

Intensifying financial inclusion through the provision of financial literacy training: a gendered perspective

Isaac Koomson

ikoomso2@une.edu.au / koomsonisaac@gmail.com

Renato A Villano

rvillan2@une.edu.au

David Hadley

dhadley@une.edu.au

Forthcoming: Applied Economics (July 2019)

NETWORK FOR SOCIOECONOMIC
RESEARCH AND ADVANCEMENT

WORKING PAPER

NESRA

nesra/wp/19/002

Intensifying financial inclusion through the provision of financial literacy training: a gendered perspective

Isaac Koomson^{1 a b}

E-mail: ikoomso2@une.edu.au / koomsonisaac@gmail.com

Renato A Villano^a

E-mail: rvillan2@une.edu.au

David Hadley^a

E-mail: dhadley@une.edu.au

^a UNE Business School, Faculty of Science, Agriculture, Business and Law, University of New England, Armidale, NSW, Australia

^b Network for Socioeconomic Research and Advancement (NESRA), Accra, Ghana

Abstract

This study examines the impact of financial literacy training on financial inclusion and its intensity using data collected from a randomised control trial. An additive index of financial inclusion is generated from four financial inclusion indicators. After testing for baseline balance and estimating impact, our findings show that beneficiaries of financial literacy training are about 7.2 percentage points more likely to own an account while they are 8.2 percentage points more likely to save. Overall, beneficiaries of financial literacy training had a 9.5 percentage points advantage in receiving financial assistance than their non-beneficiary counterparts. While financial literacy training only showed a significant impact on account ownership for female-beneficiary households, male-beneficiary households also only experienced an impact in their savings behaviour and receipt of financial assistance. Moreover, beneficiaries of financial literacy training are more likely to intensify their financial inclusion and the intensity of inclusion is higher for male and young beneficiary households. The results highlight the need to strengthen financial literacy training in order to close the gender financial inclusion gap.

Keywords: Financial inclusion; Financial literacy; Gender; Impact; Poverty
JEL Codes: C93, D14, D91, E21, G00

¹ Corresponding author: ikoomso2@une.edu.au / koomsonisaac@gmail.com

1.1 Introduction

Improvements in levels of financial inclusion (FI) has positive implications at the micro and macro levels within an economy. At the micro level, FI offers incremental and complementary solutions to reduce poverty; promote inclusive development and aid in the achievement of the Sustainable Development Goals (SDGs) (Chibba, 2009; Lopez & Winkler, 2018; Wang & Guan, 2017). At the macro level, FI can aid in the expansion of potential growth through the mobilization of savings and by attracting more firms into the formal sector, resulting in improved tax revenues (AFI, 2015; Soumaré, Tchana Tchana, & Kengne, 2016). This necessitates the implementation of policies that do not only expand but intensify FI at the individual, household and national levels. This study examines the impact of financial literacy (FL) training on FI and its intensity using data generated by a randomized control trial (RCT). Specifically, we establish the gender heterogeneities in the FL-FI nexus.² Furthermore, we determine the life-cycle impact of FL training on FI. The use of an RCT helps to provide stronger evidence that FL is a credible policy for improving FI and the results of the gender dimensional analysis will aid the design of effective programs that serve their specific gender needs and hence will enhance programme efficiency and outcomes.

This study makes the following contributions to the extant literature: (i) it takes the analytical discourse beyond extension to intensification of FI by exploring how households can own and use other financial products; (ii) it serves as a response to the call (see Section 2.1 below) for the use of an RCT in asserting causality between FL and FI; and finally, (v) the analysis of the life-cycle impact of FL on FI assists in the identification of age groups to target with specific training.

2.1 Research Context

The interest to undertake an inquiry into the FL-FI nexus is motivated by at least four thematic strands in recent FL-FI literature. Notable amongst these are: (i) the World Bank's target of achieving Universal Financial Access (UFA) by 2020; (ii) evidence of a gender gap in FI; and (iii) calls for an RCT to assert causality in the FL-FI nexus.

- (i) In 2015, the World Bank collaborated with private and public sector partners and set an ambitious target to achieve UFA by 2020 and help promote FI. Specifically, the World Bank and the International Financial Corporation (IFC) have committed to enabling 1 billion people to gain access to a transaction account through targeted interventions (World Bank, 2018). Improved access to a transaction account (including mobile money) has been considered the first step toward broader FI; which would include access to credit, ownership and use of financial products (i.e. credit and debit cards, ATMs, e-banking etc), insurance products, receipts of remittances and other indicators that are peculiar to some countries (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015; Koomson & Ibrahim, 2018; World Bank, 2018). The key drivers to be used by the World Bank and IFC in achieving UFA by 2020 are FL and awareness (World Bank, 2018). Evidence which supports the World Bank's decision to utilise FL can be garnered from a number of studies that have shown that FL significantly improves FI (Atkinson & Messy, 2013; Calcagno & Monticone, 2015; Grohmann, Kouwenberg, & Menkhoff, 2014; Klapper, Lusardi, & Panos, 2013).

² Although gender is a social construct that distinguishes the power, roles, responsibilities, behaviours and obligations of women from those of men in a society (Kaliyath, 2016), the gender analysis undertaken here attempts to reflect differences in the impact of FL on males and females. A number of studies (Deere, Alvarado, & Twyman, 2012; Fossen, 2012) have also used this approach.

