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# Financial Inclusion and Women Economic Empowerment in Ghana

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**Abstract** Although the impact of micro-credit and direct cash transfers on women economic empowerment has been extensively studied. The impact of just having either a formal or informal bank account remains relatively understudied. This paper uses a detailed national representative data of female household heads in Ghana to analyze how having a formal and informal bank account economically empowers women. Using propensity score matching, our results elicit that having a bank account encourages women to be employed and also increases their per capita income. The results also indicate that, the level of education and sector of employment positively contributes to women's economic empowerment. Additionally, the result reveal that female household heads living in the cities are more economically empowered than their counterpart living in the rural areas.

**Keywords:** Financial Inclusion · Women Economic Empowerment · Gender Equality · Ghana

**Jel Codes :** D14, D63, G21, G22, O12, O16

## 1 Introduction

Whiles universal suffrage for women thus the right to vote has being achieved mostly at independence, progress in women empowerment along the economic and reproductive dimensions is slow if not reversing in some developing countries (Doepke et al., 2012). Comparative to their counterparts in developed countries, women in developing countries are less empowered. Lower labour force participation, existing social and cultural norms, and early marriages in most developing countries interact and reinforce each other to put women in a position where they are economically dependent on men, specifically their spouses or intimate partners for survival (Duflo, 2012; Doepke et al., 2012). Women Economic empowerment is not only an end in itself, but also a means to achieving other developmental goals. Available evidence suggests that economic empowerment of women is essential for economic growth, development and helps break the vicious cycle of poverty. Pursuing women economic empowerment agenda is to ensure that no one is left behind or marginalized amidst development. As we understand from the existing literature that economic growth and development is not automatically inclusive, hence inclusiveness must be deliberately pursued, (see Suri and Jack, 2016; Doepke and Tertilt, 2019; Doepke et al., 2012; Kabeer, 2016). Existing studies that exploit the financial inclusion and gender nexus have mostly focused on estimating the gender gap in financial inclusion (for example, Ghosh and Vinod, 2017; Demirgüç-Kunt et al., 2013), with only a few studies attempting to estimate the impact of financial inclusion on women economic empowerment. Even the handful of studies that make this attempt mostly use micro-credit as a measure of financial inclusion (see Swain and Wallentin,

2009; Banerjee et al., 2015a; Duvendack and Palmer-Jones, 2012; Banerjee et al., 2015b) and much attention has not been given to "how does having a bank account in itself either formal bank account or informal bank account economically empower women. Resultantly, the impact of access to financial account on economic empowerment of women remain relatively understudied. Inclusively, the scanty available evidence remains inconclusive with some studies such as Bruhn and Love, 2011; Sedai et al., 2021 finding a positive impact of accounts ownership on women economic empowerment and others a negative impact, for example, Dupas et al., 2018; McDougal et al., 2019. This seems to suggest that the impact of financial inclusion on women empowerment is country specific. Our study therefore attempts to close the existing gap. The closest studies to this current paper is Ganle et al., 2015; Salia et al., 2017, nonetheless, these studies are qualitative and theoretical analysis respectively, additionally they both used micro-credit as measure of financial inclusion. Our study contributes to the existing literature firstly by providing an additional within country evidence for an understudied indicator of financial inclusion in relation to women economic empowerment. Here we disentangled access to finance into formal account ownership and informal account ownership. And we find that formal account access increases the per capita income of female household heads and encourages them to be employed. Secondly we make a quantitative and methodological contribution to the debate as we used propensity score matching and multinomial logit model to do our analysis. The remainder of the paper is organized as follows. Section 2 briefly analyzes the related literature, section 3, shed some light on financial inclusion in Ghana, section 4 describes the data and summary statistics, in section 5 we present the empirical methodology, section 6 reports the results and discussion, section 7 we present some robustness checks and, section 8 we discuss the policy implication and conclusion.

## 2 Related Literature

There are several channels through which women empowerment can impact economic growth and development. Firstly, women empowerment increases the stock of human capital. Secondly, lower fertility rates among highly educated women mean that these women are more likely to spend more hours at work which would increase productivity. Also, the increase in the labour force participation of women can also increase domestic savings and investment. Women Empowerment is also seen to positively impact human development (see Doss, 2013; Duflo, 2012, 2003; Doepke et al., 2012; McGillivray, 2005). Many studies have also shown that women having access to private savings accounts not only positively contributes to economic growth through savings, but also enables them to make choices like buy more durable goods, and increase their bargaining power in the household, (Dupas and Robinson, 2013b). Similarly, Suri and Jack (2016) show that increase access to mobile money in Kenya increased long-term consumption and reduced the number of households in poverty with a more pronounced effect for female headed household. In the case of India, available evidence suggests that augmenting the female to male manager ratio by 10% could improve per capita output by 2% ( Esteve-Volart, 2004). In Nepal, female headed households living in slums were offered no fee savings accounts and it resulted in an uptake of 84% of women opening an account which boosted spending on education, nutritious food and health (Prina, 2015). Another relevant evidence from Haushofer and

Shapiro (2016) indicate that unconditional cash transfers to household in Kenya increased consumption. Particularly, in households where the primary recipient of the cash is a woman the increase in consumption was biased towards children needs such as food, education and health. The transfer also was seen to increase psychological well-being of individuals and also improved women empowerment. Fielding and Lepine (2017) also provide evidence that in Africa the impact of empowerment on well-being is at least as large as more conventional development indicators like income. Doepke and Tertilt (2019) tested the hypothesis of whether cash transfers to women promote economic growth. Using data from the Mexican PROGRESA program they find that, cash transfers to women lead to an increase in spending on children.

Hence the above cited literature, suggests that women economic empowerment does not only benefit women, but also positively contributes to economic growth and development of a country.

## 2.1 Financial Inclusion and Economic Empowerment

Financial institutions are considered as an entry point for women's economic, social and political empowerment (Orso and Fabrizi, 2016). Consequently, many financial institutions mostly micro-finance distinctly target women with the objective of empowering them, alluding to the fact that women are among the most poor and under privileged in society. Improvement in the economic activities of women and increased control over resources through financial institutions can improve their status within the community, access to knowledge and increase their mobility. Over the years, academics have used various indicators such as micro credit, savings account, bank account, and mobile money among others as a measure of financial inclusion. However, micro credit remains the most dominant proxy that has been extensively studied with regards to the financial inclusion and women empowerment nexus. (see Banerjee et al., 2015b; Orso and Fabrizi, 2016; Al-Shami et al., 2018; Swain and Wallentin, 2009; Khandker and Samad, 2014). This current paper therefore deviates from the norm by focusing on access to financial account as proxy for financial inclusion, an indicator that remains understudied.

