



# Effect of Financial Literacy on Poverty Reduction Across Kenya, Tanzania, and Uganda

Isaac Koomson<sup>1,5</sup> · David Ansong<sup>2</sup> · Moses Okumu<sup>3</sup> · Solomon Achulo<sup>4</sup>

Accepted: 27 November 2022 / Published online: 9 December 2022  
© The Author(s), under exclusive licence to Springer Nature Switzerland AG 2022

## Abstract

Financial literacy can be critical to reducing poverty, but limited evidence exists on the mechanisms of change. Guided by the financial capability framework, this study examines the direct effects of financial literacy on poverty and the indirect effect through financial inclusion and entrepreneurship, using data from wave 5 of the InterMedia Financial Inclusion Insights Program for Kenya, Tanzania, and Uganda. We also examined how the relationships differ by gender and locality. Overall, the endogeneity-corrected results suggest that an increase in financial literacy is associated with a 6.9% decrease in poverty. We found that entrepreneurship and financial inclusion act as mechanisms of change through which financial literacy decreases poverty, with the findings differing by gender and locality. These findings point to the poverty-reducing effect of financial literacy, mainly in Tanzania, followed by Kenya and Uganda. The results contribute to understanding how financial literacy and poverty interact and can inform contextually relevant interventions and policies.

**Keywords** Financial literacy · Poverty · Entrepreneurship · Financial inclusion · East Africa

## Introduction

Before the COVID-19 pandemic, sub-Saharan Africa (SSA) was making positive strides in poverty reduction, shrinking the number of people living in extreme poverty from 56% in 1990 to 34% in 2018 (World Bank, 2020). The prolonged

COVID-19 pandemic has eroded these poverty reduction gains (UNCTAD, 2021). Financial literacy (i.e., financial knowledge and skills) is critical to reducing poverty (World Bank, 2018). Two potential pathways by which financial literacy could contribute to poverty reduction are its initial influence on financial inclusion (i.e., access to financial systems and services) and entrepreneurship. However, scant evidence exists on these pathways within the financial literacy-poverty reduction literature (Askar et al., 2020; Engelbrecht, 2008; Faboyede et al., 2015). Even further, persistent gender disparities in financial literacy that may affect these pathways are understudied. This study fills these knowledge gaps by addressing the following research questions: (a) What is the effect of financial literacy on poverty? (b) What pathways transmit the effects of financial literacy on poverty? and (c) To what extent do the effects and pathways depend on gender and locational differences? Empirical insights into these questions could help shed light on how financial literacy could be integrated into poverty reduction strategies and policies to help reduce poverty in SSA.

Financial literacy in SSA is suboptimal. A recent global study found that financial literacy in SSA remains low at 32% compared to 52% in high-income countries (Fanta & Mutsonziwa, 2021). In some SSA regions, such as East Africa, the financial literacy level is even lower. For

✉ Isaac Koomson  
i.koomson@uq.edu.au ; koomsonisaac@gmail.com

David Ansong  
ansong@email.unc.edu

Moses Okumu  
okumu@illinois.edu

Solomon Achulo  
a.solomonhadi@wustl.edu

<sup>1</sup> Centre for the Business and Economics of Health, The University of Queensland, St Lucia, QLD, Australia

<sup>2</sup> School of Social Work, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

<sup>3</sup> School of Social Work, University of Illinois at Urbana-Champaign, Champaign, IL, USA

<sup>4</sup> Brown School, Washington University in St. Louis, St. Louis, MO, USA

<sup>5</sup> Network for Socioeconomic Research and Advancement (NESRA), Accra, Ghana

instance, only 38% of Kenyans, 34% of Ugandans, and 40% of Tanzanians are financially literate (Klapper et al., 2015). East Africa has the highest mobile money penetration rate (i.e., the most popular fintech product in SSA) due to its role as the global hub for mobile money transactions (GSMA, 2019). Mobile money account ownership rates in Kenya (73%), Uganda (51%), and Tanzania (39%) are some of the highest in SSA (Demirgüç-Kunt et al., 2018). In these economies, the mobile money ecosystems have progressed beyond basic payment systems to sophisticated structures that provide savings, credit, insurance, and other services (Koomson, Martey et al., 2022). Although the region boasts of an impressive financial technology (fintech) revolution and start-ups, the low financial literacy is empirically puzzling, especially in contexts with high poverty rates such Kenya (37.1%), Uganda (41.5%), and Tanzanians (49.4%; World Bank, 2020). To address this evidence gap, there is a need to understand how financial literacy can be leveraged as a policy tool to address the rising poverty in East Africa.

Guided by the financial capability framework (Ansong et al., 2020; Sherraden, 2013; Sherraden & Ansong, 2013), this study tests the link between financial literacy and poverty. The financial capability framework posits that when individuals and households are financially literate and have an enabling environment where they can easily access and utilize financial services and products, then they can improve their livelihoods and well-being (Ansong et al., in press; Ansong et al., 2020; Sherraden, 2013). Individuals and families who are financially literate make sound financial management decisions, resulting in more efficient consumption and increased accumulation of both financial and durable assets (Atkinson & Messy, 2013). Evidence points to financial literacy's direct influence on poverty through increased food and non-food household consumption (Dinkova et al., 2021), an essential indicator of poverty (Askar et al., 2020; Faboyede et al., 2015; Meyer & Sullivan, 2012; World Bank, 2001). This suggests that financial literacy can assist individuals in escaping poverty through increased asset building.