- (ii) There is a 7% gender gap in FI measured in terms of account ownership (Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018). Despite an overall improvement in global total account ownership from 51% (in 2011) to 69% (in 2017), evidence shows that 65% of women own an account, compared to 72% for men in 2017. This gender gap is more pronounced in developing economies, where 59% of women and 79% of men have accounts (Demirguc-Kunt et al., 2018). Fanta and Mutsonziwa (2016) have indicated that gender gaps exist even after controlling for demographic, geographic and economic characteristics. The evidence of this gap warrants the inclusion of a gender-dimension to analyses of the FL-FI nexus to inform the design of FL training programmes to serve specific gender needs.
- (iii) Most studies on the impact of FL have used quasi-experimental designs and, in some cases, applied ex-post analyses to capture respondents with and without the FL intervention, however, those that have used an RCT are few (Karlan et al., 2016; Lusardi & Tufano, 2015). Without an RCT, it is difficult to assert that the impact on FI emanates from the FL intervention. RCTs are considered as the gold standard of experimental design because they control for self-selection bias in dealing with the counterfactual by randomly assigning potential beneficiaries of an intervention to either the control or the experimental group. This results in high levels of internal validity (Kondo, Orbeta, Dingcong, & Infantado, 2008; Price et al., 2011). Additionally, the content of the FL training program also has the potential to influence outcomes (Atkinson & Messy, 2011; Jappelli & Padula, 2013). Given these experimental design gaps it is prudent to explore this issue by employing an RCT and to structure the FL training to incorporate content that cut across the concept of financial knowledge, Attitude and practice (KAP) (Atkinson & Messy, 2011; Fund, 2013).³

To provide empirical evidence in relation to the issues raised above, we use data from Ghana. According to the Ghana Statistical Service (2014), only 35.4% of Ghanaians have a savings account or are contributing to a savings scheme. For this savings population, males rank higher (58.6%) than females (41.3%). Just 34.1% of households have some kind of insurance policy and only about 11% of households have access to credit. These figures demonstrate that large numbers of Ghanaians are financially excluded (71% in 2011 and 64% in 2014). FI in Ghana, in terms of ownership of financial products (from current, savings and fixed deposit to E-zwich accounts), displays differences along gender and locational dimensions.⁴ In urban areas, males have 54% ownership whilst females have 46% and in rural areas, the disparity is larger: males 61%, females 39% (Ghana Statistical Service, 2014a).

Empirical studies on the FL-FI nexus in Ghana are few and those that have been undertaken are biased towards using student participants. Berry et al. (2015) studied two school-based programmes that were randomly controlled and found that FL had a significantly positive impact on FI through their savings behaviour. Mireku (2015) also studied 3,932 students from 12 universities and concluded that FL has a positive influence on the financial opinions, decisions and practices of students. Boakye and Amankwah (2012) found a positive and significant relationship between FL and usage of financial products whilst Nunoo and Andoh (2012) found that SME owners' level of FL is critical in explaining their level of FI. Chowa (2015) also used an RCT for an FI programme for the youth and concluded with a call for FL to encourage FI (savings). Only two of these studies (Berry et al., 2015; Chowa et al.,

³ In this paper the terms financial practice and financial behavior are used interchangeably

⁴ This is the National Switch and Smart card payment system in Ghana which offers Deposit taking financial institutions (i.e. Universal banks, Rural banks and Savings and Loans) a platform to interoperate (Ghana Interbank Payment and Settlement Systems Limited - GhIPSS, n.d.)

2015) used an RCT and the latter focused solely on FI. Most studies also treat both males and females similarly although it is documented that males and females exhibit different financial behaviours (Chen & Volpe, 2002; Lusardi & Mitchell, 2008).

The rest of the paper is structured as follows: section three describes the data and the randomisation process, explains how key variables are measured and tests for baseline balance. The impact of FL training on FI and its intensity and the gender dimension of the analysis are presented in section four whilst section five concludes and makes recommendations.

3.1 Data

Our data was taken from the Rural and Agricultural Finance Programme's (RAFiP) project: "*Impact Assessment of Experimental Enhanced Financial Literacy Training for beneficiaries of Northern Rural Growth Programme (NRGP), Roots and Tuber Improvements and Marketing Programme (RTIMP) and Rural Enterprise Programme (REP)*" The project sampled beneficiaries of the NRGP, RTIMP and REP using an RCT. To address problems of potential selection bias, the agency responsible for data collection [The Directorate of Research, Innovation and Consultancy (DRIC-UCC) at the University of Cape Coast (UCC), Ghana] included non-beneficiaries of the three poverty reduction interventions.

NRGP, RTIMP and REP provide farmer-support services in the form of rural finance, training, rural infrastructure, commodity supply chain development and other assistance. The basis for targeting these beneficiaries is because they have been previously assessed as being poor households before their selection into the three programmes

In Appendix 1, a CONSORT flow diagram showing the logical framework used in the RCT is presented, a description of the process is given below.

3.1.1 Sampling and recruitment

To begin the sampling process, a sample frame of beneficiaries and non-beneficiaries of NRGP, RTIMP and REP was generated from available registries. Beneficiary lists were provided by the schedule officers of the three programmes whilst non-beneficiary lists were provided by their respective District Assemblies. Eligibility criteria were based on commonality of characteristics (such as economic activities and location) between the two groups. Potential spill-over effects (contamination) were resolved by dropping one out of every two respondents that belonged to the same social/economic network. To belong to a network, respondents must have been a member of agriculture, milk or other cooperatives; credit or savings groups; youth clubs or sports groups; trade union, business or professional groups; and other minor groupings. The eligible respondents were spread across 10 Districts chosen from seven regions of Ghana. These Districts were West Gonja, Central Gonja and Savelugu (from the Northern Region); Bawku West (Upper East Region); Wa West (Western Region); Wenchi and Kintampo (Brong Ahafo Region); Nkwanta south (Volta Region); Adansi (Ashanti Region); and Abura-Asebu-Kwamankese (Central region). Across all Districts, a total of 801,111 eligible respondents were selected - 66,911 beneficiaries and 741,200 non-beneficiaries (see Appendix 1 for details). A second stage eligibility filter was applied on both beneficiaries and non-beneficiaries, after which the remaining 1,500 were enumerated to be part of the study. The sample was stratified by programme, region, district and gender.

