Financial Inclusion and Growth of Non-Farm Enterprises in Ghana

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Abstract

Overtime, the policy to enhance financial inclusion at the national and household or individual levels has coincided with the increasing need for non-farm enterprises in addition to mainstream farming due to climate change and as an income diversification strategy. Using data from the sixth round of the Ghana Living Standards Survey, this chapter examines the influence of financial inclusion on growth of non-farm enterprises. We construct a multi-dimensional measure (index) of financial inclusion relying on 14 indicators while employing an instrumental variable approach in examining financial inclusion–firm growth nexus. Our evidence suggests that improvement in non-farm entrepreneurs' level of financial inclusion is growth-enhancing with higher probability in the urban relative to rural areas. At the policy level, strategies targeted at boosting financial inclusion will not only spur firms' growth but expand these enterprises and hence improve tax revenue for the economy as a whole.

Keywords: Financial inclusion; Non-farm enterprise; Firm; Growth; Ghana

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Introduction

Defined as economic activities outside agriculture and often taking place during agricultural off-seasons (GSS, 2014), non-Farm enterprises/economic activities have become livelihood strategies and risk-coping mechanisms of choice to households in developing countries, especially the farm households since climate change has had a toll on them in recent times. Farm households' diversification of income portfolios becomes necessary in their bid to address shortfalls in income and food requirements (Korir, Lagat, & Njehia, 2012). More recently, Musah, Ibrahim and Adam (2016) asserted that, participation in farm work positively and significantly enhances household welfare in Ghana albeit regional differences. This notwithstanding, the authors reckon the possible contribution of non-farm employment to households' wellbeing. It must be noted that some households also engage only in self-employed non-farm enterprises but are not as many as households that engage only in farming as self-employment. A major conclusion from the 2007 World Development Report and 2011 IFAD Rural Poverty Report have all noted that rural farm households' participation in non-farm economic activities have become a norm, rather than the exception, and the degree of participation is common at all levels of welfare. In Ghana, non-farm enterprises are common among households and the numbers have been increasing over the years. In 2005/2006 as many as about 3.2 million (46%) households in Ghana were operating non-farm enterprises (GSS, 2008) and this figure, in 2012/2013, increased to 3.7 million but represented 44.3% of Ghanaian households (GSS, 2014). Despite the reduction in the proportion of Ghanaian households operating non-farm enterprises, such enterprises remain a strategic source of household income, contributing 48.3% to sources of household income.

Apart from the benefits households enjoy from operating non-farm enterprises, the economy as a whole derives many benefits due to the contributions such enterprises make in the provision of employment to a majority of the population which also feeds into expansion of the national income. By way of identification, non-farm enterprises have been classified as being very small in size in terms of capital and operations and rely almost exclusively on owner-supplied inputs (GSS, 2014). These enterprises are also found mainly in the informal sector that employs about 85% of the Ghanaian populace, according to the 2010 Population and Housing Census (PHC, 2012). For manufacturing employment, about 85% are provided by SMEs that form 92 percent of all business in Ghana (Abor & Quartey, 2010). Based on the benefits of non-farm enterprises to households and the economy at large, it is desired that they grow or expand into bigger firms and generate employment for more people.

Expanding non-farm enterprises will require the injection of more funds into the running of the firms. Such funds may be obtained from enterprise owners' savings, credit from formal and informal financial institutions, remittances from friends and relatives. Savings can even be affected by how the owner has insured against unexpected losses (Kunreuther, 2015). The other side of the coin explains how firms and individuals can go extra lengths to reduce risk so that payable premiums, based on risk assessment, will reduce considerably (Insurance Europe, 2012). In essence, individuals and businesses save money in their quest to pay less premiums by reducing risk and losses. Theoretically, it has been proven that obtaining extra funds from these sources are also influenced by one's ownership and use of financial products and services. For instance, ownership of a bank account (Fitzpatrick, 2015; Koomson, Annim, & Peprah, 2016) and seeking financial advice from experts (Pentland, 2006) have a positive relationship with access to credit and savings behaviour. Also, ownership of bank and mobile money accounts (Horst, 2006; Jack & Suri, 2011), use of financial products like ATM, debit/credit cards and other payment systems (E-Zwich)[2] facilitate the receipt and payment of remittance from within and outside one's

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[2] This is an electronic platform that links payment systems among the financial sector institutions in Ghana.

country. Finally, we talk of insurance that brings about stability in business operations and hence results in saving of funds that could have been lost to unforeseeable risk (Insurance Europe, 2012).

