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Financial literacy, financial inclusion and participation of individual on the Ghana stock market

Agnes Akpene Akakpo¹, Mohammed Amidu^{1*}, William Coffie¹ and Joshua Yindenaba Abor²

Abstract: This paper examines the impact of financial literacy and financial inclusion on stock market participation in Ghana. It employs a sample of 1,966 respondents across the 10 regions of Ghana for the year 2018. We employ biprobit models to estimate the influence of financial literacy on financial inclusion, while robust probit models are used to independently analyse the effect of financial literacy and financial inclusion on stock market participation as well as their joint effect. We find the following results: first, financial literacy positively influences financial inclusion. Second, the study does not support previous findings that financial literacy is not a determinant of stock market participation in Ghana. Third, financial inclusion through using an account to save significantly affects stock market participation. Finally, the interaction of financial literacy and financial inclusion on stock market participation provides evidence of no significant effect.

Subjects: Economics; Banking; Credit & Credit Institutions; Investment & Securities

Keywords: Financial literacy; financial inclusion; stock market; developing country

JEL Classification: D14; D21; C36

1. Introduction

The role of financial markets in influencing the level of economic activity in developing and developed economies alike cannot be overemphasized. One of the crucial functions financial markets perform is the mobilization of funds. Notwithstanding, modern financial markets are

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Agnes Akpene Akakpo is a young researcher with an MPhil degree in Accounting from University of Ghana. She has been researching and serving as a Research and Teaching Assistant of University of Ghana Business School. Her area of research includes: challenges of small and Medium Businesses (SME's), corporate governance, information quality and disclosure as well as financial literacy and financial markets. She is also interested in how financial reporting impact social and economic policies in a country, especially in the public sector. Agnes is also a Chartered Accountant.

PUBLIC INTEREST STATEMENT

Our study analyses the impact of financial literacy and financial inclusion on individual participation on the Ghanaian stock market. We sample 1,966 households across the 10 regions of Ghana for the year, 2018. We find the following results: • first, those who have some knowledge in finance are normally financially included; • Second, the study does not agree with the previous findings that financial literacy is not a determinant of stock market participation in Ghana. • Third, financial inclusion through the usage of an account to save significantly affects household to buy or sell their investment at Ghana Stock Exchange. • Finally, we find that household who are knowledgeable in finance and also financially included do not participate on the stock market activities

characterised by the emergence of new and highly sophisticated financial products thus, making it imperative for individuals to be financially knowledgeable to participate effectively.

Financial literacy presents enormous potential benefits. For instance, when individuals are financially educated, they are often in the position to make better financial decisions which hitherto they would have. Some of the decisions they are likely to make bother on savings, borrowings, investing, insurance, and planning for retirement. Furthermore, financial literacy gives one an advantageous edge as financially knowledgeable individuals turn out to be less financially fragile (Lusardi & Mitchell, 2017). Despite the benefits of being financially literate, widespread financial illiteracy is recorded across countries. This phenomenon makes it challenging to realize the full benefits of financial inclusion. Ensuing the global financial crisis, many studies have been advanced towards the financial literacy and financial inclusion discourse with an increased emphasis on the role of financial literacy in increasing access to, and the take-up of financial services (Xu & Zia, 2012). For financial inclusion to have the intended best results, Menon (2019) suggests that financial inclusion must be reinforced by financial literacy. The importance of financial inclusion as a matter of policy has led to financial innovations across the world. These include self-help groups, microfinance institutions, low-cost accounts, general credit cards and, no-frills accounts (Gupte et al., 2012; Sarma & Pais, 2011). Although financial innovative attempts have been made to ensure many people are financially included, a vast majority of people seem to be excluded financially. The adult population in developing countries form a greater proportion of the excluded (Morgan & Pontines, 2014). The 2017 Global Findex database puts the total number of adults who remain unbanked globally at 1.7 billion (Demirgüç-Kunt et al., 2018).

Financial exclusion presents unfavourable conditions to the excluded population. In keeping with Demirguc-Kunt and Klapper (2012), financial exclusion can lead to the emergence of poverty traps and stifle development. Further, financial exclusion can lead to the emergence of an unorganized and exploitative financial sector (Sharma, 2016). Given the consequences of exclusion, governments and key financial industry players often embark on initiatives like increasing account ownership to increase inclusion which often turns out not sustainable. Also, in the long run, governments' effort to broaden financial inclusion through access to bank accounts, without ensuring that people are financially educated to possess the necessary financial skills to take up such opportunities presented to them, can result in high debt, defaults in mortgage, and insolvency (Klapper et al., 2017). These consequences are rather negative outcomes of inclusion which leave individuals worse off than intended.

The extant literature documents the importance of financial inclusion at the individual and macro-economic levels. For instance, Chakrabarty (2012) opines that financial inclusion is a more comprehensive instrument for growth whereby citizens in a country can use their earnings to improve their financial state and contribute to national growth. Sharma (2016) also suggests that economic growth and development are driven by financial inclusion. It plays this role through the building of a country's infrastructure. Klapper et al. (2016) also view financial inclusion as an important masterpiece to achieve Sustainable Development Goals (SDGs). Abor et al. (2018) also make similar observations that financial inclusion is embedded in the SDGs as it features prominently as a target in 8 out of the 17 SDGs thus making financial inclusion a pertinent agenda worth pursuing.

Although various studies have analysed the variables of interest and have established relationships between them, these relationships have been examined independently in most cases (Atkinson & Messy, 2013; Birochi & Pozzebon, 2016; Cohen & Nelson, 2011; Kozak & Sosyura, 2015; Mishra, 2018; Thomas & Spataro, 2015). These prior studies have failed to explore how the relationship between financial literacy and financial inclusion can jointly impact the participation of individuals and households in the stock market or stock market participation of individuals who are financially included through financial education. This study, therefore, seeks to answer these empirical questions. Do individuals who are financially included have financial education? Do individuals who are financial literates participate in

financial markets? Do individuals who are financially included participate in the financial markets? If that is the case, then how do financial literacy and financial inclusion impact on their participation in the stock market? Empirically, the study fills the gap in the literature by analysing the interaction among financial literacy, financial inclusion, and stock market participation. The study is being conducted in Ghana where financial literacy and financial inclusion are relatively low (Kuffour & Adu, 2019). The study thus tests two main hypotheses. First, financial literacy increases the level of financial inclusion. Secondly, the interaction between financial literacy and financial inclusion has a positive impact on stock market participation.

This paper aims to establish a link between financial literacy and financial inclusion and how they influence participation in Ghana's stock market. Apart from an extension in the scope of the current literature, this paper also makes the following important contributions regarding developing and emerging economies: First, it examines and documents the level of financial literacy, financial inclusion, and participation of Ghanaian households in the stock market. Secondly, it explores the mediating role financial literacy plays in boosting stock market participation in Ghana through financial inclusion.

Our results suggest that financial literacy improves financial inclusion significantly. More so, the effect of financial literacy on stock market participation is mixed. Further, the impact of financial inclusion through using an account to save on stock market participation is negative and highly significant hence does not improve participation. Finally, the interaction of financial literacy and financial inclusion on stock market participation yields no significant impact.

The remainder of this paper is organized into four additional sections. Section (2) reviews relevant literature on financial literacy, financial inclusion, and stock market participation. Section (3) discusses the research methodology, the measurement of key variables used in the study, as well as data sources. Section (4) discusses the empirical results and sensitivity tests and finally, section (5) provides the conclusions and policy implications.

2. Review of relevant literature

2.1. Theoretical review

The nexus among financial literacy, financial inclusion, and participation in the stock market can be explained by the Finance-Growth Theory, Stakeholder and Legitimacy Theories (SLT).

The finance-growth theory posits that economic growth outcomes are observed when individuals and households are financially included. However, it can be argued that banks and other financial intermediaries cannot efficiently contribute to economic growth when a vast majority of individuals who are financially included are not educated financially. Financial literacy, therefore, performs a key role in the financial inclusion agenda by facilitating the role played by financial systems in the finance-growth nexus. According to Schumpeter (1911), services offered by financial intermediaries are key for technical innovation and economic growth. Beck and Levine (2004) also show that banks and stock markets positively affect economic growth. Sharma (2016) provides evidence of a positive correlation between various magnitudes of bank-enabled financial inclusion and economic growth. Financial inclusion will, therefore, lead to the intended finance-growth link when individuals are financially educated to take up the opportunities offered by inclusion given that financial intermediaries are not exploitative.

Stakeholder theory explains the need for managers of organizations to maximize the interest of stakeholders in the remit of law and social values. A stakeholder is any group of individuals who can affect or are affected by the activities of the firm, in achieving the objectives of the firm. Legitimacy theory, on the other hand, is premised on the belief that a contractual relationship exists between

businesses and society. Due to this social contract, society usually allows organizations to exist and also have rights. In return for such rights and privileges, society expects organizations to operate within their bounds and norms. Against this backdrop, financial markets around the world are regulated to ensure sanity in financial markets, maintain confidence, contribute to financial stability, and also to prevent adverse economic situations. Individuals and society lose their trust in financial systems when financial institutions are not managed effectively and in the interest of stakeholders which in turn affects the legitimacy of the firm. To ensure the financial inclusion of individuals, organisations are required to provide products that enhance the good of users rather than being exploitative. This also applies to the participation of individuals who may be financially included and not be financial literates in the stock market. Stakeholder and legitimacy theories require firms to disclose adequately and also meet and maintain legal requirements for trading on the GSE and ensure maximum return on stock held by participants.

Stakeholder and legitimacy theories, therefore, indicate that financial intermediaries will only undertake financial education programs and also design financial products that will improve financial inclusion leading to positive economic outcomes and increase participation in stock markets only on the condition that such initiatives fall within the remit of the law, ethics and acceptable societal norms which bind their operation.

