have access to it by 10.5%. Thus, implying a positive impact of access to credit on welfare.

The Impact of Access to Credit on Welfare Inequality

The main objective of this study was to examine the impact access to credit has on welfare inequality among Malawian households. To access the impact of access to credit on welfare inequality the Generalized Lorenz curve as

well as the Theil Indexes and the Gini coefficient were used. Finally, the decomposition of the Theil Indexes was used to examine whether the disparities in welfare were access to credit driven (between-group dominated Inequality) or due to other factors unrelated to access to credit (within group dominated inequality).

Figure 1. The Generalized Lorenz Curve for people with access to credit and people without:



Source: Author's own calculation using IHS4 dataset and STATA program.

Figure 3 above depicts the Generalized Lorenz curve for those that had access to credit and those that did not along with the line of equality. The curve shows a gap between the line of equality and the Lorenz curves of those that have access to credit and those that do not. Both Lorenz curves lie below the equality depicting that the rich have much larger consumption shares than the poor, however inequality is more prominent among the households that did not access credit. This is shown by the Lorenz curve of those that accessed credit being much closer to the equality line. Thus, implying that access to credit places people much closer to a state of equality.

To further assess the viability of the implications made above, Theil Indexes were computed and compared among the two groups. Table 4 below presents the Theil indexes and the Gini index of households with and without credit.

Table 4. Theil Indexes and The Gini Coefficient

Observations	Theil's L Index	Theil's T Index	Gini
With Credit	0.204	0.226	0.351
Without Credit	0.327	0.602	0.435

Source: Author's own calculation using IHS4 dataset.

The results show that the Gini coefficient and Theil indexes are much higher among households that do not have access to credit. This implies that inequality is much higher among households that do not access credit which is consistent with the results shown by the generalized Lorenz curve.

However, the decomposition of these indices as shown in Table 5 indicate that access to credit only has a minor influence on intra-household welfare disparities. About 99% of these disparities are explained by within group (or unrelated to access to credit) factors.

Table 5. Decomposition of Thiel's Index

Variables	Theil's L Index	%	Theil's T Index	%
Between-Group Inequality	0.00145	0.49	0.0015	0.29
Within-Group Inequality	0.297	99.51	0.501	99.71
Total	0.29845	100	0.502	100

Source: Author's own calculation using IHS4 dataset.

5. Conclusion

The main aim of the study was to assess the impact that access to credit has on welfare inequality among Malawian households by using data from the Malawi's Integrated Household Survey that was compiled by the National Statistics Office in Malawi. This study added on to existing literature by assessing the direct impact that access to credit has on welfare inequality which was not the central focus for most studies done around in Malawi. Since welfare can be measured in many ways, consumption per capita was opted for as a proxy due to literature referring it as good measure of welfare (Attanasio and Pistaferri, 2016). Similarly, this study was done at a household level (which is why aggregate consumption was not used). To further understand the relationship between access to credit and welfare inequality, the impact of access to credit on welfare was also assessed (this was the first specific objective of the study) and propensity score analysis was employed in accordance with literature as a more feasible tool to obtain more valid results (Angrist, 2008). On the other hand, the Generalized Lorenz curve, Theil's Indexes as well as the Gini coefficient were used to assess the disparities in found in welfare.

The results were based on two objectives and hypothesis which were access to credit has no impact on consumption per capita and that disparities in consumption per capita do not exist between those that access credit and those that do not. Hence, it would imply that the relationship between access to credit and welfare inequality does not exist. However, the results based on the analysis of the first objective showed that there exists a positive relationship between access to credit and consumption per capita. Thus, it is implied that accessing credit improves a household's welfare.

The results on the second objective showed that consumption inequality was much higher among those that did not access credit than it was for those that did when the Generalized Lorenz curve, Theil's indexes and the Gini coefficient were considered. However, the decomposition of the Theil's indexes revealed that factors unrelated to access to credit had a stronger effect on the inter-household inequalities than access to credit. Consequently, this implied that welfare inequality is much higher for those that do not access credit and those that do experience lower levels of inequality, though the extent of its influence is quite low. In all, the results from the two specific objectives imply that the impact that access to credit has on welfare inequality, as the main objective of the study, is a positive one but its effect is substantially small. Thus, households with access to credit will experience

higher levels of welfare and the differences in welfare among them is also much smaller than if they do not have access to credit.