In one piece, every bit of these means of obtaining such extra funds and the conditions that facilitate them fall under the ambit of financial inclusion and represents the current definition/measurement of financial inclusion (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015). By obtaining such funds, owners are able to expand their financial base and employ more inputs into the production process while continuing to stabilize operations and preventing losses through insurance. A similar explanation is given by Hermelo and Vassolo (2007) who posited that financial resources facilitate the procurement of new equipment, development of new products and marketing in new markets. The final outcome becomes firm growth that will be depicted in the form of increased sales revenue/turnover, profits/income, market shares, assets, employees and number branches (see Figure 1). At the macro level, financial inclusion can aid in the expansion of potential growth through the mobilization of savings and attraction of more firms into the formal sector (due to their expansion), resulting in improved tax revenues (AFI, 2015). Chauvet and Jacolin (2017) also 55,596 firms in 79 countries and found that financial inclusion (the distribution of financial services across firms) has a positive impact on firm growth.
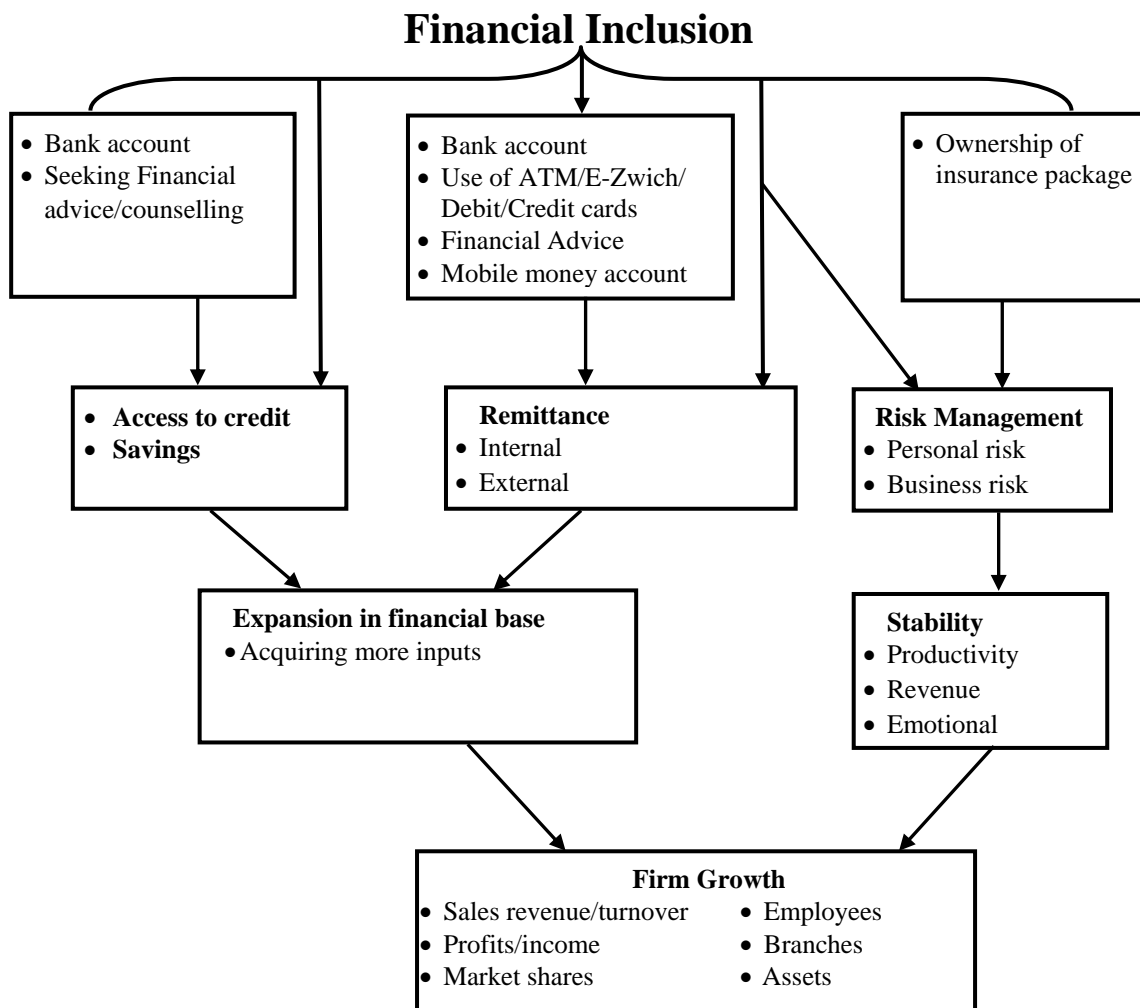
Figure 1: The link between financial inclusion and firm growth
Source: Authors' Construct (2017)