2.2. Empirical literature

Studies have taken diverse forms by establishing the nexus between financial literacy stock market participation, financial inclusion, and various dimensions of economic growth (Atkinson & Messy, 2013; Grohmann et al., 2018; Sharma, 2016). Previous studies have indicated that financial literacy is systematically linked to financial inclusion (Grohmann et al., 2018) and that lack of financial literacy particularly in stocks hinders households' involvement in the stock market (Balloch et al., 2015). More so, investigation into the contributing factors of financial inclusion in Sub-Saharan Africa by Chikalipah (2017) reveals that illiteracy is a major hindrance to financial inclusion. This suggests some kind of relationship between financial literacy and financial inclusion. Ozili (2020), however, contends the school of thought which believes that financial literacy or education is a channel through which inclusive finance can be achieved. He argues that having appreciable level of knowledge in financial matters alone is not enough to eliminate the structural barriers which hinder people from having access to finance. Ozilli further concludes that financial literacy can increase financial inclusion if the leading and only cause of the obstruction to financial inclusion is inadequate knowledge of financial services. Although extant literature on financial inclusion also documents the positive economic outcomes of inclusion, Demirguc-kunt et al.(2017) recommend more research into the area to understand why financial inclusion may not be beneficial in all circumstances.

Several studies investigating the limited participation of individuals in the stock market have fixated on the determinants of stock market participation. One of the variables of interest which has gained attention and for that reason has been extensively studied is the influence of financial literacy on the neglect of the impact of financial inclusion. For instance, Van Rooij et al. (2011) in their study, estimate financial literacy and analyse how it is related to stock market participation which is an economic outcome in the Netherlands by devising two distinct modules for the DNB household survey. They answer questions as to whether financial literacy has a bearing on the kind of financial decisions people make and also, whether participation in the stock market is affected by financial literacy. Further, they tackle the cause and effect direction between financial literacy and stock market participation and report that stock ownership improves at an increasing rate with literacy. Conversely, Banyen and Nkuah (2015) find that financial literacy is not a significant determinant of stock market participation in Ghana as a majority of Ghanaians are financial illiterates in their endeavour to explore the low levels of active involvement of Ghanaians on the stock exchange from a behavioural perspective.

Also, Okello et al. (2016) examined the role of social capital in the relationship between financial literacy and financial inclusion in rural Uganda. They find that financial literacy did not have a direct impact on financial inclusion but through the full mediation of social capital. They show that the introduction of social capital into the relationship serves as a boost thus without social capital, financial literacy may fail to improve financial inclusion.

3. Data and methodology

3.1. Data

The area of study is Ghana located in the West African sub-region. As of December 2018, the country had 10 administrative regions with each region having several administrations. The number of regions in Ghana rose to 16 following the successful creation of 6 additional regions in 2019. As of February 2019, the number of districts stands at about 230 from 216. The Ghana Statistical Service puts the total population of the country at 27 million. Ghana has a robust financial system that comprises 23 universal banks, 144 rural and community banks, 23 savings and loans companies, 137 microfinance institutions, and 11 finance houses. The sample frame used by the Ghana Statistical Services for the 2010 Population and the Ghana Demographic and Health Survey (GDHS) in 2014 is adopted by the study since it appears to be the most comprehensive and credible framework available in Ghana. A two-stage sampling procedure is used to ensure that indicators across the national level and along urban and rural areas are appropriately captured. The data for the study was collected in 2018. Probability Proportional to Size (PPS) is employed in the first stage to select 60 districts across all the 10 regions of Ghana. In the second stage, 1,966 individual households are selected, administered, and collated. The study takes a cue from the GDHS 2014 for the second stage sampling procedure.

3.2. Variable measurement

In this study, the key variables under investigation are financial literacy, financial inclusion, and stock market participation. Financial literacy is measured in line with the use and application of seven financial literacy indexes in literature. Financial inclusion is measured using five main indicators of bank-enabled inclusion. Stock market participation is also measured using three indicator variables which are investment in stocks, willingness to buy or sell shares when an agent visits and preparedness to buy or sell shares given the opportunity to convert shares to cash within the shortest possible time.

3.3. Analytical models and estimation strategy

In this paper, the following model is used to estimate the link between banks and financial inclusion.

$$Y_{1j}^* = X'_{1j}\alpha + R'_{1j}\beta + \varepsilon_{1j} \quad (1)$$
$$Y_{1j} = 1 \text{ if } Y_{1j}^* > 0$$
$$Y_{1j} = 0 \text{ if } Y_{1j}^* \leq 0$$

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 gender, age, marital status, level of education, household income level, geographical location, etc.; and financial characteristics including risk aversion and savings and investment behaviour. $R_j\beta$ is an index score of how financially literate a respondent is. 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 1. Using the maximum likelihood estimation procedure, Equation (1) is estimated as a probit model.

To estimate the determinants of the use of an account to save (Y_{2j}^*), the study employs the following model:

$$Y_{2j}^* = X'_{2j}\alpha + R'_{2j}\beta + \varepsilon_{2j} \quad (2)$$

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

$$Y_{2j} = 0 \text{ if } Y_{2j}^* \leq 0$$

Y_{2j}^* is a binary dependent variable. It is assigned the value 1 if the individual uses the account to save and zero if otherwise. All other variables hold as defined under equation (1) above. However, a self-selection problem would be encountered if equation (2) alone is estimated. This is because the individual uses an account to save only when the individual owns an account. Therefore, the study employs binary probit (biprobit) model to estimate equations (1) and (2) together, where equation (1) is the selection equation and equation (2) the decision equation, which is the decision to save after owning an account. The leading benefit of using the biprobit estimation technique is that it can overcome the endogeneity problem that arises from sample selection bias.

Because the dependent variables in the two equations are binary, the traditional Heckman 2-step approach cannot be applied here. Following Allen et al. , (2016) equations (1) and (2) are simultaneously estimated using the maximum likelihood estimation procedure. Equations similar to (2) are equally specified for the frequency of withdrawals, access to credit, and usage of accounts for payments separately. Each of the equations above is then also estimated simultaneously with equation (1). Again, it is worth considering that the individual can withdraw from an account, save or obtain bank credit, or use an account to make payments only when account ownership has been observed. To analyse the influence of financial literacy on stock market participation, the study makes use of the model specified below.

$$P_j^* = X'_{3j}\alpha + R'_{3j}\beta + \varepsilon_{3j} \quad (3)$$

$$P_j = 1 \text{ if } P_j^* > 0$$

$$P_j = 0 \text{ if } P_j^* \leq 0$$

The study estimates stock market participation using probit regression, controlling for both the wide range of potential drivers of stock market participation and dummies for individual participant demographics and socio-economic characteristics. P_j^* is the dependent variable that represents stock market participation. Stock market participation is a binary variable which equals 1 if the individual participates either by investing in stocks, is willing to buy or sell shares when an agent visits or is prepared to buy or sell shares when given the opportunity to convert shares to cash and 0 if otherwise. $X'_{3j}\alpha$ is the vector of individual household characteristics whereas $R'_{3j}\beta$ is

Table 1. Variables and their definitions

Variable	Definition	Measurement
Household Characteristics		
Gender	Gender of respondent	1 = if male; 0 = otherwise
Age	Age range of respondent	Years
Marriage Status	Marital Status of respondents	1 = if married; 0 = otherwise
Urban	Place of residence (Urban or Rural)	1 = if urban; 0 = otherwise
HHSize	Number of people in the respondent's household	Number of persons
Education	Educational status of the respondent	1 = if formally educated; 0 = otherwise
Religion	Religion of respondent	1 = if Christian; 0 = otherwise
Financial Inclusion		
ACCTO	Account ownership by the 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 Respondents	1 = if yes; 0 = otherwise
Financial Behaviour		
CreditD	Dummy variable for ownership of credit card	1 = if yes; 0 = otherwise
SaIB	Good Savings 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 financial literacy a respondent is)		
Stock value	Understanding Value/price of stock/shares	Correct answer = 1; wrong = 0
Future stock	Understanding the future value of the stock/shares	Correct answer = 1; wrong = 0
Simple interest	Understanding the 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
Stock Market Participation		
InvStock	Having an investment in stocks	1 = if yes; 0 = otherwise
AgentTrade	Willing to buy or sell shares if agent visits	1 = if yes, 0 = otherwise
StockConv	Prepared to buy or sell shares given the opportunity for conversion to cash	1 = if yes, 0 = otherwise

the index score of financial literacy of a respondent. To investigate the effect of financial inclusion on stock market participation, the equation below is estimated.

$$P_j^* = X'_{4j}\alpha + Z'_{4j}\beta + \varepsilon_{4j} \quad (4)$$

$$P_j = 1 \text{ if } P_j^* > 0$$

$$P_j = 0 \text{ if } P_j^* \leq 0$$

$Z'_{4j}\beta$ is how financially included a respondent is, taking into consideration all five indicators of inclusion. All other variables hold as defined under equation (1) and equation (3) above. The study specifies the model below to explore how financial education and financial inclusion impact stock market participation.

$$P_j^* = X'_{5j}\alpha + R'_{5j}\beta + Z'_{5j}\beta + (R'_{5j}\beta * Z'_{5j}\beta) + \varepsilon_{5j} \quad (5)$$

$$P_j = 1 \text{ if } P_j^* > 0$$

$$P_j = 0 \text{ if } P_j^* \leq 0$$

Again, all variables hold as defined in equation (1), equation (3) and equation (4) above.

4. Empirical results

4.1. Summary descriptive statistics

Table 2a presents summary statistics on the demographic characteristics of the sample for the study. In this table, the frequency distribution shows that out of the sampled respondents, about 63% are males. The age distribution reflects the youthful nature of Ghana's population. Out of the individuals sampled, the frequency distribution shows that about 58% of respondents fall within the age brackets of 19 and 35. Individuals within this age bracket record the highest frequency compared to the other age groupings in the study. Cumulatively, respondents who are between 16 and 18 years but not more than 45 years form about 88% of the sample. In terms of the geographical location of the individuals sampled, the frequency distribution shows that about 40% of individuals live in urban areas which means that the majority live in the rural parts of Ghana. Regional segregation of respondents shows that most of the respondents were drawn from the Upper East Region. The employed form about 73% of the sample. Although more people are employed than unemployed, monthly incomes of the majority of sampled individuals appear to be relatively low. The frequency distribution shows that about 81% of the sample earn incomes less than GHC 8,000 monthly. Despite recording low monthly incomes, about 33% of respondents find themselves in households with sizes ranging between 5 and 6. The frequency distribution also demonstrates that respondents have acquired some form of formal education. The level of education of respondents spans from elementary through to the tertiary level. It is interesting to observe that only about 5% of individuals sampled did not possess any form of formal education. Individuals with tertiary level education formed the greatest percentage followed by those with a secondary level of education. They form about 49% and 30% of respondents respectively. Respondents with an elementary level of education constitute about 14%. This striking feature of the sampled respondents makes them fit for analysing financial literacy, financial inclusion, and stock market participation in Ghana since respondents are expected to exhibit an understanding of the survey for the study.