Overall, these results are similar to other studies findings such as Adebowale and Dimova (2017) and Sebu (2017) which also suggested a positive impact of access to credit on welfare inequality. These studies argued that such an outcome was the result of households' improvement in welfare, where those who access credit were able to consume more products to an increase of income. However, other studies have presented a negative outcome on welfare inequality. Particularly, Kling et al., (2020) outlined that access to credit worsens welfare inequality among households. And Delis et al., (2021) suggested that this negative outcome is a result of the costs attached to credit acquisition that leave an individual worse off after loan repayment. This was the case in the study done by Diagne and Zeller (2001) as discussed in the earlier chapters as one of the reasons why Malawians household became even poorer after accessing credit.

Policy Implications

Since the results show that those that have access to credit experience lower levels of welfare inequality it means, Malawi's policies aimed at enhancing financial inclusion inclusive of different types of loans that best suit household's demands should continue to be a priority. Simultaneously, a more holistic approach on reducing inequality or poverty should be included at both household level and a national level in the country. When developing policies aimed at combating poverty and inequality through the use credit in Malawi, factors unrelated to access to credit must also be put into account and its influence examined.

References

Adebowale, O., & Dimova, R. (2017). *Does Access to Formal Finance Matter for Welfare and Inequality? Micro Level Evidence from Nigeria* (No. 007; Manchester 1824).

Angrist, J. D. (2008). Treatment Effect. In https://Economics.Mit.Edu/Files.

Attanasio, O. P., & Pistaferri, L. (2016). Consumption Inequality. *Journal of Economic Perspectives*, *30*(2).

Austin, P. C. (2011). An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behavioral Research*, *46*(3).

Barroso, A. (2022). *What Is Credit and Why Do You Need It?* https://www.nerdwallet.com/article/finace/what-is-credit

Centeno, R. V. F. (2021). *Amartya Sen's Capability Theory Approach*.

Chowdhury, M. J. A., Ghosh, D., & Wright, R. E. (2005). The Impact of Micro-Credit on Poverty: Evidence from Bangladesh. *Progress in Development Studies*, *5*(4).

Corak, M. (2013). Public Policies for Equality and Social Mobility in Canada: A Background Paper Prepared for The Canada 2020 Event Equality of Opportunity – A Canadian Dream? *Canada 2020.Ca*.

Delis, M., Fringuellotti, F., & Ongena, S. (2021). *Credit, Income, And Inequality.* https://www.newyorkfed.org/medialibrary/media/research/staffreports/sr929.pdf

Demirgüç-Kunt, A., & Levine, R. (2009). Finance and Inequality: Theory and Evidence. *Annual Review of Financial Economics*, *1*(1).

Diagne, A. (1998). *Impact of Access to Credit on Income and Food Security in Malawi* (No. 46; Food Consumption and Nutrition Division).