To illustrate, Dupas and Robinson (2013a) offered access to non interest bearing accounts to a group of male and female entrepreneurs in a Random Control Trial in Kenya. Their results suggest that women who used the account saved more, augmented both their productive investment and private expenditure. Bruhn and Love (2011) used a Diff-in-Diff methodology to examine the impact of access to financial services in Mexico. They find that financial services lead to an increase in the number of informal business owners among men and an increase in formal employment among women. The results also show that income levels increased for both genders, but with a higher impact in women. Similarly, Sedai et al. (2021) examined the impact of rotating savings and credit associations membership on women's empowerment in India. They conclude that women's membership increases their cash in hand expenditure, and their likelihood of employment and business activities. Suri and Jack (2016) used a survey data of 1608 household to estimate the effect of access to mobile money account in Kenya. Their results indicate that the access to the mobile money service increased savings, financial resilience and labour market outcomes such as moving from agriculture into business ownership.

Contrastly, McDougal et al. (2019) using bank account ownership data from 112 countries, finds that countries

where there is a higher level of controlling intimate behaviour, financial account ownership as a way of fostering women's economic autonomy may be ineffective in the absence of wider social change and support. Similar evidence is provided by Sakyi-Nyarko et al. (2022) that examined gender-differential effects of financial inclusion on household financial resilience in Ghana and their study find that financial inclusion on household resilience does not significantly vary by gender or locality. Testing the impact of expanding access to basic bank account in Uganda, Malawi and Chile, Dupas et al. (2018) find that policies only aimed at widening access to basic accounts are unlikely to improve welfare significantly, since effects even if present are mostly small and varied. In a nut-shell, the literature still remains inconclusive about the impact of access to a financial account on women economic empowerment. Additionally, most of the studies use micro-credit as a measure of financial inclusion of which this current study is different as we aim to find what the impact of merely having access to both formal sources of finance and informal sources such as Susu, savings and loan institutions, and mobile money on economic empowerment of women. Thirdly, the literature on the impact of access to finance on women economic empowerment is scanty, and even scantier in the case of Ghana as most of the current studies are just qualitative analysis or theoretical studies. Lastly, quite a number of the existing literature on the subject are random control trials, hence it will be interesting to also understand the dynamics of the causal relationship between financial inclusion (financial account access) and women economic empowerment from a cross sectional data perspective. Our studies aims at contributing to the existing literature on financial inclusion and women economic empowerment in the Ghanaian context, by using a national representative household data. Since the literature remains inconclusive, it somehow suggests that the impact of financial inclusion on women's economic empowerment may be country or geographically specific, which therefore gives the need for studies like this current paper. We also make a methodological contribution to the discourse as we employ propensity score matching and multinomial logit to do our analysis. The study also provides additional evidence for an under studied proxy.

### 3 Financial Inclusion in Ghana

As can be seen in figure 1, the degree of financial inclusion in Ghana is highly correlated with urbanization, with big cities or regions having the highest number of people in possession of bank accounts. For instance, Greater Accra region which is the country's capital has on average 52% of households in possession of a bank account. And the Ashanti region which is the second most urbanized region in Ghana has averagely 43% of households with bank account. On the other extreme of the financial inclusion scale lies the Upper East, Upper West, Northern and Volta Region, which remain the least financially included regions in Ghana.

Additionally, Ghana has a dual financial sector with mostly the informal sector concentrated in the rural areas. As a result, in this study we distinguish financial account ownership into formal and informal accounts. Where Formal accounts entails commercial banks and investment banks. Informal accounts consists of credit unions, savings and loans, Susu (Merry go round contributions), and mobile money. The classification into formal and informal finance in the context of Ghana bothers on the fact that per the regulation of the Bank of Ghana, formal financial institutions

are expected to meet a minimum paid-up capital requirement with which they are given the licence of formal banks. Informal institutions usually have a lower minimum paid-up capital requirement as compared to formal banks. The informal institutions in Ghana are mostly targeted to businesses in the informal sector and rural areas. Again, a great proportion of the informal institutions in Ghana like the co-operatives or credit unions are membership based and not open to the general public<sup>1</sup>.

