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Assessing microcredit's role in enhancing economic well-being among low-income individuals in Sub-Saharan Africa

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ABSTRACT

The study assesses the impact of microcredit on the economic welfare of low-income households across SSA from 2009 to 2019. The study used econometric methods, including panel regression models and the Generalized Method of Moments (GMM), to evaluate microcredit's role in enhancing economic well-being among low-income individuals in SSA. The choice of GMM was to address potential endogeneity. The results demonstrated the effectiveness of microcredit in alleviating poverty. The findings suggest that poverty reduction strategies should incorporate microcredit alongside improvements in education, infrastructure, and healthcare to achieve optimal outcomes. The study also identified education, population growth, per capita GDP, and transformed agriculture as critical factors in ensuring microcredit's effectiveness in improving economic well-being among low-income individuals in SSA. Microcredit is a valuable tool for enhancing economic well-being among low-income populations. Governments, financial institutions, and stakeholders must make deliberate efforts to sustain and expand microcredit in impoverished environments. Microcredit has the potential to address the low-income syndrome in SSA and reduce income inequality across social classes.

Contribution/ Originality: This study uniquely investigates the implications of a branch of microfinance (microcredit) on an aspect of poverty that is completely ignored in the literature: the depth of poverty. The study further contributes by examining a large number of SSA countries, which enhances the generalizability and efficiency of the estimates. The use of GMM helps eliminate endogeneity, which could otherwise lead to spurious results.

1. INTRODUCTION

What started as a sparingly practiced method of extending credit to entrepreneurs has evolved into an active approach for reducing poverty in Sub-Saharan Africa (SSA). SSA has the highest poverty rate in the world. The countries in SSA are also characterized by chronic poverty, usually caused by economic mismanagement, low educational attainment, and poor health services (Aktar & Bakshi, 2023; Chen & Wang, 2024). About 689 million people, representing 9% of the world's population in 2021, lived below the poverty line of $1.90 (measured at 2011 purchasing power parity) per day. The data also show that out of this figure, 490 million people, representing 71.12%, are in Africa. An average of 66% lived below the poverty line in SSA (World Bank, 2021), making it the poorest sub-region in the world. Despite global efforts such as the Sustainable Development Goals (SDGs) for 2030

to eliminate poverty, SSA remains a focus due to the complexity and depth of poverty in the region (Addae-Korankye, 2019; Akotey & Adjasi, 2016; Li, Gan, & Hu, 2011; Zhang, Huntsinger, Li, & Li, 2018).

Although targeted attempts at the regional and global level have been undertaken for several decades, it is worrying that poverty persists, especially in SSA. This concern was raised by Bhuiya, Khanam, Rahman, and Nghiem (2019) and Zhang et al. (2018), who argue that SSA has remained one of the most impoverished regions of the world. Several international organizations such as the World Bank, United Nations and the African Union alongside other development agencies devoted substantial resources towards combating poverty and promoting sustainable development within SSA (Anselm, 2017; Boateng, Boateng, & Bampoe, 2015; Johnson & Wang, 2023). However, SSA is one of the regions with high poverty indices and where millions do not have access to basic needs such as food, health care, or education (Al-shami, Al Mamun, Rashid, & Al-shami, 2021; Damoah, 2019; Garcia, Lensink, & Voors, 2020). Existing poverty significantly worsens inequalities and economic mobility while hindering overall socio-economic development, which is expected under the vision of the SDGs. What's worse, the plight of the poorest people continues to worsen. SDG 1 aims to eradicate extreme poverty by 2030 and advocates for innovative and inclusive financial benchmarks, such as microcredit, to address the needs of oppressed cultures and foster sustainable economic development (Akpoghome & Joseph-Asoh, 2022; Bel hadj Miled & Ben Rejeb, 2018; Félix & Belo, 2019).

The phenomenon of microcredit involves the provision of small loans to individuals who do not have access to the formal banking system. Microcredit has emerged as a means of assisting economically disadvantaged groups, particularly women, to engage in income-generating activities and improve their livelihoods (Aktar & Bakshi, 2023; Al-shami et al., 2021; Mohammed, Alsaif, Abdelhalee, & Farah, 2024). Starting from the great initiatives of the Grameen Bank in Bangladesh, the concept of microcredit has become popular in SSA as well, with nations establishing several microfinance institutions for broader financial inclusion (Cull & Morduch, 2017; Kisaka & Mwewa, 2014; Olaosebikan, Egbon, & Olayemi, 2022).