Table 2b displays the frequency distribution of the index of financial literacy of the sampled population. The index ranges from 0–7 which demonstrates how financial literate a person is by

Table 2a. Summary of demographic statistics

	Freq.	Percent	Cum.
Gender			
Female	722	36.89	36.89
Male	1235	63.11	100
Age			
Between 16 and 18 years	164	8.37	8.37
Between 19 and 35 years	1137	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	1125	57.22	57.22
Married	841	42.78	100
Urban			
Rural	1165	59.56	59.56
Urban	791	40.44	100
Region			
Greater Accra	282	14.38	14.38
Western	218	11.12	25.5
Eastern	205	10.45	35.95
Volta	106	5.41	41.36
Ashanti	93	4.74	46.1
Northern	254	12.95	59.05
Upper West	263	13.41	72.46
Upper East	386	19.68	92.15
Central	66	3.37	95.51
Brong Ahafo	88	4.49	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	270	13.76	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
Employment Status			
Unemployed	465	23.65	23.65
Employed	1501	76.35	100
Monthly Income			
Less than GHC 8000	1523	80.8	80.8

(Continued)

Table 2a. (Continued)

	Freq.	Percent	Cum.
Between GHC 8,000 and GHC10,000	217	11.51	92.31
Between GHC 11,000 and GHC15,000	89	4.72	97.03
Above GHC 15,000	56	2.97	100
Religion			
Christianity	1363	75.55	75.55
Islam	387	21.45	97.01
Traditional	48	2.66	99.67
Other	6	0.33	100

Table 2b. Summary statistics on financial literacy index

FinLit	Freq.	Percent	Cum.
0	33	3.11	3.11
1	45	4.24	7.35
2	97	9.14	16.49
3	163	15.36	31.86
4	221	20.83	52.69
5	263	24.79	77.47
6	201	18.94	96.42
7	38	3.58	100

answering questions on financial concepts which form the indicators of financial literacy employed by the study. The questions test respondents understanding of interest rate, interest compounding, risk diversification, understanding of stock, the future value of a stock, inflation and risk, and return. A total score of seven is an indication of high financial literacy while a score of 0 indicates low financial literacy. It is evident that respondents demonstrate an appreciable understanding of financial concepts. The standard deviation of financial literacy is 1.65 which implies that on average, a respondent can score between 3 and 6. From the table, the majority of respondents score five on the financial literacy index. They form about 25% of the sampled population. Individuals who demonstrated the least knowledge of financial concepts and therefore score 0 on the index form about 3% of the sample.

Table 2c presents the summary statistics of the five indicators of financial inclusion employed by this study. From the table, 74 % of respondents have an account either at a bank, credit union, or other financial institution. However, only about 30% of respondents who own accounts use it for saving. This reflects the savings culture of Ghanaians who prefer to hold money rather than to keep them at financial institutions. All the other indicators of financial inclusion fall below the percentage of individuals who own accounts. In terms of withdrawal using an account at least once a month, only 21% of respondents indicate inclusion in that regard. Access to credit using an account and use of account for payment by respondents constitute 40% and 24% respectively. This also suggests that account ownership does not automatically translate into using of account to save, access to credit, frequency of withdrawal, and payment using an account. It can also be

Table 2c. Frequency distribution of stock market participation variable

	Freq.	Percent	Cum.
Investment in stocks			
No	1065	89.35	89.35
Yes	127	10.65	100
Agent Trade			
No	719	54.59	54.59
Yes	598	45.41	100
Stock Conversion			
No	531	42.89	42.89
Yes	707	57.11	100
Awareness of GSE			
No	1193	66.95	66.95
Yes	589	33.05	100
Knowledge of stocks			
No	746	65.21	65.21
Yes	398	34.79	100
Investment Objective			
Short-term source of funds	1626	98.13	98.13
Future Wealth and Safety	24	1.45	99.58
Retirement Funds	5	0.3	99.88
Family	2	0.12	100
Monthly Income Used to Finance Investment			
Below 10%	1097	67.55	67.55
10%-25%	375	23.09	90.64
26%-40%	91	5.6	96.24
41% and above	61	3.76	100
Saving and Investment Behaviour			
Poor	498	29.33	29.33
Fair	603	35.51	64.84
Good	524	30.86	95.7
Very Good	73	4.3	100
Risk Aversion			
High	211	12.91	12.91
Medium	731	44.71	57.61
Low	693	42.39	100

inferred from the frequency distribution that respondents encounter more barriers and have less incentive with regards to the usage of account than ownership.

Summary statistics on the variables employed by the study to examine stock market participation in Ghana are presented in Table 2d. The indicators of participation are investment in stocks, willingness to buy or sell one's shares if an agent visits, and thirdly, a respondent's preparedness to buy or sell shares given the opportunity to convert shares to cash. The table shows that about 11% of respondents have actually invested in stocks. Also, 45% of respondents indicate a willingness to trade

Table 3. The effect of financial literacy on financial inclusion

	Accto	Saving	Accto	Credit	Accto	Freqwith	Accto	Upmt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Finlit	0.143***	-0.00825	0.138***	-0.0257	0.133***	-0.0305	0.133***	0.00424
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)
Age	0.541	0.464	0.548	0.348	0.575	0.0880	0.617*	-0.234
	(0.36)	(0.31)	(0.36)	(0.29)	(0.36)	(0.32)	(0.36)	(0.30)
Age2	-0.0874	-0.0800	-0.0893	-0.0455	-0.0918	-0.00181	-0.0971	0.0262
	(0.06)	(0.05)	(0.06)	(0.04)	(0.063)	(0.05)	(0.06)	(0.05)
lnHHsize	-0.200	-0.0660	-0.151	-0.237*	-0.156	0.338**	-0.170	0.204
	(0.19)	(0.13)	(0.18)	(0.12)	(0.18)	(0.15)	(0.18)	(0.13)
lnincome	0.124	0.108	0.0719	0.280	0.0586	0.283	0.0646	-0.0345
	(0.30)	(0.22)	(0.30)	(0.21)	(0.30)	(0.23)	(0.30)	(0.22)
Urban	0.00204	-0.257**	-0.0185	0.178	-0.00657	0.183	-0.00565	0.0651
	(0.15)	(0.113)	(0.15)	(0.11)	(0.15)	(0.12)	(0.15)	(0.12)
M. Status	0.0327	0.0828	0.0226	0.617***	0.00819	0.161	-0.0160	0.137
	(0.18)	(0.130)	(0.18)	(0.13)	(0.18)	(0.15)	(0.18)	(0.14)
E.Status	0.0895	0.328**	0.112	-0.197	0.117	-0.210	0.113	0.00134
	(0.19)	(0.15)	(0.19)	(0.14)	(0.19)	(0.16)	(0.19)	(0.15)
Gender	0.139	-0.113	0.157	0.331***	0.158	0.332***	0.154	0.189*
	(0.14)	(0.10)	(0.14)	(0.10)	(0.14)	(0.12)	(0.14)	(0.11)
Education	0.312	0.546	0.00818	0.546	0.0581	0.0611	0.0708	-0.168
	(0.57)	(0.554)	(0.66)	(0.58)	(0.65)	(0.63)	(0.65)	(0.60)
Christian	0.244	0.260	0.190	0.0134	0.202	0.153	0.200	0.245
	(0.22)	(0.176)	(0.23)	(0.17)	(0.23)	(0.20)	(0.23)	(0.18)
Saib		0.224***		0.211***		0.0753		0.217***
		(0.0577)		(0.0580)		(0.066)		(0.061)
Risk		0.0753		-0.142*		-0.0419		-0.137*
		(0.0765)		(0.075)		(0.087)		(0.080)
Credit Card						0.268**		0.550***
						(0.12)		(0.11)
GreaterAccra	0.114	0.195	0.107	0.218	0.116	0.353*	0.119	0.265
	(0.26)	(0.17)	(0.26)	(0.17)	(0.26)	(0.20)	(0.26)	(0.17)
Western	-0.0715	0.139	-0.0933	0.416**	-0.102	0.274	-0.109	-0.115
	(0.30)	(0.20)	(0.30)	(0.20)	(0.30)	(0.24)	(0.30)	(0.21)
Eastern	-0.510**	-0.153	-0.531**	0.581***	-0.531**	0.396*	-0.535**	-0.125
	(0.25)	(0.19)	(0.25)	(0.19)	(0.25)	(0.22)	(0.25)	(0.20)
Volta	-0.729***	0.193	-0.649**	0.458**	-0.664**	0.326	-0.657**	-0.243
	(0.28)	(0.21)	(0.28)	(0.21)	(0.28)	(0.25)	(0.28)	(0.23)
Ashanti	-0.242	0.180	-0.225	0.216	-0.242	-0.0710	-0.236	0.123
	(0.29)	(0.21)	(0.29)	(0.21)	(0.29)	(0.25)	(0.29)	(0.21)
Northern	4.532	1.041	3.908	0.249	3.677	-4.057	4.049	6.591
	(2080.0)	(0.84)	(559.3)	(0.79)	(327.2)	(517.5)	(834.3)	(844.3)
Upper West	-0.167	-0.180	-0.212	0.124	-0.178	0.288	-0.162	-0.0336

(Continued)

	Accto	Saving	Accto	Credit	Accto	Freqwith	Accto	Upmt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.31)	(0.23)	(0.31)	(0.23)	(0.31)	(0.26)	(0.31)	(0.24)
Upper East	0.211	0.260	0.237	0.375	0.229	0.230	0.249	-0.327
	(0.408)	(0.25)	(0.409)	(0.25)	(0.406)	(0.29)	(0.407)	(0.27)
Constant	-1.390	-3.539*	-0.622	-4.339**	-0.589	-4.745**	-0.689	-0.784
	(2.87)	(2.13)	(2.86)	(2.13)	(2.87)	(2.30)	(2.87)	(2.17)
Observation	766	766	766	766	766	766	766	766
Chi2	82.64	82.64	125.11	125.11	74.81	74.81	101.51	101.51
P	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000

Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*) are regressed against financial literacy (*Finlit*), household characteristics (Age, Age², Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Credit Card, Risk) and the region of residence (Greater Accra, Western, Eastern, Upper East, Upper West, Northern, Volta, Ashanti). Financial inclusion is the dependent variable whereas financial literacy, household characteristics and financial behaviour are independent variables. A biprobit is employed to examine the relationship between the variables specified below. This model also helps to overcome the problem of self-selection and the problem of endogeneity that is often associated with self-selection. Standard errors are displayed in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations, (2) Chi-square, (3) P-value.

if an agent visits while 57% indicate their willingness to trade given that they can easily convert their shares to cash. This suggests that liquidity may be an important factor that influences stock market participation in Ghana. More so, 33% of respondents indicate that they are aware of the Ghana Stock Exchange and what they engage in whereas 35% of them have knowledge that stocks are traded on the exchange. Respondents who agree that the securities traded on the exchange meet their risk and return preference comprise 36% compared to 64% who disagree. Out of the respondents sampled, 68% contribute less than 10 percent of their monthly incomes to finance investment, which confirms the poor and fair saving and investment behaviour of respondents. About 98% indicate that they invest because it serves to them as a source of short-term funds rather than for future wealth and safety, family, or for retirement. The sample included high, medium, and low-risk averse respondents. The low and medium risk-averse respondents form about 87% of the sample population.

