Implications of Financial Inclusion for Poverty in Cameroon: A Gendered Analysis

Fiennasah Annif' Akem

Research Paper 564

Bringing Rigour and Evidence to Economic Policy Making in Africa

AFRICAN ECONOMIC RESEARCH CONSORTIUM

CONSORTIUM POUR LA RECHERCHE ÉCONOMIQUE EN AFRIQUE

Implications of Financial Inclusion for Poverty in Cameroon: A Gendered Analysis

By

Fiennasah Annif' Akem
Department of Economics
University of Dschang-Cameroon

AERC Research Paper 564
African Economic Research Consortium, Nairobi
February 2025

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are, however, those of the author and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

ISBN 978-9966-61-269-4

Abstract

Using the FinScope Consumer survey, the study examines the implications of financial inclusion for poverty in Cameroon. Specifically, assessed the impact of financial inclusion on overall welfare and by gender. In order to account for the endogenous selection bias resulting from unobserved confounders and for structural differences between users and non-users of financial services in terms of welfare generating function, we employ the endogenous switching regression. The probit results indicate that men have a higher probability of being financially included compared to women. We further observe that financially included individuals are expected to make welfare gains of about XAF 14,544 per month. Results equally show that the impact of financial inclusion is higher among men compared to women. These results underscore the need for targeted policies to address gender disparities in access to financial services, implementing policies that promote equal opportunities for men and women in the financial landscape is essential for fostering sustainable economic development and reducing poverty in Cameroon.

Keywords: Financial inclusion, endogenous switching, welfare, Cameroon

JEL codes: O16, I32, J16

1. Introduction

In recent years, financial inclusion has moved up the global policy agenda and gained great interest due to its potential to break the vicious cycle of poverty. Globally, financial inclusion has been the subject of numerous economic investigations lately (López & Winkler, 2019). According to Park and Mercado (2018), financial inclusion promotes inclusive growth, a better livelihood and poverty reduction. Financial inclusion is also perceived as a dynamic tool for attaining sustainable growth, employment generation, poverty reduction, and income equality for both developed and developing countries (Chibba, 2009; Omar & Inaba, 2020). Equally, financial empowerment has been proven to increase female participation in community decision-making, improve their well-being, and combat socio-economic marginalization of women (World Bank, 2020a). Because women are very often marginalized and discriminated against, they are less likely to be financially included than men (Mndolwa & Alhassan, 2020).

As such, financial inclusion has become a policy priority for many countries because pro-poor growth policies have recognised an inclusive financial system as one of the most important instruments for achieving inclusive growth; (Sarma & Pais, 2011; Haq et al., 2018). In this light, the United Nations member countries have included financial inclusion as a formal target and a key objective in their development agenda (Sahay et al. 2015). The World Bank in 2018 equally identified financial inclusion as a means to achieve 7 of the 17 Sustainable Development Goals (SDGs). Some of the 7 SDGs are; eliminating extreme poverty (SDG 1) and promoting gender equality (SDG 5). The widespread adoption of digital financial services such as mobile money, Internet banking, and electronic payment systems have lowered the cost of financial transactions, thereby increasing outreach to the poor (Sahay et al. 2020; World Bank 2020a). The financial landscape in Africa have been extremely transformed by Mobile financial services, with increased outreach to rural areas, where the majority of the population were formerly excluded (Nguena 2019; Pazarbasioglu et al. 2020).

Despite these developments, gender disparities in financial inclusion still persists across regions and time. According to the world bank in 2014, they are still millions of people in developing countries who are involuntarily excluded from the financial system. These are generally underprivileged population segments such as women, low-income earners and rural dwellers. Also, the gender gap in ownership of bank account in 2017 was 7% globally and 9% in developing countries. According to 2017 Global Findex data base, men are more likely than women to own a bank account (Demirgüç-Kunt et al. 2018).

The deep digital divide and missed opportunities, particularly for unbanked women and poor populations were exposed during the COVID-19 pandemic because of the shift towards digital finance (World Bank 2020a). Gender disparities in financial inclusion undermine the important role of women in poverty alleviation and economic development. This is particularly the case in Cameroon, where women account for slightly over 50% of the total population. literature suggest that enhanced financial inclusion of women is not only desirable in terms of equality and closing of the gender gap, but improving women's access to financial inclusion can yield more positive societal benefits than improving financial access of men (Duflo 2012).

Defining financial inclusion is not a straightforward task because the concept of financial inclusion covers a broad range of conditions that need to be given. Financial inclusion has been defined as the access and use of formal financial services to all, including the most vulnerable (Fouejieu et al. 2020). Mubiru (2012) categorises financial inclusion as an aspect of social inclusion, which is the possibility for members of an economy to actively be part of economic and social advancements, both to benefit from it and to contribute to it. In this study, we consider financial inclusion as the process of guaranteeing access and usage of formal financial services at an affordable price for all members of the economy (Sarma, 2008 and Ozili, 2018). A key feature of the financial inclusion concept, as compared with that of financial development, is that from the title itself there is a focus on equality and inclusivity. Therefore, a key element of financial inclusion is equality of financial access between genders, as well as between other groups.

Individuals engulfed in poverty are often characterized by low income and consumption levels, and also; often live without clean water, proper housing, healthy food, proper medical attention, and better education among others (Tita & Aziakpono, 2017; Koomson et al., 2020). The last decades, particularly the 2000s, were noticeable by a growing interest in reducing issues such as poverty (Cardoso & Teixeira, 2020). Amidst the multitude of factors influencing these issues, the access and usage of financial services have gained the attention of scholars and policymakers. This is because financial services help individuals escape poverty by making easier the investment in education, business, and health, (Asuming et al. 2019).

According to Deonandan, (2019), Poverty is a condition in which an individual cannot obtain adequate primary needs to sustain his life. The international benchmark for extreme poverty as defined by the World Bank is surviving on less than US$1.9 a day. According to the government of Cameroon, poverty is the state in which individuals are surviving on less than 339715FCFA a year as of 2014. The rate at which the poor lack financial resources to meet their minimum standard of living is still a major challenge among African countries (Tita & Aziakpono, 2017; Ofori-Abebrese et al., 2020). According to the World Bank (2014), there are still millions of people in developing countries that are involuntarily excluded from the financial system. Choudhury and Bagchi (2016) indicated that financial exclusion is partly responsible for the persistent state of poverty and financial hardship in developing countries. Therefore, a prominent solution is to consider the initiative to extend levels of financial inclusion among the poor (Imai et al., 2012). Bateman et al., (2019) equally stated that financial inclusion is one of the panaceas to eradicate poverty from the world.

In this paper, the case of Cameroon is used to provide new empirical evidence because Cameroon is a country with relatively low levels of financial inclusion and high rates of poverty and gender inequality. Although 39% of the national population lives below the poverty line, this rate rises to 51.5% for women, with 79.2% underemployed (World Bank 2020). The protracted socio-economic impact of the COVID-19 pandemic prevent vulnerable populations from meeting their basic needs, resulting in the contraction of Cameroon's economy in 2020, and additional 400,000 people fell into extreme poverty. Furthermore, according to the 2022 World Food Programme on Cameroon Country Brief, an estimated 40 percent of Cameroon's 27.2 million people live below the poverty line, of which 52 percent are women.

Therefore, understanding the role of financial inclusion on poverty overall and by gender can be helpful in animating public policy debates related to poverty reduction and gender equality in Cameroon. In this light, a key question arises: What are the implications of financial inclusion for welfare in Cameroon? Specifically, the study seeks to assess the impact of financial inclusion on overall welfare and by gender. Based on the foregoing discussion, the corresponding research hypothesis is; the impact of financial inclusion on welfare is likely to be higher amongst women compared to men.

This study contributes to existing literature by employing the Cameroon Finscope 2017 dataset to conduct a gendered analysis of the impact of financial inclusion on poverty in Cameroon. The research employs the endogenous switching regression model, offering a more rigorous approach than several other studies as it simultaneously addresses selectivity bias and endogeneity. In contrast to previous findings, our results show that the treatment effect on the treated (ATT) estimate indicates a higher impact of financial inclusion on welfare for the male subsample compared to the female subsample.

Our findings reveal that, financial inclusion yields significant welfare benefits with respect to monthly income. Hence, financial inclusion is expected to greatly contribute to poverty alleviation by increasing the monthly income of individuals if the users have basic financial knowledge. We equally found that the impact of financial inclusion is higher among men compared to women. The remainder of the manuscript is structured as follows: Section 2 provides an overview of financial inclusion; Section 3 reviews the theoretical and empirical literature. Section 4 dwells on the empirical strategy and Section 5 on data description. Section 6 presents and discusses the empirical findings and Section 7 reflects on concluding remarks and policy implications.

2. Overview of Financial Inclusion in Cameroon

The financial sector of Cameroon is made up of banks, insurance companies, a state pension fund, and a state-owned mortgage bank. In addition, the country has over 400 microfinance institutions, 2 mobile money operators, a state-owned postal bank, and a nascent stock market based in Douala. According to the International Monetary Fund (IMF, 2020), total financial assets represent 40% of national GDP, 2/3 of which is held by banks. The value of mobile banking transactions as a percentage of GDP stood at 30.24% in 2018; (World Bank, Financial Access Survey, 2019). In relation to its population, Cameroon has a small bank network. In terms of bank branches distribution per 100,000 adults, Cameroon's ranking of 2.2 per 100,000 adults is less than half the average of both Lower Middle-Income countries - LMC (8.1) and Sub-Saharan Africa countries - SSA (5.0). As for the distribution of ATMs, Cameroon at 4.8 is also below the average for SSA at 6.46 and remarkably below average compared to other LMC at 21.66 (World Bank, Global Financial Inclusion, 2018).

From the table below, the overall trend of financial inclusion in Cameroon has been positive, even in the short period of time, between 2011 and 2021. The percentage of adults holding a bank account increased from about 15% in 2011 to 52% in 2021. This increase is reflected from the sharp increase in mobile money account ownership between 2017 and 2021. The shares of both men and women with an account have increased considerably, with the share of women almost tripling. Despite this however, the gender gap still persists. The gender gap was much wider in 2011 and 2017 than it was in 2014 and 2021.