Microcredit has now spread as a concept where small loans can be provided to poor individuals who do not have access to the proper banking system (Anselm, 2017; Kuuwill et al., 2024; Moreira-Dantas, Martínez-Zarzoso, Henning, & Dos Santos, 2023). Microcredit targets low-income groups, specifically in SSA, by providing funds without collateral to encourage income-generating activities, which can alleviate poverty (Blanco-Oliver, Samaniego, & Palacin-Sanchez, 2024; Chikwira & Okafor, 2022; Fokum, 2023). In SSA, microcredit has had a positive response and many microcredit institutions have sprung up in the region (Green & Taylor, 2024; Khan & Ali, 2023; Sen et al., 2023; Zhou, Huang, Shen, & Tian, 2023). These institutions provide credit to farmers and microentrepreneurs to encourage them to become self-reliant and develop sustainable livelihoods (Akpoghome & Joseph-Asoh, 2022; Mohammed et al., 2024; Sulemana, Fuseini, & Abdulai, 2023). Microcredit is positioned as an effective tool for economic emancipation in this region, considering the large number of people employed in the informal sector and the lack of access to traditional banks in the region (Blanco-Oliver et al., 2024; Martinez, 2023; Nishimura & Joshi, 2021).

Nonetheless, it remains an issue that requires further research regarding whether microcredit can ever improve the economic status of low-income earners in SSA (Fokum, 2023; Garcia et al., 2020; Kofi, Baafi, & Sarkodie, 2022; Matjasko, D'inverno, Marshall, & Kearns, 2020). On the contrary, the general trend is that microcredit can reduce poverty according to some studies, as it allows people to increase their earnings and expand businesses that would otherwise not be an option (Akotey & Adjasi, 2016; Aktar & Bakshi, 2023; A. Khan & Malik, 2020). Some other research stresses the point that in as much as microloans can foster economic activity in the form of self-employment, the ability of these loans to raise the income and consumption of a household could be impeded by high rates of interest or cultural and financial illiteracy attitudes toward borrowing such money (Al-shami et al., 2021; Chen & Wang, 2024; Moreira-Dantas et al., 2023). In addition, it has also been argued by critics that microcredit by itself cannot solve the issue of poverty single-handedly in SSA, as it is a multi-dimensional problem

that also involves education, health, and infrastructure (Garcia et al., 2020; Gupta, Kumar, & Rao, 2023; Hoque, Kummer, & Yigitbasioglu, 2024).

The intricacies of poverty dynamics in SSA make it more difficult to comprehend the concept of microcredit and its welfare contributions. Rural or urban, women or men, the level of the community's education, and the market's reach can mediate how microcredit best practices are employed to address poverty (Al-shami et al., 2021; Bel hadj Miled & Ben Rejeb, 2018; Bettoni, Santos, & Oliveira Filho, 2023; Blanco-Oliver et al., 2024). There are, for example, some women-owned microenterprises for whom microcredit programs have been beneficial because they increase their economic agency. Meanwhile, other studies show that women tend to stay out of the programs due to prevailing patriarchal culture and lack of mobility (Anselm, 2017; Bettoni et al., 2023; Fokum, 2023). Besides, the absence of economies of scale in SSA leads to higher transaction costs of offering small loans, which can negate the essence of microcredit by burdening the borrowers rather than relieving them (Anselm, 2017; Félix & Belo, 2019; Garcia et al., 2020; Subramaniam, Masron, Wahab, & Mia, 2021).

In light of these contrasting results, the present study seeks to make an important contribution to the literature by examining, in a systematic way, the role of microcredit in enhancing the economic status of low-income groups in 20 SSA countries (Al-shami et al., 2021; Fokum, 2023; Gupta et al., 2023; Hoque et al., 2024; Martinez, 2023; Moreira-Dantas et al., 2023). The polemics of this research, which explores the depth (how far below the poverty line these people are), ultimately aim to assess the effectiveness of microcredit as a tool for poverty alleviation in SSA (Addae-Korankye, 2019; Cull, Demirgüç-Kunt, & Morduch, 2021; Hoque et al., 2024; Zhang et al., 2018). The current research employs advanced econometric techniques, including panel data regression models and GMM, to address potential endogeneity issues and enhance the credibility of the results obtained in the study focusing on various countries in the region (Anselm, 2017; Damoah, 2021; Félix & Belo, 2019).

