14. Inclusive finance, financial literacy and livelihood activities of households in Ghana

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INTRODUCTION

Financial inclusion has become a priority for policymakers and the banking sector for promoting financial sector development and ensuring sustainable long-term economic growth. The goal of financial inclusion is to provide affordable financial services to all sections of society to improve their standard of living. This is an integral part of inclusive growth as it not only assures financial sector development but also spreads affordable financial services for the betterment of all members of the society. Financial intermediaries channel funds from savers to borrowers and by so doing provide funds for investment. Helms (2006) and Choudhury (2015) suggest that financial inclusion is a livelihood-intervention strategy that can halt the cycle of poverty and improve welfare among the vulnerable and lower-income population in developing countries.

Much attention has been given to financial education in the literature due to the unpredictable nature of the economy coupled with the rising availability of complex financial instruments and the need for prudent financial decisions. Financially literate individuals have control over financial tools and are able to make sound decisions on their usage. Financial literacy has become a necessity because financially literate individuals will understand how financial institutions operate and know how to manage their money, and are equipped with a range of analytical skills (Beal and Delpachitra, 2003). Furthermore, they are in control of their financial affairs and know how to be financially responsible. It has therefore been established that financial literacy promotes good decisions, which in turn leads to better planning and management of life events such as education and retirement, among others, thereby promoting sustainable livelihoods. More so, studies have shown that financially literate

individuals are also financially included (Chikalipah, 2017; Grohmann et al., 2018; Okello et al., 2017).

A corollary of the above is that both financial inclusion and financial literacy have been extensively covered in the literature. A number of studies show that the level of financial literacy is related to the nature of financial inclusion (Berry et al., 2018; Grohmann et al., 2018; Kaiser and Menkhoff, 2017). Financial inclusion also facilitates the flow of sustainable, efficient and effective financial systems and eventually leads to the financial stability of the society. Similarly, studies have shown the positive effects of financial literacy on sustainable livelihoods (Mukokoma et al., 2018; Okello et al., 2017). Thus, it can be argued that a sustainable livelihood depends on the relationship between financial inclusion and financial education, and this is what this chapter seeks to investigate. Although various studies have analysed the variables of interest and have established relationships (see Berry et al., 2018; Cole et al., 2011; De Kokor and Jentzsch, 2013; Grohmann et al., 2018; Kaiser and Menkhoff, 2017; Lusardi and Mitchell, 2014; Miller et al., 2015; Sekita, 2011; Sharma, 2016; Van Rooji et al., 2012), there are some gaps. These prior studies have failed to exploit how the relationship between financial inclusion and financial literacy can impact on the sustainable livelihood activities of households, or examine livelihood activities of individuals who are financially included by way of financial education. This chapter therefore seeks to answer these empirical questions. Do individuals who are financially included have financial knowledge? If so, how does inclusive finance and financial knowledge impact on sustainable livelihood activities? By providing answers to these research questions, the current chapter fills the gaps by empirically analysing the interactions among financial inclusion, financial education and sustainable livelihoods by sampling 1,966 households in Ghana. Particularly, we test for two main hypotheses: first, financial education increases the level of financial inclusion; second, the interaction between financial education and financial inclusion has an overall positive impact on sustainable livelihood activities.

The contribution of this chapter is twofold: first, it adds to existing literature by examining and documenting the level of livelihood activities of an individual who is financially included but insulating himself or herself from financial education/knowledge. We achieve this by empirically analysing the overall impact of the relationship between financial inclusion and financial education on livelihood activities from the context of a developing country, Ghana, where financial education and financial inclusion are relatively low. Such a study is relevant within such a context because of the magnitude of problems and consequential effects associated with exclusive finance and financial illiteracy on sustainable development and growth. Second, this study specifically

focuses on Ghana, which has recently adopted a policy on inclusive finance and growth.

LITERATURE REVIEW: THEORY

The theoretical principle underlying financial inclusion, literacy and livelihood can be described in terms of either the sustainable livelihood approach (SLA), finance-growth theory (FGT), or the stakeholder and legitimacy theory (SLT). The theoretical review underpinning the SLA suggests that educated individuals, households or groups are likely to have better sustainable livelihoods, whereas the less literate population in society are likely to be financially excluded, thereby depriving them of sustainable livelihoods. Specifically, the theory suggests that the asset capacity and vulnerability to/risk of poverty of the individual, group or household (I/G/H) are based on their current financial provision and participation and the individuals' level of literacy. More so, the theory elaborates that governments and households may adopt financial intervention strategies that will indirectly ensure financial inclusion as a way of improving livelihoods. According to the SLA, the livelihood of the individual is dependent on different assets/capital. These assets include human, physical, social, natural and financial capital. For an improved livelihood, there is a need for adequate understanding of these different assets so as to know the right intervention to take in the event of shocks (Morse and McNamara, 2013). The level of livelihood is directly related to the level of financial literacy, the strengh of the individual asset base, the ability of the individual to cope with risk and the nature of the intervention employed in events of vulnerability.

The FGT posits that growth and equal income distribution are ensured when the I/G/H are financially included (Gimenez et al., 2012). Thus, for improved livelihoods, there should be equal financial participation and provision, which will influence access to financial systems, increase savings and enhance growth. Studies on financial inclusion show that it improves the creation of wealth by decreasing financial risk and transaction costs, increasing savings, and hence improving the liquidity position of the I/G/H (Masiyandima et al., 2017; Park and Mercado, 2015). Thus it is pertinent to adopt financial inclusion as a tool in livelihood strategies geared towards poverty alleviation or reduction.

Finally, Parmar et al. (2010) provide the understanding that, according to the SLT, organisations will only embark on projects or programmes to improve financial inclusion and subsequently better the livelihoods of individuals in society provided they fall within their legal, ethical and legitimate span of operation.