Diagne, A., & Zeller, M. (2001). *Access to Credit and Its Impact on Welfare in Malawi.*
Gambetta, N., Azcárate-Llanes, F., Sierra-García, L., & García-Benau, M. A. (2021). Financial Institutions' Risk Profile and Contribution to The Sustainable Development Goals. *Sustainability*, *13*(14). https://doi.org/10.3390/su13147738
Government of Malawi. (2012). *National Social Support Policy*. Government of Malawi.
Greve, B. (2008). What Is Welfare? *Central European Journal of Public Policy, 2*(1).
Haughton, J., & Khandker, S. R. (2009). *Handbook On Poverty and Inequality*. The World Bank Group.
Hone, Z., & Marisennayya, S. (2019). Determinants of Household Consumption Expenditure in Debremarkos Town, Amhara Region, Ethiopia. *American Scientific Research Journal for Engineering, Technology, And Sciences (Asrjets)*, *62*(1), 124–144.
Kling, G., Pesqué-Cela, V., Tian, L., & Luo, D. (2020). A Theory of Financial Inclusion and Income Inequality. *The European Journal of Finance*. https://doi.org/10.1080/1351847x.2020.1792960
Kwengwere, P. (2011). Inequality in Malawi. In *Tearing Us Apart: Inequalities in Southern Africa* (Pp. 122–179).
Matita, M. M., & Chirwa, E. W. (2009). *Rural - Urban Welfare Inequalities in Malawi: Evidence from A Decomposition Analysis* (2009/05).
Mussa, R., & Masanjala, W. (2015). A Dangerous Divide: The State of Inequality in Malawi. *Oxfam International.*
National Statistical Office. (2005). *Integrated Household Survey 2004-2005*. O.
National Statistical Office. (2012). *Integrated Household Survey 2010-2011: Household Socio-Economic Characteristics Report*.
Nguyen, T.-T., Nguyen, T. T., & Grote, U. (2020). Credit and Ethnic Consumption Inequality in The Central Highlands of Vietnam. *Social Indicators Research*, *148*(1).
Notes On Formal and Informal Credit - Cbse Class 10 Economics. (N.D.). https://www.nextgurukul.in/wiki/concept/cbse/class-10/economics/money-and-credit/formal-and-informal-credit/3959959
Ozili, P. K. (2020). Theories of Financial Inclusion. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3526548
Ragan, C. T. S., & Lipsey, R. G. (2011). *Economics* (13th Ed.). Pearson Education Canada.
Sebu, J. (2017). *Essays On Farm Household Credit Constraint, Productivity and Consumption Inequality in Malawi* [Phd]. University of Kent.
Sen, A. (1993). Capability and well-being. In Martha Nussbaum & Amartya Sen (Eds.), Quality of Life (pp. 30-53). Oxford: Clarendon Press.
Todaro, M. P., & Smith, S. C. (2009). *Economic Development*. Pearson Addison Wesley.
United Nations. (2015). *Development Issues No. 1: Concepts of Inequality*. United Nations
United Nations. (2018). *The Sustainable Development Goals Report 2018*. https://unstats.un.org/sdgs/files/report/2018/thesustainabledevelopmentgoalsreport2018-en.pdf
United Nations. (2021). *The Sustainable Development Goals*. https://unstats.un.org/sdgs/files/report/2018/thesustainabledevelopmentgoalsreport2018-en.pdf
Van De Meerendonk, A. (2016). Assessment of social protection programmes and costing of policy options. https://www.ilo.org/wcmsp5/groups/public/-africa/ro-abidjan/ilo-lusaka/documents/publication/wcms_493917.pdf
Vellucci, P. (2021). A Critique of Financial Neoliberalism: A Perspective Combining Multidisciplinary Methods and Commodity Markets. *SN Business & Economics*, *1*(3).
World Bank. (2021a). *Malawi - Fifth Integrated Household Survey 2019-2020*.
World Bank. (2021b). *Understanding Poverty: Financial Inclusion*.

APPENDIX

COVARIATE-BALANCE SUMMARY STATISTICS

Table 1. Covariate Balance Summary

	Raw	Matched
Number of Observations	12,447	6,124
Treated Observations	3,062	3,062
Control Observations	9,385	3,062

Table 2. Standardized Differences and Variance Ratio

	Standardized Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Log of Household Size	0.22	-0.00	0.83	1.08
Central Region	0.03	-0.01	1.02	0.99
Southern Region	-0.06	-0.03	0.99	0.99
Rural	-0.16	-0.05	1.28	1.07
Male	0.11	-0.06	0.89	1.07
Marital Status	0.14	-0.07	0.87	1.09
Education Status	0.19	0.01	1.13	1.01
Employment Status	0.10	0.02	1.19	1.03
Age Group 1: 16-24 Years	0.12	-0.03	1.13	0.98
Age Group 2: 24-34 Years	0.12	-0.02	1.14	0.98
Age Group 3: 35-44 Years	0.02	0.04	1.03	1.08
Age Group 4: 45-54 Years	-0.09	0.02	0.79	1.07
Age Group 5: 55-64 Years	-0.19	0.03	0.50	1.13
Age Group 6: 65-74 Years	-0.21	0.00	0.36	1.01