This study has also contributed to empirical knowledge regarding the impact of microcredit in SSA and has policy implications for policymakers, financial institutions, and development agencies (Akpoghome & Joseph-Asoh, 2022; Bettoni et al., 2023; Cull et al., 2021; Fokum, 2023). The study highlights aspects often overlooked in previous research: the depth of poverty, measured by the poverty gap index. It examines how microcredit impacts welfare, addressing a gap in the existing literature, which is abundant in microfinance studies but lacks analysis of the sectional and branch effects of microcredit on poverty. This research reveals previously unconsidered effects of microcredit. Its findings can also inform the development of more effective and relevant microcredit policies tailored to micro borrowers in many SS countries (Anselm, 2017; Kofi et al., 2022; Kuuwill et al., 2024; Marquis et al., 2015; Zhou et al., 2023). This study can also inform policy advocacy by clarifying the circumstances that maximize the impact of microcredit so that microcredit can be viewed as one of the tools in the struggle against poverty across SSA (Aktar & Bakshi, 2023; Blanco-Oliver et al., 2024; Zhang et al., 2018). The objectives are in line with Sustainable Development Goal (SDG) 1, by guiding how the microcredit sector can be utilized to enhance the welfare of those domiciled in SSA countries (Ashta, Couchoro, & Musa, 2014; Kisaka & Mwewa, 2014; Moreira-Dantas et al., 2023).

Generally, this study aims to assess the role of microcredit in managing poverty and improving the economic status of poor people in Sub-Saharan Africa (SSA). Specifically, the study seeks to evaluate the effectiveness of microcredit on the depth of poverty in SSA, assess the contribution of microcredit to the enhancement of the economic power of the oppressed in SSA, and indicate policy options aimed at enhancing the usage of microcredit schemes as a pathway toward the achievement of Sustainable Development Goal 1 for SSA.

2. LITERATURE REVIEW

2.1. Empirical Literature

Different studies provide evidence that microcredit assists in the economic empowerment of those who are economically disadvantaged, increases their income, and helps in poverty alleviation. For example, recent studies

show that microcredit indeed provides leverage to economically disadvantaged groups and helps them increase their household income and asset base (Johnson & Wang, 2023; Patel & Robinson, 2023). In SSA, other studies demonstrate that microfinance has also improved the volatility in income and consumption levels of the low-income household (Mumba, Chanda, & Tembo, 2022; Osei, Mensah, & Boateng, 2023).

In Kenya, the effects of microcredit on female entrepreneurs have been especially impressive; women have utilized microloans to set up small businesses and attain self-sufficiency (Njoroge & Mutinda, 2023). In Tanzania, the results show that not only does microcredit increase resilience, but borrowers use it to diversify income-generating activities that can enhance household welfare in the long run (Sule, Hassan, & Omari, 2023). More recently, the effects of some microcredit interventions in Ghana on the productivity of farmers were reported; farmers reported increased productivity as they used loans to acquire better farming techniques (Addo, Mensah, & Ofori, 2023).

Acharya and Subedi (2022) and Garcia et al. (2020) report that the effectiveness of microcredit has increased with the combination of agricultural practices, literacy training, and other support services. Marquis et al. (2015) in Ghana report that such households, which shrink their investment funds by combining loans with business and other ventures, experienced not only an increase in income but also improvements in children's health and educational status. However, this microcredit strategy raises concerns, as it demonstrates how microfinance interventions for poverty alleviation can transition into economic and social aspects of poverty (Adegboye & Adebayo, 2023; Sey, Kankam, & Quartey, 2022).

Despite positive outcomes, the empirical literature does, however, show microcredit as having a mixed impact in the move towards the reduction of poverty in the long run. In Uganda, De-Haan and Lakwo (2010) found that most microcredit users enhanced their welfare, but such change was not substantial enough to create long-term economic improvements. Similar studies in Ethiopia have also shown that microcredit's effectiveness in income stabilization is, however, limited without complementing the market and policy context (Bekele & Tsegaye, 2022; Kassa & Haile, 2023).

In Ghana, Patel and Robinson (2023) remarked that microcredit offers quick help but does not have a successful record in poverty reduction. This is highly explained by the impact of high interest rates, low levels of financial literacy, and low integration into the economy at large (Ali & Amankwah, 2022; Onyema & Chukwuma, 2023). In line with this, recent evidence from Nigeria also shows that microcredit only has a slight positive relationship with poverty reduction, as most borrowers have significant repayment obligations, which may offset any income increases expected from activities funded by the loans (Ali & Amankwah, 2022; Okoye & Nwachukwu, 2022).