Financial literacy can directly or indirectly influence poverty through financial inclusion and entrepreneurship pathways (see Fig. 1). Evidence shows that financial literacy may affect financial inclusion (access and utilization of beneficial financial services) and shape entrepreneurial practices and choices (Awaworyi, Churchill & Marisetty, 2020; Koomson et al., 2020a; Koomson & Danquah, 2021; Timbile & Kotey, 2022). First, the financial inclusion pathway suggests that financial literacy can reduce vulnerability to poverty through its positive effect on beneficial financial products and services (Koomson et al., 2020a; Timbile & Kotey, 2022). The World Bank (2018) recognizes financial literacy as a key driver to achieving universal financial access. The extant literature also shows that financial literacy significantly enhances financial inclusion (Atkinson &

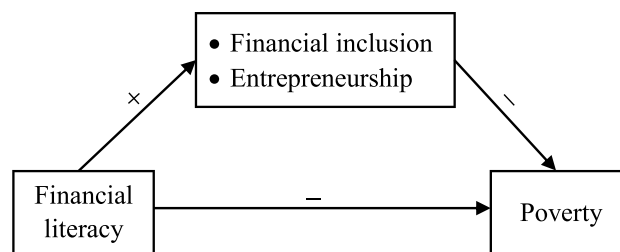


Fig. 1 Pathways from financial literacy to poverty

Messy, 2013; Calcagno & Monticone, 2015; Klapper et al., 2013; Koomson et al., 2020b). Second, the entrepreneurship pathway suggests that financial literacy can contribute to poverty reduction through its potential role in enhancing entrepreneurship. For instance, Saptono (2018) found that an increase in financial literacy is associated with a 9.8% increase in entrepreneurship skills among Indonesians. Similarly, Oseifuah (2010) and Burchi et al. (2021) found that financial literacy enhances entrepreneurship intentions and how entrepreneurs grow their businesses. Entrepreneurs play a significant role in poverty reduction in Kenya (Misango & Ongiti, 2013), and China (Si et al., 2015). Financial fragility can impede entrepreneurship because financial constraint is considered one of the most significant barriers to entrepreneurship in emerging economies (Daniels et al., 2016; Peparah & Koomson, 2015). Financial fragility emanating from lower levels of financial literacy can decrease asset accumulation and household consumption. This implies that if financial literacy is misapplied, it might worsen poverty through the above-mentioned pathways. We use data from three East African countries—Kenya, Tanzania, and Uganda—to empirically examine the financial inclusion and entrepreneurship pathways.

The study also explores gender differences in the effect of financial literacy on poverty, which is currently unexplored in emerging economies (Klapper et al., 2015). Gender's role is particularly amplified through the stack and persistent gender differences in the two mediators—financial inclusion and entrepreneurship—linking financial literacy and poverty. For instance, wide gender gaps exist in entrepreneurship in Kenya (15%), Tanzania (7.05%), and Uganda (11.5%). Similarly, gender differences in financial inclusion persist in Kenya (8%), Tanzania (9%), and Uganda (13%). These gender differences may even be wider for individuals living in rural vs. urban areas. Individuals living in rural areas may be held back by restrictive social norms, especially women who face multiple barriers in navigating financial services and entrepreneurship opportunities. These discriminatory laws, social norms, locality disparities and lack of gender-responsive financial infrastructure affect the financial literacy-poverty relationship (Ansong et al., 2020; Calcagno & Monticone, 2015; Murendo & Mutsonziwa,

2017; Okumu et al., 2021). This study's pursuit of gender- and location-disaggregated analyses in financial literacy will provide further knowledge on the extent to which gender and locality either strengthen or weaken the financial inclusion and entrepreneurship pathways. This evidence will inform gender- and location-specific interventions and policies, fostering greater consideration of known disparities.

Therefore, guided by the financial capability framework, the current study examines the direct effects of financial literacy on poverty and the indirect effect through financial inclusion and entrepreneurship, using data from three East African countries—Kenya, Tanzania, and Uganda. We also examine how gender and locality may affect the relationships. To achieve these objectives while producing consistent results, we address the endogeneity problem associated with financial literacy (Calcagno & Monticone, 2015; Fernandes et al., 2014; Lusardi & Mitchell, 2007; Murendo & Mutsonziwa, 2017).

## Data, Variables, and Model Specification

The secondary data employed in this paper is from Wave 5 (2017) of the InterMedia Financial Inclusion Insights (FII) Program (InterMedia, 2017). Although the FII program was carried out in different years across 12 emerging economies, we use data for Kenya, Tanzania, and Uganda because these are the only countries in East Africa with wave 5 data. The FII data contains information on respondents aged 15 and above, corresponding to the age cut-off used in the Global Findex database (Demirgüç-Kunt et al., 2018). Apart from data on respondents' ownership and use of financial products, the FII data also contains information on financial literacy, financial well-being, entrepreneurship, poverty, demography, and response to shocks. The surveys used a two-stage stratified cluster sampling design (InterMedia, 2017). The dataset included 3129 households in Kenya, 3060 in Tanzania, and 3001 in Uganda. The samples were reduced to 3111 households in Kenya, 3048 in Tanzania, and 2985 in Uganda after accounting for missing observations in the key variables and the covariates.

## Financial Literacy

We use a set of seven questions on financial literacy from the InterMedia FII Program's questionnaire (InterMedia, 2017). The questions sought to determine respondents' financial knowledge across basic numeracy, risk diversification, inflation, interest rates, and compound interest. For each respondent, a correct response is assigned the value 1, while a wrong response is given the value 0 (Klapper & Lusardi, 2020; Murendo & Mutsonziwa, 2017). From the seven questions, we generate an additive financial literacy score that ranges from 0 to 7. Higher scores represent higher levels of financial literacy.