Despite the possible growth-enhancing effect that financial inclusion can have on non-farm enterprises, owners of such enterprises in Ghana are mainly financially excluded which also implies that their enterprises largely suffer growth. The Ghanaian populace that double as owners of these non-farm enterprises have also been reported as having low levels of financial inclusion through a financial inclusion study by Jha, Amerasinghe and Calverley (2014) that listed Ghana, Egypt, Uganda, Nigeria and Pakistan as part of the least inclusive countries in the world. Not only are Ghanaian non-farm entrepreneurs financially excluded, based on their geographical location, but the enterprises they own [mainly small and medium enterprises (SMEs)], have also been characterised with high levels of financial exclusion (Ahiawodzi & Adade, 2012; Quaye, Abrokwah, Sarbah, & Osei, 2014). Such levels of exclusion have resulted in these SMEs being referred to as the "missing middle" (PricewaterhouseCoopers, Ghana, 2013) because they are not the target of the financial system (see Figure 2). There are gender and locational gaps in financial inclusion. Regarding ownership of financial products (fixed deposit, current, E-zwich and savings accounts), males in the urban areas have 54 percent ownership while their female counterparts have 46 percent ownership. As regards the rural areas, the percentage ownership for males is 61 percent while that of females is 39 percent. For the country as a whole, males have 55 percent ownership while females have 45 percent ownership. In sum, females are less included than males (GSS, 2014) and women again have less access to credit (Amu, 2005; Koomson et al., 2016). Specifically looking at the locational dimension also shows that rural dwellers have higher levels of exclusion because they face greater discrimination when accessing formal credit (Leyshon & Thrift, 1996) and are more likely to be refused credit when they apply (Koomson et al., 2016).
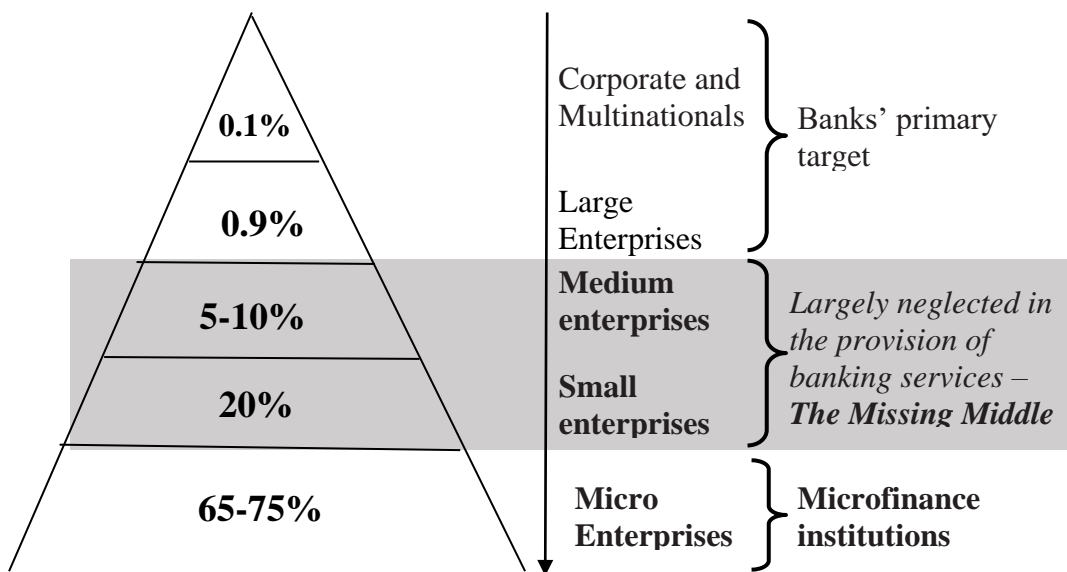
Figure 2: SMEs as the missing middle in financial inclusion
Source: AccessFinance, A World Bank bi-monthly newsletter. Issue No. 30, Jan-2010 cited in PricewaterhouseCoopers, Ghana (2013)