Over-indebtedness, limited market access, and high-interest rates are some of the structural challenges that impede the success of microcredit in SSA. Research has noted that high repayment rates force low-income borrowers into perpetual cycles of loan repayment, thus defeating the aim of microcredit, which is poverty alleviation (Matheka & Mwangi, 2023; Otieno & Karanja, 2022). Moreover, the absence of regulatory authorities allows some microfinance institutions to engage in predatory lending, and this gives rise to negative consequences for economically vulnerable borrowers (Acheampong & Mensah, 2022; Kimathi & Waweru, 2023).

Patel and Robinson (2023) studied several cases and concluded that policy support needs to be integrated within microcredit schemes, especially in rural areas, as poor infrastructure makes it hard for many to access Core markets and resources (Afriyie, Mensah, & Boateng, 2022; Osu & Akpan, 2023). The same need for regulatory and infrastructural support is echoed in the findings from Rwanda, where the authors reported that microcredit outcomes improved remarkably after government and financial literacy interventions (Mukamana & Kagaba, 2023; Uwitonze & Nsabimana, 2022).

Microcredit has been recognized as one of the significant methods for promoting women's empowerment within sub-Saharan Africa. For instance, studies show that by providing access to resources, microcredit enables women to develop businesses and contribute to household income, thereby improving their social and economic

status (Ampofo & Adusei, 2023; Okeke, Eze, & Udo, 2022). In the case of Nigeria, evidence suggests that with microcredit, many women not only become economically active but also engage in community and leadership activities, thus changing the existing patterns of gender discrimination (Adeniran & Olalekan, 2022; Bello & Alabi, 2023).

In Kenya, Chikwira and Okafor (2022) found that the incorporation of group lending models in microcredit programs increased the likelihood of repayment since borrowers were held accountable by and relied on one another, which contributed to the economic advancement of women. Similarly, studies conducted in Zambia also indicate that women's microcredit has a positive impact on children due to increased household investments in education and health (Mwansa & Bwalya, 2023; Tembo & Kunda, 2022).

The provision of microcredit to women has shown positive effects as a strategy for enhancing their mix of gross domestic product and GNI, since they use the funds to promote the growth of the family and the community. (Aina & Akinola, 2023; Muthoni & Njoroge, 2022). However, some scholars vehemently warn that success at the household level, where women have an increased rate of assets due to microcredit, cannot be deemed a success unless social structures exist that ensure equality in opportunity and resource distribution (Badu & Anane, 2022; Okeke et al., 2022).

The body of literature available in empirical studies focuses on the issues of microcredit and household economic activities in SSA. The most convincing arguments are made by these studies, and they focus on income and asset accumulation. It appears that microcredit works very well among women and rural populations, but there are limits to these effects regarding resource and program levels. Borrower characteristics, the business environment, and the design of the program will, of course, play a role in the success of microcredit. However, for microcredit to qualify as an effective poverty reduction strategy, it is necessary to identify the specific context within which it will operate, incorporating non-financial elements alongside cash.

This strategy aligns with recent research findings, which advocate for a more comprehensive, social, economic, and policy-oriented microcredit model. Since these programs address both financial and non-financial aspects of borrowers' needs, they have the potential to enhance the impact of microcredit on poverty reduction in SSA (Danso & Asante, 2022; Nkansah & Oppong, 2023).

2.2. Theoretical Basis

Among policies that involve the provision of microcredit and have the potential to improve the economic status of low-income individuals in sub-Saharan Africa, the Poverty Trap Theory is integral. This theory posits that poverty begets further poverty since the poor or areas that have limited access to finances and opportunities tend to be in a poverty cycle that is hard to escape from (Chowdhury, Singh, & Kaur, 2022; Opoku & Kyei, 2023). It is common that for those families with low income, several factors come together to deter them from making investments in productive engagements; these include lack of credit, poor communication systems, and limited economic engagement (Akindele & Ayodele, 2023; Nwankwo, Okoro, & Eze, 2022).

3. DATA AND METHODOLOGY

3.1. Research Design

This study employs a panel regression design. The data covers the years 2009-2019 and includes 20 SSA countries. The selection of countries and the study period was based on data availability. The panel design enables the examination of variations and temporal effects in the impact of microcredit on poverty reduction across different countries and over time. Data were collected from sources such as national statistics offices of the respective countries and international organizations, including the World Bank. Figures from published studies were also incorporated from the literature. Variables were selected based on economic theories and guided by existing literature.

3.2. Data and Sampling

The study focuses on all countries in SSA and selected a purposive sample of 20 countries. A selection criterion included the availability of reliable poverty and micro-finance activities data, regional spread, and stages of development of the micro-finance sector. The World Development Indicators (WDI), povcalNet for poverty statistics for developing countries, and Microcredit Information Exchange (MIX) Market were consulted for data.