4.2. The effect of financial literacy on financial inclusion

In Table 3, results on the effect of financial literacy on financial inclusion are presented. The results show that there is a positive and significant relationship between financial literacy and account ownership. This implies that financial literacy increases financial inclusion in that when individuals can understand the basic concepts of finance, they do not shy away from owning accounts, which happens to be the most basic form of financial inclusion. The results further suggest a positive relationship between age and account ownership. Age squared, on the other hand, shows a negative relationship. The positive relationship means that younger individuals have a higher probability of owning formal accounts whereas the negative relationship denotes a lower probability of account ownership. At a much younger age, individuals are more inclined to own accounts. However, a reverse effect is observed when individuals get much older. This results in a non-linear relationship between age and financial inclusion. Although Asuming et al. (2019) find age to be a significant predictor of financial inclusion in Sub-Saharan Africa, results from this study show otherwise.

On the relationship between gender and financial inclusion, the results show that males are more likely to be financially included than their female counterparts. The coefficient of account ownership for males provides some evidence. From the results, this coefficient is positive. Further, a positive and

Table 4. The impact of financial literacy on stock market participation

	(1)	(2)	(3)
	InvStock	AgentTrade	StockConv
Finlit	0.196 (0.182)	-0.0849 (0.128)	-0.238* (0.136)
Age	0.0775 (0.433)	-0.560* (0.288)	-0.527* (0.300)
age2	0.0172 (0.0730)	0.0737 (0.0501)	0.0650 (0.0527)
lnHHsize	-0.0845 (0.177)	0.110 (0.122)	0.00913 (0.123)
Lnincome	-0.326 (0.317)	0.554** (0.252)	-0.472* (0.257)
Urban	-0.208 (0.164)	0.162 (0.107)	0.0320 (0.109)
Marriage Status	-0.0248 (0.182)	0.206* (0.121)	0.112 (0.123)
Emp. Status	0.217 (0.222)	-0.0506 (0.132)	-0.146 (0.134)
Gender	-0.0854 (0.164)	0.215** (0.104)	-0.0646 (0.107)
Education	-0.442 (0.451)	-0.370 (0.409)	-0.0616 (0.401)
Christian	0.171 (0.216)	0.0318 (0.127)	0.133 (0.125)
Greater Accra	0.453 (0.334)	-0.236 (0.205)	0.0855 (0.229)
Western	0.826** (0.349)	-0.235 (0.242)	-0.428* (0.238)
Eastern	0.324 (0.362)	-0.0690 (0.186)	0.0182 (0.199)
Volta	0.445 (0.381)	0.198 (0.254)	0.527* (0.269)
Ashanti	-0.430 (0.471)	-0.116 (0.248)	0.685*** (0.254)
Brong Ahafo	0.689 (0.462)	-0.278 (0.306)	0.233 (0.294)
Central	0.742* (0.408)	-0.113 (0.270)	-0.0269 (0.300)
Upper West	0.616** (0.285)	-0.0441 (0.174)	-0.117 (0.173)
Risk and return	0.943*** (0.171)	0.838*** (0.113)	0.687*** (0.113)
Knowl. of stock	1.178***	-0.351***	0.0345

(Continued)

	(1)	(2)	(3)
	InvStock	AgentTrade	StockConv
	(0.171)	(0.125)	(0.127)
GSE Awareness	0.0178	0.414***	0.529***
	(0.199)	(0.125)	(0.127)
Inv. Financing	0.0977	0.0261	-0.0848
	(0.101)	(0.0762)	(0.0831)
Inv. Objective	0.0239	0.585	1.105**
	(0.483)	(0.590)	(0.490)
Saving and Inv.	0.0485	-0.0434	0.00171
	(0.0926)	(0.0592)	(0.0615)
Risk averse	0.454**	0.0542	-0.115
	(0.193)	(0.116)	(0.122)
Constant	-0.372	-5.067**	4.026*
	(2.967)	(2.399)	(2.410)
Observation	756	733	712
Chi2	133.075	110.330	92.432
P-values	0.000	0.000	0.000

The table shows the results of the relationship between financial literacy and stock market participation using robust probit regression. The variables used to measure participation are Investment in stock (*InvStock*), willingness to buy sell shares when an agent visits (*AgentTrade*) and willingness to buy or sell share given the opportunity to convert shares to cash (*StockConv*). These variables are regressed against financial literacy (*Finlit*), household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), region of residence (Greater Accra, Western, Eastern, Upper East, Upper West, Northern, Volta, Ashanti) and financial behaviour (Saving and Investment behaviour, Investment Objective, Percentage of Monthly income used for investment and Risk Aversion). The parentheses show robust standard errors resulting from the analysis. ***, **, and * show statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are (1) Observations (2) Chi-square and (3) P-values

significant relationship exists between males and financial inclusion indicators such as usage of account for payment, frequency of withdrawal, and access to credit except for the usage of an account to save which shows a negative relationship. This is consistent with findings by Zins and Weill (2016) that in Africa financial inclusion is favoured by being a man.¹

In addition, married individuals are more likely to be financially included as shown by the positive relationship between the married and all financial inclusion indicators. Specifically, the positive relationship observed is only significant for access to credit. A significant positive relationship is expected because the married are seen to be more responsible and thus, banks are more willing to offer them credit. Masiyandima et al. (2017) however find no significant impact of marital status on financial inclusion.

The household size of individuals has an impact on their financial inclusion. Large households are expected to withdraw more frequently than smaller households. This is shown by the positive significant impact on the frequency of withdrawal. Given their large size it is clear that they have less incentive to save because of the needs of their large members. This makes it even worse for them to have access to credit. This is shown by the negative significant influence on access to credit. Although a statistically significant relation is not observed between household size and savings, this study partly confirms Baidoo et al. (2018) finding of a negative significant relationship between household size and savings.

Table 5a. The influence of financial inclusion on stock market participation (investment in stocks)

	(1)	(2)	(3)	(4)	(5)
	InvStock	InvStock	InvStock	InvStock	InvStock
Accto	-0.158 (0.290)				
Saving		-0.487*** (0.156)			
Freqwith			-0.113 (0.193)		
Upmt				0.0183 (0.151)	
Credits					-0.0143 (0.161)
Age	0.0769 (0.434)	0.119 (0.442)	0.0905 (0.433)	0.0819 (0.435)	0.0805 (0.436)
Age2	0.0170 (0.0737)	0.0126 (0.0741)	0.0156 (0.0729)	0.0164 (0.0736)	0.0167 (0.0737)
lnHHsize	-0.0769 (0.176)	-0.0834 (0.179)	-0.0665 (0.176)	-0.0752 (0.174)	-0.0743 (0.176)
lnincome	-0.344 (0.315)	-0.301 (0.319)	-0.331 (0.316)	-0.341 (0.314)	-0.341 (0.314)
Urban	-0.217 (0.166)	-0.242 (0.163)	-0.218 (0.165)	-0.225 (0.167)	-0.223 (0.165)
Marriage status	-0.0254 (0.179)	-0.00867 (0.181)	-0.0292 (0.181)	-0.0355 (0.179)	-0.0298 (0.184)
Emp. status	0.248 (0.223)	0.311 (0.223)	0.218 (0.219)	0.240 (0.219)	0.239 (0.220)
Gender	-0.0709 (0.166)	-0.0622 (0.167)	-0.0635 (0.167)	-0.0700 (0.165)	-0.0700 (0.165)
Education	-0.369 (0.451)	-0.211 (0.452)	-0.391 (0.460)	-0.418 (0.458)	-0.409 (0.455)
Christian	0.194 (0.218)	0.248 (0.219)	0.203 (0.218)	0.195 (0.217)	0.196 (0.216)
Greater Accra	0.539* (0.316)	0.482 (0.316)	0.505 (0.313)	0.519* (0.309)	0.519* (0.311)
Western	0.899*** (0.336)	0.848** (0.330)	0.874*** (0.332)	0.889*** (0.333)	0.887*** (0.330)
Eastern	0.400 (0.341)	0.347 (0.339)	0.382 (0.339)	0.391 (0.338)	0.393 (0.334)
Volta	0.540 (0.358)	0.443 (0.358)	0.508 (0.356)	0.528 (0.354)	0.528 (0.352)
Ashanti	-0.340 (0.455)	-0.478 (0.456)	-0.364 (0.460)	-0.347 (0.451)	-0.348 (0.456)
Brong Ahafo	0.803* (0.455)	0.700 (0.456)	0.785* (0.460)	0.798* (0.451)	0.796* (0.456)

(Continued)