The table below also provide data on gender gap in account ownership. We observed that there is a gender-based differential in account ownership for

2011, 2014, 2017 and 2021. Account ownership in 2011 was 19% and 11% for men and women respectively. This indicates that a gender gap in account ownership for 2011 was 9%. By the same token, the gender gap in account ownership was 4%, 9% and 4.5% for 2014, 2017 and 2021 respectively.

Table 1: Overview of Financial Inclusion in Cameroon

Ownership of account (percent of adults age 15+)				
	2011	2014	2017	2021
Account ownership at a financial institution or through a mobile money provider.	14.8%	12.2%	34.6%	51.7%
Financial institution account	_	11.35	26.87%	23.5%
Mobile money account	_	_	15.1%	42.4%
Gender Gap in Account Ownership (percent of adults age 15+)				
	2011	2014	2017	2021
Male	19%	14%	39%	54.2%
Female	11%	10%	30%	49.3%
Use of Financial Services (percent of adults age 15+)				
	2017		2021	
Saved any money in the past year	57%		59%	
Borrowed any money in the past year	53%		58.6%	
Coming up with emergency funds: not possible	52%		49.4%	
Sent or received domestic remittances in the past year	52%		54%	
No deposit and no withdrawal in the past year	21%		18%	
Made or received digital payments in the past year	29%		49.9%	

Source: The Global Findex Database 2021

3. Literature Review

Theoretical Literature

The theoretical link between financial inclusion and poverty could be perceived through the theory of change that links ‘programme inputs and activities to a chain of observed out comes’ Rogers (2008). In this study, we adopt the theory of change developed by Duvendak and Mader (2020). This theory of change explains how financial inclusion activities are expected to produce intended changes. In our theory of change, individual’s usage of financial services such as account ownership, credit, mobile money could lead to direct changes and on to more transformative outcomes. We distinguish two outcome categories in this study: economic and gender.

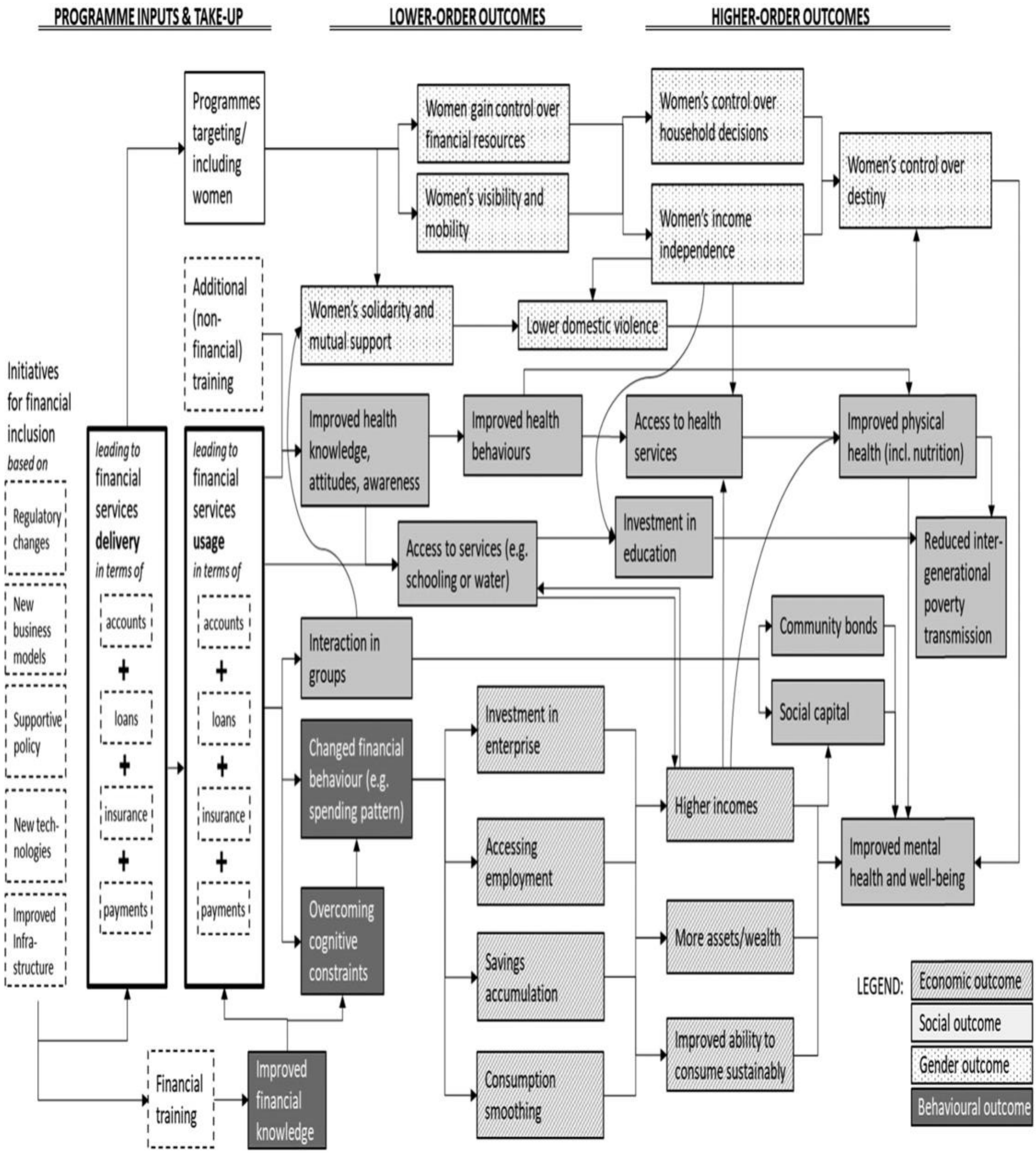
According to economic perspective, financial inclusion can affect poverty direct and indirect (Koomson et al., 2020). Directly, financial inclusion alleviates household poverty by improving the access to financial services which are expected to provide the poor households with needed resources to meet their current consumption and investments needs (King and Levine 1993). Also, financial inclusion could directly benefit poor people through changes in their financial behaviours (World Bank 2014), such that they use financial services to gain access to new income sources or enhance existing ones, to save money that they would otherwise spend or lose, to invest in assets, to sustainably consume more goods or to cope with shocks. The indirect channel can be perceived through finance-growth enhancing theories which can be traced back to Schumpeter (1934) and McKinnon (1973). The indirect channel explicates how finance-induced economic growth gradually benefits the poor through job creation and increased government social spending on health, education, and social protection (Abosedra et al. 2016; Perotti 1993). Indeed, access to financial services provides poor households the opportunity to engage in participatory long-term investments, helps in allocation of production resources in an efficient manner, and hence, a reduction in the cost of capital (Demirgüç-Kunt et al., 2018).

Regarding the gender implications, the issue of financial inclusion involves challenges to ensure gender equality in access to and use of financial products and services. The impact of such services varies between women and men and could have potential heightened benefits for women. Programs like microfinance and self-help groups, historically targeting women, contribute to women's empowerment. Digital financial services, like mobile money, offer independent saving opportunities for women (Hendriks, 2019). Financial inclusion enhances women's control over resources, strengthening their position in households and reducing poverty. Additionally, it provides women with independent income sources, fostering empowerment and visibility in business activities. Access to affordable financial products for unbanked women stimulates economic growth, job creation, and broader societal benefits.

Financial inclusion may impact men more positively than women due to gender inequalities in employment and income. Limited access to formal employment and wage disparities can hinder women's engagement in financial activities. In contrast, men, with typically greater access to resources, may benefit more from opportunities for income generation and asset accumulation. Economists argue that supply-side constraints, like high interest rates and collateral requirements, disproportionately exclude women from formal credit markets. Credit rationing discourages women entrepreneurs, and when they access loans, they often face stricter arrangements than men (Morsy and Youssef 2017). Women entrepreneurs may self-select out of the credit market due to perceived low creditworthiness. Despite expectations of competitiveness, women entrepreneurs are less financially included than men, suggesting a potentially larger marginal effect of financial inclusion for women. Alternatively, one could argue that men, being more risk-loving, might experience greater gains from borrowing if their projects succeed.

To better understand the theory and expectations of the impacts of financial inclusion, we take as a basis the theory of change diagram developed by Duvendak and Mader (2020). As indicated by different shadings in Figure 2, Duvendak and Mader (2020) distinguish four outcome categories: economic, social, gender and behavioural.

Figure 2. Financial Inclusion Impacts at the Individual/Household Level: Theory of Change Flow Diagram.



Source: The theory of change flow diagram developed by Duvendak and Mader (2020).

Empirical Literature

Determinants of Financial Inclusion

In this section, we review the studies that examine the determinants of financial inclusion. Cassimon et al. (2022) assess the drivers of and the barriers to people's financial inclusion in Mexico and found out that working in the formal sector, the level of wealth and income, educational attainment, and age are the socio-economic characteristics that most affect the likelihood of holding any formal financial product. They also indicated that the relative importance of these characteristics, however, varies across financial products. Ajide (2017) examine the determinants of financial inclusion by specially accounting for the role of institutions in a panel of 18 Sub Saharan Africa countries. The emanated findings consistently stress on the importance of institutions together with other control variables like GDP per capita, inflation, bank concentration and z-score as key drivers of FI. Kumar (2012) examined the status as well as the determinants of financial inclusion in India using both the fixed effects and dynamic panel generalized methods of moments (GMM) methodologies on 29 major states and union territories between 1995 and 2008. The results showed that branch network has unambiguous beneficial impact on financial inclusion.

Beck et al. (2007), examined factors that affect household and small firms' access and use of banking services. With regard to determinants of financial inclusion, Beck et al. finds out a positive relationship between financial inclusion variables and GDP, the quality of overall institutional environment and the level of infrastructure. Honohan (2008) emphasised on the importance of good institutions for financial institution. According to him, countries with good institutions of governance are expected to have increased trust in the economy, and hence, are more likely to have increased financial institution. The lack of trust can stalk from previous cases of bank closures, embezzlement of funds, or political seizures and expropriations and the consequent fear of their reoccurrence. Xu (2020) finds that lack of (social) trust is especially a barrier to financial inclusion for countries with weak formal institutions. Ghosh (2021) shows that trust significantly enhances account ownership and use in India. Also, from a macroeconomic perspective, the level of financial inclusion in a country is also determined by the rate of unemployment and inequality in the country (Sarma and Pais 2011). A higher proportion of the population is excluded from income generating activities due to high unemployment and inequality.