3.3. Model Specification

As the primary goal of the research is to measure the effect of microcredit on poverty, the study uses panel regression models with poverty indicators (poverty gap) as dependent variables. The independent variables include some microcredit access indicators, economic performance indicators, and resources in the form of gross domestic product per capita, trade, education, gross capital formation, and population growth. There are also control variables used to account for the effects of demographic characteristics as well as economic differences across countries.

This study follows Poverty Trap Theory. Some empirical works like Subramaniam et al. (2021) and Nsiah, Mensah, and Boateng (2021) were also consulted. The basic model is specified as

$$lnPov_{it} = \alpha_i + lnY_{it} + \varepsilon_{it} \qquad (1)$$

Where lnPov is the Natural Log of Poverty Index for country i at time t; Y_{it} is Natural Log of Gross Domestic Product per Capita (Income) for country i at time t. The ε_{it} is the error term for country i at time t. According to the Foster, Greer, and Thorbecke (1984), poverty prevalence could be measured by the Head Count index. Also, introducing microcredit and other control variables produces the equation

$$lnPGP_{it} = \alpha_i + \beta_1 lnY_{it} + \beta_2 lnMC_{it} + \beta_3 lnTRD_{it} + \beta_4 lnEdu_{it} + \beta_5 lnGCF_{it} + \beta_6 lnBRR_{it} + \beta_7 lnAVA_{it} + \beta_8 lnPG_{it} + \varepsilon_{it} \qquad (2)$$

Where MC_{it} is the microcredit measured by Gross Loan Portfolio in country i at time t, $TRDi_t$ is Trade in country i at time t, Edu_{it} is Education in country i at time t. GCFit is Gross Capital Formation in country i at time t, BRR_{it} is Borrower Retention Rate in country i at time t, AVA_{it} is Agric Value Added in country i at time t, and PG_{it} is Population Growth in country i at time t.

There are econometric problems that may emerge in the estimation of the above equations using ordinary regression techniques; therefore, estimates resulting from this approach could contain errors and inconsistencies. For instance, when an important variable is omitted from a model but is correlated with one or more control variables, the coefficient of any of the explanatory variables included in the model would capture the effect of such a variable (Stock & Watson, 2007). Therefore, it follows that Random Effect and Fixed Effect models must study the real impact. Consequently, this study estimates the following random and fixed effect models regression that controls for unobserved specific effects.

$$lnPGP_{it} = \alpha_i + \beta_1 lnY_{it} + \beta_2 lnMC_{it} + \beta_3 lnTRD_{it} + \beta_4 lnEdu_{it} + \beta_5 lnGCF_{it} + \beta_6 lnBRR_{it} + \beta_7 lnAVA_{it} + \beta_8 lnPG_{it} + Z_i + g_{it} \qquad (3)$$

$$lnPGP_i = \alpha_i + \beta_1 lnY_i + \beta_2 lnMC_i + \beta_3 lnTRD_i + \beta_4 lnEdu_i + \beta_5 lnGCF_i + \beta_6 lnBRR_i + \beta_7 lnAVA_i + \beta_8 lnPG_i + g_i \qquad (4)$$

The presence of endogeneity may lead to biased estimates, inconsistent estimator values, or both. Endogeneity arises when there is a correlation between the error term and one or more of the explanatory variables due to, for example, omitted-variable bias, measurement errors, or simultaneity. To address this issue and eliminate spurious results, the Generalized Method of Moments (GMM) has been applied to this estimation. The GMM format is as follows:

$$lnPGP_{it} = \alpha_i + rPGP_{it-1} + \beta_1 lnY_{it} + \beta_2 lnMC_{it} + \beta_3 lnTRD_{it} + \beta_4 lnEdu_{it} + \beta_5 lnGCF_{it} + \beta_6 lnBRR_{it} + \beta_7 lnAVA_{it} + \beta_8 lnPG_{it} + g_{it} \quad (5)$$

Where PGP_{it-1} is the prior value of the index used as instrumental variables.

3.4. Tests

Nevertheless, several tests are conducted to verify the credibility and usefulness of the model. To begin with, the Breusch-Pagan Lagrangian Multiplier Test explains whether the random effects model is an improvement over the basic ordinary least squares.

Third, there is Pesaran's Test for Cross-Sectional Independence, which helps to determine the extent to which residuals are independent across countries in cross-sectional relations. If heteroscedasticity is detected, robust standard errors are applied. Additionally, the Hausman test is used to establish whether Fixed Effects (FE) or Random Effects (RE) models are more appropriate.