	(1)	(2)	(3)	(4)	(5)
	InvStock	InvStock	InvStock	InvStock	InvStock
	(0.432)	(0.446)	(0.431)	(0.432)	(0.436)
Central	0.753*	0.716*	0.695*	0.730*	0.726*
	(0.421)	(0.431)	(0.418)	(0.413)	(0.412)
Upper West	0.652**	0.595**	0.620**	0.632**	0.630**
	(0.291)	(0.283)	(0.282)	(0.281)	(0.282)
Risk and return	0.936***	0.968***	0.930***	0.930***	0.932***
	(0.172)	(0.171)	(0.172)	(0.172)	(0.172)
Knowledge of stock	1.199***	1.228***	1.199***	1.197***	1.197***
	(0.168)	(0.172)	(0.169)	(0.168)	(0.169)
GSE Aware	0.0927	0.0710	0.0905	0.0789	0.0780
	(0.209)	(0.213)	(0.212)	(0.211)	(0.210)
Inv. Financing	0.0923	0.0804	0.0930	0.0886	0.0892
	(0.0987)	(0.101)	(0.0993)	(0.0995)	(0.0997)
Inv. objective	0.0138	0.148	-0.0128	-0.0150	-0.0131
	(0.482)	(0.479)	(0.470)	(0.480)	(0.482)
Saving and Inv.	0.0508	0.106	0.0515	0.0485	0.0507
	(0.0935)	(0.0932)	(0.0929)	(0.0936)	(0.0936)
Risk Averse	0.461**	0.498**	0.466**	0.452**	0.455**
	(0.197)	(0.201)	(0.196)	(0.195)	(0.197)
Constant	-0.195	-1.127	-0.377	-0.247	-0.252
	(2.967)	(2.999)	(2.974)	(2.954)	(2.956)
Observation	756	756	756	756	756
Chi2	129.970	150.085	132.066	128.623	129.981
P-values	0.000	0.000	0.000	0.000	0.000

Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*) together with household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Credit Card, Risk) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; investment in stocks (InvStock). InvStock is the dependent variables whereas financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the specified variables. Standard errors which are robust are reported in parentheses. ***, **, and * represent statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

The geographical location of individuals be it urban or rural influences their financial inclusion. The location urban shows a positive influence on all indicators of financial inclusion except for saving. This relationship can be explained by the high cost of living in urban centres, which makes it difficult to save coupled with the inordinate desire of urban dwellers to engage in fun-loving activities and leisure compared to rural dwellers. Another reason, which may explain the positive relationship for four indicators of inclusion, which are account ownership, use of account for payment, frequency of withdrawal, and credit is the concentration of banks and other financial institutions, which happens to be high in urban areas than in the rural areas. As a result, urban dwellers find banks closer to their places of settlement thus, they do not have to walk long distances to use their account for whatever transaction they desire. Urban centres also have the needed resources that facilitate banking operations, which cuts the cost of operation in urban areas. This serves as a motivation to site more banks in urban areas than in rural areas although rural dwellers may have some demand for financial services.

Table 5b. The influence of financial inclusion on stock market participation (participation motivated by agent visit)

	(1)	(2)	(3)	(4)	(5)
	AgentTrade	AgentTrade	AgentTrade	AgentTrade	AgentTrade
Accto	0.0249				
	(0.149)				
Saving		0.0861			
		(0.108)			
Freqwith			0.141		
			(0.138)		
Upmt				0.0462	
				(0.110)	
Credits					0.0793
					(0.105)
Age	-0.564**	-0.575**	-0.573**	-0.563**	-0.563**
	(0.287)	(0.289)	(0.287)	(0.287)	(0.287)
Age2	0.0744	0.0758	0.0752	0.0742	0.0733
	(0.0501)	(0.0503)	(0.0501)	(0.0500)	(0.0500)
lnHHsize	0.101	0.0998	0.0919	0.101	0.104
	(0.121)	(0.121)	(0.121)	(0.121)	(0.121)
Lnincome	0.565**	0.570**	0.544**	0.572**	0.563**
	(0.250)	(0.251)	(0.253)	(0.251)	(0.251)
Urban	0.166	0.170	0.158	0.162	0.158
	(0.107)	(0.107)	(0.107)	(0.107)	(0.107)
Marriage status	0.205*	0.204*	0.208*	0.201*	0.191
	(0.121)	(0.121)	(0.121)	(0.121)	(0.122)
Emp. status	-0.0601	-0.0734	-0.0483	-0.0611	-0.0663
	(0.132)	(0.133)	(0.132)	(0.131)	(0.132)
Gender	0.208**	0.210**	0.200*	0.207**	0.202*
	(0.104)	(0.104)	(0.104)	(0.104)	(0.104)
Education	-0.385	-0.410	-0.389	-0.385	-0.379
	(0.407)	(0.412)	(0.408)	(0.408)	(0.410)
Christian	0.0258	0.0195	0.0138	0.0240	0.0241
	(0.127)	(0.127)	(0.127)	(0.127)	(0.127)
Greater Accra	-0.278	-0.270	-0.263	-0.278	-0.270
	(0.198)	(0.197)	(0.198)	(0.197)	(0.197)
Western	-0.268	-0.259	-0.258	-0.260	-0.268
	(0.237)	(0.238)	(0.238)	(0.238)	(0.237)
Eastern	-0.104	-0.0939	-0.0917	-0.105	-0.105
	(0.179)	(0.179)	(0.180)	(0.179)	(0.179)
Volta	0.157	0.165	0.178	0.161	0.166
	(0.245)	(0.244)	(0.245)	(0.245)	(0.246)
Ashanti	-0.162	-0.152	-0.138	-0.160	-0.153
	(0.236)	(0.237)	(0.237)	(0.236)	(0.236)
Brong Ahafo	-0.330	-0.315	-0.312	-0.329	-0.312

(Continued)

	(1)	(2)	(3)	(4)	(5)
	AgentTrade	AgentTrade	AgentTrade	AgentTrade	AgentTrade
	(0.294)	(0.296)	(0.296)	(0.294)	(0.295)
Central	-0.125	-0.119	-0.0855	-0.118	-0.112
	(0.268)	(0.269)	(0.271)	(0.268)	(0.268)
Upper West	-0.0598	-0.0481	-0.0538	-0.0559	-0.0485
	(0.172)	(0.172)	(0.171)	(0.172)	(0.173)
Risk and return	0.841***	0.841***	0.841***	0.834***	0.838***
	(0.113)	(0.113)	(0.113)	(0.114)	(0.113)
Knowl. of stock	-0.357***	-0.360***	-0.357***	-0.361***	-0.356***
	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)
GSE Awareness	0.395***	0.398***	0.386***	0.396***	0.398***
	(0.124)	(0.123)	(0.124)	(0.123)	(0.123)
Inv. Financing	0.0263	0.0263	0.0261	0.0266	0.0284
	(0.0761)	(0.0758)	(0.0762)	(0.0761)	(0.0760)
Inv. objective	0.590	0.581	0.569	0.596	0.593
	(0.596)	(0.588)	(0.595)	(0.588)	(0.584)
Saving and Inv.	-0.0418	-0.0502	-0.0429	-0.0431	-0.0475
	(0.0595)	(0.0605)	(0.0593)	(0.0592)	(0.0599)
Risk averse	0.0496	0.0459	0.0404	0.0485	0.0427
	(0.117)	(0.116)	(0.116)	(0.116)	(0.117)
Constant	-5.153**	-5.130**	-4.907**	-5.206**	-5.133**
	(2.388)	(2.391)	(2.411)	(2.389)	(2.390)
Observation	733	733	733	733	733
chi2	107.675	108.282	109.447	107.707	107.570
P-values	0.000	0.000	0.000	0.000	0.000

Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*), household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Credit Card, Risk) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; willingness to buy or sell shares when an agent visits (AgentTrade). AgentTrade is the dependent variables whereas financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the specified variables. Robust standard errors are displayed in parentheses. Statistical significance at 1%, 5% and 10% level are indicated by ***, **, and * respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

Formal education and income have a similar influence on financial inclusion. Both education and income show a positive relationship with all indicators of financial inclusion with the exception of the use of account for payment where both show a negative relationship. In literature, Zins and Weill (2016) find a higher influence of income and education on financial inclusion in Africa. A more recent study by Yangdol and Sarma (2019) also adds to the plethora of evidence that income improves the financial inclusion level of individuals after analysing financial inclusion from a demand perspective.

Finally, the results of financial behaviour on financial inclusion indicators show that individuals who possess good saving and investment behaviour are more likely to have access to credit, use their account to save, frequently withdraw using their accounts, and also make payments using their

Table 5c. The effect of financial inclusion on stock market participation (participation motivated by stock conversion to cash)

	(1)	(2)	(3)	(4)	(5)
	StockConv	StockConv	StockConv	StockConv	StockConv
Accto	-0.0226				
	(0.155)				
Saving		-0.0187			
		(0.111)			
Freqwith			0.200		
			(0.143)		
Upmt				0.0980	
				(0.114)	
Credits					0.0406
					(0.109)
Age	-0.532*	-0.530*	-0.547*	-0.527*	-0.532*
	(0.297)	(0.297)	(0.297)	(0.296)	(0.297)
age2	0.0655	0.0655	0.0679	0.0650	0.0652
	(0.0519)	(0.0519)	(0.0519)	(0.0517)	(0.0519)
lnHHsize	-0.0161	-0.0152	-0.0289	-0.0128	-0.0133
	(0.122)	(0.122)	(0.122)	(0.122)	(0.122)
Lnincome	-0.432*	-0.433*	-0.474*	-0.421	-0.436*
	(0.256)	(0.256)	(0.258)	(0.256)	(0.256)
Urban	0.0450	0.0437	0.0340	0.0353	0.0420
	(0.108)	(0.109)	(0.108)	(0.109)	(0.109)
Marriage status	0.119	0.119	0.118	0.108	0.112
	(0.123)	(0.123)	(0.123)	(0.123)	(0.124)
Emp. Status	-0.168	-0.167	-0.156	-0.174	-0.175
	(0.135)	(0.135)	(0.134)	(0.134)	(0.135)
Gender	-0.0748	-0.0758	-0.0900	-0.0822	-0.0783
	(0.107)	(0.107)	(0.107)	(0.107)	(0.107)
Education	-0.0663	-0.0647	-0.0838	-0.0819	-0.0720
	(0.394)	(0.393)	(0.394)	(0.396)	(0.392)
Christian	0.112	0.114	0.0941	0.110	0.112
	(0.125)	(0.125)	(0.125)	(0.125)	(0.125)
Greater Accra	-0.00830	-0.0136	0.00610	-0.0152	-0.00872
	(0.214)	(0.214)	(0.215)	(0.214)	(0.214)
Western	-0.507**	-0.511**	-0.486**	-0.493**	-0.506**
	(0.233)	(0.234)	(0.235)	(0.234)	(0.233)
Eastern	-0.0762	-0.0794	-0.0633	-0.0816	-0.0770
	(0.189)	(0.190)	(0.191)	(0.189)	(0.189)
Volta	0.412	0.410	0.446*	0.418	0.418
	(0.261)	(0.261)	(0.262)	(0.262)	(0.262)
Ashanti	0.556**	0.553**	0.591**	0.556**	0.560**
	(0.241)	(0.241)	(0.242)	(0.239)	(0.240)
Brong Ahafo	0.0905	0.0858	0.116	0.0883	0.0964