3.1.2 Randomisation process

Out of the 1,500 enumerated respondents, 300 were randomly allocated to FL training (105 males and 195 females) in March 2016; with the remaining 1,200 forming the control group.

3.1.3 Intervention components

Under the FL training, beneficiaries received education in three main areas (which was divided into modules):

1. Financial goals - by the end of this module, beneficiaries were able to answer the following questions: what is the meaning of goals? How do you set achievable financial goals? What types of financial goals are there, and how do you prioritise them?;
2. Financial management - under this module, beneficiaries were taught the meaning of money, handling money, good borrowing behaviour, savings, insurance, remittances, transfers, financial products, and financial concepts;
3. Business finance and business management - within this module, beneficiaries learnt various strategies relating to the development of a work plan, budgeting, and record keeping.

The FL training was provided in all Districts in March 2016 by professionals from the University for Development Studies, Tamale (an accredited training service provider). The training took two days. All participants took keen interest in the training and were present on both days. For the training to be effective, the language of instruction was the participants' local language because that was their request during the baseline survey. Those in the southern sector (Adansi South and Abura Asebu Kwamankese and Nkwanta South) used the Akan language, whereas those in the Northern part of the country used Mole Dagbani as the medium.

3.1.4 Data collection procedures

On 25th November 2015, baseline data was collected from 1,441 respondents (59 people were withdrawn from the study for various reasons including; lack of response, relocation etc. - see Appendix 1). Of the baseline sample, males made up 532 (37%) and females 909 (63%). The bias of the sample towards women is because of the existence of gender gaps in income, poverty, wealth, education, inheritance, access to healthcare and household decision-making in Ghana (Akotia & Anum, 2015). Data collection was done by 40 field assistants and supervisors who were recruited based on their educational level and proficiency in at least two Ghanaian languages.

Endline data collection was done from September 1st to the 20th 2016 after revising the instruments to incorporate questions on the training intervention. The sample size for the endline survey was 1,415 (37% male and 63% female) because of a 13% attrition rate which had to be resolved through a process of random replacement. After the random replacement, the gap between baseline and endline surveys reduced to 1.8%. Specifically, beneficiaries of the FL training were reduced to 261 (108 males and 153 females) whilst the control group was reduced to 1,154 people (418 males and 736 females). Although the period between baseline and endline data collection may seem short, it is in line with Berry, Karlan and Pradhan's (2015) analysis of a FL education programme for a youth project in Ghana, which started in October 2010 and ended in July 2011. Similarly, a study that offered business training in Vietnam collected endline data five to six months after training to capture short-term effects of

that training (Bulte, Lensink, & Vu, 2016). The revised instruments were approved by RAFiP and validated by DRIC-UCC.

3.1.5 Ethical issues

The research instruments met the Institutional Review Board (IRB) of UCC's standardised safeguards on research ethics. Informed consent was also sought from each respondent before administering the instrument.

3.2 Measurement of key variables

3.3.1 Measurement of FI

We adapt the World Bank's multidimensional measure of FI that incorporates the ownership and use of a range of financial products and services in the financial system (and which includes; access to credit, receiving/seeking financial assistance, ownership of accounts - including mobile money accounts, savings behaviour, insurance products, receipt of remittance, and others) (Demirgüç-Kunt et al., 2015; Fanta & Mutsonziwa, 2016). We use four out of these many indicators; ownership of account, savings behaviour, access to credit, and financial assistance (see Appendix 2). Apart from using them separately, we also generated an additive index from the four binary indicators which resulted in a count variable ranging between a maximum count of 4 and a minimum of zero. Although our data limits us to only four indicators, we are guided by the conclusions of Stenner, Stone, and Burdick (2009) who state that not including all indicators or, altering the indicators of a measure, will not transform the latent variable being measured. Such an additive index has been used previously in studies to measure FI (Grohmann et al., 2014); entrepreneurial traits of students (Peprah, Afoakwah, & Koomson, 2015) and an employment security index (Nunoo, Darfor, Koomson, & Arthur, 2016). After discussing the data collection process and defining variables, we proceed to examine test for baseline balance.

3.4 Testing for baseline balance

We present some summary statistics on the study sample in Table 1 using baseline data collected in November 2015. As a test of baseline balance, we present mean differences across treatment and control groups for a battery of outcomes including demographic and household characteristics. Consistent with the approach suggested and applied by Deke (2014); Gertler et al. (2016); Duflo, Dupas and Kremer (2017), we use a linear probability model (LPM) of the form specified in Eq. 1.

$$Y_i = \alpha + \beta Treat_i + \varepsilon_i \quad (1)$$

where Y represents any of the outcomes of interest and $Treat$ is whether or not the household head benefitted from FL training. For each of the variables, we present β , which is the difference in average outcome between treatment and control group and its p-value. We also show the mean outcome in the control group (α). Since the randomization was at the household level and is represented by one person, we do not cluster the standard errors (Duflo et al., 2017). The LPM fits the data because the FL is a binary variable and is not subject to the potential biases that are associated with estimates of continuous variables when used in an LPM (Deke, 2014).