It is also argued frequently that information and communications technology (ICT) is instrumental in enhancing financial inclusion (Honohan 2008;

Andrianaivo & Kpodar 2011; Ouma et al. 2017). To deploy financial services, ICT infrastructure could also be use across a wider geographical zone and to reach remote areas at an affordable cost. An example of how ICT has helped in dealing with challenges of distance and reducing the transaction cost of extending financial services to individuals is the deployment of branchless banking services such as mobile money, and recently mobile banking. People and small businesses with access to mobile money are more likely to be financially included.

Gautier et al. (2020) analyses the determinants of financial inclusion in Cameroon between 2011 and 2014 and found out that, the main determinants of financial inclusion in Cameroon are education and income. They further reveal that the education variable negatively influences all indicators of financial inclusion. While income positively affects all indicators of financial inclusion over the two periods apart from the type of credit to which it is negatively correlated in 2011. Similarly, Omar and Inaba (2020) examined the determinants of financial inclusion. They construct a novel index of financial inclusion using a broad set of financial sector outreach indicators and found that per capita income, ratio of internet users, age dependency ratio, inflation, and income inequality significantly influence the level of financial inclusion in developing countries.

Allen et al. (2016) provides an individual level and country level analysis on the determinants of financial inclusion. From the individual-level analysis, they find that those who earn higher income, are older, live in urban areas, have higher education, live in smaller households, and are married and employed, are more likely to own an account and frequently use their bank accounts. With respect to account ownership, they did not find evidence of a significant difference between men and women, but the analysis indicate that men are more likely to frequently use an account. The country level analysis shows the importance of the architecture of the financial system as a determinant of financial inclusion. Another individual determinant of financial inclusion is financial literacy. For example, Koomson et al. (2020) conducted an experimental study on financial literacy in Ghana and found out that with financial literacy women and youths are more likely to be financially included.

Financial Inclusion Gender Gap

Beginning 2011, the World Bank Findex Database has allowed us to empirically identify the existence of gender disparities in financial inclusion, although the issue have been known about for some time. The World Bank Findex Database allow us to observe the worldwide ubiquity of the gender disparities in financial inclusion between 2011 and 2021. Over this period gender gaps have closed in some regions like East Asia, meanwhile in other regions like sub Saharan Africa, the gender gap has considerably widened over time.

According to the World Bank Findex Database (2021), the overall global trend in financial inclusion has been positive between 2011 and 2021. Worldwide, in the proportion of men and women with a bank account, the gender gap was 8.1 percentage points in 2011, drop to 7.1 percentage points in 2014 but slightly increased to 7.4 percentage points in 2017. 2021 saw a considerable drop in the global gender gap, 78% of men and 74% of women had an account giving a gender gap of 4 percentage points. Particularly for high income economies, the gender gap stood at 4 percentage points in 2011 and has been stagnant at 1 percent points from 2014 to 2021. Specifically, the gender gap in account ownership across developing economies has fallen to 6 percentage points from 9 percentage points, where it hovered for many years. More specifically, in sub-Saharan Africa, the gap rose from 5% in 2011 to **12%** in 2021, triple the global average and double that of other developing regions.

Ghosh and Vinod (2017) carried out a detailed study in financial access microdata in India and further explore the gender gap in financial inclusion. Ghosh and Vinod (2017) first confirmed the existence of a gender gap in financial inclusion in India. They indicated that compared to male headed households, female headed households are 8% less likely to access formal finance and 20% less likely to make use of cash loans. They also noted that compared to male headed households, female headed households are 6% less likely to access formal finance. Furthermore, Ndoya and Tsala (2021) analyses the drivers of the gender gap in financial inclusion in Cameroon. Analyzing six distinct financial inclusion variables captured by access to and use of financial inclusion products and services, they show that there is a gender gap in all indicators of access to and use of financial products and services in favour of men. Using the Findex data, Ansar et al. (2021) explained gender gaps in financial inclusion. They argue that the gender gaps are much smaller when comparing solely employed men and women, implying that the gender gap in labour force participation rates is a major driver of gender disparities in financial inclusion.

Impact of Financial Inclusion on Poverty/Welfare

Although financial inclusion is presently one of the most widely recognized areas of activity in international development, papers assessing the effect of financial inclusion on poverty are still rare, as stated by Schmied and Marr (2016). Inoue (2019) examined the impacts of financial inclusion on poverty reduction in India. The study used an unbalanced panel dataset from India from 1973 to 2004, using a generalized method of moments (GMM) procedure to estimate the effect of financial inclusion on poverty ratios for public sector banks and financial deepening for private sector banks. The study revealed that financial inclusion is statistically inversely related to the poverty ratio for public sector banks, but not for private sector banks.

Using the logit model, Dawood et al. (2019) studied whether financial inclusion ease household poverty. They indicated that financial inclusion has the tendency to reduce the probability of households from absolute poverty. In a similar study, Churchill and Marisetty (2020) investigated the effect of financial inclusion on poverty using 45,000 households in India. The study revealed that, there is a negative relationship between financial inclusion and poverty, implying that financial inclusion reduces poverty. Koomson et al. (2020) examines the effect of financial inclusion on poverty and vulnerability to poverty of Ghanaian households. Using a three-stage feasible least squares procedure to estimate households' vulnerability to poverty, through the probit technique, they found that an increase in financial inclusion has two effects on household poverty. First, it is associated with a decline in a household's likelihood of being poor by 27%. Second, it prevents a household's exposure to future poverty by 28%. Similarly, Sakyi-Nyarko et al. (2022), investigates the relationship between financial inclusion and household well-being in Ghana. Their result indicates that there are significant welfare gains from increased financial inclusion.

Anthony et al. (2021) investigated the threshold effect of financial inclusion on poverty reduction in sub-Saharan Africa and found out that, beyond a threshold level of 0.365, financial inclusion would lead to poverty reduction with money supply being positively significant towards poverty reduction in SSA. Furthermore, Omar and Inaba (2020) estimated the impact of financial inclusion on poverty reduction and income inequality and revealed that financial inclusion reduces poverty rates and income inequality significantly in developing economies. Equally, Jabir et al. (2017) analyzed the effect of financial inclusion on poverty among the low-income household level in sub-Saharan Africa and suggest that, financial inclusion significantly reduced the level of poverty in sub-Saharan Africa through providing net wealth and larger welfare benefits to the poor.

Burgess and Pande (2005), investigate if the state-led expansion of rural bank branches in India had a negative effect on poverty. They find a robust negative impact of newly opening bank in those locations. Moreso, a study by Ellis et al. (2010) shows that households with access to financial products and services are enabled to invest in activities contributing to a higher future income and, as a consequence, to growth. Even in the poorest income groups, borrowing and saving decisions take place for a variety of investment purposes. Similarly, Brune Giné, et al. (2011) focus on rural banks in Malawi and find that increased financial inclusion through commitment saving accounts improves the access to savings for agricultural input use and therefore improve the well-being of households in poverty.

By taking the income growth of the lowest income share as well as the headcount growths of people living on less than 1 USD per day as the dependent variable, Beck et al. (2007) examined the effect of financial inclusion on poverty. They found a significant positive relationship between private credit and poverty alleviation. Further than this, they also found out that compared to the rich, they are a disproportional benefit of financial inclusion for the poor, resulting in a lower income inequality. Schmied and Marr (2016) assessed the relationship of financial inclusion and poverty in Peru. In their studies, financial inclusion has a small, but eradicating effect on different measures of poverty. Also, Hussaini and Chibuzo (2018) found a negative effect of financial inclusion on poverty in Nigeria.

To extends the existing literature, this study provides new evidence by examining the impact of financial inclusion on poverty in Cameroon while considering the gender implications. The study also makes use of the endogenous switching regression model which is more rigorous than several other studies in the sense that it corrects simultaneously for sample selection bias and endogeneity. More so, conducting a gendered analysis and focusing on Cameroon, the research provides a unique contribution to the literature and expands our knowledge in this field.

4. Empirical Strategy

We employ the endogenous switching regression in our study. The endogenous switching regression is employed to assess the impact of financial inclusion on welfare in Cameroon. The monthly income is used as a proxy for individual welfare.

Measure of Financial Index (FI)

We propose to construct a composite index of household financial inclusion. To achieve this, we aim to use the Multiple Correspondence Analysis (MCA). The most widely used functional form is the construction of composite indicators is given as follows:

$$FI_i = \frac{1}{K}\sum_{k=1}^{K}\sum_{j_k=1}^{J_k} W_{j_k}{}^{k}\, I_{j_k i}{}^{k} \qquad (1)$$

Where k denotes number of dimensions with *k = (1, 2, …, K)*, *j* represents the number of modalities of each dimension with *j*= (*1, 2,…Jk*) and *I* denotes the binary (0/1) indicator of each modality. *W* represents weight obtained with MCA. The variables (dimensions) to be consider in the construction of the financial inclusion index are savings, receipt of remittance, ownership of financial products (ownership of mobile money account, ownership of insurance policy), use of financial services (transact using cheque book, transact using ATM, transact using E-banking). To render the financial inclusion index to lie between 0 and 1, the index is normalised using the Min-Max approach. The financial inclusion dummy is then defined as individuals whose financial inclusion index is greater than the median index=1; and 0 otherwise.

Modelling the effect of financial inclusion on well-being

To capture the effect of financial inclusion on welfare (proxied by monthly income), the welfare generating function can be written as:

$$\ln W_i = \beta' X_i + \delta FI_i + \varepsilon_i \qquad (2)$$

Where $\ln W_i$ is the log of monthly income proxy for welfare; X is a column vector of individual, household and community characteristics, which are expected to determine the individual welfare; β' is a row vector of corresponding parameters, FI denotes household financial inclusion which takes the value of 1 if the individual is financially included and 0, otherwise. The parameter, δ, captures the effect of financial inclusion on welfare and ε is the random error term.

However, Equation 2 is likely to yield biased and inconsistent estimates of the effect of financial inclusion based on the idea that the decision to use a financial service is potentially endogenous and also the decision to use a financial service is likely not random. The source of endogeneity can be traced to the correlation between financial inclusion and the error term arising from omitted variables and occurrence of measurement error. Also, the relationship between financial inclusion and welfare may be such that welfare may be because of financial inclusion or high welfare may lead to greater financial inclusion. As such, we also acknowledge the possibility of reverse causality as another source of endogeneity.