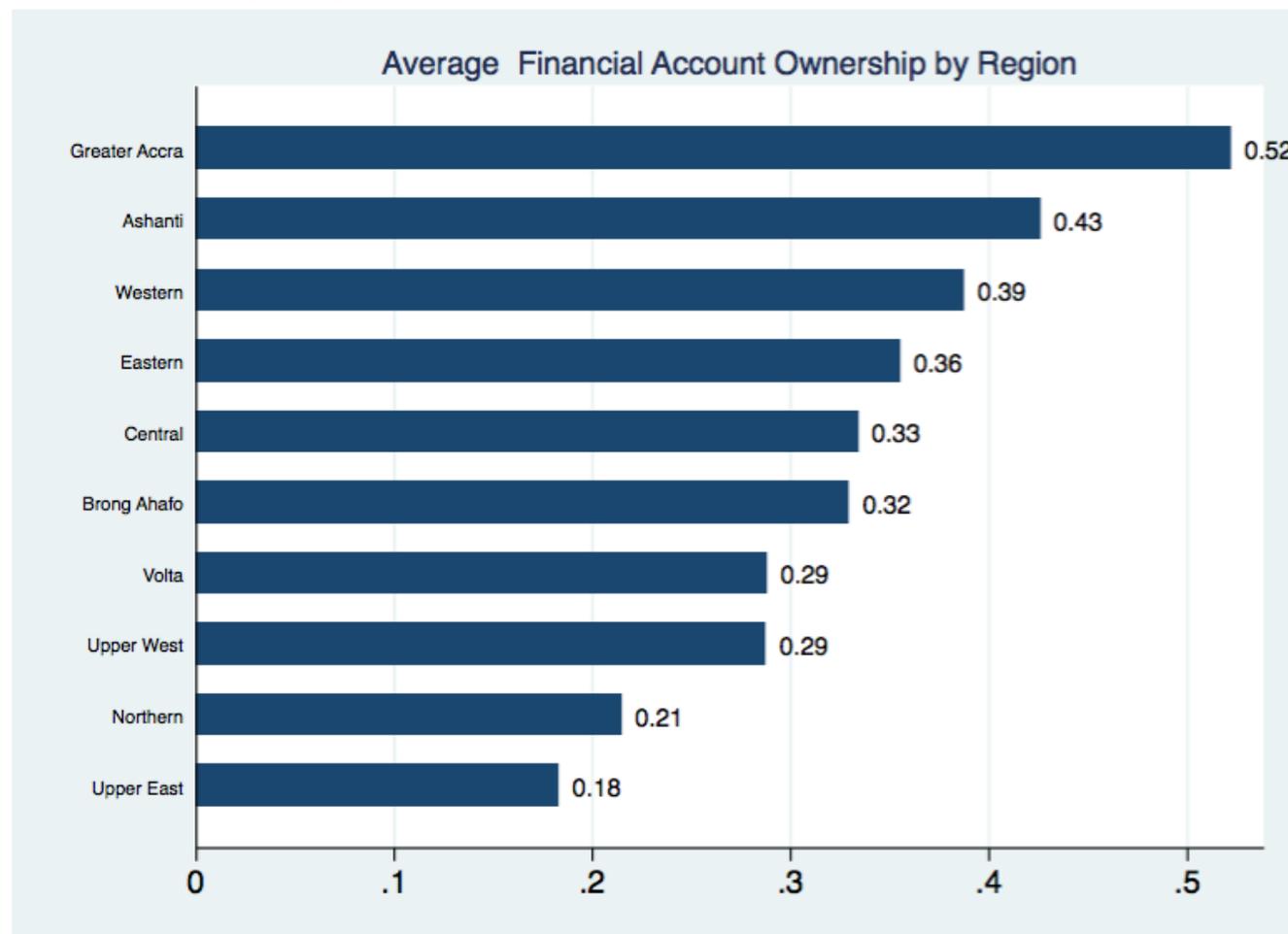


Fig. 1

In Ghana, like in many African countries where men are traditionally considered as the ones to be in charge of household resources, men are more in possession of financial accounts than women. Aside traditional norms, the presence of financial inclusion gender gap can also be attributed to many factors. The most common ones are broadly categorized into three groups. Namely; demand side barriers such as lower income, lack of bargaining power in the household, lack of asset ownership and lower rate of cell phone Ghosh and Vinod, 2017; Zhang and Posso, 2019. Supply side barriers include inappropriate products, gender specific policies and practices in product design and marketing (- Sakyi-Nyarko et al., 2022). Lastly, legal and regulatory barriers such as account opening requirements that put women at a disadvantage, (for example, formal work contract) lack of formal identification (see Sakyi-Nyarko et al., 2022).

<sup>1</sup> Some examples include, Accra Academy Co-operative Credit Union Ltd, University of Ghana Credit Union, and Bole Community Cooperative Credit Union among others

## 4 Data Description and Summary Statistics

The primary data source for this study is the Ghana living standard survey (GLSS). This is an exhaustive nationwide household survey carried out by the Government of Ghana (Ghana Statistical Service) supported by the World Bank (Social Dimensions of Adjustment Project Unit) usually spanning a period of 12 months. The first Ghana Living Standard survey was carried out in 1987, thereafter there has been a series of surveys. For this study, we used the sixth and seventh waves of the GLSS which were conducted in 2012-2013 and 2016-2017 respectively. To the best of our knowledge, the GLSS is the most comprehensive database in Ghana that provides household and community level information on gender, including details of access to and use of finance, consequently making it the ideal dataset for this study. The uniqueness of the GLSS 6 and GLSS 7 is that, the survey of these two rounds collected detailed information on the demographic characteristics of the households, education, health, employment, migration remittances, information communication and technology (ICT), tourism, housing, household agriculture, non-farm household enterprises, financial services, anthropometric outcomes and asset. The GLSS data is usually collected in two stages, in the first stage 1,200 Enumeration Areas (EAs) are selected from the ten regions of Ghana using probability proportional to population size. In the second stage, a total of 18,000 people are reached in the 1,200 Enumeration Areas. However, for the sixth and seventh waves 16,772 and 14,009 households were interviewed respectively. After pooling the two waves together we had 21,686 males and 9,095 females. Nonetheless, female household heads are our subjects of interest. After data cleaning the sample reduced to 4,739 which we used for the analysis.

Descriptive statistics are shown in table 1, it can be observed that there exist significant differences between male household heads and female household heads. For instance, the average per capita income for male household heads is 7.18 while that of female household heads is 6.93. In terms of financial account ownership, on average male heads own more accounts than female heads. And while male heads turn to proportionately possess both formal and informal accounts, female heads on the other hand turn to own more of informal account than formal account. Considering employment, unemployment is higher among female heads than male heads. In summary, the statistics in table 1 reveal that with regards to per capita income and employment status female heads fall behind male heads. This suggests that every possible channel through which women can be empowered should be explored.

## 5 Empirical Methodology

Following precedent research such as Ñopo et al., 2007; Attanasio et al., 2008; Blattman et al., 2014; Suri and Jack, 2016, we use a multivariate regression model where we investigate the impact of financial inclusion on women economic empowerment while controlling for various individual, household and regional level characteristics. Consequently, for a woman in household  $h$ , from region  $i$ , in time  $t$ , the basic model assume the following form:

$$WE_{hit} = \beta_1 FI_{hit} + \beta_2 X_{hit} + \beta_3 Wave_t + \beta_4 U_i + \epsilon_{hit} \quad (1)$$