In Table 1, we estimate the regressions and show the means for the full sample in column 1 and follow up with separate models for male-female subsamples in columns 2 and 3. Although randomisation typically achieves balance, there are some few cases where some measures will not be balanced (Banerjee, Duflo, Glennerster, & Kinnan, 2015; Duflo et al., 2017). In our case, the treatment group in rural areas were 6.9 percentage points lesser than the control group of the training. The difference in treatment and control groups in rural areas is wider among males than females because the gender stratification of the sampling was done to include more females due to their limited economic empowerment (see section 3.1.4). On the average, males in the treatment group recorded household size there was, one person lesser (significant at 5%) than those recorded by the control group. Similar to Duflo et al. (2017), these isolated cases of imbalances are not overly concerning because we considered 12 variables across two groups so having few significant variables by chance can be expected. Across all the FI indicators, there is no statistical difference between the proportion of formal accounts owned, savings made, credit accessed, and financial assistance received by treatment and control groups. This also holds for both males and females. The average number (intensity) of FI indicators taken up by treatment and control groups are not statistically different. In other words, the FI indicators, including intensity, are similar for treatment and control groups.

Respondents were, on average, 45 years old at the commencement of the study; this figure was 47 years for males and 43 years for females. More than 30% of the participants had attained some form of formal education, although there was a gender gap. Whilst more than 42% of males reported having received formal education, only 24.6% of females did. Rural participants were about 91% of the respondents. On average, participants' households were made up of about 6 people

Table 1: Baseline summary statistics

Variables	(1) Full	(2) Male	(3) Female
<u>Account ownership</u>			
Treatment-control difference	0.057	0.102	0.009
p-value	(0.103)	(0.259)	(0.835)
Comparison/control mean	0.399	0.500	0.342
<u>Engaged in Savings</u>			
Treatment-control difference	0.040	0.085	-0.010
p-value	(0.413)	(0.207)	(0.887)
Comparison/control mean	0.661	0.649	0.671
<u>Access to Credit</u>			
Treatment-control difference	0.029	-0.047	0.072
p-value	(0.376)	(0.370)	(0.278)
Comparison/control mean	0.329	0.399	0.290
<u>Received financial Assistance</u>			
Treatment-control difference	0.040	0.004	0.049
p-value	(0.218)	(0.943)	(0.200)
Comparison/control mean	0.219	0.313	0.171
<u>Financial inclusion index</u>			
Treatment-control difference	0.183	0.193	0.132
p-value	(0.137)	(0.174)	(0.225)
Comparison/control mean	1.148	1.436	0.987
<u>Rural</u>			
Treatment-control difference	-0.069**	-0.094**	-0.056*

Table 1. (Continued)

p-value	(0.024)	(0.045)	(0.051)
Comparison/control mean	0.911	0.945	0.892
<u>Age</u>			
Treatment-control difference	-2.232	-4.506	-0.981
p-value	(0.411)	(0.235)	(0.366)
Comparison/control mean	44.624	47.052	43.264
<u>Household size</u>			
Treatment-control difference	0.309	0.929**	-0.151
p-value	(0.168)	(0.021)	(0.461)
Comparison/control mean	5.945	6.071	5.875
<u>Education</u>			
Treatment-control difference	0.137	0.119	0.132
p-value	(0.206)	(0.253)	(0.186)
Comparison/control mean	0.311	0.427	0.246
<u>Durable asset per capita</u>			
Treatment-control difference	0.037	-0.278	0.243
p-value	(0.644)	(0.366)	(0.185)
Comparison/control mean	1.652	1.778	1.581
<u>Marital status</u>			
Treatment-control difference	-0.074	-0.028	-0.080
p-value	(0.199)	(0.551)	(0.220)
Comparison/control mean	2.174	2.000	2.271
<u>Religious affiliation</u>			
Treatment-control difference	-0.115	-0.128	-0.112**
p-value	(0.410)	(0.579)	(0.047)
Comparison/control mean	2.634	2.675	2.612
Observations	1,441	532	909

P-values in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.1 Impact of FL training on FI

In line with previous studies (Banerjee et al., 2015; Bruhn & McKenzie, 2009; Duflo et al., 2017; Gertler et al., 2016), we derive the impact of FL training on FI by estimating the average treatment effect using a model similar to the one presented in Eq.1 but we include all the variables used in testing for balance (Bruhn & McKenzie, 2009; Scott, McPherson, Ramsay, & Campbell, 2002). Since the endline accounts for all the variables as covariates, the treatment effect model is slightly modified and specified in Eq. 2.

$$Y_i = \alpha + \beta Treat_i + \gamma X_i + \varepsilon_i \quad (2)$$

where Y refers to any of the outcome variables of interest, $Treat$ is an indicator for whether or not the household head benefitted from FL training and β is the treatment effect. X_i is a vector of all control variables including regional fixed effects, location (rural), age, household size, education, durable asset per capita, marital status and religious affiliation. According to Bruhn and McKenzie (2009), including all covariates used in testing balance helps to improve precision of estimates. Since there are multiple outcomes for FI, we also report p-values adjusted for multiple hypothesis testing across indicators. This helps to avoid the danger of over-interpreting any single significant result (Banerjee et al., 2015; Duflo et al., 2017).

In the subsections below, we present the results on the effect of FL training on FI. Section 4.2 shows the effect on the indicators of FI whilst section 4.2.1 presents the gender differences in the effect of FL training on the FI indicators. In section 4.3, we present the effect of FL training on the intensity of FI and also show the gender differences in the FL-FI intensity nexus. Section 4.4 discusses the life-cycle analysis of FL training on FI

4.2 Impact of FL training on indicators of FI

From the results presented in Table 2, we see that at the end of the survey, 20% of beneficiary households owned an account, compared to 12.8% of non-beneficiaries. By inference, beneficiary households are 7.2 percentage points more likely to own an account. This outcome can be linked to the FL training on good money management. Participants were trained on how to keep money in secure locations outside the house. Introducing participants to some of the secure locations (e.g. bank account) and teaching them to inculcate good savings behaviour meant that participants needed bank accounts as a necessary condition and mainly explains why beneficiaries owned more accounts than non-beneficiaries. Similar to Atkinson and Messy (2013), we can infer that provision of FL training helps to increase account ownership due to the awareness it brings to beneficiaries, especially those who are first time users of financial products.