To address sample selectivity bias, the Heckman (1979) two-step approach is commonly employed. However, this approach fails to account for potential differences between financially included and financially excluded groups. According to Wirba et al. (2021), the problem of selectivity bias and endogeneity can be simultaneously resolved by appealing to the endogenous switching model in an explicit fashion. Therefore, the advantage of the endogenous switching regression model over other techniques such as the propensity score matching, and the instrumental variable technique is based on the idea that it simultaneously accounts for selectivity bias and endogeneity

The endogenous switching model considers two regimes – financially included' regime and financially excluded' regime:

$$FI_i^* = \alpha' Z_i + \nu_i \qquad (3)$$

Where, $FI_i = 1,\ if\ FI_i^* \geq 0$ (financially included) and $FI_i = 0,\ if\ FI_i^* < 0$ (financially excluded).

FI^* is a continuous latent variable, which determines the individual financial inclusion status. Z is a set of exogenous explanatory variables, α is a vector of parameters to be estimated and v is the error term. FI is the financial inclusion indicator which takes the value 1 if the individual is financially included and 0, otherwise.

In the financial included' regime, the welfare generating function is given as:

$$Ln\, W_{1i} = \beta_1' X_{1i} + \varepsilon_{1i} \quad if\ FI_i = 1 \qquad (4)$$

While the second regime (financially excluded) welfare generating function is given as:

$$Ln\, W_{0i} = \beta_0' X_{0i} + \varepsilon_{0i} \quad if\ FI_i = 0 \qquad (5)$$

$\mathrm{Ln}\, W_{1i}$ and $\mathrm{Ln}\, W_{0i}$ represent the log of monthly income for financially included and financially excluded, respectively. X_{1i} and X_{0i} are vectors of individual and community characteristics, while β_1 and β_0 are the corresponding row vector of parameters. ε_1 and ε_0 are the error terms. Although the vectors - Z and X can overlap, at least one variable in Z should not appear in X to properly identify the outcome equations. In the present study, we identify the model using the proportion of neighbourhood associations captured at the village level.

To derive an instrumental variable, we exploit the concept of social interactions to construct a cluster proportion of neighbourhood associations using village level information. As articulated in Baye et al. (2020), the intuition behind the cluster identification strategy is that the average neighbourhood behavioural tendencies through the imitation and emulation channels are likely to influence the decision of an observed individual to use a financial service, but this is unlikely to directly affect its welfare, except through the decision to use a financial service. The exogeneity of the neighbourhood associations as an instrument is based on the idea that the proportion is captured at the cluster(village) level, which is expected to be beyond the control of the individual in question.

The average treatment effect on the treated (ATT) which in our context gives the welfare attributable to financial inclusion captured by the use/access to financial services is given as:

$$E(\mathrm{Ln}\, W_{1i}\,|FI_i = 1\,) - E(\mathrm{Ln}\, W_{0i}\,|FI_i = 1\,) = (\beta_1{}' - \beta_0{}')X_{1i} + \left(\sigma_{\varepsilon_1 \nu} - \sigma_{\varepsilon_0 \nu}\right)\lambda_1 \quad (6)$$

The average treatment on the untreated (ATU) is given as:

$$E(\mathrm{Ln}\, W_{1i}\,|FI_i = 0\,) - E(\mathrm{Ln}\, W_{0i}\,|FI_i = 0\,) = (\beta_1{}' - \beta_0{}')X_{0i} + \left(\sigma_{\varepsilon_1 \nu} - \sigma_{\varepsilon_0 \nu}\right)\lambda_0 \quad (7)$$

The average treatment effect (ATE) is then given as:

$$ATE = \Phi(\delta' Z_i)ATT + \left(1 - \Phi(\delta' Z_i)\right)ATU \quad (8)$$

Equation (12) shows that the average treatment effect (ATE) which is the weighted average of the average treatment on the treated (ATT) and the average treatment on the untreated (ATU). Where, ϕ and Φ are the standard normal probability density function and the cumulative distribution function of the standard normal distribution, respectively. λ_1 and λ_0 represent the inverse Mills ratios for users of financial services and non-users of financial services, respectively.

5. Description of Data

This study makes use of the FinScope (2017) Consumer surveys undertaken by FinMark Trust; a non-profit organisation based in South Africa. The survey conducted in Cameroon in 2017 with the support of the Cameroon National Institute of Statistics (NIS). The FinScope methodology uses a sampling procedure that ensures minimum acceptable levels for national, urban/rural and regional reliable estimates with acceptable margins of error. A multi-stage sampling methodology is applied which entails selection of enumeration areas from recent census or population estimates using probability proportional to size followed by the selection of households as well as the selection of one adult in the selected household using a Kish Grid. Based on face-to-face interviews, a total of 6,826 individuals were surveyed in Cameroon. The data contains detailed information about the demographic and socio-economic characteristics of the individuals, and their access to and use of formal, informal and mobile money/digital financial services. In addition, there are important variables in the data collection, such as financial literacy, financial capability, income, and employment. One of the strengths of this data is its comprehensive information regarding all financial products (that is credit, transfers and remittances, savings, risk and insurance and mobile money). Information regarding variables of interest is captured by the FinScope questionnaire. The demographic section captures information on the level of education, gender, age, marital status and region of residence of a respondent.

Table 2: Descriptive Statistics of some Selected Variables

Variable	Description of variables	Mean	Std. Dev.	Min	Max
Monthly income in XAF	Monthly expenditure per year in FCFA	61429.16	71686.01	1	1400000.6
Log (monthly income)	Log points	10.6452	0.9223	0	14.152
Financial inclusion	1, if individual is financially included, & 0, otherwise	0.5345	0.4988	0	1
Savings	1, if individual has savings, & 0, otherwise	0.5256	0.4994	0	1
Insurance	1, if individual is insured, & 0, otherwise	0.1025	0.3034	0	1
Mobile Money	1, if individual has a mobile money account, & 0,	0.2991	0.4579	0	1

	otherwise				
Use of financial services (Transact)	1, if individual Transact using either cheque book, ATM, E-banking, & 0, otherwise	0.1422	0.3493	0	1
Remittances	1, if individual received remittance, & 0, otherwise	0.4359	0.4959	0	1
Male	1, if individual is a male, & 0, otherwise	0.4865	0.4999	0	1
Age	Expressed in years	36.4346	16.2236	15	94
Age squared	Expressed in years	1590.646	1454.269	225	8836
Married	1, if individual is married, & 0, otherwise	0.47817	0.4996	0	1
Primary education	1, if individual has primary education, & 0, otherwise	0.2781	0.4481	0	1
Secondary education	1, if individual has secondary education, & 0, otherwise	0.4212	0.4938	0	1
Tertiary education	1, if individual has tertiary education, & 0, otherwise	0.0753	0.2639	0	1
Urban residency	1, if individual resides in urban area, & 0, otherwise	0.454	0.4979	0	1
Anglophone	1, if individual is an anglophone, & 0, otherwise	0.205	0.4037	0	1
Self employed	1, if individual is self-employed, & 0,	0.4399	0.4964	0	1

	otherwise				
House ownership	1, if individual owns a household, & 0, otherwise	0.4854	0.4998	0	1
Proportion of neighbourhood associations at village level	Proportion of the associations captured at the village level	0.1694	0.2621	0	1

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

Notes: The financial inclusion index is derived using multiple correspondence analysis using the dimensions savings, remittance, mobile money, insurance, and financial services, normalized (0 to 1) using Min-Max approach. The financial inclusion dummy equals 1 if above the median index, 0 otherwise.

6. Empirical Results

Mean Comparison test of Characteristics between Financially Included and Financially Excluded

Table 3 presents the mean comparison of individual characteristics with respect to their financial inclusion status. Findings indicate that the monthly income of financially included individuals is higher than that of financially excluded individuals in the order of about FCFA 28,781. This is because financially included individuals often have access to formal financial services that enable them to engage in income-generating activities and accumulate wealth. The positive impact on income resulting from enhanced financial inclusion aligns with conclusions drawn in earlier research studies (Koomson et al., 2020; Ofori-Abebrese et al., 2020; Mohammed et al., 2017; Swamy, 2014). The Alliance for Financial Inclusion (AFI, 2015) similarly emphasizes that advancements in financial inclusion contribute to the entrepreneurial capabilities of recipients, leading to heightened household monthly income and an overall enhancement in household welfare.

Results also shows that, a higher proportion of the financially included individuals are men, meanwhile higher proportion of financially excluded are female. This reflects the idea that gender inequality in employment and wage disparities often grant men greater access to formal employment opportunities and higher income levels. These findings are consistent with the findings of Demirguc-Kunt et al. (2018) and Lotto (2018).

We also observe that, on average, individuals that financially included are older than financially excluded individuals. In terms of marital status, 34.08% of financially included individuals are single, while 38.31% of financially excluded individuals are single. On the average, 54.89% of financially included are married compared to 46.55% of financially excluded individuals. Averagely, 2.45% of financially included are divorced, while only 2.93% of financially excluded are divorced.

Table 3: Mean Comparison test of Individual Characteristics between Financially Included and Financially Excluded

Variable	Financially Included (N=3,873)		Financially Excluded (N=2,953)		Difference in mean/proportion	
	Mean	Std. Dev.	Mean	Std. Dev	Difference	Std. Error
Monthly income (XAF)	70,785	80,304	42,004	43,147	28,781***	1819
Log (Monthly income)	10.8094	0.8624	10.3041	0.9491	0.5053***	0.0230
Gender (male=1)	0.5157	0.4998	0.4259	0.4946	0.0898***	0.0129
Age	37.1576	14.9252	34.9335	18.5465	2.2241***	0.4184
Age squared	1603.3985	1334.907	1564.1683	1675.162	39.230***	37.578
Married	0.4511	0.0073	0.5337	0.0106	-0.0826***	0.0129
Primary education	0.2876	0.4527	0.2582	0.4378	0.0294**	0.0116
Secondary	0.4675	0.499	0.3249	0.4685	0.1426**	0.0126

education					*	
Tertiary education	0.1087	0.3114	0.0059	0.0763	0.1029***	0.0067
Urban residency	0.5327	0.499	0.2907	0.4542	0.2420***	0.0125
Anglophone	0.2342	0.4235	0.1442	0.3514	0.0900***	0.0104
Self employed	0.4589	0.0073	0.4016	0.0104	0.0573***	0.0128
House ownership	0.4252	0.0072	0.6101	0.0103	-0.1849***	0.0127
Proportion of neighbourhood association at village level	0.1913	0.0041	0.1240	0.0046	0.0673***	0.00674

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

On the average, 28.76% of financially included individuals have primary level of education, while 25.82% of financially excluded individuals have primary education. In terms of secondary education, 46.75% of financially included and 32.49% of financially excluded individuals have this level of education. On the average, 10.87% of financially included persons have a tertiary level of education, while only 0.59% of financially included persons have this level of education. These results indicate that individuals with at least a secondary school person is more likely to have access to financial services. Furthermore, 53.27% of financially included persons are urban dwellers, while only 29.07% of financially excluded persons are urban dwellers. On average, 23.42% of financially included households are Anglophones, while only 14.42% of financially excluded households are Anglophones.