Even the non-farm enterprises that are considered micro and are the target of MFIs, owners of these enterprises have problems accessing credit due to usurious interest rates and transaction costs (Peprah & Koomson, 2015; Shylendra, 2006); are at times refused the loans entirely or asked to compulsorily save before assessing credit (Koomson et al., 2016;

Mensah, 2009). Based on these challenges, the most common source of capital for non-farm enterprises is personal savings (73%) followed by that from friends and relatives (14.6%). Regarding credit, majority (92.3%) of them do not apply for credit, with just about two percent applying for bank loans (GSS, 2008, 2014). This is the more reason why enhancing financial inclusion for non-farm entrepreneurs is very paramount. Even if they do not access credit, which is not desirable, they will either seek financial advice, engage more in mobile money transactions, manage risk properly and get their enterprises growing.

Besides financial inclusion, the size of a non-farm enterprise, measured by the number of employees, can also influence its growth and that increasing the number of employees (size) is likely to result in the growth of the enterprise (Pagano & Schivardi, 2003). Contrary to this assertion is the Gibrat's law which says that the rate at which a firm grows is independent of it is initial size (Hermelo & Vassolo, 2007; Zhou & de Wit, 2009). Although some researchers have come out with findings in support of this law (Daunfeldt, Elert, & Lang, 2012; Geroski & Gugler, 2004), others have also had contesting findings, implying that the law does not hold (Calvo, 2006; Petrunia, 2008). Years of operation has also been depicted as having mixed effects. While some explain that older firms are more likely to grow more due to accumulation of experience over time (Delmar & Shane, 2006), others believe that firms that have operated for long are less likely to grow (Geroski & Gugler, 2004; Yasuda, 2005). A similar positive effect of education on firm growth has been asserted by Nandram & Samsom (2000) and Welter (2001).

With regard to working hours, Pencavel (2015) believes that employees' number of working hours has the potential to grow a firm, although he found a non-linear relationship between these variables. Zhou & de Wit (2009) found that male owners of firms had greater growth than females and this could be attributed to males' greater ambitions to grow than their female counterparts which also stems from greater availability of resources to men than women (Welter, 2001). Zhou & de Wit (2009) did not find any significant effect of firm owner's age and firm growth while Oeconomiae (2011) found a significantly positive effect of managers' age and firm growth (performance).

Based on the evidence and the framework for financial inclusion and growth of non-farm enterprises, this chapter aims at ascertaining whether financial inclusion has an effect on growth of non-farm enterprises using sales revenue (income) as a measure of growth. Our choice of sales revenue is due to its ability to reveal both the short- and long-term changes in a firm (Zhou & de Wit, 2009) and its credential as an objective measure of firm growth (Delmar, 2006) compared to others. In fact, earlier studies (see for instance Akudugu, 2013; Demirguc-Kunt & Klapper, 2012) have proxied financial inclusion by a person's ownership of formal bank account. We deviate from this measure of financial inclusion by employing a multi-dimensional construct of financial inclusion that includes several important indicators of financial inclusion. With this we are able to introduce a more instructive and robust measure in our examination of financial inclusion and its interaction with firm growth. The rest of the chapter flows as follows: the next section outlines our measure of firm growth and financial inclusion while Section 3 specifies our methodology including data issues and empirical strategy. Section 4 presents the analyses and discussions while Section 5 concludes the study with key policy recommendations.