## Poverty

The poverty measure used in the InterMedia FII program is the progress out of poverty index (PPI) (InterMedia, 2017), which uses a standard set of 10 easy-to-answer questions to estimate consumption-based poverty rates for each household included in pro-poor programs (Schreiner, 2017). Examples of the PPI questions which revolve around deprivations in asset ownership, materials for roofs and walls, education, and employment include, "What is the main source of lighting fuel for the household? What is the highest grade that the female head/spouse has completed?" The responses to the ten questions are converted to a probability that the respondent's household is below the national poverty line and other globally recognized poverty lines. The PPI scores range from 0 to 100, with 0 representing the poorest households and 100 representing the wealthiest households. The PPI scores are converted to determine whether a respondent's household lives below the poverty line of \$2.50 per day (Chua et al., 2012; InterMedia, 2017). For the binary poverty variable, 1 denotes living below the poverty line and 0 above the poverty line (i.e., "1 = Poor"; "0 = Non-poor").

## Empirical Model

We employ a Probit model to estimate the association between financial literacy and poverty since poverty is captured as a binary variable. The model for obtaining our preliminary results is specified in Eq. (1).

$$Pr(Pov_{ij}|X_{ij}) = \alpha FL_{ij} + \beta X_{ij} + \vartheta_j + \varepsilon_{ij} \quad (1)$$

where  $Pov_{ij}$  is a binary variable for the poverty status of household  $i$  in country  $j$ .  $FL_{ij}$  is a continuous variable representing the financial literacy score for household head  $i$  in country  $j$ ; and  $X$  is a vector of control variables considered as other poverty determinants in extant studies (Awaworyi Churchill & Marisetty, 2020; Koomson & Danquah, 2021; Koomson et al., 2020a). These variables include age, gender, education, household size, location, mobile phone ownership, marital status, and religion.  $\vartheta_j$  captures country-specific fixed effect while  $\varepsilon$  is a random error term.

As indicated in previous studies that have analyzed the link between financial literacy and various welfare outcomes, financial literacy is endogenous, and failure to address it will produce biased estimates (Calcagno & Monticone, 2015; Fernandes et al., 2014; Lusardi & Mitchell, 2007; Murendo & Mutsonziwa, 2017; Van Rooij et al., 2011). In previous studies, the endogeneity problem has been resolved using the average level of financial literacy within one's region/province (Calcagno & Monticone, 2015; Fernandes et al., 2014; Murendo & Mutsonziwa, 2017), parents' or siblings' financial experience (Van Rooij et al., 2011), or background knowledge in economics or business (Lusardi &

Mitchelli, 2007) in a two-stage least squares (2SLS) or instrumental variable (IV) regression. Consistent with these studies (see, e.g., Calcagno & Monticone, 2015; Fernandes et al., 2014; Murendo & Mutsonziwa, 2017), we resolve the endogeneity in this study using an IV-Probit model in which the average financial literacy among a respondent's neighbors (outside their households) is employed as an instrument. Unlike previous studies, we do not generate the overall mean level of financial literacy within respondents' neighborhoods. However, we apply the leave-out mean approach, which generates the average neighborhood level of financial literacy for each respondent by excluding the household the respondent belongs. This approach helps avoid any potential problem of violating the exclusive restriction condition which can render the instrument invalid.

Apart from the IV-Probit method, we test for consistency in findings by applying the Lewbel (2012) 2SLS method used widely in the literature to address endogeneity (Koomson & Awaworyi Churchill, 2021; Koomson & Danquah, 2021). Table 5 presents the description and summary statistics for all variables included in the analysis.

## Mediation Analysis

We also investigated the potential roles of entrepreneurship and financial inclusion as potential pathways via which financial literacy influences poverty. We use a two-step process to confirm whether these variables are significant pathways in line with previous studies (Kofinti et al., 2022; Koomson & Awaworyi Churchill, 2021; Koomson & Danquah, 2021). Entrepreneurship is measured using a binary variable, where 1 refers to self-employment and 0 if otherwise (Nikolaev et al., 2020; Peprah et al., 2015). Financial inclusion is measured using a multidimensional approach that cuts across three dimensions: account ownership, access to credit, and insurance ownership. After obtaining the multidimensional financial inclusion score, we applied a cut of 0.5 to obtain a binary measure of financial inclusion where 1 is assigned to a household head whose financial inclusion score is greater than 0.5 and 0 if otherwise (see, e.g., Koomson & Danquah, 2021; Zhang & Posso, 2019). In the second step, we independently include the potential mediators as additional control variables and note how the coefficient of financial literacy reacts. If any of them is a mediator, its inclusion should result in the shrinking of the magnitude of the coefficient of financial literacy, or it must become statistically insignificant.

## Results

### Preliminary Results

This section reports preliminary estimates for the relationship between financial literacy and poverty in Table 1.

Overall, these results suggest that financial literacy is significantly associated with poverty reduction in East Africa. Results for all countries are displayed in Column 1, while Columns 2 to 4 report estimates for Kenya, Tanzania, and Uganda, respectively. Specifically, we see in Column 1 that a unit increase in financial literacy is associated with a decrease in the probability of being poor by 2.3% points. At the country level, an increase in financial literacy is linked to a decrease in the probability of being poor by 2.3% points in Kenya, 2.1 in Tanzania, and 1.3 in Uganda. Although our analyses depict an inverse relationship between financial literacy and poverty, these Probit estimates can be biased because financial literacy has been identified as inherently endogenous. We resolve the endogeneity problem in the "Financial literacy" section using an IV-Probit model, which employs an external instrument.

The significant results of the control variables in Column 1 indicate a positive relationship between the household head's age and poverty. Female heads, the educated, those who own mobile phones, and urban residents are less likely to be poor. Also, those married, separated, or divorced are more likely to be poor than those who have never married.