Table 1: Variable Description and Summary Statistics

Variables	Obs	Mean	SD	Min	Max	Male	Female
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
logIncome_per - Log of Income Percapita	26,868	7.10	1.61	0	16	7.18	6.93
Financial Acct - Dummy	29,007	0.34	0.47	0	1	0.36	0.30
Formal_Account - Dummy	28,931	0.16	0.36	0	1	0.17	0.12
Informal_Account - Dummy	28,931	0.16	0.37	0	1	0.16	0.17
Age in years	30,781	46.02	15.91	15	99	44.67	49.25
Married - Dummy	30,778	0.66	0.47	0	1	0.82	0.28
Divorce - Dummy	30,778	0.11	0.31	0	1	0.05	0.25
Widowed - Dummy	29,510	0.13	0.33	0	1	0.02	0.39
Marital_Stat - Dummy	30,778	0.11	0.32	0	1	0.11	0.12
Self Employed - Dummy	30,781	0.25	0.43	0	1	0.28	0.18
Employed - Dummy	30,781	0.40	0.49	0	1	0.41	0.38
Unemployed - Dummy	30,781	0.35	0.48	0	1	0.31	0.44
Primary - Dummy	26,725	0.82	0.37	0	1	0.80	0.87
Secondary - Dummy	26,725	0.13	0.24	0	1	0.15	0.10
Tertiary - Dummy	26,725	0.04	0.15	0	1	0.05	0.3
PostGrad - Dummy	26,725	0.00	0.07	0	1	0.00	0.00
No Education - Dummy	26,725	0.00	0.05	0	1	0.00	0.00
Islam - Dummy	30,776	0.19	0.39	0	1	0.22	0.11
Christian - Dummy	30,776	0.67	0.47	0	1	0.62	0.81
Traditional - Dummy	30,776	0.07	0.26	0	1	0.09	0.04
No religion - Dummy	30,776	0.06	0.25	0	1	0.08	0.04
Agricsector - Dummy	30,781	0.02	0.13	0	1	0.02	0.04
NonAgricsector - Dummy	30,781	0.98	0.48	0	1	0.98	0.96
Rural - Dummy	30,781	0.56	0.50	0	1	0.59	0.49
Urban - Dummy	30,781	0.44	0.50	0	1	0.41	0.49
First Quintile - Dummy	30,781	0.21	0.41	0	1	0.23	0.16
Second Quintile - Dummy	30,781	0.18	0.38	0	1	0.18	0.17
Third Quintile - Dummy	30,781	0.17	0.38	0	1	0.17	0.18
Fourth Quintile - Dummy	30,781	0.19	0.40	0	1	0.19	0.21
Fifth Quintile - Dummy	30,781	0.24	0.43	0	1	0.22	0.28
Wave 6 from 2012 to 2013	30,781	0.54	0.50	0	1	0.56	0.52
Wave 7 from 2016 to 2017	30,781	0.46	0.50	0	1	0.44	0.48
Western Region	30,781	0.10	0.30	0	1	0.10	0.09
Central Region	30,781	0.09	0.29	0	1	0.08	0.13
Greater Accra Region	30,781	0.11	0.31	0	1	0.11	0.11
Volta Region	30,781	0.10	0.29	0	1	0.09	0.12
Eastern Region	30,781	0.10	0.31	0	1	0.10	0.11
Ashanti Region	30,781	0.12	0.33	0	1	0.11	0.15
Brong Ahafo Region	30,781	0.10	0.29	0	1	0.09	0.10
Northern Region	30,781	0.10	0.30	0	1	0.13	0.04
Upper East Region	30,781	0.09	0.29	0	1	0.10	0.08
Upper West Region	30,781	0.09	0.29	0	1	0.10	0.06

Where WE is an indicator of women empowerment, FI represents the different forms of financial inclusion, X is a vector of controls at the individual, and household levels such as age, marital status, level of education, household income quintile, and religion. Region, and Wave fixed effect are included and  $\epsilon$  denotes the error term.  $\beta_1$  is our coefficient of interest and is expected to be positive. Below we describe all variables used which were all drawn from the Ghana Statistical Living Standard Survey.

## 5.1 Variable Description

Women's empowerment which is our dependent variable of interest is a multidimensional concept which entails the woman's personal, cultural, economic and political sphere. Empowerment is viewed in terms of one's control over resources either financial, physical, or human and control over one's ideologies, beliefs, values and attitudes. Kabeer (1999) defined empowerment as the process by which those who have been denied the ability to make strategic life choices acquire such an ability. However, a challenge arises when it comes to the measurement of empowerment since it cannot be observed directly. As such, many studies over the years have used various indicators. For instance, Westeneng and d'Exelle (2015) use women's employment as a measure of economic empowerment. Anderson and Eswaran (2009) study women autonomy which they use interchangeably as women empowerment. The study revealed that employment of women outside their husbands farm is what contributes to women autonomy and not just employment in general. Studies such as Ñopo et al., 2007; Attanasio et al., 2011, 2008; Galasso et al., 2004; Suri and Jack, 2016 also used employment as a measure of women economic empowerment. Other studies have also used business ownership and self employment. For instance, Bandiera et al. (2013) used the transition from agriculture labour supply to running small business as a proxy of women economic empowerment and so do, Aker et al., 2011; Woodruff and McKenzie, 2013; Campos et al., 2015. By contrast, Blattman et al., 2014; Suri and Jack, 2016; Khandker and Samad, 2014 use income per capita as a an indicator of economic empowerment of women.

Following precedent literature in this paper we employ two indicators as our measure of women economic empowerment, that is, log of household (HH) income per capita and employment status. Log of HH per capita income is the natural log of annual household income divided by household size. Regarding employment status we considered different categories, one is when the women is formally employed, self employed and unemployed.

Again, drawing inspiration from the existing literature, our study proxied financial inclusion, by ownership of a financial account. Pertaining to this inclusion we further disaggregated account ownership into formal account and informal account as explained earlier. Formal account ownership is a dummy that takes the value 1 if a female household head has an account at the bank and 0 otherwise. Informal account ownership on the other hand is a dummy that takes 1 if the women owns a mobile money account, Susu<sup>2</sup>, cooperative account or account at other informal savings and loan institutions.

With regards to the vector of control variables in equation 1, the wealth of GLSS dataset allowed as to include an exhaustive list of variables. The full list of all controls included can be found in table 1, and in table 5 in the appendix.

## 5.2 Estimation Strategy

To estimate the model we employ different estimation strategies such as the OLS, probit, multinomial logit. However, there is a possible problem of endogeneity through reverse causality, and hence, estimating equation 1 with the

<sup>2</sup> Susu is a merry go round contribution when all participants contribute money into a common purse and each participants receives the pooled amount in turns

either OLS, probit or Multinomial logit will lead to biased estimates. The instrumental variable approach, and propensity score methods among other techniques can be used to overcome the endogeneity problem. However, finding an instrument that is correlated with the endogeneous variable, but does not have a direct correlation with the dependent variable is challenging particularly in cross sectional studies. Consequently, we deal with the endogeneity problem by pursuing the Propensity Score Matching (PSM) method. The propensity score matching is based on the assumption that conditional on some observable baseline characteristics individuals who did not receive treatment can be compared to individuals with treatment as if the treatment was randomized. The PSM mimics randomized experiments to overcome the issue of selection bias. The average effect on the treated in a propensity score matching model is specified below;

$$ATT = E(\Delta|X, T = 1) = E(Y^1 - Y^0|X, T = 1) = E(Y^1|X = 1) - E(Y^0|X, T = 1) \quad (2)$$

Where ATT signifies the average effect of the treatment on the treated. X is a matrix of pre-treatment variables. The expression  $E(Y^0|X, T = 1)$  is the counterfactual outcome which is not observed, however the matching method produces this counterfactual outcome for the treated by computing the probability of receiving the treatment, otherwise known as the propensity score. The approach then matches individuals with similar propensity score across those who received treatment (i.e have a bank account) and those without treatment (i.e without bank account). The propensity score, which is also referred to as the balancing score  $P(X) = Pr(T = 1|X)$ , make's it possible for the comparison between treated individuals and untreated individuals to be more meaningful. Comparative to other conventional regression techniques, PSM has a built in advantage of using characteristics (X) that are not affected by the intervention, but are correlated with both the outcome variable and the intervention ( Rosenbaum and Rubin, 1983; Abadie and Imbens, 2006). Heckman et al. (1999) argues that, matching estimators produce low-bias estimates of the effect of a treatment. Firstly, because conditioning on X (i.e baseline characteristics) discards selection bias. Secondly, for the fact that treatment and control individuals are drawn from the same data, hence are exposed to similar economic condition. Lastly, like control experiments the matching method does not require any functional form assumption on the outcome equation. The data source for this study provides enough set of control variables that we are able to estimate the matching estimate with low- bias and satisfying the two major assumptions underlying the PSM; conditional independence of outcome variables on treatment and the balancing condition. As can be seen from Figure 2, there exists a significant overlap in the spread of propensity score in the treated and control group. Hence the our specified model balances covariates across both groups and the common support or balancing assumption is satisfied.