Measuring firm growth

Several characteristics of firms can be used as indicators of firm growth. Some of these include sales revenue/turnover, profits/income, assets and market shares (Ardishvili, Cardozo, Harmon, & Vadakath, 1998; Davidsson, 1991; Delmar, 2006; Weinzimmer, Nystrom, & Freeman, 1998; Zhou & de Wit, 2009). Of these indicators, the widely-used are

employment and sales/revenue/incomes because (i) they reveal both short-term and long-term changes in a firm (Zhou & de Wit, 2009); (ii) they are more objective measures and are easy to obtain compared to other measures (Delmar, 2006). According to Hermelo and Vassalo (2007), using employment size an indicator biases the measurement against capital-intensive firms while using assets also biases the measure against capital intensive firms and firms that have a significant level of out-sourcing. This notwithstanding, we base our choice on Delmar, Davidsson and Gartner's (2003) conclusion, after analysing different measures of growth, that the expression of a particular measure of firm growth depends on the aim of the investigation. We used sales revenue (income) from non-farm enterprises as an indicator of growth due to the benefits associated with such a measure and also because most non-farm enterprises do not have employees apart from the owner running it (Abbott, Murenzi, & Musana, 2012). Others who who require extra labour fall on labour within their households, which will usually be present with or without financial inclusion (credit or remittance ad other others).

Measuring financial inclusion

The measurement of financial inclusion has gone through stages where, adults that owned account with formal financial institutions were considered to be financially included (Demirguc-Kunt & Klapper, 2012) to a more broad measure to include ownership of accounts with a bank or another financial institution and even with mobile money providers (Demirgüç-Kunt et al., 2015) since mobile money has become part of the mainstream modes of banking in today's financial system in both developed and developing countries (Aker & Mbiti, 2010; Donovan, 2012). Recent measures of financial inclusion now broadly cut across ownership and use of a range of financial products and services in the financial system including access to credit, ownership of savings account and insurance products, receipt of remittance and others (Demirgüç-Kunt et al., 2015; Fanta & Mutsonziwa, 2016). This study embraces this multi-dimensional measure of financial inclusion by using 14 indicators of financial inclusion that were mainly grouped into ownership of financial products, use of financial products, access to credit and receipt of remittance. Table 1 displays these indicators and their average ownership by the study's sampled non-farm entrepreneurs.

Indeed, measuring financial inclusion from these indicators can be done using key approaches notably the principal component analysis (PCA) and an additive index. While each approach is unique, the PCA comes with four key conditions in its application. First, it requires that the index is generated from components (usually component 1) having eigen values more than one (Hamilton, 2012; Kaiser, 1960). Second, the "rule of thumb" of retaining components that capture variations of or possess cumulative percentage of 70% or 90% (Rae & Rea, 2016). Third, the use of the scree plot (Hamilton, 2012); and finally the use of Kaiser-Meyer-Olkin (KMO) — a post-estimation test which is expected to produce a coefficient than is greater than 50% to indicate sample adequacy (Field, 2005). Although most researchers usually consider any of conditions two to four in addition to condition one to inform their basis for generating an index using a PCA, our data does not satisfy both conditions one and two and for that reason, using a financial inclusion index generated from PCA will lead to a loss of about 82% (see Appendix 1 and 2) of the characteristics of the indicators combined in generating the variable. For instance, because component 1 has the highest Eigen value, it reports only 18% proportion or retention of the overall variations in all the indicators combined. Based on this outcome, we resort to an additive index of financial inclusion that sums together all the financial inclusion indicators that are owned and used by non-farm entrepreneurs. This method has previously used to generate an entrepreneurial trait index (Peprah, Afoakwah, & Koomson, 2015) and an employment security index (Nunoo, Darfor, Koomson, & Arthur, 2016) . All the indicators are binary so it is expected to result in

a minimum value of 0 and a maximum of 14 but obtained a minimum of zero and a maximum of 7 which is evidence of low levels of financial inclusion among owners of non-farm enterprises. This approach does not lead to loss of qualities/characteristics of the indicators as would have been the case with an index using PCA.

Table 1: Indicators used in generating the financial inclusion index

Variable	All		Rural		Urban	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Ownership of Financial Products						
Ownership of current or cheques account	0.677	0.468	0.631	0.484	0.698	0.460
Ownership of investment account	0.099	0.299	0.047	0.212	0.124	0.330
Ownership of savings account	0.928	0.258	0.900	0.300	0.943	0.232
Ownership of fixed deposit account	0.025	0.156	0.040	0.197	0.017	0.129
Ownership of e-zwich account	0.008	0.091	0.008	0.090	0.008	0.091
Ownership of insurance policy	0.293	0.455	0.217	0.412	0.360	0.480
Ownership of any other account	0.033	0.178	0.063	0.243	0.017	0.129
Use of Financial Products						
Transact using cheque book	0.901	0.299	0.852	0.356	0.925	0.264
Transact using ATM	0.591	0.492	0.421	0.495	0.656	0.476
Transact using e-zwich card	0.056	0.230	0.047	0.213	0.060	0.238
Transact using e-banking	0.030	0.170	0.008	0.090	0.041	0.198
Transact using any other financial product	0.597	0.491	0.647	0.479	0.565	0.496
Access to credit	0.110	0.313	0.118	0.322	0.104	0.305
Receipt of remittance	0.351	0.477	0.378	0.485	0.327	0.469
Financial inclusion Index	1.574	1.456	1.262	1.290	1.852	1.537