Regarding the variable proportion of neighbourhood associations, used as an instrumental variable in this study, findings indicate that amongst the financially included persons the proportion of neighbourhood associations is about 19.1% meanwhile amongst financially excluded persons, the proportion of neighbourhood associations is about 12.4%. This indicates a significant difference between financially included and financially excluded in terms of their adherence to neighborhood associations.

Determinants of Financial Inclusion in Cameroon

Table 4 presents the coefficients and the marginal effects of the probit model of financial inclusion in Cameroon. Compared to women, being a man increases the probability of being financially included by 4%. The age of the individual positively affects the likelihood of financial inclusion up to a certain age threshold, beyond which, it reduces the likelihood of financial inclusion. This quadratic behaviour entails that at the active age, individuals are likely to be financially included, but the probability tend to reduce when they get older. Being a married person does not reduce the probability of financial inclusion.

Table 4: Gender Disparity in the probability of financial inclusion

	(1)	(2)
VARIABLES	Coefficient	Marginal effects
Male	0.1042***	0.0404***
	(0.0343)	(0.0133)
Age	0.0637***	0.0247***
	(0.0054)	(0.0021)
Age squared	-0.0005***	-0.0002***
	(0.0001)	(0.0000)
Married	0.0579	0.0225
	(0.0370)	(0.0143)
Primary education	0.6079***	0.2359***

	(0.0492)	(0.0192)
Secondary education	1.1179***	0.4338***
	(0.0514)	(0.0201)
Tertiary education	2.2530***	0.8742***
	(0.1176)	(0.0448)
Urban residency	0.5606***	0.2175***
	(0.0372)	(0.0144)
Anglophone	-0.0460	-0.0179
	(0.0375)	(0.0146)
Self employed	-0.0577	-0.0224
	(0.0417)	(0.0162)
House ownership	-0.2668***	-0.1035***
	(0.0389)	(0.0151)
Proportion of neighbourhood associations	0.3327***	0.1291***
	(0.0657)	(0.0255)
Constant	-2.3275***	
	(0.1130)	
Observations	6,826	6,826

Source: Computed by author using FinScope Cameroon (2017) and Stata 15. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The marginal effect depicts that the levels of education positively correlate with the probability of being financially included. The degree of correlation intensifies with the level of education. Specifically, compared to the uneducated persons, those with primary education have a 23.6% higher probability of being financially included, meanwhile, those with secondary education have about 43.4% higher probability of being financially included. Those with tertiary education have about 87.4% higher likelihood of being financially included. Compare with households dwelling in the rural arears in the overall sample, households in the urban region have about 21.8% higher likelihood of being financially included.

The marginal effect results also reveal that compare with individuals who do not own a house, owing a house reduces the likelihood of being financially included by 10.4%. Homeownership in Cameroon can lead to a concentration of wealth in a single asset which can result in a lack of diversification in an individual's financial portfolio. If a significant portion of an individual's wealth is tied up in the house, it may limit their ability to allocate resources to other income generating financial assets and services, potentially reducing their overall financial inclusion.

To properly identify the selection equation, the cluster proportion of neighborhood associations was captured at the village level and used as an instrument. That is, the proportion of individuals belonging to neighborhood associations in a cluster (village) that the individual in question finds herself. Findings indicate that, cluster proportion of neighbourhood associations has a positive significant effect on the decision to be financially included. Indeed, a unit increase in this proportion increases the likelihood of financially included by about 12.9%.

Endogenous Switching Regression Results

Table 5 presents the OLS and estimates of the Endogenous Switching Regression (ESR) of the determinants of welfare in Cameroon. Following Lokshin and Sajaia (2004), in the context of endogenous switching regression, the Wald test or the likelihood ratio test helps to evaluate the hypothesis of joint independence of the three equations, as well as the covariance coefficients providing information on self-selection. Result of the Likelihood ratio test reveals that the three equations (the selection equation and the two regime equations) are jointly dependent, thus revealing evidence of endogeneity that needs to be addressed in the welfare model. Findings equally indicate that the covariance coefficients $\rho_{\varepsilon_1 \nu}$ and $\rho_{\varepsilon_0 \nu}$ are significantly positive and negative respectively. The positive and significant sign of the correlation coefficient $\rho_{\varepsilon_1 \nu}$ indicates that, compared to individuals selected randomly from the overall sample; the financially included persons have a higher state of welfare than a randomly selected person from the sample. The negative and significant sign of the correlation coefficient $\rho_{\varepsilon_0 \nu}$ equally indicates that, compared to a individuals selected randomly from the overall sample; financially excluded persons have lower state of welfare.

Table 5: Endogenous Switching Regression Results

	(1)	(2)	(3)	(4)
		Endogenous Switching Regression		
	OLS		Financially included	Financially excluded
VARIABLES		Selection	Log income	Log income
Financial inclusion	0.2599***			
	(0.0237)			
Male	0.2527***	0.1049***	0.3135***	0.1622***
	(0.0208)	(0.0343)	(0.0255)	(0.0346)
Age	0.0553***	0.0652***	0.0804***	0.0232***
	(0.0034)	(0.0055)	(0.0048)	(0.0059)
Age squared	-0.0005***	-0.0005***	-0.0008***	-0.0002***
	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Married	0.1462***	0.0614*	0.1309***	0.1152***
	(0.0222)	(0.0370)	(0.0270)	(0.0374)
Primary education	0.0096	0.6116***	0.1162**	-0.0179

	(0.0307)	(0.0493)	(0.0540)	(0.0498)
Secondary education	0.1362***	1.1269***	0.3879***	-0.1287*
	(0.0321)	(0.0516)	(0.0629)	(0.0693)
Tertiary education	0.4908***	2.2719***	0.7311***	-0.0547
	(0.0499)	(0.1180)	(0.0846)	(0.2491)
Urban residency	0.2002***	0.5594***	0.2855***	0.0668
	(0.0234)	(0.0372)	(0.0326)	(0.0482)
Self-employed	-0.0370	-0.0497	-0.0775***	0.0627*
	(0.0226)	(0.0376)	(0.0276)	(0.0378)
Anglophone	0.0368	-0.0586	0.0500	0.0745*
	(0.0258)	(0.0416)	(0.0312)	(0.0438)
House ownership	-0.0040	-0.2671***	-0.0728**	0.0769*
	(0.0241)	(0.0390)	(0.0311)	(0.0410)
Proportion of neigbourhood associations		0.3152*** (0.0657)		
Constant	8.9740***	-2.3626***	8.3732***	9.6131***
	(0.0673)	(0.1138)	(0.1574)	(0.1101)
$ln\sigma_{\varepsilon_1\nu}$			-0.2474***	
			(0.0137)	
$\rho_{\varepsilon_1\nu}$			0.1983**	
			(0.0808)	
$ln\sigma_{\varepsilon_0\nu}$				-0.0988***
				(0.0152)
$\rho_{\varepsilon_0\nu}$				-0.1611*

		(0.0844)
Wald test of indep. eqns	6.58**	
Log likelihood	-12064.959	
Observations	6,826	

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results portray organised differences across the two regimes. There is evidence of gender-based discrimination in terms of welfare among the two regimes. In particular, male gender registers higher welfare state compared to female gender in the two regimes, high so among financially included. Gender roles and caregiving responsibilities can influence welfare outcomes in Cameroon. Women often bear a disproportionate burden of unpaid care work, such as childcare and household chores. These responsibilities can limit their ability to engage in income-generating activities or pursue educational and career opportunities.

Results further suggest that for financially included, all the levels of education positively affect welfare meanwhile amongst financially excluded, only secondary education has a negative effect on welfare. It is possible that individuals with secondary education in Cameroon, who are financially excluded, face a mismatch between the skills they possess and the job market requirements. They may lack the necessary skills or qualifications for higher-paying or more stable employment opportunities.

For both financially included and financially excluded regimes, a married person is likely to have a higher state of welfare compare to a person that is not married. For financially included, compare with persons dwelling in rural regions, households in urban regions have higher state of welfare in the order of 28.6% while for the financially excluded individuals dwelling in the urban areas do not have significant welfare differences compared to their rural counterparts.

Estimates of the Average Treatment Effect of Financial Inclusion on Welfare

Table 6 presents the results of the estimated average treatment effects of financial inclusion on welfare. Making use of the msat command in Stata 15 developed by Araar (2015) we generated estimates of the average treatment effect on the treated (ATT), average treatment effect on the untreated (ATU) and the average treatment effect (ATE) which is the weighted average of the first two.

The ATT estimate shows that, on the average, financially included would have made welfare losses of approximately XAF22, 109 per month if they were not financially included. Also, the ATU estimate indicates that individuals that were not actually financially included would have made welfare gains in terms of monthly income of approximately XAF 4,623 per month if they were financially included. ATE, as expected, is between ATT and ATU. Its positive and significant estimate which represents treatment effect for the overall target population in the study (treated and untreated subjects together) equally indicates that financially included persons would have made welfare gains of approximately XAF 14,544 per month if they are financially included.