4. RESULTS AND DISCUSSION

4.1. Descriptive Results

The summary statistics for selected economic variables as well as social variables involved are presented in Table 1. Each measure is ascertained for all variables. These measures include the number of observations, the mean value, the standard deviation, the minimum, and the maximum values of that variable. These, together with their economic interpretations, assist in understanding the economic and social fabrics that underlie these outcomes.

There are 220 observations for the measure of the poverty gap. The mean of the poverty gap is 17.043%. This indicates that, on average, a person's income falls 17.043% below the poverty line. However, with a variability of 10.635%, the depth of poverty exceeds one unit for all SSA countries.

The range varies from a minimum of 1.764% to a maximum of 42.586%, indicating significant disparities in the degree of poverty among SSA countries. Lower figures suggest that the income of these countries is just above the poverty line, whereas higher values indicate areas where low-income countries are well below the poverty line. Additionally, from an economic perspective, a higher poverty gap signifies the amount needed to transfer to the poor to elevate their income or expenditures to the poverty line level.

The gross loan portfolio represents the total loans, which are expressed in USD. The mean is $24,660,944. This suggests that financial institutions, on average, have a substantial gross loan amount. Additionally, the high standard deviation of $33,103,529 indicates variability in the loan amounts issued by different institutions and across various SSA countries.

These loans can be as low as $161,782, where one organization has issued multiple smaller loans. Larger gross loan portfolios may indicate higher levels of economic activity and more developed financial systems within countries, while high deviations may reflect geographic differences in financial development or economic activity levels.

Table 1. Summary statistics.

Variables	Observation	Mean	Standard dev.	Minimum	Maximum
Poverty (Gap)	220	17.043	10.635	1.764	42.586
Gross loan portfolio (US$)	220	24,660,944	33,103.529	161,782	181,543,009
Income (US$)	220	1487.07	1547.034	290.156	8737.041
Trade	220	89.327	61.215	1.000	197
Education (Secondary)	220	75.468	45.314	1.000	149
Gross capital formation	220	25.698	8.668	9.941	56.396
Borrower retention rate	209	70.163	14.106	37.780	113.15
Agric value added	220	22.541	11.672	1.927	60.61
Population growth	220	2.74	0.517	0.387	3.759

The mean value of income per capita is $1487.07 with an approximate standard deviation of $1547.034. The standard deviation depicts meaningful variations in the income levels of the SSA. The lowest observed income stood at $290.156, which indicates how poor a country is capable of being, and the highest at $8737.041. Hence, this high dispersion of income in the SSA region indicates a significant level of income variation within SSA.

Education in the study is measured by the proportion of the population that has achieved secondary education. This variable also has 220 observations, with a mean value of 75.468 percent. This indicates that a sufficient proportion of people have completed at least secondary education. However, the standard deviation of 45.314 percent provides a rough estimate of the dispersion of these levels across the counties under consideration. The coverage ranges from at least 1 percent to as high as 149 percent, indicating significant differences in education levels and achievements among the areas studied. Some areas have no education at all, while others have established education systems that ensure their residents complete secondary education or pursue further studies.

Capital formation is the total investment in the economy made domestically, and it has been computed for 220 observations. It has a mean of 25.698 percent, which indicates that roughly 25% of the Gross Domestic Product is invested within national boundaries in SSA. The standard deviation remains at 8.668%, reflecting variable levels of investment among countries. This suggests different degrees of investment, with some countries having a low ratio of investments to GDP and others a higher ratio. Consequently, most developed countries are likely to have a relatively higher percentage of GDP spent on infrastructure development.

Borrower retention, or the proportion of borrowers who return to the same lending institution, has 209 observations. The average retention of borrowers stands at 70.163% of total loans, indicating that at least 70% of borrowers seek assistance from the same institution. The standard deviation is 14.106%, reflecting loyalty to borrowers on the part of different institutions over time. The lowest recorded retention rate is 37.780%, while the maximum is 113.15%, suggesting a significant divergence in lender behaviors, with some banks enjoying very high borrower retention. Borrowers with high retention rates with their preferred financial institutions demonstrate high levels of satisfaction and trust, which positively influence the growth and stability of the economy.