Source: Authors' computation using GLSS6 data

Data

The study used data from the sixth round of the Ghana Living Standards Survey (GLSS 6) obtained from the Ghana Statistical Service (GSS). A multi-stage sampling technique was use to collect the data over a 12 month period spanning 18th October 2012 to 17th October 2013. Besides the non-farm module, that has become paramount since fourth round 4 of the GLSS, other modules covered in the recent survey included education, health, employment, migration and tourism, agriculture, access to financial and insurance services, credit and assets, peace and security, governance and, demographic characteristics. Although the study covered a nationally representative sample of 18,000 households and successfully enumerated 16,772 households, the non-farm enterprising households were 7,060. With respect to the enterprises, information such as revenue (income), number of employees, hours worked per day, years of operation, sources of credit and capital among others were available for 5,417 households. However, missing observation for some key variables further reduced our sample to 5,388. For the Instrumental Variable (IV) method, the sample was reduced to 1,508 as it represents the number of non-farm entrepreneurs who indicated their sources of receiving remittance.

Estimation technique

This study applied the IV estimation technique to determine the effect of financial inclusion on growth of non-farm enterprise. The reason for using the IV method is that financial inclusion is an index of 14 indicators and is likely to be influenced by others variables that do not influence growth of the enterprise. To do this, we need an instrument(s) that does (do) have a direct influence on financial inclusion but not firm growth (Cameron & Trivedi, 2010). We them settled on three instruments — source of credit, means of receiving remittance and formal educational status of the firm's owner. For these three instruments, the first two intuitively qualify as instruments without checks but the formal educational status leaves one to believe that the educational status also has a role to play in influencing firm growth. If it does, it cannot pass as an instrument. As we will show later, the ordinary least squares (OLS) estimation reveals that formal educational status of non-farm enterprises do not have a significant influence on growth of these enterprises. With the insignificance of formal education confirmed, we included the educational variable as an instrument because formal education plays a role in enhancing financial inclusion. Embracing the need to demand insurance, access credit, use credit/debit cards are all significantly influenced by formal education. More so, for formal bank account alone (savings, current or fixed deposit), the particular type owned by an individual is greatly influenced by one's understanding of the specific package and the actual rate of interest and charges that are associated with them. Based on the explanations above, we state our structural and reduced form equations below:

Firm revenue (income) as growth
Structural equation (2nd Stage)

$$Growth_i = \beta_0 + \beta_1 FI_i + \beta_2 Emp_i + \beta_3 Yrsop_i + \beta_4 Hrswrk_i + \beta_5 Rural_i + \beta_6 Male_i + \beta_7 Age_i + \beta_8 Age^2_i + \beta_9 \ln Aginc + \beta_{10} Reg_i + \varepsilon_i$$

Reduced form equation (1st stage)

$$FI_i = \alpha_0 + \alpha_1 Scecred_i + \alpha_2 Scerem_i + \alpha_3 Fedu_i + \alpha_4 Emp_i + \alpha_5 Yrsop_i + \alpha_6 Hrswrk_i + \alpha_7 Rural_i + \alpha_8 Male_i + \alpha_9 Age_i + \alpha_{10} Age^2_i + \alpha_{11} \ln Aginc_i + \alpha_{12} Reg_i + \varepsilon_i$$

where *Growth* is growth of non-enterprise and is measured using sales revenue or income from non-enterprise; *FI* is financial inclusion which is an index of 14 indicators; *Emp* represents number of employees and also use to proxy firm size; *Yrsop* is the number of years the enterprise has been operating; *Hrswrk* is the average hours of work per day; *Rural* is a dummy variable for location, where 0 is for urban and 1 is for rural; *Male* denotes gender, where 0 is female and 1 is male; *Age* and *Age²* is the non-farm entrepreneur's age and its square used to examine the nonlinear relationship between age and *Growth*; *lnAginc* is the income or revenue from agricultural; *Reg* is a structural variable representing regional dummies; *Scecred* and *Scerem* are sources of credit and remittance respectively and *Edu* is a dummy variable for entrepreneurs' formal educational status where those with no formal education is coded 0 and 1 for those with some level of formal education. In the next section, we discuss our empirical findings. Descriptive statistics are presented in Table 2 below.