Regarding savings behaviour, beneficiary households are 8.2 percentage points more likely to embark on savings: 45.4% compared to 37.2%. Training participants on good money handling practices such as saving to later cater for less frequent business expenses helps to boost savings. Also, good borrowing and lending behaviour helps to prevent leakage of financial resources which can be channelled into savings. Our finding supports the work of Berry et al. (2015) whom also used an RCT and found that financial education enhances savings for students.

Beneficiary households are 9.5 percentage points more likely to receive financial advice. In absolute terms, 14.9% of beneficiaries received financial assistance compared to 5.4% for non-beneficiaries. Provision of training on why, how and where to seek financial assistance introduces participants to newer ideas and forms part of the reasons why beneficiaries experienced a bigger improvement in their receipt of financial assistance. Also, most participants were financially constrained so knowing of sources and how to access them makes a lot of difference. Our finding corroborates that of Calcagno and Monticone (2015) who found that investors with higher FL are more likely to seek financial advice whilst those with low FL seek less advice and end up paying more in the form agency cost. The analysis carried out by Soumaré, Tchana Tchana and Kengne (2016) also produced a similar result although that analysis was done using only a three-component decomposition of FI. The analysis reported here adds a further component and contributes to the literature by empirically showing how FL training helps to improve households' receipt of financial assistance.

Table 2: Effect of FL training on indicators of FI

Variables	(1) Account ownership	(2) Engaged in savings	(3) Access to credit	(4) Received financial assistance
Treatment effect	0.072** (0.028)	0.082*** (0.009)	0.012 (0.694)	0.095*** (0.001)
Comparison/control mean	0.128	0.372	0.138	0.054
p-value on equality of effects	(1)=(2)=(3)=(4): 0.000***			
Observations	1,401	1,377	1,394	1,094
R-squared	0.161	0.085	0.120	0.086
p-value in parentheses	*** p<0.01, ** p<0.05, * p<0.1			

4.2.1 Gender dimension to the impact of FL training on indicators of FI

Female-beneficiary households are 8.5 percentage points more likely to own an account and the breakdown for females is 32.7% for beneficiaries as against 24.4% for non-beneficiaries. Although FL training has an effect in enhancing account ownership for beneficiaries, the outcome is mainly depicted in female-beneficiary households. This outcome is particularly important due to the 7% gender gap that exist in FI (Demirguc-Kunt et al., 2018) and also because the proportion of females who own a bank account in developing are well below that of their male counterparts. We say so because, demand-side FI is measured using ownership of bank or mobile money account so getting FL training to increase account ownership for women has a big policy relevance in closing the gender gap in FI. Unlike account ownership, improvement in savings behaviour through FL training is mainly depicted in male-beneficiary households. Specifically, male-beneficiary households are 13.4 percentage points more likely to embark on savings: 41.4% versus 28%. This study complements other studies from Ghana that found a positive relationship between FL and FI but did not use an RCT (Boakye & Amankwah, 2012; Mireku, 2015) and we go further by establishing the gender heterogeneities of this impact. Receipt of financial assistance exhibits a similar outcome as savings behaviour. In absolute terms, 56.4% of male-beneficiary households received financial assistance compared to the 40.9 for their counterparts. This implies that male-beneficiary households are 13.4 percentage points more likely to receive financial assistance.

Table 3: Gender differences in effect of FL training on indicators of FI

Variables	(1) Account ownership		(2) Engaged in Savings		(3) Access to Credit		(4) Received financial Assistance	
	Male	Female	Male	Female	Male	Female	Male	Female
Treatment effect	0.050 (0.330)	0.083* (0.059)	0.134*** (0.008)	0.043 (0.305)	0.021 (0.656)	0.025 (0.544)	0.155*** (0.002)	0.056 (0.129)
Comparison/control mean	0.230	0.244	0.280	0.454	0.010	0.189	0.409	0.015
p-value on equality of effects	(1)=(3)=(5)=(7): 0.001***				(2)=(4)=(6)=(8): 0.0812*			
p-value on equality of effects	(1)=(2): 0.004***		(3)=(4): 0.038**		(5)=(6): 0.008***		(7)=(8): 0.000***	
Observations	524	877	516	861	521	873	381	713
R-squared	0.238	0.140	0.115	0.095	0.200	0.105	0.132	0.107
p-value in parentheses	*** p<0.01, ** p<0.05, * p<0.1							

4.3 FL training and intensity of FI

This section discusses households' tendency of intensifying their current levels of FI by owning and/or using more than one financial product or service. We see from Table 4 that beneficiary households are 25 percentage points more likely to intensify their current levels of FI but this tendency is bigger among male-beneficiary households. While male-beneficiaries are 33.8 percentage points more likely to intensify their levels of FI, female-beneficiaries are 16.8 percentage points more likely to do so. This outcome is expected because the FL training exposed participants to a range of the FI indicators and they are likely to intensify their FI if they take positive steps to their knowledge into practice by embracing the ownership and use of a number of the indicators. An analogical link that can be drawn will be an informed beneficiary who receives financial assistance and decides to save the bank but taps into his gained knowledge that he/she needs a bank account to keep the money safe. This clearly shows how FL training can influence the to intensify of FI. Our finding supports that of Grohmann et al. (2014) who found that FL increases the intensity of FI but does not support their gender analysis which showed that females are more likely to intensify their level of FI.