### Endogeneity-Corrected Results

This section employs the average financial literacy score among respondents' neighbors as an instrument in an IV-Probit regression and presents the results in Table 2. Expectedly, the first stage estimates show that the higher the level of financial literacy in a respondent's neighborhood, the higher the respondent's own level of financial literacy (Calcagno & Monticone, 2015; Fernandes et al., 2014; Murendo & Mutsonziwa, 2017). The F-statistics are above the threshold of 10, which implies that the instrument is not weakly associated with financial literacy (Stock & Yogo, 2002). Furthermore, the instrumented results are all greater than the preliminary results, signifying that the endogeneity related to financial literacy biased the preliminary estimates downwards. Based on the biasedness of the preliminary results, the endogeneity-corrected estimates are our preferred estimates. Specifically, we observe in Column 1 that an increase in financial literacy reduces poverty by 6.9% points across all countries. When disaggregated by countries, a unit increase in financial literacy is associated with a decrease in the probability of poverty by 5.9% points in Kenya, 6.7 in Tanzania, and 4.2 in Uganda. Our findings suggest that improved financial literacy can be employed as an effective policy strategy for reducing poverty. This finding supports those of Askar et al. (2020) and Faboyede et al.

**Table 1** Financial literacy and poverty (Probit results)

	(1) Full ME	(2) Kenya ME	(3) Tanzania ME	(4) Uganda ME
Poverty (0/1)				
Financial literacy	−0.023*** (0.005)	−0.023*** (0.006)	−0.021*** (0.005)	−0.013* (0.008)
Age	0.001 (0.002)	−0.005 (0.003)	0.001 (0.002)	0.003 (0.004)
Female	−0.037*** (0.013)	−0.082*** (0.017)	−0.014 (0.014)	−0.097*** (0.025)
<b>Education (Base = Polygamy)</b>				
Primary	−0.167*** (0.023)	−0.258*** (0.029)	−0.109*** (0.029)	−0.110*** (0.035)
Secondary	−0.403*** (0.025)	−0.472*** (0.032)	−0.208*** (0.031)	−0.291*** (0.041)
Tertiary	−0.624*** (0.041)	−0.626*** (0.052)	−0.261*** (0.046)	−0.475*** (0.092)
Household size	0.033*** (0.003)	0.107*** (0.005)	0.069*** (0.004)	−0.149*** (0.008)
Rural	0.287*** (0.014)	0.144*** (0.019)	0.133*** (0.013)	0.306*** (0.027)
Mobile phone	−0.262*** (0.015)	−0.127*** (0.020)	−0.071*** (0.015)	−0.439*** (0.026)
<b>Marital status (Base = Never married)</b>				
Polygamy	0.163*** (0.027)	0.084** (0.034)	0.037 (0.031)	0.156*** (0.047)
Monogamy	0.062*** (0.016)	−0.046** (0.021)	−0.014 (0.016)	0.165*** (0.031)
Divorced/Separated/Divorced	0.054** (0.023)	0.127*** (0.031)	0.029 (0.023)	0.269*** (0.040)
<b>Religion (Base = no religion)</b>				
Christianity	−0.127 (0.081)	−0.072 (0.091)	−0.171* (0.100)	−0.385** (0.172)
Islam	−0.127 (0.082)	0.075 (0.096)	−0.185* (0.100)	−0.544*** (0.175)
Traditional Africa	−0.354* (0.195)	0.021 (0.137)	— —	— —
Hinduism/Buddhism	−0.300** (0.125)	— —	−0.422** (0.174)	−0.497** (0.210)
Country fixed effects	Yes	No	No	No
Observations	9149	3111	3048	2985

Robust standard errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; ME, marginal effects

(2015), who have shown that financial literacy is capable of aiding in the reduction of poverty. However, our study focuses on East Africa, which has become home to emerging financial technologies with improved financial literacy as a corollary. Comparatively, respondents in Tanzania are most likely to experience the strongest effect of financial literacy on poverty reduction, followed by Kenya and Uganda, respectively.

### Location and Gender Dimension

In this section, we report location-specific results to explore the differential effects of financial literacy on poverty for rural and urban residents. In Table 3, we report the results for the rural sample in Panel B and see in Column 1 that, overall, a unit increase in financial literacy is associated with a decrease in the probability of being poor in a rural area

**Table 2** Financial literacy and poverty (IV-Probit results)

	(1)	(2)	(3)	(4)
Poverty (0/1)	Full	Kenya	Tanzania	Uganda
<b>Pane A: Full sample</b>				
Financial literacy	−0.069*** (0.007)	−0.059*** (0.011)	−0.067*** (0.013)	−0.042*** (0.010)
Household head variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbors	0.894*** (0.022)	0.908*** (0.039)	0.834*** (0.041)	0.924*** (0.038)
F-statistic of first stage	1613.08	553.48	407.51	595.77
Observations	9149	3111	3048	2985
<b>Pane B: Rural sample</b>				
Financial literacy	−0.055*** (0.009)	−0.066*** (0.015)	−0.027* (0.014)	−0.036*** (0.012)
Household head variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbors	0.892*** (0.026)	0.902*** (0.049)	0.838*** (0.049)	0.941*** (0.043)
F-statistic of first stage	1134.42	340.32	296.31	482.71
Observations	6128	1912	2059	2155
<b>Pane C: Urban sample</b>				
Financial literacy	−0.114*** (0.011)	−0.056*** (0.019)	−0.154*** (0.018)	−0.064*** (0.020)
Household head variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbors	0.902*** (0.043)	0.934*** (0.063)	0.831*** (0.080)	0.894*** (0.082)
F-statistic of first stage	452.23	216.06	105.70	116.02
Observations	3003	1197	983	823
<b>Pane D: Male sample</b>				
Financial literacy	−0.074*** (0.012)	−0.063*** (0.021)	−0.086*** (0.022)	−0.045*** (0.017)
Household head variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbors	0.847*** (0.035)	0.790*** (0.061)	0.771*** (0.067)	0.938*** (0.058)
F-statistic of first stage	579.88	165.86	130.58	257.97
Observations	3450	1165	1162	1120
<b>Pane E: Female sample</b>				
Financial literacy	−0.065*** (0.008)	−0.060*** (0.013)	−0.056*** (0.016)	−0.039*** (0.013)
Household head variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbors	0.926*** (0.029)	0.998*** (0.049)	0.870*** (0.052)	0.912*** (0.050)
F-statistic of first stage	1036.42	405.20	275.84	334.70
Observations	5699	1946	1885	1865