## 6 Results and Discussion

The first three columns of Table 2 reports the Ordinary Least Square (OLS) results of regressing the logarithm of income per capita of female household heads as a measure of economic empowerment on access to financial account while controlling for relevant individual, household, and regional specific characteristics. It worthy to note that, all

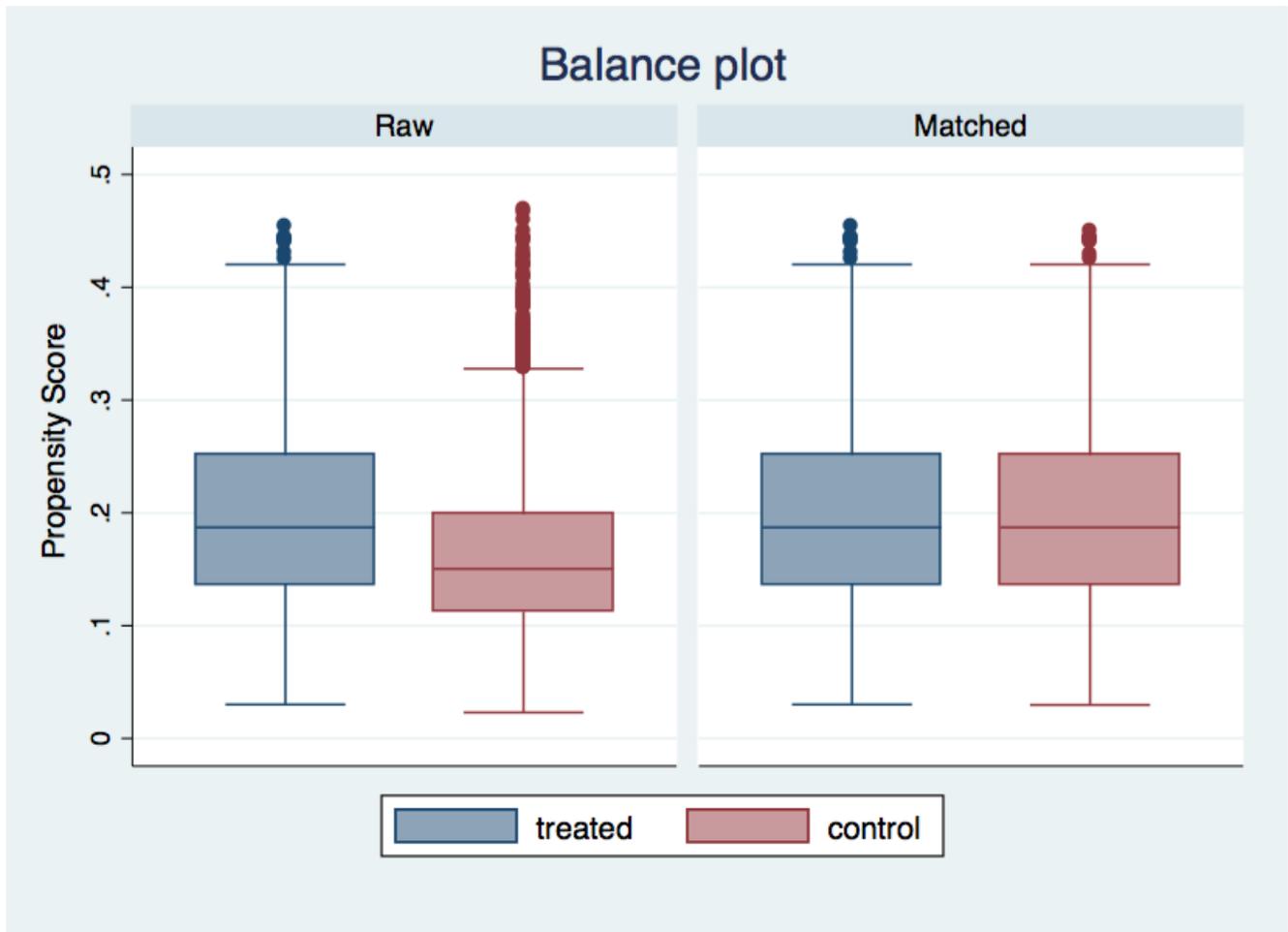


Fig. 2

regressions include year, and region fixed effects and standard errors are clustered at the region level. Due to the limitation of space we did not report the full results, that is coefficients of all variables included in the model, but only on the variables of interest. Full estimation results can be found in Table 5 in the Appendix. In Table 2, each column captures a unique model with a different account ownership as the independent variable. Column 1 shows the results of the impact of access to financial account (ie. both formal and informal) on income per capita. The point estimate in this column suggests that on average when female households head without a financial account switch to have an account, their per capita income increases by 28%<sup>3</sup>, and when female households heads with an account switch to not having an account their per capita income decreases by 22%<sup>4</sup> and this is significant at 1% level. We then disaggregate the account ownership into formal account and informal account, and as can be seen from column 2, female household heads with a formal (bank) account seem to have higher income per capita as compared to their counterparts without a formal account. Specifically, female household heads switching from not having a formal account to having an account, will have their per capita income increase by 40%. In column 3,

<sup>3</sup> Since the model is a semi logarithmic model with a dummy variable as our independent variable of interest the impact on the outcome variable is not the point estimate, but must be computed. For instance, from equation 1 the impact of Financial account on per capita income is computed as  $\%WE = (\exp(\beta_1) - 1) * 100$ . Detailed explanation can be found in Halvorsen et al. (1980)

<sup>4</sup>  $\%WE = (\exp(-\beta_1) - 1) * 100$  is the impact of a dummy variable switching from 1 to 0 in a semi logarithmic model

the coefficient of informal account ownership although positive it is not significant at any of the accepted levels of significance. Figure 3 plots the relationship between financial account ownership and log of income per capita for different age groups. As can be seen from the figure, across all age groups the income per capita is higher for female heads with a financial account than females heads without an account. Interestingly, our results also show that the level of education and the sector of employment positively impacts the economic empowerment of women, -see full regression results in Appendix. Similar conclusion was reached by Orso and Fabrizi (2016) which find that education helps to empower Bangladesh women. The results also reveal that female household heads living in cities and urban areas are more economically empowered than their counterparts living in rural areas.