METHODOLOGY

Sampling and Data Collection Methods

Ghana is the area of study. As at 2018, the country had 10 administrative regions with each region containing several administrative districts. There are currently 216 districts. Estimates from the Ghana Statistical Service indicate that the total population of Ghana stands at 27 million. In terms of the financial system, Ghana can boast of 23 universal banks, 144 rural and community banks, 57 non-bank financial institutions and some microfinance institutions and finance houses. The study adopts the most comprehensive and credible sample frame available in Ghana today, which has been used by the Ghana Statistical Service for the 2010 Population and Housing Census and, more recently, the Ghana Demographic and Health Survey (GDHS) in 2014. A two-stage sampling procedure is employed. This sampling design ensures that we capture indicators across the national level and along urban and rural locations. In the first stage, 60 districts are selected across all the 10 regions of Ghana using Probability Proportional to Size. Population is used as the indicator of size. In the second stage, taking a cue from the 2014 GDHS, we selected 1,966 individual households. The data were collected in 2018.

Analytical Models and Estimation Strategy

Empirically, we specify five main indicators of bank-enabled financial inclusion: (a) ownership of a bank account; (b) the use of a bank account to save; (c) frequency of usage of a bank account, defined in terms of three or more withdrawals a month; (d) access to bank credit, defined in terms of having secured a loan from a bank in the past year; and (e) usage of an account to make payments. Each of these variables is a dummy variable with 1 signifying the possession of a financial inclusion attribute, while 0 signals otherwise (exclusion). We adopt the empirical strategy used by Allen et al. (2016) for this study. We use the following model to estimate the link between banks and financial inclusion:

$$Y_{1j}^* = X_{1j}^{'}\alpha + R_{1j}^{'}\beta + \varepsilon_{1j}$$

$$Y_{1j} = 1 \; if \; Y_{1j}^* > 0$$

$$Y_{1j} = 0 \; if \; Y_{1j}^* \leq 0 \tag{14.1}$$

where Y_{1j}^{*}, the dependent variable, represents account ownership. It is a binary variable which equals 1 if the individual owns an account and 0 if otherwise. The subscript j refers to the individual. $X_{j}^{'}$ is a vector of individual household-level characteristics such as age, marital status, educational attainment, locality, and so on, and financial characteristics such as risk aversion, and saving and investment behaviour. $R_{j}^{'}\beta$ is an index score of how financially literate a respondent is. In line with the use and application of financial literacy-related indexes in previous research, the higher (lower) the overall score for financial literacy, the higher (lower) the level of financial literacy of a person. The index includes being able to answer correctly (with possible answers provided): calculating or understanding (1) the value of shares; (2) the future value of shares; (3) simple interest; (4) interest plus the principal (amount); (5) the relationship between return and risk; (6) relationship between inflation and cost of living; (7) diversification and/or spreading of risk. Answering each of the questions correctly is scored 1, and 0 otherwise. A total score of 7 is an indication of a higher financial literacy, and a score of 0 indicates that the person has no knowledge of financial matters. Financial literacy is projected to relate positively with financial inclusion. ε_{j} is a normally distributed random error term with zero mean and constant variance. All variables used in the models, their definitions and measurements are shown in Table 14.1. Equation (14.1) is estimated as a probit model using the maximum likelihood estimation procedure. To estimate the determinants of the use of an account to save (Y_{2j}^{*}), we employ the following model:

$$Y_{2j}^{*} = X_{2j}^{'}\alpha + R_{2j}^{'}\beta + \varepsilon_{2j}$$

$$Y_{2j} = 1 \; if \; Y_{2j}^{*} > 0$$

$$Y_{2j} = 0 \; if \; Y_{2j}^{*} \leq 0 \tag{14.2}$$

Y_{2j}^{*} is the dependent variable, which is binary in nature. It is assigned the value 1 if the individual uses the account to save, and 0 otherwise. All other variables are as defined under equation (14.1) above. However, because the individual uses an account to save only when the individual owns an account, there would be a self-selection problem if we estimate equation (14.2) alone. We employ a binary probit (biprobit) model to estimate equations (14.1) and (14.2) together, where equation (14.1) is the selection equation and equation (14.2)

the decision equation (the decision to save after owning an account). The main advantage of using the biprobit estimation method is that it is able to overcome the endogeneity problem that arises from sample selection bias.

Because the dependent variables in the two equations are binary, the traditional Heckman two-step approach cannot be applied here. Following Allen et al. (2016), we estimate equations (14.1) and (14.2) simultaneously using the maximum likelihood estimation procedure. Equations similar to (14.2) are equally specified for frequency of withdrawals, access to credit and usage of accounts for payments separately. Each of these equations is then also estimated simultaneously with equation (14.1). Again, we take notice that the individual is able to withdraw from an account, save or obtain bank credit, or use an account to make payments only when account ownership has been observed.

The study also aims to evaluate the livelihood/welfare implications of financial inclusion as mediated by financial literacy (*FinLit*). In this case, we employ welfare methodology to investigate whether the effect of financial inclusion on livelihood activities is dependent on the financial knowledge of the person. The indicators of livelihood/welfare at the household level will include changes in income level (continuous), enhanced ability to finance educational needs (dummy), ability to possess an asset (index) and poverty reduction (dummy). The assumptions underlying the use of these measures are that, first, if an individual is financially included by way of financial literacy, it would lead to an enhancement of livelihood activities, which would further improve upon the income-earning capacity of such an individual. And a higher income is expected to enable households to satisfy their needs. Second, we assume that if financial inclusion is useful, it should help the individual to live above the poverty line. We therefore model the effect of financial inclusion on income/employment (our measure of livelihood) as follows:

$$W_{ik} = f(V_{ik}, G_{ik}, U_{ik}, D_{ij}) \qquad (14.3)$$

where W_{ik} is our measure of livelihood, subscript i represents the household, subscript k ($k = 1, 2$) represents the two proxies of livelihood (employment status and income), D is a dummy equal to 1 if a household is financially included and 0 otherwise, subscript j ($j = 1, 2, 3, 4, 5$) represents the five dimensions of financial inclusion and V, G and U respectively are vectors of socioeconomic, geographic and community-specific characteristics hypothesised to influence livelihood activities measured as the income/employment opportunities of the individuals. Because income is a continuous variable, we estimate (14.3) using two-stage least squares (2SLS). The rationale is that the 2SLS approach is able to deal with the problem of endogeneity identified

earlier. Where unemployment (that is, the absence of livelihood activities) is the dependent variable, we estimate (14.3) using a robust probit. This is because our analysis shows a one-way relationship running from financial inclusion to unemployment. Thus, endogeneity is not present in the unemployment model.