Table 4: Effect of FL training on intensity of FI

Variables	(1)	(2)	(3)
	Financial inclusion index		
	Full	Male	Female
Treatment effect	0.250***	0.338***	0.168*
	(0.000)	(0.003)	(0.078)
Comparison/control mean	0.610	0.172	0.909
p-value on equality of effects (1)=(2)=3: 0.037***			
Observations	1,404	525	879
R-squared	0.155	0.238	0.141
p-value in parentheses	*** p<0.01, ** p<0.05, * p<0.1		

4.4 Life-cycle analysis of FL on FI

The life-cycle effect of FL training displayed in Table 5 shows that the magnitude of the impact declines from the first to the second age cohorts. Whilst the intensity of FI is 33.3 percentage points higher for beneficiaries aged 35 years and below, this outcome is 23.9 percentage points for those between 36-50 years. The 9.4 percentage point difference between the two age cohorts implies that, provision of FL training to the young makes a bigger impact on the likelihood to own and use more financial products and services than adults. This outcome is expected because use of financial products and services are becoming technologically driven and such technologies are used more by the young. Since evidence shows that the young typically have lower FL levels and are more likely to be financially excluded (Atkinson & Messy, 2013), providing them with FL training is likely to yield bigger outcomes than among the old who are already doing better. Programmes should strategically target the young so that they can serve as agents in the diffusion of financial knowledge. This call is supported by that of Atkinson and Messy (2013) who opine that targeting young people who are living with their parents helps in getting the knowledge to the parents and other family members.

Table 5: Life-cycle effect of FL training on intensity of FI

Variables	(1) ≤ 35 years	(2) 36-50 years	(3) ≥ 51 years
Treatment effect	0.333** (0.013)	0.239** (0.028)	0.160 (0.257)
Comparison/control mean	0.337	0.922	0.541
p-value on equality of effects (1)=(2)=(3): 0.046**			
Observations	415	586	403
R-squared	0.209	0.139	0.226

p-value in parentheses *** p<0.01, ** p<0.05, * p<0.1

5.1 Conclusions and recommendation

Despite an improvement in the global level of account ownership from 51% (2011) to 67% (2017) there is still a large proportion of the world's population who are financially excluded. The World Bank is attempting to eliminate financial exclusion and has set a target to achieve Universal Financial Access (UFA) by 2020 and to use this target as the first step toward broader FI. The World Bank proposes to use improvements in FL as a catalytic tool to achieve UFA by 2020, however, there is a need to intensify FI beyond simple bank and mobile money account ownership so that people embrace the ownership and use of various financial products and services. Previous studies have shown a positive relationship between FL and FI but these studies have not focused on the intensification of FI. Furthermore, most of the studies that have examined the FL-FI nexus have mainly used quasi-experimental designs. Addressing these problems requires the use of an RCT which is accompanied by a rigorous analytical procedure.

This study determined the impact of FL training on FI and its intensity and extended the analysis to explore the gender heterogeneities in the FL-FI nexus. Consistent with earlier studies (Banerjee et al., 2015; Duflo et al., 2017; Gertler et al., 2016), we tested for baseline balance among a battery of outcomes using an LPM. Treatment effects were also estimated using a similar model that controlled for variables that were used in testing for balance.

Our analyses produced the following findings: (i) beneficiaries of FL training are 7.2 percentage points more likely to own an account but this is mainly experienced among female-beneficiary households; (ii) beneficiary households are 8.2 percentage points more likely to save but this outcome is mainly practised by male-beneficiary households; (iii) Beneficiaries are more likely to receive financial assistance but, similar to savings, the outcome is significant for men; (iv) FL training beneficiaries are more likely to intensify their FI but the intensity is experienced more by male-beneficiary households; and (v) the life-cycle analysis shows that FL training has a bigger impact among the young than among adults. At old age, FL training does not show any impact. Based on our findings, we recommend that designers of FL training programmes focus more on the young because targeting the young is likely to be more effective. Finally, our results show that governments and policy makers can rely on the capability of FL training to bridge the gender-FI gap.

Acknowledgements

We are grateful to the Rural and Agricultural Finance Programme (RAFiP) for providing funds for the project that yielded the data for this study. Thanks to Professor Samuel K. Annim and the Directorate of Research, Innovation and Consultancy (DRIC) at the University of Cape Coast (UCC), Ghana for granting us permission to use the data. We also appreciate the support provided by Dr. James Atta Peprah (the principal supervisor of the project). Finally, we would like to thank every team member that contributed to the success of the project.