(Continued)

	(1)	(2)	(3)	(4)	(5)
	StockConv	StockConv	StockConv	StockConv	StockConv
	(0.282)	(0.282)	(0.279)	(0.280)	(0.282)
Central	-0.0542	-0.0580	-0.00132	-0.0458	-0.0517
	(0.291)	(0.291)	(0.294)	(0.291)	(0.293)
Upper West	-0.148	-0.153	-0.145	-0.148	-0.146
	(0.172)	(0.172)	(0.171)	(0.172)	(0.173)
Risk and return	0.697***	0.698***	0.697***	0.684***	0.695***
	(0.113)	(0.113)	(0.113)	(0.115)	(0.113)
Knowl. of stock	0.0125	0.0134	0.0124	0.00282	0.0125
	(0.126)	(0.126)	(0.126)	(0.126)	(0.126)
GSE Awareness	0.482***	0.482***	0.463***	0.480***	0.482***
	(0.124)	(0.124)	(0.124)	(0.124)	(0.124)
Inv. financing	-0.0823	-0.0828	-0.0856	-0.0837	-0.0829
	(0.0831)	(0.0828)	(0.0832)	(0.0830)	(0.0830)
Inv. Objective	1.154**	1.155**	1.133**	1.138**	1.142**
	(0.489)	(0.486)	(0.493)	(0.481)	(0.485)
Saving and Inv.	0.00851	0.00980	0.00515	0.00349	0.00457
	(0.0615)	(0.0622)	(0.0613)	(0.0617)	(0.0621)
Risk averse	-0.121	-0.121	-0.135	-0.129	-0.127
	(0.122)	(0.122)	(0.123)	(0.122)	(0.123)
Constant	3.671	3.661	4.104*	3.591	3.717
	(2.397)	(2.397)	(2.415)	(2.393)	(2.395)
Observation	712	712	712	712	712
Chi2	89.737	89.656	89.729	91.892	89.873
P-values	0.000	0.000	0.000	0.000	0.000

Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*), household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Credit Card, Risk) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; preparedness to buy or sell shares given the opportunity to convert shares to cash (StockConv). StockConv is the dependent variables whereas financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the specified variables. Robust standard errors are shown in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

account. Saving and investment behaviour has a positive and significant relationship with payments using an account, use of an account to save, and access to credit. Also, individuals with credit cards are more likely to withdraw using their account and also make payment using their account. The positive significant relationship between the variables of interest demonstrates that the ownership of credit cards contributes to financial inclusion.

4.3. The effect of financial literacy on stock market participation

The results on the relationship between financial literacy and stock market participation are presented in Table 4. From the table, although a positive relationship exists between financial literacy and investment in stocks, a negative relationship is observed for the other two indicators of stock market participation, which are the willingness to buy or sell shares when an agent visits and also

Table 6a. The effect of financial literacy and financial inclusion on stock market participation (investment in stock)

	(1)	(2)	(3)	(4)	(5)
	InvStock	InvStock	InvStock	InvStock	InvStock
Fld*Accto	0.173 (0.184)				
Fld*Saving		-0.247 (0.210)			
Fld*Freqwith			-0.0357 (0.240)		
Fld*Upmt				0.132 (0.190)	
Fld*Credits					0.00915 (0.188)
Age	0.0814 (0.433)	0.0812 (0.440)	0.0832 (0.435)	0.0707 (0.434)	0.0806 (0.436)
Age2	0.0165 (0.0731)	0.0163 (0.0743)	0.0161 (0.0736)	0.0182 (0.0736)	0.0165 (0.0737)
LnHHsize	-0.0810 (0.176)	-0.0734 (0.175)	-0.0726 (0.175)	-0.0877 (0.175)	-0.0732 (0.175)
LnIncome	-0.333 (0.317)	-0.324 (0.314)	-0.339 (0.314)	-0.345 (0.315)	-0.341 (0.315)
Urban	-0.213 (0.165)	-0.243 (0.163)	-0.222 (0.165)	-0.221 (0.165)	-0.223 (0.164)
Marriage status	-0.0307 (0.182)	-0.0219 (0.179)	-0.0315 (0.180)	-0.0409 (0.179)	-0.0341 (0.181)
Emp. status	0.219 (0.221)	0.262 (0.218)	0.237 (0.217)	0.235 (0.219)	0.240 (0.220)
Gender	-0.0819 (0.165)	-0.0523 (0.164)	-0.0669 (0.165)	-0.0781 (0.165)	-0.0710 (0.163)
Education	-0.435 (0.453)	-0.391 (0.454)	-0.412 (0.457)	-0.426 (0.456)	-0.414 (0.455)
Christian	0.177 (0.215)	0.218 (0.218)	0.198 (0.217)	0.189 (0.216)	0.196 (0.217)
Greater Accra	0.462 (0.334)	0.566* (0.314)	0.520* (0.309)	0.490 (0.316)	0.519* (0.313)
Western	0.835** (0.348)	0.918*** (0.331)	0.888*** (0.331)	0.879*** (0.333)	0.885*** (0.335)
Eastern	0.340 (0.355)	0.427 (0.341)	0.396 (0.339)	0.377 (0.337)	0.389 (0.343)
Volta	0.460 (0.376)	0.542 (0.355)	0.528 (0.354)	0.506 (0.354)	0.525 (0.362)
Ashanti	-0.407 (0.463)	-0.354 (0.454)	-0.346 (0.453)	-0.380 (0.446)	-0.347 (0.452)
Brong Ahafo	0.721	0.823*	0.800*	0.766*	0.795*

(Continued)

	(1)	(2)	(3)	(4)	(5)
	InvStock	InvStock	InvStock	InvStock	InvStock
	(0.474)	(0.439)	(0.432)	(0.440)	(0.433)
Central	0.738*	0.728*	0.721*	0.733*	0.726*
	(0.409)	(0.412)	(0.412)	(0.412)	(0.412)
Upper West	0.621**	0.620**	0.630**	0.632**	0.631**
	(0.283)	(0.280)	(0.281)	(0.282)	(0.281)
Risk and return	0.940***	0.944***	0.930***	0.930***	0.932***
	(0.171)	(0.172)	(0.172)	(0.171)	(0.172)
Knowl. of stock	1.177***	1.208***	1.201***	1.181***	1.197***
	(0.171)	(0.171)	(0.169)	(0.170)	(0.172)
GSE Aware	0.0281	0.100	0.0807	0.0689	0.0777
	(0.204)	(0.212)	(0.211)	(0.212)	(0.210)
Inv. financing	0.0943	0.0837	0.0886	0.0876	0.0889
	(0.100)	(0.0993)	(0.0996)	(0.100)	(0.0996)
Inv. objective	0.00967	0.0483	-0.0169	-0.0124	-0.0119
	(0.485)	(0.480)	(0.479)	(0.472)	(0.480)
Saving and Inv.	0.0495	0.0609	0.0504	0.0418	0.0493
	(0.0927)	(0.0917)	(0.0933)	(0.0924)	(0.0925)
Risk averse	0.453**	0.454**	0.455**	0.444**	0.453**
	(0.192)	(0.195)	(0.193)	(0.193)	(0.194)
Constant	-0.306	-0.554	-0.276	-0.129	-0.253
	(2.963)	(2.944)	(2.957)	(2.957)	(2.958)
Observation	756	756	756	756	756
Chi2	131.918	131.493	129.060	129.338	129.165
P-values	0.000	0.000	0.000	0.000	0.000

The table presents the interaction of financial literacy and financial inclusion on stock market participation. Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*), financial literacy, household characteristics (Age, Age2, Hhsiz, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Risk aversion, Investment Objective, Investment Financing) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; Investment in stock (InvStock). InvStock is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. InvStock is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the variables specified. Robust standard errors are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

preparedness to sell or buy shares given the opportunity to convert shares to cash. The relationship is only significant for participation given the opportunity for cash conversion. The negative significant coefficient means that financial literacy is a significant determinant of stock market participation and that financial literates in Ghana are less likely to participate in the stock market even when they are offered stock conversion opportunities. This is contrary to findings by Banyen and Nkuah (2015) that stock market participation is not significantly determined by financial literacy because most Ghanaians are financial illiterates. Kuffour and Adu (2019) also find contrary evidence which suggests that less financially literate individuals are less likely to participate in the stock market. Kadoya et al. (2017) also find stock market participation to be significantly improved by financial literacy.