Table 14.1   Variables and their definitions

Variable	Definition	Measurement
Personal/household characteristics		
Gender	Gender of respondent	1 = if male; 0 = otherwise
Age	Age range of respondent	Years
Marriage status	Marital status of respondent	1 = if married; 0 = otherwise
Urban	Place of residence (Urban or Rural)	1 = if urban; 0 = otherwise
Region	Residence in a particular region	1 = if yes; 0 = otherwise
HHSize	Number of people in the respondent's household	Number of persons
Education	Educational status of respondent	1 = if formally educated; 0 = otherwise
Religion	Religion of respondent	1 = if Christian; 0 = otherwise
Livelihood/income activities		
Employment status	Employment status of respondent	1 = if yes; 0 = otherwise
MonthlyInc	Monthly household income range of respondent	Ghana cedis
Financial inclusion		
Accto	Account ownership by respondent	1 = if yes; 0 = otherwise
Saving	Usage of account for savings	1 = if yes; 0 = otherwise
Upmt	Usage of account for payments	1 = if yes; 0 = otherwise
Freqwith	Withdraws money at least once a month	1 = if yes; 0 = otherwise
Credit	Access to credit by respondent	1 = if yes; 0 = otherwise
Financial behaviour		
CreditD	Dummy variable for ownership of credit card	1 = if yes; 0 = otherwise
SaIB	Good saving and investment behaviour of respondent	1 = if yes; 0 = otherwise
Risk	Respondent is risk-averse	1 = if yes; 0 = otherwise
Financial literacy (index score of how financially literate a respondent is)		
Stock value	Understanding the value/price of stocks/ shares	Correct answer = 1; wrong = 0
Future stock	Understanding the future value of the stocks/ shares	Correct answer = 1; wrong = 0

Variable	Definition	Measurement
Personal/household characteristics		
Simple interest	Understanding simple interest	Correct answer = 1; wrong = 0
Amount	Understanding interest plus the principal	Correct answer = 1; wrong = 0
Risk and return	Relationship between return and risk	Correct answer = 1; wrong = 0
Inflation and cost of living	Relationship between inflation and cost of living	Correct answer = 1; wrong = 0
Risk diversification	Simple understanding of diversification and/ or spreading of risk	Correct answer = 1; wrong = 0
	Financial literacy index	Total score = 7

ECONOMETRIC RESULTS

Summary of Descriptive Statistics

Table 14.2a presents the frequency distribution for the sample for the study. About 63% of the respondents are males. The data also show that the majority of the respondents (about 89%) are in the labour force, which is segregated into ages between 19 and 60. Most of the respondents have also acquired some form of formal education, with 49% having tertiary education and 44% having elementary and secondary education. The typical household size for the sample is either between 5 and 6 (about 33%) or between 3 and 4 (about 31%). Most of the respondents are in rural settlements (about 60%).

Table 14.2b shows the frequency distribution of the financial inclusion variables. The evidence is that most of the respondents own a bank account; about 26% do not. It is not surprising that the savings behaviour of the respondents is low, comprising 30% of the sample. Access to credit (about 39%) is quite low. The frequency of withdrawal is almost the same as the use of accounts for payments, with the former being about 79% and the latter 76%.

Considering the livelihood variables for the study, we realise in Table 14.2c that most of the respondents (76%) are employed and earn a living, but the sample also shows that most of the respondents earn below GHS 8,000 per month (about USD 1,375 in June 2021). Putting the earnings in perspective, we realise that about 92% of the households have a monthly income of up to GHS 10,000. Table 13.2d shows that the average monthly income for a household is about GHS 8,917. Financial literacy has a standard deviation of about 1.65, which suggests that a respondent on average could score either 6 or 3. The evidence in Table 14.2c also reveals that about 59% of the respondents claim that bank charges are expensive; only 19% perceive the charges to be moderate.

Table 14.2a   Frequency distribution of demographics

	Freq.	Percent	Cum.
Gender			
Female	722	36.89	36.89
Male	1,235	63.11	100
Age			
Less than 18 years	164	8.37	8.37
Between 19 and 35 years	1,137	58.04	66.41
Between 36 and 45 years	431	22	88.41
Between 46 and 60 years	182	9.29	97.7
Above 60 years	45	2.3	100
Marriage status			
Single	1,125	57.22	57.22
Married	841	42.78	100
Education			
None	101	5.18	5.18
Elementary	268	13.75	18.93
Secondary	594	30.48	49.41
Tertiary	961	49.31	98.72
Other	25	1.28	100
Household size			
Less than 2	158	8.05	8.05
Between 3 and 4	607	30.94	38.99
Between 5 and 6	643	32.77	71.76
Between 7 and 8	284	14.48	86.24
Above 8	268	13.66	99.9
Missing	2	0.1	100
Urban			
Rural	1,165	59.56	59.56
Urban	790	40.39	99.95
Missing	1	0.05	100

Table 14.2b   Frequency distribution of financial inclusion variables

	Freq.	Percent	Cum.
Account			
No	509	25.89	25.89
Yes	1,457	74.11	100
Savings			
No	1,384	70.4	70.4
Yes	580	29.5	99.9
Credit			
No	1,200	61.04	61.04
Yes	766	38.96	100
Frequency of withdrawal			
No	1,546	78.64	78.64
Yes	420	21.36	100
Use of account for payments			
No	1,495	76.04	76.04
Yes	471	23.96	100

Table 14.2c   Frequency distribution of livelihood variables

	Freq.	Percent	Cum.
Employment status			
Unemployed	465	23.65	23.65
Employed	1,501	76.35	100
Monthly income			
Less than GHC 8,000	1,523	80.71	80.71
Between GHC 8,000 and GHC 10,000	217	11.5	92.21
Between GHC 11,000 and GHC 15,000	89	4.72	96.93
More than GHC 15,000	56	2.97	99.89
Missing	2	0.11	100
Bank charges			
Expensive charges	825	54.89	54.89
Very expensive charges	63	4.19	59.08
Normal charges	328	21.82	80.9
Moderate charges	212	14.11	95.01
Very moderate charges	75	4.99	100