The last three columns of Table 2 showcase the results of a probit model of a binary employment variable and financial inclusion. From column 4, female household heads having a financial account increases their probability of being employed by 9.8 percentage points which is significant at 1% level. From column 5, female household heads particularly owning a formal account increases their probability of being employed by 16 percentage points. Informal account again is not significant in the probit model. However, the insignificance of informal account does not necessarily imply that informal account ownership does not economically empower women. In the case of our study since our sample size is not very large we propose that future studies can investigate the impact of informal account ownership with a larger sample size. This results is also echoed in Westeneng and d'Exelle, 2015; Anderson and Eswaran, 2009.

In Table 3 we report the estimation results from a multinomial logit model where we further disentangle employment into three categories, namely formally employed(wage employment), self employed and unemployed in order to get a better understanding of the dynamics between financial account ownership and women empowerment. From the point estimate of the marginal effects, financial accounts ownership has a positive association with employed individuals. And the relationship appears to be driven by formal account similar to the OLS and PSM results. That is individuals with a formal account are more likely to be drawn into wage employment than self employment. Similar conclusion was echoed in Croson and Gneezy (2009) where they argued that women are more risk averse than men hence would prefer wage employment than starting a business which is much riskier. In the second column of Table 3, there exist a negative relationship between self employed female household heads and formal account ownership account. Meaning that women with an account are less likely to be self employed. This negative result could be as a result of many factors. For example, according to Buvinić and Furst-Nichols (2016) access to financial account alone is not sufficient to grow female owned subsistence level firms, rather intensive financial inclusion packages coupled with training. Bruhn and Love (2011) also accounts that businesses run by women turn to be less productive and have lower returns to capital, hence access to financial account alone may not be enough to empower self employed women. The coefficients of informal account as can be seen in column 3 are all not statistically significant although it has the expected positive sign for employed and unemployed individuals.

However, as mentioned earlier, there exist a possible endogeneity problem and since finding a good instrument is challenging we used the Propensity Score Matching method to circumvent the problem. Results from the Propensity Score Matching are reported in Table 4. Here we present the different types of financial account ownership on income per capita and employment status. In particular, we notice in this Table 4 the acronym ATT which represents the average treatment effect on the treated. From column 1 of the table, we see that ownership of a financial account has a positive and significant effect on the income per capita of female households heads. Particularly, female household heads switching from not having a financial account to having an account increases their per capita income by 27.8% which is significant at 1%. Regarding formal account, in column 2, it is evident from the result that formal account ownership has a positive causal relationship with income per capita. Female household heads switching from not having a formal account to have one increases their per capita income by 21.2%. Again as in the OLS estimations the coefficient of informal account ownership was not significant. Results from the propensity score are strikingly close and consistent with the OLS results. That is, overall these results suggest that access to financial account empowers female households heads through their per capita income although this impact is mostly driven by formal account ownership.

From columns 4 to 6 of Table 4, we report the average treatment of financial inclusion on employment status of female households heads. In column 1, the point estimate of financial account ownership is positive and significant at 1%. Implying that household heads with a financial account have a 11.8 percentage point probability to be formally employed. Again this positive effect seem to be to driven by formal account as the point estimate of informal account is negative although significant. This result suggest that financial account ownership mostly formal account access helps women to be formally employed. This findings is consistent with studies such as Bruhn and Love, 2011; Suri and Jack, 2016.