Table 6b. The effect of financial literacy and financial inclusion on stock market participation (participation motivated by agent Visit)

	(1)	(2)	(3)	(4)	(5)
	AgentTrade	AgentTrade	AgentTrade	AgentTrade	AgentTrade
Fld*Accto	-0.0824 (0.124)				
Fld*Saving		0.162 (0.161)			
Fld*Freqwith			-0.0309 (0.200)		
Fld*Upmt				0.00589 (0.158)	
Fld*Credits					0.221 (0.150)
Age	-0.560* (0.287)	-0.570** (0.288)	-0.561* (0.287)	-0.563** (0.287)	-0.562* (0.288)
Age2	0.0739 (0.0501)	0.0752 (0.0502)	0.0738 (0.0500)	0.0742 (0.0500)	0.0726 (0.0500)
LnHHsize	0.108 (0.122)	0.100 (0.122)	0.102 (0.121)	0.101 (0.121)	0.104 (0.121)
LnIncome	0.555** (0.252)	0.568** (0.251)	0.567** (0.250)	0.566** (0.251)	0.577** (0.252)
Urban	0.162 (0.107)	0.177* (0.107)	0.167 (0.107)	0.166 (0.107)	0.159 (0.107)
Marriage status	0.206* (0.121)	0.201* (0.121)	0.207* (0.121)	0.206* (0.121)	0.179 (0.121)
Emp. status	-0.0513 (0.132)	-0.0658 (0.131)	-0.0578 (0.131)	-0.0577 (0.131)	-0.0602 (0.132)
Gender	0.214** (0.104)	0.202* (0.104)	0.211** (0.104)	0.209** (0.104)	0.186* (0.104)
Education	-0.371 (0.409)	-0.385 (0.408)	-0.376 (0.407)	-0.377 (0.408)	-0.379 (0.406)
Christian	0.0300 (0.127)	0.0175 (0.127)	0.0267 (0.127)	0.0255 (0.127)	0.0214 (0.127)
Greater Accra	-0.238 (0.204)	-0.308 (0.202)	-0.274 (0.197)	-0.276 (0.201)	-0.324 (0.202)
Western	-0.238 (0.240)	-0.286 (0.240)	-0.263 (0.235)	-0.267 (0.237)	-0.321 (0.240)
Eastern	-0.0764 (0.184)	-0.126 (0.182)	-0.100 (0.180)	-0.104 (0.180)	-0.167 (0.184)
Volta	0.191 (0.250)	0.137 (0.247)	0.159 (0.246)	0.157 (0.246)	0.0955 (0.252)
Ashanti	-0.122 (0.246)	-0.189 (0.239)	-0.160 (0.236)	-0.162 (0.238)	-0.214 (0.238)

(Continued)

	(1)	(2)	(3)	(4)	(5)
	AgentTrade	AgentTrade	AgentTrade	AgentTrade	AgentTrade
Brong Ahafo	-0.286 (0.302)	-0.362 (0.300)	-0.326 (0.294)	-0.330 (0.297)	-0.394 (0.300)
Central	-0.113 (0.270)	-0.133 (0.270)	-0.124 (0.268)	-0.122 (0.268)	-0.137 (0.268)
Upper West	-0.0459 (0.173)	-0.0572 (0.172)	-0.0572 (0.171)	-0.0568 (0.171)	-0.0599 (0.172)
Risk and return	0.838*** (0.113)	0.839*** (0.113)	0.841*** (0.113)	0.841*** (0.113)	0.846*** (0.114)
Knowl. of stock	-0.350*** (0.125)	-0.361*** (0.125)	-0.356*** (0.126)	-0.358*** (0.126)	-0.375*** (0.126)
GSE Awareness	0.412*** (0.124)	0.383*** (0.124)	0.397*** (0.123)	0.396*** (0.123)	0.378*** (0.123)
Inv. financing	0.0274 (0.0762)	0.0262 (0.0758)	0.0267 (0.0760)	0.0270 (0.0760)	0.0327 (0.0759)
Inv. Objective	0.594 (0.589)	0.570 (0.593)	0.598 (0.594)	0.596 (0.594)	0.609 (0.589)
Saving and Inv.	-0.0431 (0.0591)	-0.0446 (0.0592)	-0.0406 (0.0591)	-0.0411 (0.0591)	-0.0460 (0.0593)
Risk Averse	0.0558 (0.116)	0.0513 (0.116)	0.0523 (0.116)	0.0514 (0.116)	0.0421 (0.116)
Constant	-5.082** (2.397)	-5.112** (2.389)	-5.180** (2.389)	-5.158** (2.389)	-5.225** (2.400)
Observation	733	733	733	733	733
Chi2	110.345	106.991	108.029	108.085	105.518
P-values	0.000	0.000	0.000	0.000	0.000

The table presents the interaction of financial literacy and financial inclusion on stock market participation. Financial inclusion indicators which are account ownership (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of withdrawal (*freqwith*) and usage of account to make payment (*upmt*), financial literacy, household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Risk aversion, Investment Objective, Investment Financing) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; willingness to buy or sell shares when an agent visits (AgentTrade). AgentTrade is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. InvStock is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the variables specified. Robust standard errors are reported in parentheses, ***, **, and * indicate statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

Although findings in the literature suggest that males are more financial literate than females (Atkinson & Messy, 2012; Klapper et al., 2015; Hasler & Lusardi, 2017) and thus are more likely to invest in stocks, the results show the contrary for investment in stocks and stock conversion as indicators of participation. The results show that financially literate males are less likely to invest in stocks and are also less likely to buy or sell their shares given the opportunity to convert them into cash. However, they are more likely to buy or sell their shares when they are visited by an agent. The relationship between males and participation in the stock market through an agent is positive and significant contrary to Banyen and Nkuah (2015) and Kuffour and Adu (2019) finding that gender is not a significant determinant of participation in the stock market. Although married individuals will

Table 6c. The effect of financial literacy and financial inclusion on stock market participation (participation motivated by stock conversion)

	(1)	(2)	(3)	(4)	(5)
	StockConv	StockConv	StockConv	StockConv	StockConv
Fid*Accto	-0.185 (0.134)				
Fid*Saving		-0.155 (0.168)			
Fid*Freqwith			-0.0892 (0.205)		
Fid*Upmt				-0.0729 (0.167)	
Fid*Credits					0.213 (0.156)
Age	-0.526* (0.298)	-0.528* (0.297)	-0.528* (0.297)	-0.533* (0.297)	-0.529* (0.296)
Age2	0.0650 (0.0524)	0.0649 (0.0520)	0.0649 (0.0519)	0.0659 (0.0520)	0.0632 (0.0517)
LnHhsize	0.00130 (0.123)	-0.0143 (0.122)	-0.0133 (0.122)	-0.0133 (0.122)	-0.0112 (0.122)
LnIncome	-0.462* (0.258)	-0.440* (0.256)	-0.431* (0.256)	-0.435* (0.256)	-0.425 (0.259)
Urban	0.0369 (0.109)	0.0352 (0.109)	0.0489 (0.108)	0.0448 (0.108)	0.0410 (0.109)
Marriage status	0.115 (0.123)	0.122 (0.123)	0.119 (0.122)	0.122 (0.123)	0.0999 (0.123)
Emp. status	-0.153 (0.134)	-0.161 (0.133)	-0.171 (0.133)	-0.169 (0.133)	-0.178 (0.133)
Gender	-0.0670 (0.107)	-0.0690 (0.107)	-0.0699 (0.108)	-0.0707 (0.107)	-0.0938 (0.108)
Education	-0.0660 (0.398)	-0.0651 (0.392)	-0.0713 (0.391)	-0.0684 (0.391)	-0.0709 (0.385)

(Continued)

Table 6c. (Continued)

	(1)	(2)	(3)	(4)	(5)
	StockConv	StockConv	StockConv	StockConv	StockConv
Christian	0.125 (0.124)	0.121 (0.125)	0.116 (0.125)	0.115 (0.125)	0.109 (0.125)
Greater Accra	0.0628 (0.227)	0.0163 (0.220)	-0.00792 (0.214)	0.00270 (0.218)	-0.0493 (0.220)
Western	-0.450* (0.237)	-0.494** (0.232)	-0.503** (0.233)	-0.507** (0.232)	-0.546** (0.238)
Eastern	-0.0139 (0.195)	-0.0558 (0.191)	-0.0667 (0.190)	-0.0701 (0.190)	-0.134 (0.198)
Volta	0.485* (0.268)	0.431 (0.265)	0.415 (0.262)	0.418 (0.261)	0.365 (0.266)
Ashanti	0.638** (0.255)	0.586** (0.242)	0.557** (0.240)	0.565** (0.244)	0.509** (0.244)
Brong Ahafo	0.186 (0.292)	0.117 (0.285)	0.0901 (0.282)	0.104 (0.286)	0.0255 (0.289)
Central	-0.0331 (0.297)	-0.0466 (0.292)	-0.0654 (0.291)	-0.0571 (0.291)	-0.0682 (0.292)
Upper West	-0.129 (0.173)	-0.152 (0.171)	-0.153 (0.171)	-0.153 (0.171)	-0.149 (0.172)
Risk and return	0.688** (0.113)	0.701*** (0.113)	0.696*** (0.113)	0.697*** (0.113)	0.704*** (0.113)
Knowl. of Stock	0.0316 (0.127)	0.0183 (0.126)	0.0185 (0.127)	0.0205 (0.127)	-0.00938 (0.126)
GSE Awareness	0.514*** (0.126)	0.494*** (0.124)	0.486*** (0.124)	0.486*** (0.124)	0.465*** (0.125)
Inv. financing	-0.0812 (0.0830)	-0.0812 (0.0827)	-0.0840 (0.0828)	-0.0817 (0.0828)	-0.0805 (0.0834)
Inv. Objective	1.138** (0.498)	1.183** (0.485)	1.150** (0.485)	1.151** (0.491)	1.151** (0.472)

(Continued)

Table6c. (Continued)

	(1)	(2)	(3)	(4)	(5)
	StockConv	StockConv	StockConv	StockConv	StockConv
Saving and Inv.	0.00357 (0.0614)	0.0111 (0.0613)	0.00931 (0.0612)	0.00941 (0.0615)	0.00197 (0.0617)
Risk averse	-0.114 (0.121)	-0.122 (0.121)	-0.121 (0.122)	-0.120 (0.122)	-0.132 (0.122)
Constant	3.912 (2.410)	3.669 (2.393)	3.641 (2.397)	3.682 (2.397)	3.655 (2.414)
Observation	712	712	712	712	712
Chi2	90.750	90.616	91.483	89.549	90.246
P-values	0.000	0.000	0.000	0.000	0.000

The table presents the interaction of financial literacy and financial inclusion on stock market participation. Financial inclusion indicators which are ownership of an account (*accto*), saving using an account (*saving*), access to bank credit (*credits*), frequency of usage (*frequith*) and usage of account to make payment (*upmt*), financial literacy, household characteristics (Age, Age2, Hhsize, Income, Urban, Employment status, Marriage status, and Religion), financial behaviour (Saving and Investment behaviour, Risk aversion, Investment Objective, Investment Financing) and the region of residence (Greater Accra, Western, Eastern, Central, Brong Ahafo, Upper West, Volta, Ashanti) are regressed against the stock market participation indicator; preparedness to buy or sell shares given the opportunity to convert shares to cash (StockConv). StockConv is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. InvStock is the dependent variables whereas financial literacy, financial inclusion indicators, household characteristics and financial behaviour are independent variables. A robust probit is employed to examine the relationship between the variables specified. Robust standard errors are reported in parentheses, ***, **, and * indicate statistical significance at 1%, 5% and 10% level respectively. The diagnostic tests reported are: (1) Observations (2) Chi-square (3) P-values

rarely invest in stocks, they are expected to participate in the stock market given that their agent visits them or they are given the opportunity to convert their shares to cash. There is a positive significant relationship between married individuals and stock market participation through an agent.