Table 14.2d   Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Monthly income	1,885	8917.241	2492.78	8000	20000
Financial literacy	1,061	4.146089	1.645565	0	7
Loan price	1,215	0.401359	0.17935	0.033974	1.142394
Fees price	1,215	0.021024	0.022098	0.000047	0.136608
Deposit price	1,215	0.050274	0.036728	0.006831	0.367335

The Effect of Financial Education on Financial Inclusion

Table 14.3 contains the results of biprobit estimates of the influence of financial literacy variables on financial inclusion while controlling for socio-demographic and financial characteristics of individuals. For model fitness, the Wald test shows that the independent variables jointly predict financial inclusion significantly at the 1% level, showing that the models have good fit. We conducted our analysis by first examining the most basic measure of financial inclusion – that is, the proportion of the sample population that has a bank or/and mobile money account – and our analysis shows a highly significant and positive relationship between account ownership and financial literacy. The ability to read and understand financial numbers motivates and influences a person to own a bank/mobile money account. Alternatively, individuals who wish to open accounts have some level of financial knowledge, as reported in early studies (Abor et al., 2018a, 2018b; Abu and Issahaku, 2017). Interestingly, the education status of the individual does not explain financial inclusion.

Age, on the other hand, has a quadratic impact on account ownership such that at a youthful age individuals are more inclined towards opening accounts but as individuals age and earnings stabilise or decline, the enthusiasm for opening and/or keeping accounts wanes. This is seen in the fact that the coefficient of age is positive while the coefficient for age square is negative in the models where account ownership is the dependent variable. Also, size of household has a positive significant influence on frequency of withdrawal, an indication that large households will withdraw at least once a month as compared to individuals in small households. Married individuals have access to more credit, implying that they are more financially included than individuals who are not married. The result on gender and financial inclusion also shows

that males are more likely to have access to credit and withdraw more than once in a month compared to females.

On the relationship between financial behaviour and financial inclusion, the result shows a positive significant relationship between financial behaviour and financial inclusion indicators such as savings, access to credit and usage of accounts for payment. This implies that individuals with a good saving and investment attitude are financially included as they have a higher propensity to save with the banks, obtain credit facilities and also make payments through their bank accounts. More so, individuals who own credit cards withdraw more than once a month and use their accounts to make various payments.

Table 14.3   The effect of financial education on financial inclusion

	Accto (1)	Saving (2)	Accto (3)	Credit (4)	Accto (5)	Frequency of withdrawal (6)	Accounts (7)	Use account to make payments (8)
FinLit	0.142***	-9.7E-05	0.137***	-0.0265	0.133***	-0.035	0.132***	0.0102
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)
Age	0.604*	0.457	0.617*	0.268	0.648*	0.0265	0.688**	-0.224
	(0.35)	(0.30)	(0.35)	(0.29)	(0.35)	(0.32)	(0.35)	(0.30)
Age^2	-0.0964	-0.0784	-0.0995	-0.0327	-0.103*	0.01	-0.108*	0.0255
	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)
LnHHsize	-0.226	-0.0724	-0.188	-0.179	-0.193	0.254*	-0.206	0.202
	(0.18)	(0.12)	(0.18)	(0.12)	(0.18)	(0.14)	(0.18)	(0.13)
Urban	0.00239	-0.282**	-0.0123	0.164	-0.00323	0.183	-0.00212	0.0369
	(0.15)	(0.11)	(0.15)	(0.11)	(0.15)	(0.12)	(0.15)	(0.11)
Marr. status	0.0125	0.0735	0.00807	0.629***	-0.0062	0.146	-0.0303	0.131
	(0.18)	(0.13)	(0.18)	(0.13)	(0.18)	(0.14)	(0.18)	(0.14)
Gender	0.124	-0.134	0.145	0.326***	0.144	0.354***	0.141	0.164
	(0.14)	(0.10)	(0.14)	(0.10)	(0.14)	(0.12)	(0.14)	(0.11)
Education	0.327	0.544	0.0216	0.57	0.0761	0.0634	0.0893	-0.165
	(0.57)	(0.55)	(0.66)	(0.58)	(0.65)	(0.63)	(0.65)	(0.59)
Christian	0.238	0.207	0.18	0.0534	0.192	0.197	0.19	0.244
	(0.22)	(0.17)	(0.23)	(0.17)	(0.23)	(0.19)	(0.23)	(0.18)
Sav and Inv		0.237***		0.206***		0.0548		0.216***
		(0.06)		(0.06)		(0.06)		(0.06)
Risk		0.0638		-0.113		-0.05		-0.137*
		(0.07)		(0.07)		(0.08)		(0.08)

	Accto (1)	Saving (2)	Accto (3)	Credit (4)	Accto (5)	Frequency of withdrawal (6)	Accounts (7)	Use account to make payments (8)
Credit card						0.280**		0.572***
						(0.11)		(0.11)
Greater Accra	0.13	0.181	0.123	0.171	0.132	0.334*	0.136	0.265
	(0.26)	(0.17)	(0.26)	(0.17)	(0.26)	(0.19)	(0.26)	(0.17)
Western	-0.0521	0.14	-0.0633	0.347*	-0.0682	0.213	-0.0782	-0.122
	(0.29)	(0.20)	(0.29)	(0.20)	(0.29)	(0.23)	(0.29)	(0.20)
Eastern	-0.554**	-0.185	-0.562**	0.505***	-0.562**	0.346*	-0.566**	-0.123
	(0.25)	(0.19)	(0.25)	(0.18)	(0.25)	(0.21)	(0.25)	(0.19)
Volta	-0.742***	0.169	-0.651**	0.401*	-0.666**	0.249	-0.662**	-0.241
	(0.28)	(0.21)	(0.28)	(0.21)	(0.28)	(0.24)	(0.28)	(0.22)
Ashanti	-0.238	0.197	-0.215	0.184	-0.23	-0.105	-0.225	0.173
	(0.29)	(0.20)	(0.29)	(0.21)	(0.29)	(0.25)	(0.29)	(0.21)
Northern	4.51	1.048	3.927	0.221	3.68	-3.905	4.051	6.637
	(2051.20)	(0.84)	(585.20)	(0.79)	(323.70)	(297.2)	(825.20)	(840.80)
Upper West	-0.195	-0.208	-0.229	0.057	-0.192	0.282	-0.178	-0.0319
	(0.31)	(0.23)	(0.30)	(0.22)	(0.30)	(0.25)	(0.31)	(0.23)
Upper East	0.211	0.205	0.253	0.358	0.245	0.174	0.263	-0.263
	(0.41)	(0.25)	(0.41)	(0.24)	(0.41)	(0.28)	(0.41)	(0.27)
Constant	-0.212	-2.200***	0.0935	-1.982**	7.44E-05	-2.11**	-0.0446	-1.135
	(0.80)	(0.76)	(0.87)	(0.78)	(0.87)	(0.85)	(0.86)	(0.79)
Observation	790	790	790	790	790	790	790	790
Chi^2	83.514	83.514	124.811	124.811	73.939	73.939	106.47	106.47
P-values	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: LnHHsize is the log of household size. Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