Note: *FL*, financial literacy; Standard errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

**Table 3** Association between financial literacy and entrepreneurship and financial inclusion

	(1)	(2)
Poverty (0/1)	Entrepreneurship	Financial inclusion
Financial literacy	0.013*** (0.004)	0.019*** (0.004)
Household head variables	Yes	Yes
Household-level variables	Yes	Yes
Country fixed effects	Yes	Yes
Observations	9135	5363

Financial literacy; Robust standard errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

by 5.5% points. Also, an increase in financial literacy by a unit is related to reductions in the likelihood of poverty by 6.6%, 2.7%, and 3.6% points in the rural areas of Kenya, Tanzania, and Uganda, respectively. In Column 1 of Panel C, we observe that a unit increase in financial literacy generally decreases the probability of being poor in an urban area by 11.4% points. From Columns 2 to 4, we see that a unit increase in financial literacy is associated with a decrease in the probability of poverty by 5.6% points in urban Kenya, 15.4 in urban Tanzania, and 6.4 in urban Uganda. Overall, financial literacy has a bigger poverty-reducing effect in urban than rural areas. The bigger poverty-reducing effect of financial literacy among urban residents is consistently established in Tanzania and Uganda, except in Kenya, where financial literacy reduces poverty more among rural households.

Gender-wise, we report results for the male and female subsamples, respectively, in Panels D and E of Table 3. In Column 1 of Panel D, we find that, across all countries, a unit increase in financial literacy is associated with 7.4% points decrease in the probability of poverty among male-headed households. Our overall results in Column 1 of Panel E show that an increase in financial literacy by a unit is linked to 6.5% points decrease in the probability of poverty among female-headed households. Comparatively, these results show that financial literacy reduces poverty more among male- than female-headed households. The greater effect of financial literacy in reducing poverty among male-headed households is consistent across all the sampled countries.

### Robustness Checks

In this section, we check for consistency in our endogeneity-corrected estimates using the Lewbel (2012) 2SLS method and present the results in Table 6. We employ the Lewbel method, combining external and internally generated instruments. The results from the Lewbel regression for all countries in Colum

1 show that, overall, an increase in financial literacy reduces poverty by 5.6% points. For specific countries, a unit increase in financial literacy is associated with a decrease in the probability of poverty by 6.7%, 5.5%, and 3.5% points, respectively, in Kenya, Tanzania, and Uganda. Consistent with existing literature, the Lewbel results, which correct for endogeneity, are greater than the Probit estimates but lower than the IV-Probit results (Awaworyi Churchill & Marisetty, 2020; Koomson & Danquah, 2021). This implied that the poverty-reducing effect of financial literacy is consistent across different endogeneity-correcting models.

### Financial Inclusion and Entrepreneurship as Pathways

Per our two-step mediation modeling approach, financial literacy is significantly associated with entrepreneurship and financial inclusion in the first step. The results in Table 3 show that financial literacy is associated with increases in entrepreneurship (Saptono, 2018), and financial inclusion (Koomson et al., 2020b; Koomson, Martey et al., 2022) by 1.3 and 1.9% points, respectively. In Panel A of Table 4, we include entrepreneurship and financial inclusion as covariates and report the results in Columns 1 and 2, respectively. In Column 1, we see that entrepreneurship and financial inclusion are associated with 5.9 and 11.2% points decrease in poverty, respectively. The full model preliminary results for comparison are reported in Panel B. Since the models which included the mediators (see Panel A) have reduced sample sizes, we re-estimate the preliminary models without the mediators (see Panel B) to ensure the coefficients for comparison are obtained from the same sample. This is done to provide adequate grounds on which to compare estimates. After including entrepreneurship and financial inclusion in the models, we see that the coefficients of financial inclusion in Columns 1 and 2 of Panel A have reduced in magnitude compared to those in Panel B, which implies that these variables serve as key pathways through which financial literacy influences poverty. In other words, an increase in financial literacy enhances entrepreneurship and financial inclusion, which provides the financial resources required for poverty reduction.

### Implications and Conclusion

Financial literacy can help reduce poverty in SSA, but empirical studies on the causal relationship between financial literacy and poverty remain limited. To fill the knowledge gap, we use data from three East African countries (i.e., Kenya, Tanzania, and Uganda) and apply the IV-Probit model to address the potential endogeneity associated with financial literacy. We explored the potential mediating roles of entrepreneurship and financial inclusion and examined how the results vary by subgroups (i.e., gender and locality).

**Table 4** Mechanisms of change from financial literacy to poverty

	(1)	(2)
	<i>Mediator:</i> <i>Entrepreneurship</i>	<i>Mediator:</i> <i>Financial inclusion</i>
Poverty (0/1)	Full	Full
<b>Panel A: Results for mechanism</b>		
Financial literacy	–0.023*** (0.005)	–0.028*** (0.006)
Entrepreneurship	–0.059*** (0.014)	
Financial inclusion		–0.112*** (0.020)
Household head variables	Yes	Yes
Household-level variables	Yes	Yes
Country fixed effects	Yes	Yes
Observations	9135	5363
<b>Panel B: Initial results for comparison</b>		
Financial literacy	–0.025*** (0.005)	–0.030*** (0.006)
All controls	Yes	Yes
Observations	9135	5363

Robust standard errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ 

Overall, financial literacy decreased poverty consistently across the three sampled countries, with Tanzania having the largest effect compared to Kenya and Uganda. The findings also show that financial literacy's ability to enhance entrepreneurship and financial inclusion is a key mechanism through which financial literacy reduces poverty. The poverty-reducing effect of financial literacy is generally greater in rural locations and among male-headed households.