4.2. Economic Well-Being and Microcredit

Table 2 summarizes results from four regression models. They include Pooled OLS, Random Effect, Fixed Effect, and GMM. The table further shows the relationship between the poverty gap and other variables using a sample of 20 SSA countries. Regarding Gross Loan Portfolio (LNGLP), the findings across models are negative. This indicates that an increase in the gross loan portfolio is associated with a reduction in poverty across all models reviewed. The estimates were: Pooled OLS model -0.044; RE model -0.071; FE model -0.085; SR-GMM model -0.044; and LR-GMM model -0.24. "***", "**" and '*' are used to note the levels of probability of statistical significance at least 1%, 5%, and 10% level respectively. The lagged GMM effect indicates that over time, microcredit can be an effective tool in alleviating poverty as it provides credit to those who are financially constrained (Blundell & Bond, 1998).

Table 2. Poverty (Poverty gap) and microcredit.

Variables	Pooled OLS	Random effect (RE)	Fixed effect (FE)	System GMM	
				Short-run	Long-run
LNGLP	-0.044	-0.071**	-0.085***	-0.044***	-0.240***
	(0.027)	(0.028)	(0.031)	(0.009)	(0.037)
LNY	-0.849***	-0.625***	-0.440***	-0.211***	-1.149***
	(0.080)	(0.120)	(0.153)	(0.040)	(0.169)
LNTRD	-0.060**	0.002	0.034	-0.014	-0.075
	(0.024)	(0.040)	(0.051)	(0.011)	(0.060)
LNEDU	-0.100***	-0.048	-0.030	-0.020*	-0.109*
	(0.036)	(0.043)	(0.048)	(0.011)	(0.060)
LNGCF	-0.337**	-0.357***	-0.395***	-0.203**	-1.104***
	(0.134)	(0.135)	(0.144)	(0.073)	(0.334)
LNBRR	-0.556***	-0.144	-0.072	-0.068	-0.369
	(0.150)	(0.186)	(0.202)	(0.052)	(0.295)
LNAGRIVA	-0.464***	-0.327**	-0.337*	-0.186***	-1.013***
	(0.093)	(0.133)	(0.183)	(0.033)	(0.121)
LNPG	0.036	0.065	0.038	0.088**	0.480**
	(0.154)	(0.198)	(0.216)	(0.039)	(0.209)
LNPGAP(-1)				0.816***	
				(0.018)	
Constant	14.625***	10.936***	9.547***	4.164***	
	(1.108)	(1.398)	(1.561)	(0.690)	
Observations	209	209	209	190	190
Probability>F	0.000	0.000	0.000	0.000	
R-Squared	0.5924				
Within R2		0.1710	0.1794		
Between R2		0.6257	0.4545		
Overall R2		0.4926	0.3671		
Hausman (Chi2)		8.08***	8.08		
Wald test (Chi2)			19408.35***		
AR(2) [Prob]				0.935	
Hansen [Prob]				0.218	

Note: The dependent variable is poverty gap. Standard errors are in parentheses. *, ** and *** represent statistical significance at 10%, 5% and 1% respectively.

As demonstrated in several models, the wealthier individuals are, the smaller the disparity between the elite and the poor. All models show negative values of Income (LNY): -0.849 in Pooled OLS, -0.625 in RE, -0.440 in FE, -0.211 for the GMM Short Run Model, and -1.149 for the GMM Long Run Model. The significance at the 1 percent level (***) reinforces the validity of this inverse relationship over time. Inertial growth is critical when addressing the poverty gap. The long-run effect in the GMM Model indicates that one-off growth is ineffective at reducing poverty.

The paragraph explains the effect of trade on changes in the poverty gap as captured by the Trade (LNTRD) coefficients. In this model, while the Pooled OLS model indicates the existence of a dependable relationship where one variable affects the other inversely by -0.060, other models are linearly built and do not show any significant impacts. There appears to be no robust evidence that trade reduces poverty in the context and specification in which it is examined.

According to the above table, factors like poverty were likely to be affected adversely by higher levels of education, experiencing more of a negative poverty gap, especially in both the pooled OLS and the GMM models. In the pooled OLS, the coefficient for education (LNEDU) was -0.100 with a t-statistic of-10** and this indicates less than a 1 percent level of significance. The GMM short-run model for the same being -0.020 with the t-statistic of -2* which is significant at 10 percent. This is because, even with education being held apart, numerous potential socio-economic factors can impact the likelihood of someone being poor or not.

It is also noted that in all models, the GDP has a negative coefficient, which indicates and implies that with an increase in incomes, poverty rates per capita on average decrease. The coefficients are -0.337 in the Pooled OLS

model, -0.357 in the RE model, -0.395 in the FE model, -0.203 in the GMM short-run model, and -1.104 in the GMM long-run model, respectively. These results are critical, given that most SSA countries, for example, are characterized by low income, which limits their economic growth rate.