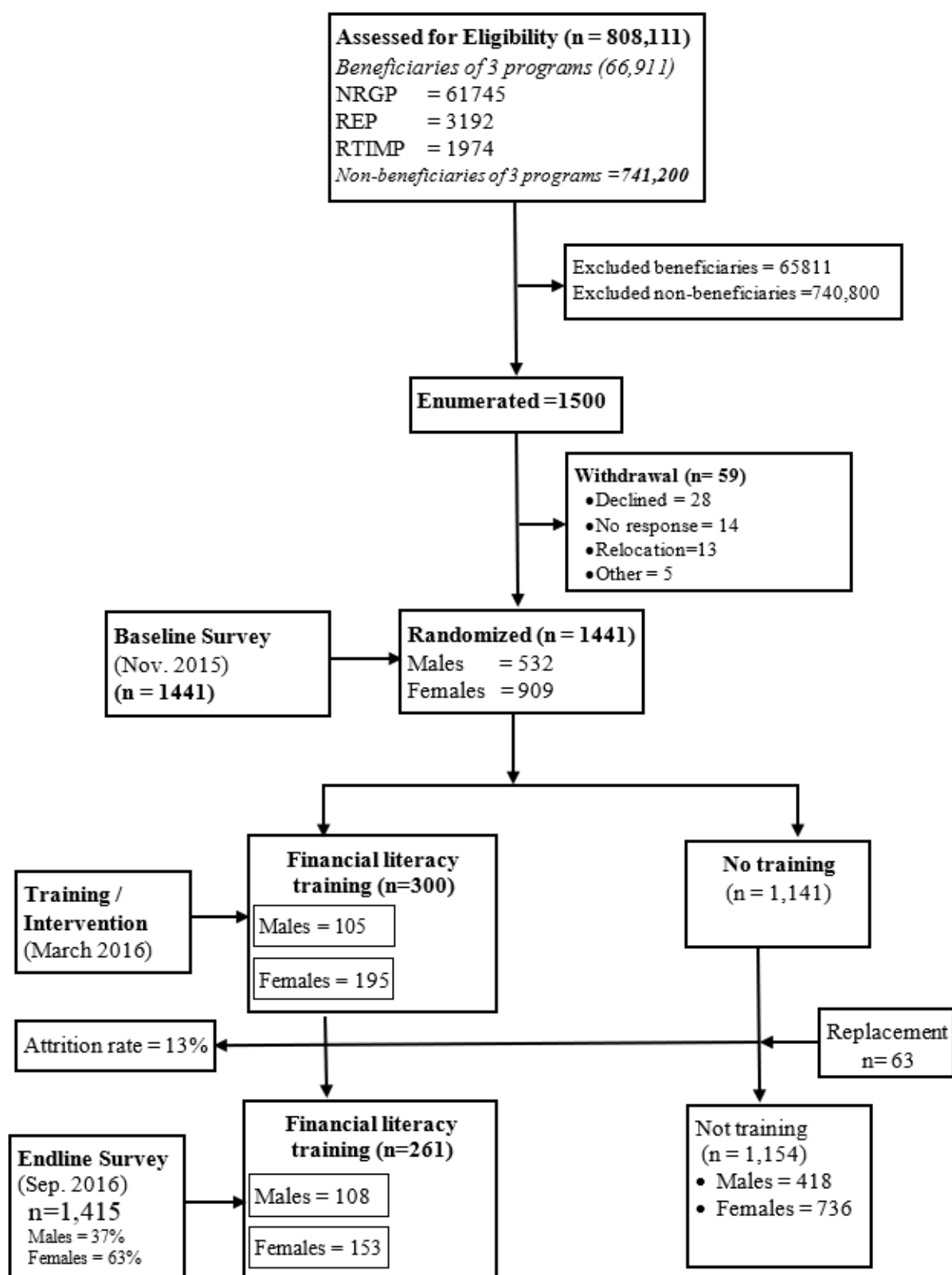
References

- AFI. (2015). *2015 Maya declaration report: Commitments into action. Alliance for Financial Inclusion*. Retrieved from http://www.afi-global.org/sites/default/files/publications/maya_report_2015-final.pdf
- Akotia, C. S., & Anum, A. (2015). Gender, culture, and inequality in Ghana: An examination of sociocultural determinants of gender disparity. In *Psychology of gender through the lens of culture* (pp. 375–394). Springer.
- Atkinson, A., & Messy, F.-A. (2011). Assessing financial literacy in 12 countries: An OECD/INFE international pilot exercise. *Journal of Pension Economics and Finance*, *10*(04), 657–665.
- Atkinson, A., & Messy, F.-A. (2013). Promoting financial inclusion through financial education. *OECD Working Papers on Finance, Insurance and Private Pensions*, (34), 1.
- Banerjee, A., Duflo, E., Glennerster, R., & Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, *7*(1), 22–53.
- Berry, J., Karlan, D., & Pradhan, M. (2015). *The impact of financial education for youth in Ghana*. Retrieved from National Bureau of Economic Research website: <http://www.nber.org/papers/w21068>
- Boakye, C., & Amankwah, N. (2012). *Determinants of the demand for financial products in Ghana*. Retrieved from <http://www.arabic.microfinancegateway.org/sites/default/files/mfg-en-paper-determinants-of-the-demand-for-financial-products-in-ghana-2012.pdf>
- Bruhn, M., & McKenzie, D. (2009). In pursuit of balance: Randomization in practice in development field experiments. *American Economic Journal: Applied Economics*, *1*(4), 200–232.
- Bulte, E., Lensink, R., & Vu, N. (2016). Do gender and business trainings affect business outcomes? Experimental evidence from Vietnam. *Management Science*. Retrieved from <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2016.2472>
- Calcagno, R., & Monticone, C. (2015). Financial literacy and the demand for financial advice. *Journal of Banking & Finance*, *50*, 363–380.
- Chen, H., & Volpe, R. P. (2002). Gender differences in personal financial literacy among college students. *Financial Services Review*, *11*(3), 289–308.
- Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. *The European Journal of Development Research*, *21*(2), 213–230.
- Chowa, G., Masa, R., Ansong, D., Despard, M., Wu, S., Hughes, D., ... Ofori-Acquah, C. (2015). Impacts of financial inclusion on youth development. *The Global Child Poverty Challenge*, *180*, 15–35.