Analysis and Discussion
Table 2: Summary statistics of variables used in determining the effect of financial inclusion on growth of non-farm enterprises

Variable	All (Ghana)		Rural		Urban	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Growth (sales revenue or income from non-farm enterprise)	11,028.56	36,323.73	6,698.47	24,858.30	14,876.01	43,722.59
Financial inclusion	1.57	1.46	1.26	1.29	1.85	1.54
Number of employees (firm size)	1.08	1.25	1.05	1.15	1.10	1.33
Years of operation	8.72	8.91	8.76	9.09	8.68	8.74
Average hours of work per day	1.54	3.64	1.39	3.38	1.67	3.85
Rural (0=urban; 1=rural)	0.47	0.50	—	—	—	—
Male owner	0.66	0.47	0.73	0.45	0.60	0.49
Age of owner	45.26	14.05	46.32	14.66	44.33	13.41
Age of owner squared	2,246.22	1,417.24	2,360.42	1,520.19	2,144.75	1,310.99
Income from agriculture	1,663.69	5,955.68	2,874.14	7,885.23	588.16	3,048.62
Region						
Western	0.12	0.32	0.13	0.33	0.11	0.32
Central	0.09	0.28	0.08	0.27	0.09	0.29
Greater Accra.	0.12	0.32	0.02	0.13	0.21	0.41
Volta	0.11	0.32	0.15	0.35	0.08	0.28
Eastern	0.12	0.33	0.13	0.33	0.12	0.33
Ashanti	0.14	0.35	0.09	0.29	0.18	0.38
Brong Ahafo	0.08	0.28	0.09	0.29	0.08	0.27
Northern	0.08	0.27	0.09	0.29	0.07	0.25
Upper East.	0.06	0.23	0.09	0.28	0.03	0.17
Upper West	0.08	0.27	0.14	0.35	0.03	0.16
Instruments						
Formal Educational Status (0=no education; 1=educated)	0.54	0.50	0.43	0.50	0.64	0.48
Source of Credit						
No credit used	0.92	0.28	0.92	0.27	0.91	0.28
Bank	0.02	0.14	0.01	0.12	0.03	0.16
Other financial agencies	0.02	0.14	0.02	0.13	0.02	0.15
Cooperative union	0.01	0.08	0.01	0.08	0.01	0.08
Money lender	0.01	0.08	0.01	0.09	0.01	0.07
Family/Friend	0.02	0.14	0.02	0.15	0.02	0.14
Other sources	0.01	0.09	0.01	0.10	0.01	0.09

Table 2. *(Continued)*

Means of receiving remittance						
Western Union money transfer	0.08	0.27	0.04	0.19	0.12	0.32
MoneyGram	0.02	0.14	0.01	0.10	0.03	0.17
Vigo (Merchant bank)	0.00	0.04	0.00	0.04	0.00	0.04
Fast Money Transfer (GCB)	0.02	0.14	0.02	0.13	0.02	0.15
Bank accounts	0.06	0.23	0.04	0.19	0.08	0.27
Post office	0.01	0.08	0.00	0.05	0.01	0.10
Friends/relatives	0.48	0.50	0.54	0.50	0.43	0.49
Brought home by migrant	0.27	0.45	0.28	0.45	0.27	0.44
Other means	0.06	0.24	0.07	0.26	0.05	0.22

Source: Author's computation using GLSS 6 data.