In addition, all pooled OLS, RE, and GMM models support this, indicating that increased agricultural value added (LNAGRIVA) decreases the poverty gap. The coefficients for LNAGRIVA were -0.464 in the pooled OLS model ($P < 0.01$), -0.327 in the RE model ($P < 0.05$), -0.186 in the GMM short-run model ($P < 0.01$), and -1.013 in the GMM long-run model ($P < 0.01$). This suggests that if a nation enhances its economic management, particularly in the agricultural sector, it will be able to sustain prosperity in the long term.

The results indicate that the population growth (LNPG), represented by the coefficients for LNPG, has a mixed effect on the poverty gap. Among the models employed—pooled OLS, RE, and FE—it is observed that the coefficient is not statistically significant. This further suggests that the correlation between the two variables being studied is weak. Yet GMM has a positive short-run effect of 0.088 (t=2*), significant at 5%, and a long-run effect of 0.480 (t-statistic; 7**), also significant at 5 % level. These results suggest that resources for the population, when used efficiently in the short term, can lower poverty levels when in excess.

The value of the poverty gap when independent variables are zero is captured by the estimated constant terms. The values of the constants are, respectively, 14.625 for the Pooled OLS model, 10.936 for the RE model, 9.547 for the FE model, and 4.164 for the GMM estimates. All are significant at the 1% level. The baseline poverty levels indicate that these high constants suggest a need for targeted interventions to address the root causes of poverty.

Contrarily, by the Hausman test results in Table 2, a great deal of evidence is in favor of fixed effects and not random effects models, with effects of time p value =8.08. This indicates that heterogeneities of certain variables, which are not observed but differ across countries and over time, are important in its estimations, making them more valid and less biased than the pooled estimates obtained under the assumptions of cross-sectional independence, which claim that all are constant at all times.

As an example, the Wald test statistic for the joint significance of the explanatory variables in the GMM model has a value of 19,408.35. This implies that they are jointly significant, at least in theory. Since this Chi-squared statistic is greater than the significance level, it leads us to accept the alternative hypothesis. This suggests that we have a reasonable degree of confidence that the alternative hypothesis is true.

In fact, there was no significant autocorrelation of the time series as indicated by the AR(2) test in the case of GMM models, with a probability of 0.935. This implies that GMM estimates are consistent because at least one of the model assumptions regarding the error terms is satisfied, and therefore, careful treatment of such equations will always yield correct inferences, even in the presence of noise. Hansen's test of over-identification is indeterminate because its p-value is 0.218, which precludes us from making any firm assertions about its validity. A non-significant result from Hansen's test would suggest that the null hypothesis could not be rejected; thus, we may proceed with the alternative hypothesis. The results from the GMM method are acceptable within normal ranges, and the instruments employed during this process appear to be appropriate overall.

In conclusion, microcredit has, arguably, enabled low-income earners in SSA, who are often faced with poverty, to improve their economic situation. In particular, microcredit has opened business opportunities for marginalized groups vulnerable to exclusion from the formal banking system. This research emphasizes that microcredit serves both as a financial inclusion method and an anti-poverty strategy by increasing household income levels and creating conditions for small businesses. However, its effectiveness can be influenced by other structural and socio-economic hardships. A key point from this analysis is the heterogeneity of microcredit's impact across SSA countries. Regarding how microcredit can be effectively utilized by borrowers, limitations such as infrastructural gaps, financial illiteracy, and social and cultural factors are significant. High interest rates and short repayment periods place additional burdens on borrowers, making loans less economical in the long term. Furthermore, the

lack of related infrastructure, such as adequate transportation and healthcare facilities, hampers rural and remote borrowers from fully utilizing microcredit services.

5. POLICY SUGGESTIONS

Regulated interest rates and borrower-friendly repayment terms can relieve low-income borrowers of the burden and thus enable microcredit systems to become sustainable and accessible. Coupled with these, integrating financial literacy programs within microcredit schemes is essential. Such initiatives may also equip borrowers with the necessary skills to manage loans effectively, reduce default rates, and enhance financial self-sufficiency in the long term. Investment in infrastructure such as transportation, healthcare, and education is vital for strengthening the effectiveness of microcredit in SSA. Improved infrastructure can enhance market access, reduce transaction costs, and support economic activities driven by microcredit. Additionally, the use of technology and internet-enabled devices, such as mobile banking, can help lower costs and expand the reach of microcredit to marginalized populations in remote areas.

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