The Impact of Financial Inclusion on Livelihood

Table 14.4 presents the results of the effect of all the five financial inclusion measures on employment status. The results show that all the financial inclusion indicators have a positive and significant influence on employment, an indication that a financially included individual stands a better chance of being employed than those who are financially excluded. Alternatively, those who

are employed are paid through financial services such as bank, mobile money, e-zwich, and so on. Furthermore, financial inclusion encourages access to credit and thus makes capital available for numerous business ventures. The creation of business ventures then increases employment opportunities. More so, the availability of capital then fosters human resource development and builds strong entrepreneurship among individuals. These findings support the results of previous studies on financial inclusion and livelihood (Khaki and Sangmi, 2017; Masiyandima, et al., 2017; Michael and Sharon, 2014).

Table 14.4   Impact of financial inclusion on livelihood (employment status)

	(1)	(2)	(3)	(4)	(5)
	empstatus	empstatus	empstatus	empstatus	empstatus
Accto	0.550***				
	(0.0988)				
Saving		1.505***			
		(0.537)			
Freqwith			1.533**		
			(0.612)		
Upmt				0.908***	
				(0.251)	
Credit					1.308***
					(0.406)
Age	-0.0119	-0.177	0.140	0.0942	0.0191
	(0.0684)	(0.136)	(0.122)	(0.0840)	(0.114)
Age^2	0.00427	0.0241	-0.0296	-0.00917	-0.0155
	(0.0118)	(0.0225)	(0.0226)	(0.0145)	(0.0198)
LnHHsize	0.00581	-0.00875	-0.0887	-0.0207	0.0596
	(0.0279)	(0.0502)	(0.0575)	(0.0369)	(0.0512)
Urban	0.0468*	0.132***	0.0162	0.00117	-0.0216
	(0.0257)	(0.0501)	(0.0500)	(0.0405)	(0.0544)
Marr. status	0.0612**	0.0707	-0.00655	-0.00640	-0.149**
	(0.0270)	(0.0519)	(0.0472)	(0.0356)	(0.0740)
Gender	-0.0312	0.0814	-0.0951**	-0.0469	-0.0355
	(0.0223)	(0.0569)	(0.0452)	(0.0299)	(0.0395)
Education	0.0887	-0.0256	0.188**	0.277***	0.0436
	(0.0784)	(0.142)	(0.0932)	(0.0727)	(0.116)

	(1)	(2)	(3)	(4)	(5)
	empstatus	empstatus	empstatus	empstatus	empstatus
Christian	-0.0267	-0.0912*	-0.108*	-0.0633	-0.0308
	(0.0288)	(0.0546)	(0.0578)	(0.0387)	(0.0491)
Risk	-0.0159	-0.0227	-0.00623	-0.0268	0.0620
	(0.0201)	(0.0347)	(0.0371)	(0.0256)	(0.0517)
Greater Accra	0.0199	-0.0168	-0.144	-0.0453	-0.0463
	(0.0425)	(0.0855)	(0.109)	(0.0703)	(0.0872)
Western	0.0893*	0.0112	0.0175	0.103	-0.124
	(0.0457)	(0.104)	(0.0877)	(0.0722)	(0.116)
Eastern	0.106**	0.115	-0.0494	0.0491	-0.160
	(0.0466)	(0.0917)	(0.0958)	(0.0713)	(0.118)
Volta	0.142**	-0.0224	0.00476	0.124	-0.0997
	(0.0562)	(0.120)	(0.108)	(0.0773)	(0.129)
Ashanti	0.0876	-0.0223	0.0699	-0.0114	-0.0230
	(0.0536)	(0.116)	(0.0865)	(0.0848)	(0.105)
Northern	0.0177	-0.0829	-0.134	-0.151*	-0.345**
	(0.0585)	(0.101)	(0.0970)	(0.0828)	(0.142)
Upper West	-0.0466	-0.0727	-0.228**	-0.0955	-0.223**
	(0.0500)	(0.0895)	(0.108)	(0.0708)	(0.103)
Upper East	-0.0594	-0.233***	-0.261***	-0.102	-0.287***
	(0.0460)	(0.0887)	(0.0892)	(0.0652)	(0.0925)
Sav and Inv	0.0168	-0.0846	0.0496**	0.00583	-0.0535
	(0.0156)	(0.0591)	(0.0239)	(0.0238)	(0.0451)
Credit card	-0.00624	-0.187*	-0.118	-0.127**	
	(0.0273)	(0.105)	(0.0843)	(0.0633)	
Constant	0.211	0.896***	0.475**	0.329**	0.439*
	(0.137)	(0.283)	(0.224)	(0.165)	(0.228)
Observation	1,399	1,399	1,399	1,399	1,399
Chi²	290.488	119.043	116.320	172.812	120.307
P-values	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

In Table 14.5, we analyse the results of the effect of all the five financial inclusion measures on household income. The results show that all the financial inclusion indicators have a positive and significant influence on income. This means that when individuals are financially included they have some sources of livelihood which yield a high income. This can be explained in several

ways. First, an individual with bank accounts can use them for financial transactions and also earn interest on them. Second, having access to a savings account gives an individual a chance of obtaining credit from financial providers that can be invested in income-generating ventures. More so, individuals can withdraw from their accounts at any time so as to capitalise on business opportunities for more income in future. Again, having a bank account saves time and energy which would have been wasted in long queues to pay utility bills. These findings support earlier studies on the impact of financial inclusion at the micro level (Abor et al., 2018b; Abu and Issahaku, 2017; Swamy, 2014) and at the macro level (Kim et al., 2018; Lenka and Sharma, 2017; Sharma, 2016).