- Deere, C. D., Alvarado, G. E., & Twyman, J. (2012). Gender inequality in asset ownership in Latin America: Female owners vs household heads. *Development and Change*, 43(2), 505–530.
- Deke, J. (2014). *Using the linear probability model to estimate impacts on binary outcomes in randomized controlled trials*. Mathematica Policy Research.
- Demirgüç-Kunt, A., Klapper, L. F., Singer, D., & Van Oudheusden, P. (2015). *The global finindex database 2014: Measuring financial inclusion around the world*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2594973
- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Finindex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*. Retrieved from <http://documents.worldbank.org/curated/en/332881525873182837/pdf/126033-PUB-PUBLIC-pubdate-4-19-2018.pdf>
- Duflo, E., Dupas, P., & Kremer, M. (2017). The impact of free secondary education: Experimental evidence from Ghana. *Massachusetts Institute of Technology Working Paper Cambridge, MA*.
- Fanta, A. B., & Mutsonziwa, K. (2016). *Gender and financial inclusion: Analysis of financial inclusion of women in the SADC region* (Policy Research Paper No. 01/2016). Retrieved from <http://www.finmark.org.za/wp-content/uploads/2016/12/gender-and-financial-inclusion.pdf>
- Fossen, F. M. (2012). Gender differences in entrepreneurial choice and risk aversion—a decomposition based on a microeconomic model. *Applied Economics*, 44(14), 1795–1812.
- Fund, T. (2013). Financial literacy and inclusion: Results of OECD/INFE survey across counties and by gender. *Russia Trust Fund on Financial Literacy and Education*.
- Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. (2016). *Impact evaluation in practice*. Retrieved from <https://doi.org/10.1596/978-1-4648-0779-4>
- GhIPSS. (n.d.). Ghana Interbank Payment and Settlement Systems Limited: Easy banking for everyone. Retrieved from <http://www.ghipss.net/products-services/e-zwich>
- Grohmann, A., Kouwenberg, R., & Menkhoff, L. (2014). *Financial literacy and its consequences in the emerging middleclass*. Retrieved from <https://www.econstor.eu/handle/10419/100079>
- GSS. (2014). *Ghana living standards survey: Main report*. Retrieved from Ghana Statistical Service, Accra. website: http://www.statsghana.gov.gh/docfiles/glss6/GLSS6_Main%20Report.pdf
- Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, 37(8), 2779–2792.
- Kaliyath, S. (2016). Gender as a Social Construct. *Qualitative Research on Illness, Wellbeing and Self-Growth: Contemporary Indian Perspectives*.
- Karlan, D., Kendall, J., Mann, R., Pande, R., Suri, T., & Zinman, J. (2016). *Research and Impacts of Digital Financial Services*. Retrieved from National Bureau of Economic Research website: <http://www.nber.org/papers/w22633.pdf>
- Klapper, L., Lusardi, A., & Panos, G. A. (2013). Financial literacy and its consequences: Evidence from Russia during the financial crisis. *Journal of Banking & Finance*, 37(10), 3904–3923.
- Kondo, T., Orbeta, A., Dingcong, C., & Infantado, C. (2008). Impact of microfinance on rural households in the Philippines. *IDS Bulletin*, 39(1), 51–70.
- Koomson, I., & Ibrahim, M. (2018). Financial Inclusion and Growth of Non-farm Enterprises in Ghana. In *Financing Sustainable Development in Africa* (pp. 369–396). Springer.

- Lopez, T., & Winkler, A. (2018). The challenge of rural financial inclusion—evidence from microfinance. *Applied Economics*, 50(14), 1555–1577.
- Lusardi, A., & Mitchell, O. S. (2008). Planning and financial literacy: How do women fare? *American Economic Review*, 98(2), 413–17.
- Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics and Finance*, 14(04), 332–368.
- Mireku, K. (2015). *Financial literacy among University students: Evidence from Ghana*. Department of Accounting and Finance, Kwame Nkrumah University of Science and Technology.
- Nunoo, J., & Andoh, F. K. (2012). Sustaining small and medium enterprises through financial service utilization: Does financial literacy matter? *Unpublished Paper Presented at the Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, Washington*. Retrieved from <http://ageconsearch.umn.edu/bitstream/123418/2/Sustaining%20SME%20article.pdf%20Jacob%20Nunoo1.pdf>
- Nunoo, J., Darfor, K. N., Koomson, I., & Arthur, A. (2016). *Employment Security and Workers' Moonlighting Behaviour in Ghana*. Retrieved from AGDI Working Paper website: <https://www.econstor.eu/bitstream/10419/149930/1/agdi-wp16-006.pdf>
- Peprah, J. A., Afoakwah, C., & Koomson, I. (2015). Savings, entrepreneurial trait and self-employment: evidence from selected Ghanaian Universities. *Journal of Global Entrepreneurship Research*, 3(1), 1.
- Price, D., Chisholm, A., van der Molen, T., Roche, N., Hillyer, E. V., & Bousquet, J. (2011). Reassessing the evidence hierarchy in asthma: Evaluating comparative effectiveness. *Current Allergy and Asthma Reports*, 11(6), 526.
- Scott, N. W., McPherson, G. C., Ramsay, C. R., & Campbell, M. K. (2002). The method of minimization for allocation to clinical trials: A review. *Controlled Clinical Trials*, 23(6), 662–674.
- Soumaré, I., Tchana Tchana, F., & Kengne, T. M. (2016). Analysis of the determinants of financial inclusion in Central and West Africa. *Transnational Corporations Review*, 8(4), 231–249. <https://doi.org/10.1080/19186444.2016.1265763>
- Stenner, A. J., Stone, M. H., & Burdick, D. S. (2009). Indexing vs. measuring. *Rasch Measurement Transactions*, 22(4), 1176–1177.
- Wang, X., & Guan, J. (2017). Financial inclusion: Measurement, spatial effects and influencing factors. *Applied Economics*, 49(18), 1751–1762.
- World Bank. (2018). UFA2020 Overview: Universal Financial Access by 2020. Retrieved from <http://www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financial-access-by-2020>

Appendix 1: CONSORT Flow Diagram for this study



Source: Authors' construct (2018)

Appendix 2: Questions used in measuring FI

D4a. Have you ever received credit from financial institutions? Yes/No

D7. Do you have a bank account? Yes/No

D8. Have you been saving for the past 12 months? Yes/No

D9. Have you ever received any financial assistance from NRG/RTIMP/REP? Yes/No