On the relationship between age and stock market participation, the results reveal that as individuals get older, they are more likely to participate in the stock market. This is shown by the positive coefficient of age squared for all three indicators of participation. This phenomenon can be explained by the fact that as people age, they tend to spend less and invest more in their retirement. The results also show a negative significant relationship between age and two indicators of participation which implies that the young are less likely to participate (because the young people need cash, but less income) in the stock market through an agent and even when they can easily convert their shares to cash.

When risk and return preferences of stock market participants are met by securities traded on the exchange, they tend to elicit more participation. This evidence is provided by the significant positive relationship between risk and return preferences and all three indicators of stock market participation. This finding confirms Banyen and Nkuah (2015) assertion that stock market participation is favoured by instruments that meet consumers' risk and return preferences. Also, when individuals are employed, they are more likely to participate in the stock market by investing in stocks. This is evidenced by the coefficient of employment which is positive but not significant. Conversely, a negative relationship is observed between employment and the other two indicators of stock market participation. The results also indicate that stock market participation is influenced by household incomes. In that, as households' monthly income increases individuals are more likely to buy or sell their shares when an agent visits them. These individuals tend to shy away from buying or selling their shares when offered the opportunity to convert their shares to cash. In both cases, statistical significance is observed. When individuals' objective for investing is to have access to short-term funds, they are more likely to participate in the stock market when presented with the opportunity to convert their shares into cash since their investment objective is met.

Finally, awareness and knowledge of stock contribute significantly to stock market participation in Ghana. This implies that financial literates who have knowledge that stocks are traded on the Ghana Stock Exchange and are aware of the GSE and their activities are more likely to participate in the stock market. Also, risk-averse financial literates are more likely to invest in stocks and participate through an agent than when presented with shares conversion opportunities. It can be inferred that their understanding of basic finance tends to moderate their level of aversion which enables them to invest in stocks. A positive significant relationship is seen between investment in stock and knowledge of stock whereas a positive significant relationship is observed for GSE awareness and willingness to trade when an agent visits and trades one's shares given that the individual has the opportunity to convert his shares to cash. This is in line with Acquah-Sam (2014) findings that lack of knowledge of the workings of the capital market is a major reason for the lack of participation of Ghanaians in the stock market. Guiso and Jappelli (2005) also document similar findings that awareness is a significant predictor of stock market participation. The relationship between knowledge of stock and buying or selling shares through an agent is negative and highly significant. This suggests that when individuals have knowledge of the securities traded on the stock market they are less likely to buy or sell their shares when an agent visits since they understand the workings of the stock market and would not want to bear the charges that come with using an agent to trade.

4.4. The influence of financial inclusion on stock market participation

On the relationship between the stock market participation indicator *Invstock* and all five indicators of financial inclusion, the results in Table 5a show no statistical significance except for use of an account to save. The relationship is negative and highly significant. This suggests that when individuals are financially included using their account to save, their chances of participating in the

stock market is limited. This can be attributed to the fact that saving using an account provides more incentives in terms of ease and flexibility of having access to one's funds as and when needed. Also, an individual is more likely to have access to packages offered by banks by virtue of saving using an account. Regional analysis reveals that stock market participation through financial inclusion is likely to be high in Greater Accra, Western, Brong Ahafo, and Upper West Region. These regions demonstrate a positive significant relationship with investment in stocks.

Having knowledge of stocks and risk and return preference also show a positive and significant relationship with investment in stock. This implies that there is a high probability that financially included persons who have knowledge of the stocks traded on the Ghana Stock Exchange and have their risk and return preferences met will participate in the stock market. Risk-averse individuals who are financially included are more likely to participate in the stock market because their risk and return preferences have been met. Results on the control variables show no significant impact on stock market participation through financial inclusion. However, it can be observed that financially included Christians and the employed demonstrate a higher likelihood to participate in the stock market.

Using **AgentTrade** as an indicator of stock market participation in [Table 5b](#), the results show no significant impact of all five financial inclusion indicators on stock market participation. The results also indicate that as the incomes of individuals who are included financially increase, they are more likely to participate in the stock market. The relationship between income and stock market participation through an agent is positive and significant. Also, males and married individuals are more likely to participate in the stock market. A positive and significant relationship is observed between males and stock market participation through an agent. However, the employed, individuals with formal education and persons with knowledge of stocks are less likely to participate in the stock market through an agent. The relationship is negative and significant for individuals with knowledge of stocks. Awareness, on the other hand, contributes significantly to stock market participation positively.

It can be observed from [Table 5c](#) that even when the indicator for participation is **StockConv** the impact of financial inclusion on stock market participation is not significant which is similar for previous estimates using **InvStock** and **AgentTrade** as indicators of participation.

With regards to risk and return preferences and awareness, they show a positive significant relationship with participation given conversion whereas knowledge of stock shows a positive relationship although not significant. This implies that individuals who have knowledge of stock are less likely to buy or sell their shares given stock conversion opportunities. More so, having an investment objective is significant to stock market participation when an individual is financially included. The aged are also more likely to participate in the stock market given the opportunity for conversion than the young. In contrast, the vice versa is observed for age and age squared for investment in stocks.

In conclusion, stock market participation improves when financially included individuals are visited by their agents. This evidence is provided by the positive coefficient of all five indicators of financial inclusion when they are regressed on **AgentTrade**.

4.5 The interactive effect of financial literacy and financial inclusion on stock market participation.

[Table 6a](#) presents the results of the interactive effect of financial literacy and financial inclusion on stock market participation using **InvStock** as an indicator of participation. The results indicate that the interaction of financial literacy and financial inclusion indicators do not have a significant impact on stock market participation although the coefficient of financial literacy and indicators of inclusion such as account ownership, use of account for payment, and access to credit is positive. The level of

risk aversion, risk and return preferences and knowledge of stock tend to be significant predictors of stock market participation given that a person is financially literate, and included financially. This is shown by the positive and statistically significant coefficients. On a regional level, financial literates who are also financially included in Greater Accra, Western, Brong Ahafo, Central, and Upper West regions are more likely to participate in the stock market by investing in stocks.

Using **AgentTrade** as an indicator of stock market participation, **Table 6b** presents the results of interacting financial literacy and financial inclusion on stock market participation. The results show a similar effect on stock market participation when *InvStock* is used as an indicator of participation. The only distinguishing feature in the case of using *AgentTrade* is that although there is no significant impact of financial literacy and inclusion on stock market participation, the coefficient of interacting financial literacy and saving using an account is positive.

On the control variables, gender, age, marital status, monthly household incomes and the location of respondents show a significant relationship with stock market participation when financial literacy and financial inclusion interact. The results show that even with financial literacy and inclusion the young are less likely to participate in the stock market. Also, males who are financial literate and included are more likely to participate than their female counterparts. Further, stock market involvement of financial literates and the included will rise as they experience an increase in their monthly incomes. Urban dwellers are more likely to participate in the stock when they are financially educated and included by means of using an account to save. Married individuals will lean towards active participation in the stock market when they are financial literates and included financially.

When **StockConv** is used as an indicator of stock market participation, age, monthly incomes, investment objective, awareness, and risk and return preferences of respondents tend to influence stock market participation significantly when financial literacy and financial inclusion variables are interacted. **Table 6c** presents the results to that effect.

Insert 6a, b and c here

5. Conclusion

This study examines financial literacy, financial inclusion and, stock market participation across a sample of 1,966 respondents across the ten regions of Ghana for the period 2018. Financial literacy is measured as an index from 0–7. Financial inclusion is also measured using five indicators, which capture access and usage of accounts. Stock market participation is measured in this study using three indicator variables. Biprobit regression model is used to examine the relationship between financial literacy and financial inclusion. With regards to the effect of financial literacy on stock market participation and the influence of financial inclusion on stock market participation, a robust probit regression is used by the study. Having established the effect of financial literacy on stock market participation and the effect of financial inclusion on stock market participation separately, the interaction effect of these two key variables is subsequently examined on participation.

The results suggest that financial literacy improves financial inclusion significantly. More so, the effect of financial literacy on stock market participation is mixed. Further, the impact of financial inclusion through using an account to save on stock market participation is negative and highly significant hence does not improve participation. Finally, the interaction of financial literacy and financial inclusion on stock market participation yields no significant impact.

Our results give rise to the following policy implications: First, the study identifies a highly significant and positive relationship between financial literacy and account ownership. It is, therefore, suggest

that financial inclusion policy initiatives should be backed by financial literacy in order for financial inclusion to yield the intended outcomes. Second, it is recommended that financial inclusion policy-makers focus on the gender gap in financial inclusion to be able to come up with ways of bridging it for holistic financial development as females usually form a majority of the world's population. Third, although the main variables of financial inclusion and financial literacy do not have a significant impact on stock market participation, other factors such as awareness of the Ghana Stock Exchange, knowledge of stocks traded on the exchange, risk and return preferences, investment objective, and level of risk aversion significantly affect stock market participation in Ghana. It is therefore suggest that the Ghana Stock Exchange should educate the general public about the securities traded on the exchange, what they engage in, their mandate, and the importance of the exchange to economic development. This will go a long way to increase awareness among the public and thus elicit participation among the general public. Fourth, the agents should consider the risk and return preferences as well as investment objectives during the introduction of new stocks to consumers to elicit participation. Agents should not be fixated on their commissions but should rather seek the well-being of consumers and not be exploitative. They should fully disclose the risk and returns associated with stocks and not engage in insider trading. Finally, the rights of financial consumers should be adequately protected by existing laws, so that even financial illiterates would find it safe to own and use their accounts and also participate in the stock market. Financial institutions can also take up the initiative of educating their clients on basic financial concepts and helping them to cultivate good saving and investment behaviour as they go a long way to elicit increased patronage of account ownership and subsequent usage.

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Note

1. Our results also suggest that Ghanaian women are likely to save than the men.

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