Table 14.5   Impact of financial inclusion on livelihood (Income)

	(1)	(2)	(3)	(4)	(5)
	Income	Income	Income	Income	Income
Accto	0.184***				
	(0.0574)				
Saving		0.502**			
		(0.231)			
Freqwith			0.450**		
			(0.229)		
Upmt				0.301**	
				(0.121)	
Credit					0.444**
					(0.176)
Age	-0.149***	-0.208***	-0.101**	-0.115***	-0.147***
	(0.0385)	(0.0597)	(0.0477)	(0.0414)	(0.0507)
Age^2	0.0248***	0.0322***	0.0143	0.0206***	0.0193**
	(0.00679)	(0.00980)	(0.00894)	(0.00718)	(0.00930)
LnHHsize	0.0527***	0.0467**	0.0207	0.0471***	0.0747***
	(0.0134)	(0.0201)	(0.0228)	(0.0158)	(0.0217)
Urban	0.00927	0.0326	0.00455	-0.00743	-0.0163
	(0.0140)	(0.0210)	(0.0174)	(0.0190)	(0.0227)
Marr. status	0.0249*	0.0262	0.00560	0.00175	-0.0447
	(0.0141)	(0.0201)	(0.0164)	(0.0154)	(0.0290)
Gender	-0.0162	0.0168	-0.0330*	-0.0231	-0.0176
	(0.0125)	(0.0228)	(0.0176)	(0.0147)	(0.0164)
Education	-0.0457**	-0.0837*	-0.00852	0.0175	-0.0615
	(0.0230)	(0.0508)	(0.0224)	(0.0157)	(0.0431)

	(1)	(2)	(3)	(4)	(5)
	Income	Income	Income	Income	Income
Christian	0.0123	-0.0113	-0.0117	-0.00127	0.0101
	(0.0122)	(0.0220)	(0.0208)	(0.0159)	(0.0183)
Risk	-0.00487	-0.00982	-0.00385	-0.00811	0.0263
	(0.0107)	(0.0132)	(0.0139)	(0.0118)	(0.0236)
Greater Accra	0.00453	-0.00531	-0.0431	-0.0200	-0.0248
	(0.0313)	(0.0408)	(0.0426)	(0.0363)	(0.0394)
Western	-0.0384	-0.0654	-0.0580*	-0.0327	-0.116**
	(0.0318)	(0.0460)	(0.0346)	(0.0360)	(0.0516)
Eastern	-0.0312	-0.0296	-0.0763**	-0.0490	-0.127**
	(0.0304)	(0.0412)	(0.0372)	(0.0343)	(0.0515)
Volta	-0.0236	-0.0809	-0.0678	-0.0285	-0.110**
	(0.0328)	(0.0530)	(0.0430)	(0.0373)	(0.0559)
Ashanti	0.0272	-0.00546	0.0196	-0.00109	-0.0136
	(0.0379)	(0.0522)	(0.0403)	(0.0436)	(0.0486)
Northern	-0.0247	-0.0573	-0.0727**	-0.0782**	-0.152**
	(0.0289)	(0.0411)	(0.0339)	(0.0358)	(0.0598)
Upper West	-0.0534*	-0.0636*	-0.105***	-0.0688**	-0.118***
	(0.0282)	(0.0383)	(0.0395)	(0.0330)	(0.0443)
Upper East	-0.0288	-0.0891**	-0.0939***	-0.0414	-0.110***
	(0.0294)	(0.0386)	(0.0332)	(0.0324)	(0.0402)
Sav and Inv	0.00860	-0.0240	0.0199**	0.00527	-0.0148
	(0.00865)	(0.0243)	(0.00876)	(0.0117)	(0.0190)
Credit card	-0.00587	-0.0708	-0.0342	-0.0435	
	(0.0155)	(0.0477)	(0.0324)	(0.0306)	
Constant	9.119***	9.366***	9.202***	9.154***	9.192***
	(0.0701)	(0.123)	(0.0783)	(0.0763)	(0.0923)
Observation	1,365	1,365	1,365	1,365	1,365
Chi^2	140.023	82.381	111.503	117.743	76.988
P-values	0.000	0.000	0.000	0.000	0.000

Notes: Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

The Impact of Financial Literacy on Livelihood

Table 14.6 presents results of the effect of financial literacy on the two livelihood indicators (that is, employment status and income). Financial literacy has

a positive but insignificant effect on livelihood. This means that the acquisition of financial knowledge does not affect the sustainable livelihood of the individual. This implies that a sustainable livelihood does not depend on financial literacy. This finding, however, does not support the findings of previous studies of Ghosh (2011) at the country level, Okello et al. (2017) at the firm level and Mukokoma et al. (2018) at the individual level of analysis. The coefficient of age square has a positive significant influence on income. This means that the level of income obtained by individuals increases proportionally with their age. Size of household, on the other hand, has a positive relationship with the level of income, an indication that large households are more likely to earn more income.