Table 6: Estimated treatment effects based on the endogenous switching regression

Index	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i} \mid FI_i = 1) - E(\text{Ln}\, W_{0i} \mid FI_i = 1)$[ATT]	22,108.90	334.607

$E\left(\text{Ln}\, W_{1i}\,\middle\|FI_i = 0\right) -$ $E\left(\text{Ln}\, W_{0i}\,\middle\|FI_i = 0\right)$[ATU]	4,622.81	181.50
$\Phi(\delta' Z_i)ATT + \left(1 - \Phi(\delta' Z_i)\right)ATU$ [ATE]	14,544.23	230.65

	Male	
Index Estimating the average treatment effect on the t	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i} \,\|FI_i = 1\,) -$ $E(\text{Ln}\, W_{0i} \,\|FI_i = 1\,)$[ATT]	24,925.68	395.42
$E\left(\text{Ln}\, W_{1i}\,\middle\|FI_i = 0\right) -$ $E\left(\text{Ln}\, W_{0i}\,\middle\|FI_i = 0\right)$[ATU]	3,044.40	195.59
$\Phi(\delta' Z_i)ATT + \left(1 - \Phi(\delta' Z_i)\right)ATU$ [ATE]	15,459.61	273.33

	Female	
Index Estimating the average treatment effect on the t	Estimate (XAF)	Std Err
$E(\text{Ln}\, W_{1i} \,\|FI_i = 1\,) -$ $E(\text{Ln}\, W_{0i} \,\|FI_i = 1\,)$[ATT]	17,722.34	239.31

$E\left(\text{Ln}\,W_{1i}\,\middle\vert FI_i = 0\right) - E\left(\text{Ln}\,W_{0i}\,\middle\vert FI_i = 0\right)$[ATU]	4,983.25	150.33
$\Phi(\delta' Z_i)ATT + \left(1 - \Phi(\delta' Z_i)\right)ATU$ [ATE]	12,211.28	168.82

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

Notes: ATT: Average treatment effect on the treated

ATU: Average treatment effect on the untreated

ATE: Average treatment effect

Table 6 also provides a gendered analysis of the impact of financial inclusion on welfare. These results were obtained by running separate analysis for the male and female subsamples. The detail endogenous switching results are presented in Appendix 1 and Appendix 2 respectively for the male subsample and female subsample. Amongst the male subsample, the ATT indicates that financially included men would have experienced welfare losses of about XAF 24,926 per month if they were not financially included. Meanwhile financially included women would have witnessed welfare losses of about XAF17,722 per month the women were not financially included.

Regarding the ATU estimate, the gendered analysis results reveal that financially excluded men would have make welfare gains of approximately XAF 3,044 per month if they were financially included meanwhile financially excluded women would have make welfare gains of XAF 4,983 per month if they were financially included. Contrary to expectation, this ATU estimate shows that the impact of financial inclusion on welfare is higher for the female subsample compared to the male subsample.

The ATE estimates reports that the financially included men are expected to enjoy a welfare premium of about XAF 15,460 meanwhile financially included women are likely to enjoy welfare gains of about XAF 12,211. Based on the ATE which the whole sample estimate, the impact of financial inclusion is likely to be higher amongst men compared to women. These findings are consistent with the results obtained by Mukong and Amadhila (2021) using Namibian data, but contradict those found by Seng (2021) using Cambodian data.

7. Conclusion and Policy Implications

The main objective of this paper is to assess the implications of financial inclusion for poverty in Cameroon. Specifically, the paper assessed the impact of financial inclusion on welfare overall and by gender. The mean comparison test of individual characteristics between financially included and financially excluded individuals gave a primary suggestion that on average, a financially included person enjoy a monthly income premium of about XAF28,781 per month over a financially excluded person in Cameroon. Results also shows that, about 52% of financially included are male, meanwhile only about 43% of financially excluded are male. We further observed that, compared to the female household heads, being a male household head increases the probability of financial inclusion by 3.1%. Meanwhile, the impact evaluation results indicated that being financially included generated gains in monthly income in the order of about XAF 14,544.23. Based on these findings, financial inclusion yields significant welfare benefits with respect to monthly income. Hence, financial inclusion is expected to greatly contribute to poverty alleviation by increasing the monthly income of individuals if the users have basic financial knowledge.

The findings of this research hold significant policy implications. The findings, which consider the impact of financial inclusion on welfare with a gender-specific lens, underscore the need for targeted policies to address gender disparities in access to financial services. Firstly, policymakers should prioritize interventions that specifically target women, addressing existing gender disparities in access to financial services. Initiatives such as financial literacy programs tailored for women can empower them economically. Secondly, efforts to reduce supply-side constraints, such as high interest rates and collateral requirements, should be explored to enhance overall financial inclusion. Thirdly, recognizing the potential for financial inclusion to alleviate poverty, policymakers should consider creating an enabling environment for entrepreneurship, especially for women, by providing accessible credit facilities and supportive regulations. Lastly, implementing policies that promote equal opportunities for men and women in the financial landscape is essential for fostering sustainable economic development and reducing poverty in Cameroon.

8. References

Aakvik, A., Heckman, J.J, & Vytlacil, E.J. (2005). Estimating treatment effects for discrete outcomes when responses to treatment vary: An application to Norwegian vocational rehabilitation Programs. *Journal of Econometrics*, 25, 15–51.

Abosedra, S., Shahbaz, M., & Nawaz, K. (2016). Modelling causality between financial deepening and poverty reduction in Egypt. *Social Indicators Research,* 126(3), 955–969.

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development.
The Review of Economic Studies, 64(2), 151-172.

Ajide, K. B. (2017). Determinants of Financial Inclusion in Sub-Saharan Africa Countries: Does Institutional Infrastructure Matter? *Journal of Applied Statistics* Vol. 8 No. 69

Allen, F., A. Demirgüç-Kunt, L. Klapper, M. Soledad, & M. Peria (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, 27, 1 – 30.

Andrianaivo, M., & Kpodar, K. (2011). ICT, Financial Inclusion and Growth: Evidence from African Countries. MF Working Paper WP/11/73.

Anthony Y. N., Hadrat Y., George T., Kwasi A. and Samuel T.B. (2021). The effect of financial inclusion on poverty reduction in Sub-Sahara Africa: Does threshold matter? *Cogent Social Sciences,* 7(1)

Ansar, S., R. Deshpande, L. Klapper, & A. Koning (2021). What Drives the Financial Inclusion Gender Gap for Young Women? [Blog]. Retrieved from https:// www. cgap. org / blog / what-drives-financial-inclusion-gender-gap -young-women

Araar, A. (2015). Poverty and Inequality in Developing Countries: A Review of the Literature. *Journal of Development Economics*, 20(4), 567-580.

Asuming, P. O., Osei-Agyei, L. G., & Mohammed, J. I. (2019). Financial inclusion in Sub-Saharan Africa: Recent trends and determinants. *Journal of African Business,* 20(1), 112-134.

Bateman, M., Duvendack, M., & Loubere, N. (2019). Is fin-tech the new panacea for poverty alleviation and local development? Contesting Suri and Jack's M-Pesa findings published in Science. *Review of African Political Economy,* 46(161), 480-495.

Baye, F.M., Epo, B.N., and Ndenzako, J. (2020). Female education and full-time employment in Guinea: An ambiguous relationship. *Labor History*, 61(3-4), 267-285.

Beck, T., A. Demirguc-Kunt, and R. Levine (2007). 'Finance, Inequality, and the Poor'. *Journal of Economic Growth,* 12: 27–49. https://doi.org/10.1007/s10887-007-9010-6

Beck, T., Lekvov, A., & Levine, R. (2007). Big bad banks? The impact of U.S: Branch Deregulation on Income Distribution. The Journal of Finance, 65, pp. 1637-1667.

Beck, T., Demirgüç-Kunt, A., & Honohan, P. (2009). Access to financial services:
Measurement, impact, and policies. *The World Bank Research Observer*

Boot, A. W., & Thakor, A. V. (1993). Self-interested bank regulation. *The American Economic Review.* 83(2), 206-212.

Brody, C., De Hoop, T., Vojtkova, M., Warnock, R., Dunbar, M., Murthy, P. and Dworkin, S. L. (2015) Economic Self-Help Group Programmes for Improving Women's Empowerment: A Systematic Review, 3ie Systematic Review 23. London: International Initiative for Impact Evaluation (3ie).

Brune, L., Giné, X., Goldberg, J., & Yang, D. (2011). Commitments to Save: A Field Experiment in Rural Malawi. Washington, DC: World Bank.

Brunnermeier, M. K., Crockett, A., Goodhart, C. A., Persaud, A., & Shin, H. S. (2009). *The fundamental principles of financial regulation*. International Center for Monetary and Banking Studies (ICMB).

Burgess, R., & Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking. *American Economic Review* (pp. 780–795).

Cardoso, S. M., & Teixeira, A. A. C. (2020). The Focus on poverty in the most influential journals in eco- nomics: A bibliometric analysis of the "Blue Ribbon*" journals. Poverty & Public Policy, 12*(1), 10–42.

Cassimon, S., Maravalle, A., González, A., Pandiella and Turroques, L. (2022). Determinants af and Barriers to People's Financial Inclusion in Mexico. OECD Economics Department Working PAPERS No. 1728 https://www.oecd.org/economy/mexico-economic-snapshot.

Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. *The European Journal of Development Research.* 21(2), 213–230.

Choudhury, S. R., & Bagchi, D. (2016). Financial Exclusion-A Paradox in Developing, Countries. *Journal of Economics and Finance*. *3*(1), 40–45.

Churchill, S. A. and Marisetty, V. B. (2020). Financial inclusion and poverty: A tale of forty-five thousand households. *Applied Economics.* 52(16), 1777–1788.

Davis, E.P. & Sanchez-Martinez, M. (2015). *Economic theories of poverty*. London: Joseph Rowntree Foundation.

Dawood T. C., Pratama H., Masbar R., & Effendi R. (2019). Does financial inclusion alleviate household poverty? Empirical evidence from Indonesia. *Economics & Sociology*, 12(2), 235–252.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The global findex database 2017: Measuring financial inclusion and* *the fintech revolution*. Retrieved on 11/1/2018 from http://documents.world bank.org/curated/en/33288 15258 73182 837/pdf/12603 3-PUB-PUBLIC-pubda te-4-19-2018.pdf.

Deonandan, R. (2019), Defining Poverty: A Summary of Competing Models. In: *Journal of Social and Political Sciences*, 2(1), 17-21.

Dev, S. M. (2006). Financial inclusion: Issues and challenges. *Economic and Political Weekly,* 41(41) 4310-4313.

Duflo, E. (2012). Hope, Aspirations and the Design of the Fight Against Poverty. Stanford University Center for Ethics in Society, Stanford, CA.

Duvendak and Mader (2020). Impact of financial inclusion in low- and middle-income countries: a systematic review of reviews. *Journal of Economci Surveys*, 34 (3), 594-629.