Guided by the financial capability framework, our findings show that financial literacy and financial inclusion are crucial in policies that address poverty. Ansong and et al., (2020) argue that programs aiming at advancing the SDG of ending poverty could leverage existing social and economic structures and networks to better support individuals and families to become financially literate and included (i.e., financially capable). For instance, the existing human services workforce at the forefront of developing and implementing poverty reduction strategies could be trained with financial capability competencies to enhance their ability to infuse financial literacy and inclusion into their programming. Similarly, strategies for incorporating financial literacy training into mainstream education systems may also have lasting effects on the financial literacy levels of emerging youth, thus potentially boosting the effectiveness of poverty reduction tools in the sampled countries and across other emerging economies.

Entrepreneurship is critical in alleviating poverty; however, our findings show that financial literacy is required to further shape entrepreneurial practices, as found in other

studies (Bhatti et al., 2021). Based on our findings on the mediating role of entrepreneurship, workforce development programs and policies could benefit from the intentional infusion of financial literacy training to promote sustainable and decent employment (i.e., SDG 1 and 8). In a constantly changing financial sector, new entrepreneurs, in particular, may need support in understanding the prevailing financial system to make sound projections and financial decisions for the businesses (e.g., budgeting, credit management, analysis-based decision-making, and growing and controlling businesses; Jiaton et al., 2021). It is plausible that individuals with high financial literacy will have the necessary financial skills, market knowledge, and finance sources to establish and sustain new businesses and thereby accumulate resources and improve their purchasing power (SDG 6). These improvements could help decrease food insecurity (SDG 2) and boost investments in quality education (SDG 4), good health and well-being (SDG 3), and households' access to clean water and sanitation.

Thus, based on our study findings, we recommend that policymakers, educational institutions, and other development programs adopt and mainstream the implementation of financial capability (i.e., literacy and inclusion) and entrepreneurship programs to reduce poverty and improve the well-being of people. These financial capability and entrepreneurship programs can be included as foundational courses for university students. Financial capability curricula can also be embedded into academic disciplines as a core subject or unit.



For the informal sector, these combined financial capability and entrepreneurship programs can be infused into localized curricula to benefit local groups and informal traders such as market women associations. Policymakers should take seriously and support initiatives to design and promote national financial capability strategies, such as the financial literacy week observed in many emerging countries.

The formal financial sector could also do more to advance financial literacy. Financial institutions and other key players in the financial industry should consider adopting financial literacy as part of their credit programs. Rather than waiting to foreclose businesses when they fail to pay back the loans, it might be prudent for these

institutions to provide continuous and on-demand financial literacy to all individuals who seek loans to start businesses. In the coming years, more empirical studies are expected to shed light on the connection between financial literacy and poverty reduction, encouraging more attention to be given to making financial literacy a priority in Sub-Saharan Africa

## Appendix

**Table 5** Summary statistics

Variable	Description	Mean	Std. Dev
Poor	Dummy variable equals 1 if income lived on is less than \$2.50 per day	0.535	0.499
Financial literacy score	Continuous variable for financial literacy score obtained from all seven questions	3.691	1.465
Age	Continuous variable for age of respondent in years	36.029	15.548
Age squared	Continuous variable for the squared age of respondent in years	1539.776	1383.064
Female	Binary variable equals 1 if respondent is female	0.623	0.485
Primary	Binary variable equals 1 if respondent's educational level if primary	0.508	0.500
Secondary	Binary variable equals 1 if respondent's educational level if Secondary	0.306	0.461
Tertiary	Binary variable equals 1 if respondent's educational level if Tertiary	0.064	0.245
Household size	Continuous variable for number of persons in household	3.607	2.218
Rural	Binary variable equals 1 if respondent is located in a rural area	0.670	0.470
Mobile phone	Binary variable equals 1 if respondent owns a mobile phone	0.664	0.472
Polygamy	Binary variable equals 1 if respondent is in a polygamous marriage	0.077	0.266
Monogamy	Binary variable equals 1 if respondent is in a monogamous marriage	0.420	0.494
Divorced/Separated/Divorced	Binary variable equals 1 if respondent is Divorced/Separated/Divorced	0.149	0.356
Christian	Binary variable equals 1 if respondent is Christian	0.799	0.401
Islamic Variables	Binary variable equals 1 if respondent is Islamic	0.187	0.390
Traditional	Binary variable equals 1 if respondent is Islamic	0.001	0.035
Hinduism/Buddhism/Other	Binary variable equals 1 if respondent is into Hinduism/Buddhism	0.004	0.064
Entrepreneurship	Binary variable equals 1 if respondent is self-employed	0.304	0.460
Financial inclusion	Binary variable equals 1 if respondent's multidimensional financial inclusion score is greater than 0.5	0.269	0.444
Average financial literacy neighbors (postcode)	Average financial literacy score among neighbors within postcode	3.689	0.635

**Table 6** Financial literacy and poverty (Lewbel 2SLS): Internal & internal instruments

Variables	(1) Full	(2) Kenya	(3) Tanzania	(4) Uganda
Financial literacy	-0.056*** (0.007)	-0.067*** (0.012)	-0.055*** (0.013)	-0.035*** (0.011)
Household head variables	Yes	Yes	Yes	Yes
Household level variables	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No
<b>First stage</b>				
Average FL among neighbours	0.860*** (0.022)	0.879*** (0.038)	0.814*** (0.041)	0.923*** (0.038)
F-statistic	104.29	43.52	30.79	40.21
Observations	9,149	3,113	3,048	2,988
R-squared	0.361	0.391	0.262	0.428

FL = Financial literacy; Standard errors in parentheses

\*  $p < 0.1$ ;  $p < 0.05$ ;  $p < 0.01$ 

## Declarations

**Ethics Approval** This article relies on publicly available secondary data collected with participant consent for the InterMedia Financial Inclusion Insights (FII) Program.