Table 14.6   The impact of financial literacy on livelihood

	(1)	(2)
	empstatus	lnincome
FinLit	0.0102	0.0224
	(0.0281)	(0.0208)
Age	0.0482	-0.208***
	(0.0794)	(0.0582)
Age^2	-0.00834	0.0357***
	(0.0141)	(0.00985)
LnHHsize	-0.0355	0.0805***
	(0.0310)	(0.0205)
Urban	-0.00175	0.0268
	(0.0280)	(0.0207)
Marr. status	0.0756***	0.0202
	(0.0274)	(0.0222)
Gender	0.00604	-0.0127
	(0.0265)	(0.0201)
Education	0.0577	0.0148
	(0.129)	(0.0502)
Christian	-0.0635*	0.0598***
	(0.0340)	(0.0226)
Sav and Inv	0.0405***	0.0256***
	(0.0143)	(0.00993)
Credit card	-0.0380	0.0266
	(0.0264)	(0.0179)
Risk	0.00448	-0.0111
	(0.0218)	(0.0117)

	(1)	(2)
	empstatus	lnincome
Greater Accra	0.0144	-0.0196
	(0.0415)	(0.0346)
Western	0.0338	-0.0596
	(0.0463)	(0.0364)
Eastern	0.00642	-0.0760**
	(0.0470)	(0.0353)
Volta	0.0234	-0.0509
	(0.0534)	(0.0393)
Ashanti	0.0307	0.00468
	(0.0504)	(0.0428)
Northern	0.113**	-0.00620
	(0.0467)	(0.0619)
Upper West	-0.0748	-0.0888**
	(0.0636)	(0.0365)
Upper East	-0.00764	-0.0332
	(0.0617)	(0.0470)
Constant	0.684***	9.092***
	(0.182)	(0.104)
Observation	773	749
Chi^2	57.141	79.997
P-values	0.000	0.000

Notes: Lnincome is the log of income. Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

The Sensitivity of Livelihood Activities to Financial Literacy and Financial Inclusion

In Table 14.7, we present the robust results on the interaction of financial literacy and inclusion with employment status. From the results, a positive significant relationship exists between the interaction of financial inclusion indicators (that is, account ownership, savings and usage of account) and financial literacy on the one hand, and employment status as a proxy for livelihood on the other. This relationship implies that the ownership of an account resulting from financial education places individuals in a better position to be employed. Also, individuals who have built a saving attitude through the acquisition of financial knowledge also have a propensity for obtaining employment. Finally, individuals who exhibit knowledge of finance through the frequent usage

of accounts for various transactions also have a better likelihood of being employed than those who do not. Thus, financial literacy alone may not create avenues for employment (see Table 14.6). However, if the individual has an account and uses the account to save, and is financially literate, they stand a better chance of being employed. Savings and investments have a positive significant effect on employment status. This implies that individuals who save and invest are more likely to earn a livelihood through employment.

Table 14.7   The sensitivity of livelihood to financial literacy and financial inclusion (employment status)

	(1)	(2)	(3)	(4)	(5)
	empstatus	empstatus	empstatus	empstatus	empstatus
FinLit*Accto	0.0436*				
	(0.0238)				
FinLit*Saving		0.165*			
		(0.0853)			
FinLit*Freqwith			0.170		
			(0.115)		
FinLit*Upmt				0.0559*	
				(0.0315)	
FinLit*Credit					0.0159
					(0.0540)
Age	-0.00545	-0.0951	0.0387	0.0377	0.0519
	(0.0845)	(0.130)	(0.108)	(0.0769)	(0.077)
Age^2	-0.000364	0.0142	-0.00864	-0.00677	-0.008
	(0.0148)	(0.0231)	(0.0190)	(0.0141)	(0.014)
LnHHsize	-0.0257	0.00503	-0.0869*	-0.0424	-0.035
	(0.0317)	(0.0496)	(0.0506)	(0.0311)	(0.032)
Urban	-0.00468	0.0603	-0.0488	-0.00820	-0.001
	(0.0293)	(0.0504)	(0.0494)	(0.0306)	(0.028)
Marriage status	0.0805***	0.0547	0.0515	0.0673**	0.0747***
	(0.0291)	(0.0477)	(0.0454)	(0.0297)	(0.027)
Gender	-0.00571	0.0239	-0.0671	-0.00156	0.0066
	(0.0271)	(0.0388)	(0.0611)	(0.0271)	(0.026)
Education	-0.0173	-0.0697	-0.0455	0.0289	0.0705
	(0.133)	(0.199)	(0.160)	(0.132)	(0.124)
Christian	-0.0592*	-0.0991*	-0.103*	-0.0713*	-0.064*
	(0.0358)	(0.0558)	(0.0596)	(0.0395)	(0.034)

	(1)	(2)	(3)	(4)	(5)
	empstatus	empstatus	empstatus	empstatus	empstatus
Risk	0.00957	-0.00967	0.0126	0.0144	0.0032
	(0.0225)	(0.0294)	(0.0277)	(0.0229)	(0.022)
Greater Accra	-0.000117	-0.0448	-0.0530	-0.0121	0.0159
	(0.0427)	(0.0669)	(0.0771)	(0.0467)	(0.042)
Western	0.0283	-0.00425	-0.0316	0.0427	0.0335
	(0.0477)	(0.0744)	(0.0799)	(0.0502)	(0.046)
Eastern	0.0133	0.0294	-0.0834	0.0137	0.0075
	(0.0476)	(0.0691)	(0.0878)	(0.0505)	(0.046)
Volta	0.0269	-0.00477	-0.0473	0.0338	0.0237
	(0.0547)	(0.0825)	(0.0903)	(0.0553)	(0.054)
Ashanti	0.0245	-0.0149	0.0438	0.0102	0.0326
	(0.0526)	(0.0815)	(0.0640)	(0.0553)	(0.0505)
Northern	0.0714	-0.271	0.173**	-0.0952	0.112**
	(0.0525)	(0.287)	(0.0751)	(0.126)	(0.0499)
UpperWest	-0.0700	-0.00650	-0.138	-0.0775	-0.0746
	(0.0630)	(0.0878)	(0.0938)	(0.0653)	(0.0642)
Upper East	-0.0302	-0.0445	-0.0677	0.00860	-0.00357
	(0.0647)	(0.0873)	(0.0917)	(0.0630)	(0.0602)
Sav and Inv	0.0321**	-0.0193	0.0304	0.0205	0.0408***
	(0.0152)	(0.0381)	(0.0215)	(0.0189)	(0.0143)
Credit card	-0.0478*	-0.0708*	-0.102*	-0.0849**	-0.108
	(0.0272)	(0.0427)	(0.0527)	(0.0374)	(0.235)
Constant	0.712***	0.956***	0.970***	0.771***	0.711***
	(0.182)	(0.289)	(0.302)	(0.191)	(0.183)
Observation	773	773	773	773	773
Chi²	49.009	20.703	26.787	54.909	60.524
P-values	0.000	0.415	0.141	0.000	0.000

Notes: Standard errors are reported in parentheses. ***, **, and * indicates statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

The results in Table 14.8 show the interaction between financial literacy and inclusion on the level of income. From the results, there is a positive impact of the interaction between financial inclusion indicators (account ownership, savings and usage of account) and financial literacy on income. The positive relationship implies that the ownership of an account resulting from financial education places individuals in a better position to be wealthy. Also, individuals who have built a saving attitude through the acquisition of financial

knowledge stand a better chance of prospering than those who do not. Finally, individuals who exhibit knowledge of finance through the frequent usage of accounts for various transactions also have a financial advantage over those who do not. Savings and investments have a positive significant effect on income. This implies that individuals who save and invest are more likely to earn more income.