Ellis, K., Lemma, A., & Rud, J.-P. (2010). Investigating the Impact of Access to Financial Services on Household Investment. London: Overseas Development Institute.

Findex (2021) Cameroon Gender gap report in http://reports.weforum.org/global-gender-gap-report-2017

FinScope survey Cameroon (2017). Key market data on financial inclusion in Cameroon. Ministry of Finance (Minfi).

Fouejieu, A., Sahay, R., Cihak, M., & Chen, S. (2020). Financial inclusion and inequality: A cross-country analysis. *The Journal of International Trade & Economic Development*. https://doi.org/10.1080/09638199.2020.1785532

Gautier, T.T., Luc, N. N., and Djimoudjiel, D. (2020). Dynamic Analysis of Determinants of Financial Inclusion in Cameroon. *European Scientific Journal*. 16(1), 106-121

Ghosh, S., & Vinod, D. (2017). What constrains financial inclusion for women? Evidence from Indian micro data. *World Development*, 92, 60–81.

Ghosh, S. (2021). How important is trust in driving financial inclusion? *Journal of Behavioral and Experimental Finance,* 30, issue C.

Government of Cameroon, (2003). The Poverty Reduction Strategy Paper, Ministry of Economic Affairs, Programming and Regional Development.

Hannig, A., & Jansen, S. (2010) Financial inclusion and financial stability: Current policy issues. *ADBI working paper series No. 259*. Tokyo, Japan: Asian Development Bank Institute.

Haq, W., N. A. Ismail, and N. M. Satar. (2018). Investigation of household debt through multilevel multivariate analysis: Case of a developing country. *Journal of Reviews on Global Economics,* 7,297–316. https://doi.org/10.6000/1929-7092.2018.07.26.

Heckman, J, (1979). Sample selection bias as a specification error. *Econometrica, 47*(1), 153-162.

Hendriks, S. (2019) The role of financial inclusion in driving women's economic empowerment. *Development in Practice* 29(8): 1029–1038.

Honohan, P. (2008). Cross-Country Variation in Household Access to Financial Services. *Journal of Banking and Finance*, pp. 2493–2500.

Hussaini, U., & Chibuzo, I. C. (2018). The effects of financial inclusion on poverty reduction: The moderating effects of microfinance. *International Journal of Multidisciplinary Research and Development*, pp. 188-198.

Imai, K. S., T. Arun, and S. K. Annim. (2012). Microfinance and household poverty reduction: New evidence from India. *World Development,* 38(12), 1760–1774.

IMF, (2020). Country Report No. 19/247 fourth review under the extended credit facility arrangement and requests for waivers of non-observance of performance criteria and modification of performance criteria—press Release; Staff Report; and Statement by the Executive Director for Cameroon.

Inoue, T. (2019). Financial inclusion and poverty reduction in India. *Journal of Financial Economic Policy*, 11(1), 21–33.

Jabir M., Mensah L., and Gyeke-Dako A. (2017). Financial inclusion and poverty reduction in sub Saharan Africa. *African Financial Journal*. 19, 1–22

Johnston, D., & Morduch, J. (2008). The unbanked: Evidence from Indonesia. *The World Bank Economic Review,* 22(3), 517-537.

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics,* 108(3), 717–737.

Koomson, I., Villano, R. A., & Hadley, D. (2020). Effect of financial inclusion on poverty and vulnerability to poverty: Evidence using a multidimensional measure of financial inclusion. *Social Indicators Research*, 149(1), 613–639.

Kumar, P. K (2012). Determinants of Financial Inclusion: A Study of Some Selected Districts of West Bengal, India. *Indian Journal of Finance*, Volume 5(8), pp. 29 - 36.

Kwakye, J. K. (2012). Financial intermediation and the cost of credit in Ghana. Accra, Ghana: The Institute of Economic Affairs (IEA). Retrieved from Retrieved from: http://ieagh.org/wp-content/uploads/2014/08/MonographNo.-36Financial

Lokshin, M., & Sajaia, Z. (2004). Household Behavior in the Presence of Alcohol and Drug Addiction. *Journal of Behavioral Economics,* 10(3), 275-288.

López, T. & Winkler, A. (2019). Does financial inclusion mitigate credit boom-bust cycles? *Journal of Financial Stability*, 43, 116- 129

Lotto, J. (2018). 'Examination of the Status of Financial Inclusion and Its Determinants in Tanzania'. *Sustainability*, 10(8): 2873. https://doi.org/10.3390/su10082873

Maddala, G. S. (1986). Disequilibrium, Self-Selection, and Switching Models*. Handbook of Econometrics*, 1633-1682, North-Holland: Elsevier.

McKinnon, R. I. (1973). *Money and capital in economic development*. Washington: Brookings Institution Press.

Mndolwa, F.D. and A.L. Alhassan (2020). 'Gender Disparities in Financial Inclusion: Insights from Tanzania'. *African Development Review*, 32(4): 578–90. https://doi.org/10.1111/1467-8268.12462

Mohammed, J.I., L. Mensah and A. Gyeke-Dako. 2017. “Financial inclusion and poverty reduction in sub-Saharan Africa”. African Finance Journal, 19(1): 1–22.

Morsy, S., & Youssef, I. (2017). The Impact of Economic Policies on Employment in Developing Countries. *Journal of Development Economics*, 42(3), 315-328.

Mubiru, J. (2012). Financial Inclusion as tool for combating poverty: Joseph Mubiru memorial lecture. Bangladesh Bank. https://www.bou.or.ug/bou/bou-website/bouwebsitecontent/MediaCenter/speeches/Joseph_Mubiru_lectures/2011/All/17th_JMML_Presentation_-_Guest_Speaker.pdf

Mukong A. K. and Amadhila, E. M. (2021). Financial Inclusion and Household Wellbeing in Namibia. *Southern African Business Review 25*, 1-21.

Ndoya, H. H. and Tsala, O. N. (2021). What drive gender gap in financial inclusion? Evidence from Cameroon. *African Development Review*. 33(4), 674-687.

Nguena, C.L. (2019). Mobile Financial and Banking Services Development in Africa. Working Paper Series 323. *Abidjan: African Development Bank*.

Ofori-Abebrese, G., Baidoo, S. T., & Essiam, E. (2020). Estimating the effects of financial inclusion on welfare in sub-Saharan Africa. *Cogent Business & Management*, 7(1)

Ouma, S.A., T.M. Odongo, and M. Were (2017). ‘Mobile Financial Services and Financial Inclusion: Is It a Boon for Savings Mobilization?’ *Review of Development Finance,* 7(1): 29–35. https://doi.org/10.1016/j.rdf.2017.01.001

Omar, M. A., & Inaba, K. (2020). Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis. *Journal of Economic Structures*, 9(37), 1–25.

Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review,* 18(4), 329–340.

Park, C.-Y., & Mercado, R. (2018). Financial inclusion, poverty, and income inequality. *The Singapore Economic Review, 63*(1)185–206.

Pazarbasioglu, C., A.G. Mora, M. Uttamchandani, H. Natarajan, E. Feyen, and M. Saal (2020). 'Digital Financial Services'. Washington, DC: World Bank.

Perotti, R. (1993). Political equilibrium, income distribution, and growth. *The Review of Economic Studies,* 60(4), 755–776.

Rao, E. J. and M. Qaim (2011). Supermarkets, Farm Household Income, and
Poverty: Insights from Kenya. *World Development,* 39(5), 784-796.

Rogers, P. J. (2008) Using programme theory to evaluate complicated and complex aspects of interventions. Evaluation 14(1): 29–48.

Sahay R, Cihak M, N'Diaye PM, Barajas A, Mitra S, Kyobe A, Mooi YN, & Yousefi SR (2015) *Financial inclusion: can it meet multiple macroeconomic goals*? IMF Staff Discussion Notes 15/17, International Monetary Fund.

Sahay, R., U. Eriksson von Allmen, A. Lahreche, P. Khera, S. Ogawa, M. Bazarbash, and K. Beaton (2020). 'The Promise of Fintech: Financial Inclusion in the Post COVID-19 Era'. Departmental Paper 20/09. Washington, DC: IMF.

Sakyi- Nyarko, C., Ahmad, A. H., & Green, C. (2022). The role of financial inclusion in improving household well-being. *Journal of International Development,* 1–27, https://doi.org/10.1002/jid.3661

Sakyi, D., Onyinah, P. O., Baidoo, S. T., & Ayesu, E. K. (2021). Empirical determinants of saving habits among commercial drivers in Ghana. *Journal of African Business*, 22(1), 106-1251–20.

Sarma, M. (2008). Index of financial inclusion (Working Paper No. 215). Indian Council for Research on International Economic Relations.

Sarma, M., & Pais, J. (2011). *Financial Inclusion and Development: A Cross Country Analysis*. Paper presented at the Annual Conference of the Human Development and Capability Association, New Delhi.

Schmied, J., & Marr, A. (2016). Financial Inclusion and Poverty: The Case of Peru. Regional and Sectoral Economic Studies, Vol. 16-2 (2016).

Scholes, M., Benston, G. J., & Smith, C. W. (1976). A transactions cost approach
to the theory of financial intermediation. *The Journal of Finance*, 31(2), 215-231.

Scholtens, B., & van Wensveen, D. (2003). The theory of financial intermediation in Vienna, Austra: SUERF-The European Money and Finance Forum. Retrieved from https://pdfs.semanticscholar.org/8636/9b327b9d9a242562a605dc1e85c38c4fa665.pdf

Schumpeter, J. A. (1934). Theory of economic development: An inquiry profits, capital, credit, interest, and the business cycle. Harvard University Press.

Seng, K. (2021). The poverty-reducing effects of financial inclusion: Evidence from Cambodia. In *Financial Inclusion in Asia and Beyond*. 1st Edition, Routledge.

Tita, A. F., & Aziakpono, M. J. (2017). The effect of financial inclusion on welfare in sub-Saharan Africa: Evidence from disaggregated data. *African Review of Economic and Finance*, 9(2), 30–65.

Vaessen, J., Rivas, A., Duvendack, M., Palmer Jones, R., Leeuw, F., Van Gils, G., Lukach, R., Holvoet, N., and Bastiaensen, J. (2014) The Effects of microcredit on women's control over household spending in developing countries. Campbell Systematic Review. Retrieved from http://www.campbell collaboration.org/lib/project/178/.