**Competing Interests** The authors declare no competing interests.

## References

- Ansong, D., Okumu, M., Huang, J., Sherraden, M. S., Johnson, L., & Zou, L. (2020). Financial capability and asset building in social and economic development: Advancing the sustainable development goals (CSD Perspective No. 20–27). St. Louis, MO: Washington University, Center for Social Development. <https://doi.org/10.7936/vh44-x812>
- Askar, M. W., Ouattara, B., & Zhang, Y.-F. (2020). Financial literacy and poverty reduction: The case of Indonesia (ADB Working Paper No: 1097). *Asian Development Bank*. <https://www.adb.org/publications/financial-literacy-poverty-reduction-case-indonesia>
- Atkinson, A., & Messy, F.-A. (2013). Promoting financial inclusion through financial education. *OECD Working Papers on Finance, Insurance and Private Pensions*, 34, 1.
- Awaworyi Churchill, S., & Marisetty, V. B. (2020). Financial inclusion and poverty: A tale of forty-five thousand households. *Applied Economics*, 1–12. <https://doi.org/10.1080/00036846.2019.1678732>
- Bhatti, M., AlDoghan, M., Saat, S., Juhari, A., & Alshagawi, M. (2021). Entrepreneurial intentions among women: Does entrepreneurial training and education matters? (Pre- and post-evaluation of psychological attributes and its effects on entrepreneurial intention). *Journal of Small Business and Enterprise Development*, 28, 167–184. <https://doi.org/10.1108/JSBED-09-2019-0305>
- Burchi, A., Włodarczyk, B., Szturo, M., & Martelli, D. (2021). The effects of financial literacy on sustainable entrepreneurship. *Sustainability*, 13(9), 5070.
- Calcano, R., & Monticone, C. (2015). Financial literacy and the demand for financial advice. *Journal of Banking & Finance*, 50, 363–380.
- Chua, R., Sebastian, A., & Silva, A. (2012). Poverty outreach of selected microfinance institutions in the Philippines. *Grameen® Foundation USA, All Rights Reserved*. <https://microfinancecouncil.org/poverty-outreach-of-selected-microfinance-institutions-in-the-philippines/>
- Daniels, C., Herrington, M., & Kew, P. (2016). Global entrepreneurship monitor 2015/2016: Special report on entrepreneurial finance. *Global Entrepreneurship Research Association*. <https://www.gemconsortium.org>
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The global finindex database 2017: Measuring financial inclusion and the Fintech revolution. *The World Bank*. <http://documents.worldbank.org/curated/en/332881525873182837/pdf/126033-PUB-PUBLIC-pubdate-4-19-2018.pdf>
- Dinkova, M., Kalwij, A., & Alessie, R. (2021). Know more, spend more? The impact of financial literacy on household consumption. *De Economist*, 169(4), 469–498.
- Engelbrecht, L. (2008). The scope of financial literacy education: A poverty alleviation tool in social work? *Social Work/Maatskaplike Werk*, 44(3).
- Faboyede, O. S., Ben-Caleb, E., Oyewo, B., & Faboyede, A. (2015). Financial literacy education: Key to poverty alleviation and national development in Nigeria. *European Journal Accounting Auditing and Finance Research*, 3(1), 20–29.
- Fanta, A., & Mutsonziwa, K. (2021). Financial literacy as a driver of financial inclusion in Kenya and Tanzania. *Journal of Risk and Financial Management*, 14(11), 561.
- Fernandes, D., Lynch, J. G., Jr., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861–1883.
- GSMA. (2019). State of the industry report on mobile money 2018. Available online: <https://www.gsma.com/r/wp-content/uploads/2019/02/2018-State-of-the-Industry-Report-on-Mobile-Money.pdf> [Accessed 16.04. 2019]
- InterMedia. (2017). Financial inclusion insights program. *Bill & Melinda Gates Foundation (the BMGF)*. [http://finclusion.org/data\\_finder](http://finclusion.org/data_finder)
- Jiatong, W., Murad, M., Bajun, F., Tufail, M. S., Mirza, F., & Rafiq, M. (2021). Impact of entrepreneurial education, mindset, and creativity on entrepreneurial intention: Mediating role of entrepreneurial self-efficacy. *Frontiers in Psychology*, 12, 724440. <https://doi.org/10.3389/fpsyg.2021.724440>
- Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management*, 49(3), 589–614.