Table 14.8   The sensitivity of livelihood to financial literacy and financial inclusion (income)

	(1)	(2)	(3)	(4)	(5)
	lnincome	lnincome	lnincome	lnincome	lnincome
FinLit*Accto	0.0374**				
	(0.0167)				
FinLit*Saving		0.118*			
		(0.0621)			
FinLit*Freqwith			0.121		
			(0.0749)		
FinLit*Upmt				0.0460**	
				(0.0213)	
FinLit*Credit					0.0381
					(0.0380)
Age	-0.238***	-0.294***	-0.198***	-0.201***	-0.201***
	(0.0606)	(0.0906)	(0.0648)	(0.0558)	(0.0570)
Age^2	0.0402***	0.0494***	0.0330***	0.0348***	0.0349***
	(0.0102)	(0.0151)	(0.0111)	(0.00934)	(0.00968)
LnHHsize	0.0859***	0.109***	0.0278	0.0723***	0.0810***
	(0.0214)	(0.0371)	(0.0396)	(0.0217)	(0.0209)
Urban	0.0251	0.0673*	-0.00532	0.0212	0.0284
	(0.0214)	(0.0387)	(0.0311)	(0.0219)	(0.0208)
Marriage status	0.0246	0.00184	0.00409	0.0130	0.0185
	(0.0232)	(0.0355)	(0.0326)	(0.0238)	(0.0225)
Gender	-0.0186	0.000816	-0.0583	-0.0164	-0.0113
	(0.0209)	(0.0271)	(0.0421)	(0.0210)	(0.0198)
Education	-0.0278	-0.0510	-0.0350	0.0147	0.0424
	(0.0454)	(0.122)	(0.0660)	(0.0511)	(0.0345)
Christian	0.0611**	0.0263	0.0310	0.0507**	0.0589***
	(0.0239)	(0.0416)	(0.0397)	(0.0241)	(0.0227)

	(1)	(2)	(3)	(4)	(5)
	lnincome	lnincome	lnincome	lnincome	lnincome
Risk	-0.00719	-0.0239	-0.00428	-0.00270	-0.0145
	(0.0129)	(0.0188)	(0.0175)	(0.0140)	(0.0119)
Greater Accra	-0.0298	-0.0598	-0.0652	-0.0375	-0.0154
	(0.0356)	(0.0526)	(0.0516)	(0.0377)	(0.0338)
Western	-0.0643*	-0.0895	-0.107**	-0.0521	-0.0599*
	(0.0373)	(0.0568)	(0.0511)	(0.0399)	(0.0358)
Eastern	-0.0688*	-0.0617	-0.139**	-0.0667*	-0.0723**
	(0.0361)	(0.0507)	(0.0572)	(0.0378)	(0.0347)
Volta	-0.0425	-0.0702	-0.101*	-0.0364	-0.0509
	(0.0406)	(0.0591)	(0.0601)	(0.0421)	(0.0393)
Ashanti	0.00403	-0.0195	0.0168	-0.00356	0.00860
	(0.0438)	(0.0614)	(0.0474)	(0.0456)	(0.0424)
Northern	-0.0307	-0.273	0.0444	-0.165*	-0.00930
	(0.0645)	(0.192)	(0.0516)	(0.0978)	(0.0693)
Upper West	-0.0894**	-0.0496	-0.133***	-0.0950**	-0.0866**
	(0.0373)	(0.0603)	(0.0490)	(0.0391)	(0.0363)
Upper East	-0.0469	-0.0625	-0.0741	-0.00931	-0.0238
	(0.0478)	(0.0667)	(0.0603)	(0.0481)	(0.0457)
Sav and Inv	0.0184*	-0.0155	0.0167	0.00975	0.0266***
	(0.0111)	(0.0275)	(0.0153)	(0.0137)	(0.00989)
Credit card	0.0166	-0.00400	-0.0190	-0.0126	-0.142
	(0.0186)	(0.0316)	(0.0354)	(0.0256)	(0.166)
Constant	9.136***	9.321***	9.329***	9.179***	9.154***
	(0.0993)	(0.196)	(0.173)	(0.111)	(0.102)
Observation	749	749	749	749	749
Chi²	77.220	40.149	52.686	75.188	79.902
P-values	0.000	0.005	0.000	0.000	0.000

Notes: Standard errors are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level respectively. Refer to Table 14.1 for definitions of variables.

CONCLUDING REMARKS

This paper contributes to the literature by providing empirical evidence on how financial literacy affects the relationship between financial inclusion and livelihood activities of people in Ghana. We find the following results: first, financial education increases financial inclusion in Ghana. This outcome is consistent with prior studies. That is, the level of financial knowledge

individuals have accrued on how to manage their finance influences them to own and use their bank account for various transactions. Second, the results show that financial inclusion improves livelihood. However, no relationship exists between financial education and livelihood. Finally, the results also show that livelihood is sensitive to the interaction between financial inclusion and financial literacy. We thus conclude that inclusive finance resulting from the acquisition of financial knowledge promotes sustainable livelihoods in Ghana. Therefore, both financial inclusion and literacy are relevant tools for sustainable development at the individual level. Following the results obtained from this study, domestic policy makers in Ghana are strongly encouraged to be mindful of the fact that financial inclusion when combined with financial literacy can be a powerful tool for fostering sustainable livelihoods.

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