Wirba, E.L. Akem, F. A. and Baye, F.M (2021). "Earnings-gap between Men and Women in the Informal Labour Market of Cameroon" Review of Economic Development.

World Bank (2014), “Global Financial Development Report 2014: financial inclusion”, World Bank, Washington, DC.

World Bank (2018). The Little Data Book on Financial Inclusion AFDB report: www.afdb.org/fileadmin/uploads/afdb/Documents/Project and Operations /Cameroon - Joint 2015

Worldbank (2019). http://pubdocs.worldbank.org/en/819481492188154977/mpo-cmr.pdf

World Bank (2020a). ‘Digital Financial Services’. Washington, DC: World Bank.

Worldbank (2021). http://pubdocs.worldbank.org/en/819481492188154977/mpocmr.pdf

World Food Programe Cameroon Country Brief (2022). Saving Lives Changing Lives.

World Bank. 2022. The Little Data Book on Financial Inclusion 2022. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/38148 License: CC BY 3.0 IGO.

Xu, X. (2020). Trust and financial inclusion: A cross-country study. Finance Research Letters, 35, 101310

Appendix 1: Endogenous framework for the male sub sample

	(1)	(2)	(3)	(4)
		Endogenous Switching Regression		
	OLS		Financially included	Financially excluded
VARIABLES		Selection	Log income	Log income
Financial inclusion	0.3057***			
	(0.0330)			
Age	0.0713***	0.0707***	0.1008***	0.0312***
	(0.0049)	(0.0084)	(0.0071)	(0.0090)
Age squared	-0.0007***	-0.0006***	-0.0010***	-0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married	0.1396***	0.1409**	0.1268***	0.0764
	(0.0341)	(0.0608)	(0.0421)	(0.0593)
Primary education	0.1231***	0.6201***	0.2740***	0.0877
	(0.0458)	(0.0768)	(0.0817)	(0.0740)
Secondary education	0.2089***	1.0991***	0.5009***	-0.0653
	(0.0468)	(0.0790)	(0.0906)	(0.1013)
Tertiary education	0.5070***	2.3981***	0.8169***	0.0004
	(0.0662)	(0.1743)	(0.1169)	(0.3594)
Urban residency	0.1738***	0.6349***	0.3003***	-0.0283
	(0.0324)	(0.0549)	(0.0456)	(0.0736)

Self-employed	-0.0192	-0.0410	-0.0550	0.1085*
	(0.0316)	(0.0564)	(0.0380)	(0.0568)
Anglophone	0.0037	-0.1106*	0.0050	0.0557
	(0.0355)	(0.0608)	(0.0440)	(0.0605)
House ownership	-0.0759**	-0.3338***	-0.1557***	0.0276
	(0.0340)	(0.0581)	(0.0444)	(0.0613)
Neigbourhood associations		0.4645***		
		(0.0986)		
Constant	8.8621***	-2.3577***	8.1409***	9.6297***
	(0.1003)	(0.1763)	(0.2213)	(0.1647)
$ln\sigma_{\varepsilon_1 \nu}$			-0.2450***	
			(0.0212)	
$\rho_{\varepsilon_1 \nu}$			0.3021***	
			(0.1147)	
$ln\sigma_{\varepsilon_0 \nu}$				-0.1776***
				(0.0243)
$\rho_{\varepsilon_0 \nu}$				-0.1771
				(0.1379)
Wald test of indep. eqns		5.49**		
Log likelihood		-5657.4624		
Observations		3,321		

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix 2: endogenous switching regression framework for the female subsample

	(1)	(2)	(3)	(4)
		Endogenous Switching Regression		
	OLS		Financially included	Financially excluded
VARIABLES		Selection	Log income	Log income
Financial inclusion	0.2102***			
	(0.0336)			
Age	0.0424***	0.0584***	0.0626***	0.0178**
	(0.0046)	(0.0072)	(0.0067)	(0.0077)
Age squared	-0.0004***	-0.0004***	-0.0006***	-0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married	0.1333***	0.0532	0.1145***	0.1414***
	(0.0317)	(0.0504)	(0.0381)	(0.0525)
Primary education	-0.0528	0.6339***	0.0228	-0.0866
	(0.0422)	(0.0656)	(0.0732)	(0.0681)
Secondary education	0.1174***	1.1964***	0.3400***	-0.1512
	(0.0455)	(0.0706)	(0.0887)	(0.0971)
Tertiary education	0.5400***	2.1784***	0.7467***	-0.0809

	(0.0782)	(0.1641)	(0.1234)	(0.3422)
Urban residency	0.2196***	0.4883***	0.2730***	0.1379**
	(0.0337)	(0.0512)	(0.0461)	(0.0635)
Self-employed	-0.0283	-0.0556	-0.0766*	0.0455
	(0.0329)	(0.0521)	(0.0406)	(0.0527)
Anglophone	0.0680*	-0.0078	0.0915**	0.0877
	(0.0372)	(0.0574)	(0.0443)	(0.0625)
House ownership	0.0579*	-0.1997***	0.0053	0.1071*
	(0.0341)	(0.0532)	(0.0435)	(0.0556)
Neigbourhood associations		0.1900**		
		(0.0888)		
Constant	9.2355***	-2.2890***	8.7988***	9.6813***
	(0.0933)	(0.1519)	(0.2189)	(0.1482)
$ln\sigma_{\varepsilon_1 \nu}$			-0.2539***	
			(0.0181)	
$\rho_{\varepsilon_1 \nu}$			0.1293	
			(0.1112)	
$ln\sigma_{\varepsilon_0 \nu}$				-0.0490**
				(0.0195)
$\rho_{\varepsilon_0 \nu}$				-0.1499
				(0.1056)
Wald test of indep. eqns		2.25		
Log likelihood		-6357.1163		

Observations	3,505

Source: Computed by author using FinScope Cameroon (2017) and Stata 15.

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix 3: **Fuller description of the Endogenous Switching Regression**

The error terms ν, ε_1 and ε_0 are assumed to have a trivariate normal distribution, with mean vector zero and follow the covariance matrix:

$$\sum = \begin{bmatrix} {\sigma^2}_{\varepsilon_1} & \sigma_{\varepsilon_1\varepsilon_0} & \sigma_{\varepsilon_1\nu} \\ & {\sigma^2}_{\varepsilon_0} & \sigma_{\varepsilon_0\nu} \\ & & {\sigma^2}_{\nu} \\ & & \end{bmatrix}$$

According to Maddala (1986) and Rao and Qaim (2011), ${\sigma^2}_{\nu}$ is assumed to be 1 as α can only be estimated up to a scale factor. Furthermore, since $\mathrm{Ln}\,W_1$ and $\mathrm{Ln}\,W_0$ are not observed together, the covariance $\sigma_{\varepsilon_1\varepsilon_0}$ is zero. In a cross-sectional sample, $\mathrm{Ln}\,W_1$ and $Ln\,W_0$ are only partially observed, with the former being only observed for the subsample of users of financial services and the latter being only observed for the subsample of non-users of financial services. In the presence of unobserved effects, the selection equation error term (ν) correlates with the error term of the outcome equations $\varepsilon_1$and ε_0 and thus, the expected values of ε_1 and ε_0 would be nonzero conditional on regime selection. Endogeneity can be tested with estimates of the covariance terms $\sigma_{\varepsilon_1\nu}$ and $\sigma_{\varepsilon_0\nu}$.

If $\sigma_{\varepsilon_1\nu} = \sigma_{\varepsilon_0\nu} = 0$, then the model depicts exogenous switching, meanwhile if $\sigma_{\varepsilon_1\nu} = \sigma_{\varepsilon_0\nu} \neq 0$, then the model exhibits endogenous switching. Thus, we need to test for significant of the coefficient of correlation between $\varepsilon_1$and ν $(\rho_{\varepsilon_1\nu} = \sigma_{\varepsilon_1\nu}/\sigma_{\varepsilon_1}\sigma_\nu)$ and between ε_0 and ν $(\rho_{\varepsilon_0\nu} = \sigma_{\varepsilon_0\nu}/\sigma_{\varepsilon_0}\sigma_\nu)$. The expected values of the error terms ε_1 and ε_0 conditional on regime selection using the correlations are given as follow:

$$E(\varepsilon_{1i}|FI_i = 1, X_{1i}) = E(\varepsilon_{1i}|\nu_i \geq -\alpha' Z_i) = \sigma_{\varepsilon_1\nu} \frac{\phi(\alpha' Z_i)}{\Phi(\alpha' Z_i)}$$
$$= \sigma_{\varepsilon_1\nu}\lambda_1$$

$$E(\varepsilon_{0i}|FI_i = 0, X_{0i}) = E(\varepsilon_{0i}|\nu_i < -\alpha' Z_i) = \sigma_{\varepsilon_0\nu} \frac{-\phi(\alpha' Z_i)}{1-\Phi(\alpha' Z_i)} = \sigma_{\varepsilon_0\nu}\lambda_0$$

Where, FI is user of financial services status, ϕ and Φ are the standard normal probability density function and the cumulative distribution function of the standard normal distribution, respectively. λ_1 and λ_0 represent the inverse Mills ratios for users of financial services and non-users of financial services, respectively.

The conditional expected value of the welfare of a financially included individual after correcting for sample selectivity is given as:

$$E(\mathrm{Ln}\, W_{1i} \,|FI_i = 1) = \beta_1{}' X_{1i} + \sigma_{\varepsilon_1\nu}\lambda_1$$

Where, $\sigma_{\varepsilon_1\nu}\lambda_1$ accounts for sample selection arising from the idea that a financial included individual differs from other individuals with characteristics X and Z because of unobserved characteristics

While conditional expected value of welfare that the same individual would have if he/she is financially excluded is given as below:

$$E(\mathrm{Ln}\, W_{0i} \,|FI_i = 1) = \beta_0{}' X_{1i} + \sigma_{\varepsilon_0\nu}\lambda_1$$

Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

Bringing Rigour and Evidence to Economic Policy Making in Africa

- Improve quality.
- Ensure Sustainability.
- Expand influence.

www.aercafrica.org

Learn More

www.facebook.com/aercafrica

www.instagram.com/aercafrica_official/

twitter.com/aercafrica

www.linkedin.com/school/aercafrica/

Contact Us
African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@aercafrica.org