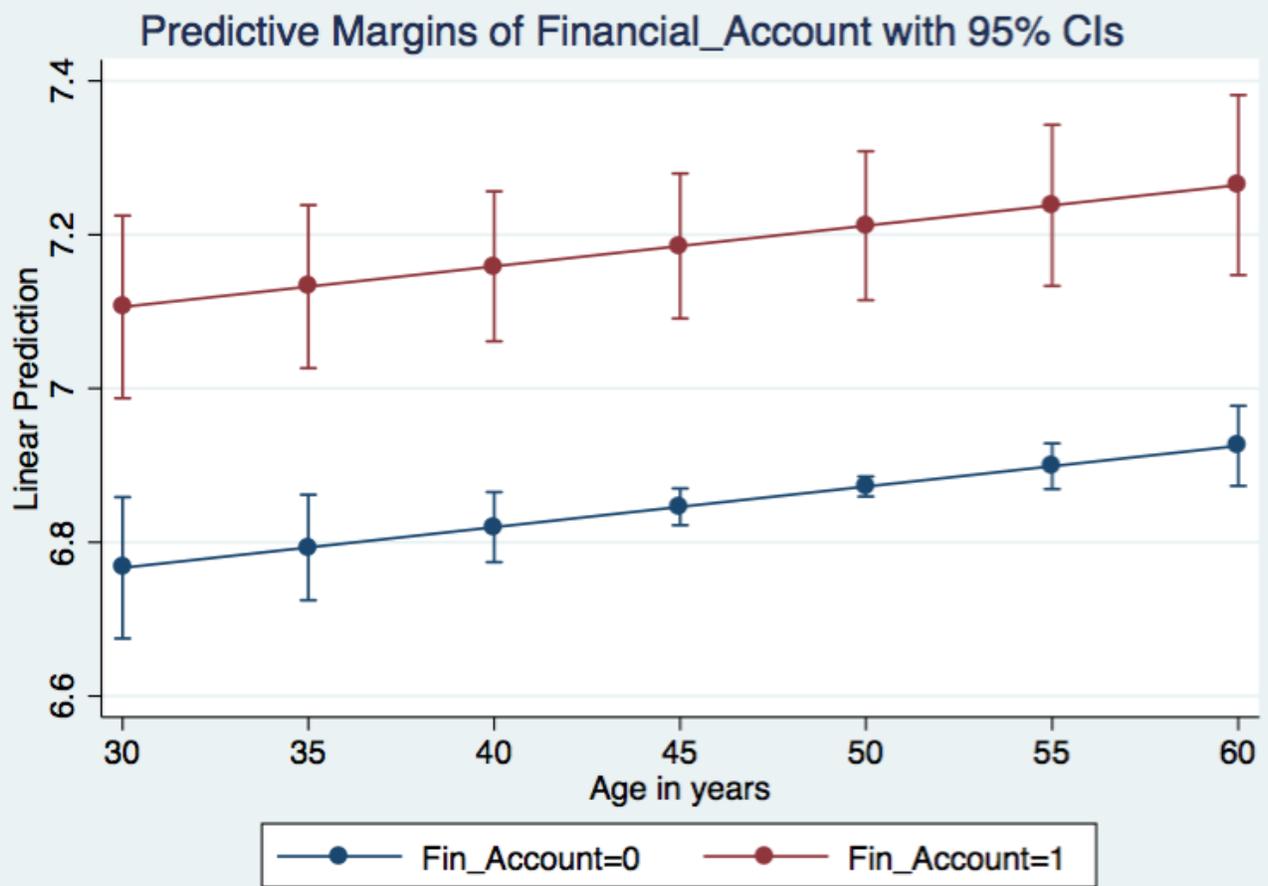


Fig. 3

Table 2: Impact of Financial Inclusion on Income Per capita and Employment, OLS and Probit

Variable	OLS- Dep: Per capita Income			Probit-Dep: Employment		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Financial Account	0.2527*** (0.0610)			.0986*** ( 0.0153)		
Formal Account		0.3392*** (0.0480)			0.1619*** (0.0216)	
Informal Account			0.1097 (0.0822)			-0.0018 (0.0180)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
R-squared	0.35	0.35	0.35			
Observation	4,184	4,174	4,174	4,739	4,728	4,728

**Notes:** Column 1-3, captures the OLS estimation for the outcome variable per capita income. Column 4-6 captures the marginal effects of financial inclusion on Employment status. Here the employment status is a dummy variable that takes 1 if the individual is employed and 0 otherwise. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment sector. Household Characteristics: include income quintile, and Regional fixed effects include 9 dummies for region of residence. And time fixed effect dummy. Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3: Marginal Effects of Financial Inclusion on Three Categories of Employment, Multinomial logit

	Employed	Self Employed	Unemployed
	(I)	(II)	(III)
Financial Account	0.0932*** (0.0182)	-0.0722*** (0.0150)	-0.0210 (0.0155)
Formal Account	0.1440*** (0.0220)	-0.1408*** (0.0266)	-0.0033 (0.0289)
Informal Account	0.0020 (0.0198)	0.0024 (0.0112)	-0.0044 (0.0177)
Individual Characteristics	✓	✓	✓
Household Characteristics	✓	✓	✓
No of Observation	4,739	4,728	4,728

Column 1 captures the marginal effect of financial inclusion on employed female HH, column 2 on self employed female HH and column 3 on Unemployed female HH outcome variable of interest. Here the employment status is a three categorical variable that takes takes 1 if the female HH is employed, 2 if the female HH is self employed and 0 if unemployed. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment Sector. Household Characteristics : include income quintile, and Regional fixed effects include 9 dummies for region of residence. And time fixed effect dummy . Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 4: Impact of Financial Inclusion on Income Per capita and Employment, PSM- Exact Matching

Variable	ATT- Dep: Per capita Income			ATT-Dep: Employment		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Financial Account	0.2454*** (0.0820)			0.1176*** ( 0.0302)		
Formal Account		0.1919* (0.1068)			0.1741*** (0.0308)	
Informal Account			-0.0320 (0.0957)			-0.0682*** (0.0259)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
Observation	4,184	4,174	4,174	4,739	4,728	4,728

**Notes:** Column 1-3, captures the ATT with the outcome variable per capita income. Column 4-6 captures the ATT with Employment as the outcome variable of interest. Here the employment status is a dummy variable that takes 1 if the individual is employed and 0 otherwise. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment Sector. Household Characteristics: include income quintile, and Regional fixed effects include 9 dummies for region of residence. And time fixed effect dummy. Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 7 Robustness Checks

To ensure the validity of our model, we used different matching estimators like the Kernel matching and the nearest neighbour matching techniques to ascertain that, the original results are not dependent on the estimator. With the nearest neighbour matching we used nearest neighbour 1 and neighbour 4. As can be seen in Table 5 and Table 6, the results from the different matching techniques are not different from the exact matching method previously used.

Additionally, to ensure that the results are not affected by outliers we drop the Greater Accra Region sample. Again as can be seen in Table 7 that the results are similar to the one of full sample. As a falsification test, we dropped all the individuals in the treatment group (ie. women with a bank account) and randomly assigned treatment to 1000 individuals of the previous control group and the remaining sample become the current control group. With this new sample we run a Monte Carlo simulations to estimate the average treatment effect on the treated (ATT) under 50 iterations. From the results, none of the estimated ATT was significant. Which signifies that the principal results are valid.

Table 5: Impact of Financial Inclusion on Income Per capita and Employment, Kernel Matching

Variable	Dep: Per capita Income			Dep: Employment		
	(I)	(II)	(III)	(VI)	(V)	(VI)
Financial Account	0.2874*** (0.0627)			.0992*** ( 0.0196)		
Formal Account		0.3112*** (0.0854)			0.2081*** (0.0275)	
Informal Account			0.0951 (0.0742)			-0.0238 (0.02560)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
R-squared	0.35	0.35	0.35			
Observation	4,184	4,174	4,174	4,739	4,728	4,728

**Notes:** Column 1-3, captures the Kernel matching for the outcome variable per capita income. Column 4-6 captures the Kernel Matching of financial inclusion on Employment status. Here the employment status is a dummy variable that takes 1 if the individual is employed and 0 otherwise. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment sector. Household Characteristics: include income quintile, and Regional fixed effects include 9 dummies for region of residence. And time fixed effect dummy. Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 6: Impact of Financial Inclusion on Income Per capita and Employment, Nearest Neighbour Matching

Variable	ATT- Per capita Income, nn(1)			ATT- (VI)	ATT- Employment, nn(1)	
	(I)	(II)	(III)		(V)	(VI)
Financial Account	0.2615*** (0.0722)			.0788*** ( 0.0189)		
Formal Account		0.3893*** (0.1150)			0.1284*** (0.0283)	
Informal Account			0.1047 (0.0830)			-0.012 (0.0209)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
R-squared	0.35	0.35	0.35			
Observation	4,184	4,174	4,174	4,739	4,728	4,728
Variable	ATT- Per capita Income, nn(3)			ATT- (VI)	ATT- Employment, nn(3)	
	(I)	(II)	(III)		(V)	(VI)
Financial Account	0.226*** (0.0604)			0.0507*** ( 0.0155)		
Formal Account		0.3150*** (0.0896)			0.1070*** (0.0230)	
Informal Account			0.0746 (0.0693)			-0.0212 (0.0178)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
Observation	4,184	4,174	4,174	4,739	4,728	4,728