- Klapper, L., Lusardi, A., & Panos, G. A. (2013). Financial literacy and its consequences: Evidence from Russia during the financial crisis. *Journal of Banking & Finance*, 37(10), 3904–3923.
- Klapper, L., Lusardi, A., & Van Oudheusden, P. (2015). Financial literacy around the world. World Bank. Washington DC: World Bank. [https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit\\_paper\\_17\\_F3\\_SINGLES.pdf](https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit_paper_17_F3_SINGLES.pdf)
- Kofinti, R. E., Koomson, I., Paintsil, J. A., & Ameyaw, E. K. (2022). Reducing children's malnutrition by increasing mothers' health insurance coverage: A focus on stunting and underweight across 32 sub-Saharan African countries. *Economic Modelling*, 117, 106049. <https://doi.org/10.1016/j.econmod.2022.106049>
- Koomson, I., & Awaworyi Churchill, S. (2021). Ethnic diversity and food insecurity: Evidence from Ghana. *The Journal of Development Studies*, 1–15. <https://doi.org/10.1080/00220388.2021.1928641>
- Koomson, I., & Danquah, M. (2021). Financial inclusion and energy poverty: Empirical evidence from Ghana. *Energy Economics*, 94. <https://doi.org/10.1016/j.eneco.2020.105085>
- Koomson, I., Martey, E., & Etwire, P. M. (2022). Mobile money and entrepreneurship in East Africa: The mediating roles of digital savings and access to digital credit. *Information Technology & People*, (ahead-of-print). <https://doi.org/10.1108/ITP-11-2021-0906>
- Koomson, I., Villano, R. A., & Hadley, D. (2020a). Effect of financial inclusion on poverty and vulnerability to poverty: Evidence using a multidimensional measure of financial inclusion. *Social Indicators Research*, 25(4), 375–387. <https://doi.org/10.1007/s11205-019-02263-0>
- Koomson, I., Villano, R. A., & Hadley, D. (2020b). Intensifying financial inclusion through the provision of financial literacy training: A gendered perspective. *Applied Economics*, 52(4), 375–387. <https://doi.org/10.1080/00036846.2019.1645943>
- Koomson, I., Villano, R. A., & Hadley, D. (2022). The role of financial literacy in households' asset accumulation process: Evidence from Ghana. *Review of Economics of the Household*, 1–24. <https://doi.org/10.1007/s11150-022-09603-z>
- Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics*, 30(1), 67–80.
- Lusardi, A., & Mitchell, O. S. (2007). Financial literacy and retirement preparedness: Evidence and implications for financial education. *Business Economics*, 42(1), 35–44.
- Meyer, B. D., & Sullivan, J. X. (2012). Identifying the disadvantaged: Official poverty, consumption poverty, and the new supplemental poverty measure. *The Journal of Economic Perspectives*, 26(3), 111–135.
- Misango, S. B., & Ongiti, O. K. (2013). Do women entrepreneurs play a role in reducing poverty? A case in Kenya. *International Review of Management and Business Research*, 2(1), 87.
- Murendo, C., & Mutsonziwa, K. (2017). Financial literacy and savings decisions by adult financial consumers in Zimbabwe. *International Journal of Consumer Studies*, 41(1), 95–103.
- Nikolaev, B., Shir, N., & Wiklund, J. (2020). Dispositional positive and negative affect and self-employment transitions: The mediating role of job satisfaction. *Entrepreneurship Theory and Practice*, 44(3), 451–474. <https://doi.org/10.1177/1042258718818357>
- Okumu, M., Ansong, D., Koomson, I., & Chen, D. G. (2021). How financial resilience shapes social and public health policy choices in sub-Saharan Africa: Empirical insights from the COVID-19 pandemic. Retrieved from <https://doi.org/10.1086/717770>
- Oseifuah, E. K. (2010). Financial literacy and youth entrepreneurship in South Africa. *African Journal of Economic and Management Studies*, 1(2), 164–182. <https://doi.org/10.1108/20400701011073473>
- Peprah, J. A., Afoakwa, C., & Koomson, I. (2015). Savings, entrepreneurial trait and self-employment: Evidence from selected Ghanaian Universities. *Journal of Global Entrepreneurship Research*, 3(1), 1.
- Peprah, J. A., & Koomson, I. (2015). Capital and credit sources and household non-farm income in Ghana. *Journal of Arts and Social Science*, 3(1), 74–97.
- Saptono, A. (2018). Entrepreneurship education and its influence on financial literacy and entrepreneurship skills in college. *Journal of Entrepreneurship Education*, 21(4), 1–11.
- Schreiner, M. (2017). There's no place like home? How the interview method affects results with the Progress out of Poverty Index®. *Microfinance. Com/English/Papers/Scoring\_Poverty\_Interview\_Method\_Effects\_EN. Pdf*, Retrieved, 2.
- Sherraden, M. S. (2013). Building blocks of financial capability. In *Financial education and capability: Research, education, policy, and practice* (pp. 3–43). Oxford University Press.
- Sherraden, M. S., & Ansong, D. (2013). Conceptual development of the CYFI model of children and youth as economic citizens (CSD Research Report 13–03). St. Louis, MO: Washington University, Center for Social Development. [https://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=1700&context=csd\\_research](https://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=1700&context=csd_research)
- Si, S., Yu, X., Wu, A., Chen, S., Chen, S., & Su, Y. (2015). Entrepreneurship and poverty reduction: A case study of Yiwu. *China. Asia Pacific Journal of Management*, 32(1), 119–143.
- Stock, J. H., & Yogo, M. (2002). Testing for weak instruments in linear IV regression. National Bureau of Economic Research. <https://www.nber.org/papers/t0284.pdf>
- Timbile, A. N., & Kotey, R. A. (2022). The role of financial inclusion in eliminating household poverty: Evidence from the rural Wa West District of Ghana. *Journal of Land and Rural Studies*, 10(1), 75–105.
- UNCTAD. (2021). Economic development in Africa report 2021: Reaping the potential benefits of the African Continental Free Trade Area for inclusive growth. United Nations Conference on Trade and Development (UNCTAD). Retrieved from <https://unctad.org/webflyer/economic-development-africa-report-2021>
- Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics*, 101(2), 449–472.
- World Bank. (2001). World development report 2000–2001: Attacking poverty. World Bank Group. New York: Oxford University Press. <https://openknowledge.worldbank.org/handle/10986/11856>
- World Bank. (2018). UFA 2020 Overview: Universal Financial Access by 2020. <http://www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financial-access-by-2020>
- World Bank. (2020). Poverty and shared prosperity 2020: Reversals of fortune. Washington, World Bank. <https://doi.org/10.1596/978-1-4648-1602-4>. License: Creative Commons Attribution CC BY 3.0 IGO. <https://www.worldbank.org/en/publication/poverty-and-shared-prosperity>
- Zhang, Q., & Posso, A. (2019). Thinking inside the Box: A closer look at financial inclusion and household income. *The Journal of Development Studies*, 55(7), 1–16. <https://doi.org/10.1080/00220388.2017.1380798>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.