**Notes:** Column 1-3, captures the nearest neighbour matching for the outcome variable per capita income. Column 4-6 captures the nearest neighbour matching of financial inclusion on Employment status. Here the employment status is a dummy variable that takes 1 if the individual is employed and 0 otherwise. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment sector. Household Characteristics: income quintile, and Regional include fixed effects include 9 dummies for region of residence. And time fixed effect dummy. Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 7: Impact of Financial Inclusion on Income Per capita and Employment, Sample without Greater Accra Region

Variable	OLS- Per capita Income			Probit-	Employment	
	(I)	(II)	(III)	(VI)	(V)	(VI)
Financial Account	0.2372*** (0.0703)			0.1058*** ( 0.0162)		
Formal Account		0.3407*** (0.0652)			0.1860*** (0.0115)	
Informal Account			0.1190 (0.0889)			0.0048 (0.0182)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
R-squared	0.33	0.33	0.33			
Observation	3,745	3,738	3,738	4,073	4,066	4,221
Variable	ATT- Per capita Income			ATT-	Employment	
	(I)	(II)	(III)	(VI)	(V)	(VI)
Financial Account	0.2320*** (0.0781)			0.0652*** ( 0.0220)		
Formal Account		0.3760*** (0.1229)			0.2005*** (0.0366)	
Informal Account			0.1577* (0.0944)			-0.0183 (0.0247)
Individual Characteristics	✓	✓	✓	✓	✓	✓
Household Characteristics	✓	✓	✓	✓	✓	✓
Observation	3,745	3,738	3,738	4,073	4,066	4,221

**Notes:** Column 1-3, captures the OLS results for the outcome variable per capita income. Column 4-6 captures the probit results of financial inclusion on Employment status. Here the employment status is a dummy variable that takes 1 if the individual is employed and 0 otherwise. Individual characteristics include: Age, Marital Status, Educational Level, Religion, Location, Employment sector. Household Characteristics: income quintile, and Regional include fixed effects include 9 dummies for region of residence. And time fixed effect dummy. Robust standard errors clustered at the regional level are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 8 Policy Implication and Conclusion

This paper contributes to the existing debate regarding financial inclusion and women economic empowerment. Using a household level data from Ghana, the study finds that having a bank account encourages women to be employed and also augments their per capita income. Although this positive effect is driven by formal account ownership. Informal account ownership seem not to have any impact on women economic empowerment, however, since our sample size is small, we suggest future studies with bigger sample size should investigate how having informal bank account empowers women economically. Further disaggregating employment status in to being employed, self employed and unemployed, the results reveal that women prefer to be employed by others, thus wage employment than to be self employed. These results are also consistent with the findings of Bruhn and Love, 2014; Croson and Gneezy, 2009; Suri and Jack, 2016. In terms of policy implications, the results of this paper suggests that government programs that aim to economically empower women should be focused mostly on women living in rural areas and women with lower levels of education. The results also indicate that, having a bank account alone is not enough to economically empower women, but must be complimented with other tools like entrepreneurial training, capacity building, and financial education targeted at women. Lastly, the results also demonstrate that informal finance needs to be well regulated such that loss of capital and deposits by clients is mitigated, and hence would be able to economically empower women.

## 9 Appendix

Table 8 is the OLS regressions of Financial inclusion on income per capita with all the variables included in the estimations.

Table 8: OLS Regressions - Dependent Variable: Income Percapita

Variables	(1)	(II)	(III)
F_Account	0.253*** (0.061)		
Formal_Account		0.339*** (0.048)	
Informal_Account			0.110 (0.082)
Age	0.005** (0.002)	0.005** (0.002)	0.005** (0.002)

*Continued on next page*

Table 8 – *Continued from previous page*

Variables	(1)	(2)	(3)
Married	-0.199** (0.067)	-0.215*** (0.066)	-0.221*** (0.067)
Divorce	-0.311** (0.101)	-0.326*** (0.100)	-0.343*** (0.103)
Widowed	-0.244** (0.103)	-0.259** (0.101)	-0.275** (0.104)
Unemployed	-0.692*** (0.080)	-0.700*** (0.077)	-0.698*** (0.077)
Primary	-0.079 (0.067)	-0.077 (0.065)	-0.070 (0.065)
Secondary	0.330*** (0.099)	0.316*** (0.093)	0.407*** (0.097)
Tertiary	0.724*** (0.089)	0.713*** (0.093)	0.685*** (0.087)
Post_Graduate	1.141*** (0.048)	1.156*** (0.046)	1.124*** (0.057)
Islam	-0.018 (0.142)	-0.031 (0.148)	-0.016 (0.148)
Christian	0.148 (0.114)	0.159 (0.117)	0.177 (0.118)
Traditional	-0.054 (0.137)	-0.065 (0.146)	-0.057 (0.144)
Urban	0.204** (0.080)	0.204** (0.084)	0.227** (0.083)
Agricsector	-0.867*** (0.191)	-0.879*** (0.194)	-0.886*** (0.196)
s2nd_quintile	0.413*** (0.090)	0.425*** (0.088)	0.425*** (0.088)
t3rd_quintile	0.764*** (0.101)	0.783*** (0.097)	0.786*** (0.100)
f4th_quintile	1.073***	1.088***	1.097***

*Continued on next page*

Table 8 – *Continued from previous page*

Variables	(1)	(2)	(3)
	(0.110)	(0.107)	(0.108)
f5th_quintile	1.674***	1.695***	1.725***
	(0.098)	(0.095)	(0.095)
Wave7	0.416***	0.420***	0.374***
	(0.100)	(0.105)	(0.107)
WesternR	0.573***	0.543***	0.562***
	(0.089)	(0.087)	(0.090)
CentralR	0.094	0.072	0.084
	(0.084)	(0.082)	(0.085)
GreaterAccraR	0.521***	0.475***	0.531***
	(0.103)	(0.106)	(0.107)
VoltaR	0.321***	0.303***	0.327***
	(0.077)	(0.077)	(0.078)
EasternR	0.460***	0.437***	0.455***
	(0.086)	(0.085)	(0.086)
AshantiR	0.473***	0.463***	0.465***
	(0.089)	(0.089)	(0.088)
BrongAhR	0.325***	0.302***	0.313***
	(0.073)	(0.073)	(0.073)
NorthernR	0.308***	0.347***	0.358***
	(0.044)	(0.046)	(0.046)
UpperEastR	0.022	0.003	0.005
	(0.050)	(0.046)	(0.049)
<i>N</i>	4184	4174	4174
R-Squared	0.349	0.350	0.347

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