Regression Analysis

We tested for endogeneity using the Wu–Hausman test (*p*-value = 0.024) without robust standard errors (Hausman, 1978; Wu, 1974) and with Wooldridge's (1995) robust regression-based test (*p*-value=0.031) for models with robust standard errors and they both (at 5% alpha level) lead to a rejection of the null hypothesis that financial inclusion is exogenous. This gives credence to our treatment of financial inclusion as endogenous therefore, using source of receiving credit, means of receiving remittances and formal educational status as instruments to correct for endogeneity. What must be noted is that financial inclusion maybe exogenous when using a single indicator such as ownership of a bank account with a formal financial institution but for a multi-dimensional construct like the one employed in this study, financial inclusion is likely to have other variables having effect on it which renders it endogenous. We used these instruments because they both have a direct influence on financial inclusion but not on firm growth. Looking at the coefficient for financial inclusion in Table 3 shows that, the OLS is inconsistent in explaining the actual effect of financial inclusion on firm growth because the effect under OLS is 11 percent while that of the IV is 43 percent. In essence, using OLS would bias the estimate downwards hence the use of a consistent estimator (IV) with financial inclusion considered endogenous.

To test whether the instruments are weak, we conducted the weak instrument test using the *F*-statistic of the first stage regression (Staiger & Stock, 1994) and obtained an *F*-statistic of 11.35>10 and means we reject the null hypothesis of weak instrument. Relying on the Cragg-Donald Wald *F*-statistic of 11.35 also leads to a rejection of the null hypothesis of weak instruments at an alpha level of 10 percent. For Overidentification/valid instruments test, we relied on Wooldridge's (1995) score test of overidentifying restrictions (*p*-value=0.065) due to robust standards in our model and also because both Sargan's (1958) and Basmann's (1960) tests assume that the errors are independent and identically distributed (i.i.d). Based on the score test, we fail to reject the null hypothesis of valid instruments at a 5% level. Having justified the conditions for using the instruments, and the IV technique at large, we proceed to the analyses and discussion.

Our findings show that an improvement in an entrepreneur's level of financial inclusion results in about 43 percent growth in his/her non-farm enterprise. Our finding on financial inclusion–firm growth is robustly positive irrespective of the estimation approach and location of firm. This is because being financially included comes with many benefits such as stability in operations through insurance and increased access to extra funds to

expand operations (e.g. procurement of more raw materials). Again, increased use of financial products such as ATM and debit cards expedites the transfer of funds to and from business partners while the usage also reduces probability of losing financial resources (through theft) that could otherwise have been put into the running the enterprise. A look at the growth for the rural and urban non-farm enterprises shows a slight difference of about four percent in favour of rural non-farm enterprises and by inference means that improving financial inclusion with a target on non-farm enterprises is pro-rural. In other words, improving levels of financial inclusion has the tendency of impacting[3] slightly more on rural non-farm enterprises compared to similar enterprises located in the urban areas and cities. Such increment in financial resource and how it enables the procurement of additional inputs corroborates with Hermelo and Vassolo (2007).

Adding on an employee into a non-farm enterprises bring about a 12 percent growth in the enterprise. Employing an additional hand in an enterprise located in a rural area results in a 16 percent growth while it does not have an impact on enterprises in the urban areas. Besides, the seemingly no impact of employment (firm size) on firm growth in the urban model, this study refutes the Gibrat's Law which opines that firm's growth and its size are completely independent. Findings by Calvo (2006) and Petrunia (2008) have also not supported Gibrat's law. Unlike previous studies that have been criticised as largely focusing on manufacturing firms, our study cuts across enterprises that range from manufacturing, through service to retail (GSS, 2014).

The number of years of operating a non-farm enterprise also enhances firm growth. For a non-farm enterprise that operates for an additional five years, the enterprise has the potential to grow at nine percent. What is clear from the finding is that, years of operation have a greater effect on non-farm enterprises in the urban areas relative to those in rural areas. While the impact of a five-year operation will be proportionately accompanied with a growth of two percent for enterprises located in the rural areas, that of those in the urban areas is 16 percent. Our findings support that of Delmar and Shane (2006) and runs contrary to Yasuda (2005) who posited that older firms are less likely to grow.

Further evidence suggests that average hours of work per day positively impact on the growth of non-farm enterprises. An extension in the hours of work by an hour has the probability of generally increasing growth in non-farm enterprises by three percent. With regard to location-specific, we found that an extra working hour per day for an enterprise located in the urban area can grow the enterprise by about five percent while no significant effect was found between working hours and growth for firms in the rural areas. The outcome of increased working hours is expected and in line with the findings of Pencavel (2015). Further findings reveal that non-farm enterprises located in the rural areas grow 45 percent less than those sited in the urban areas. This is likely due to the many facilities that are unavailable to enterprises in the rural areas but are available to those in the urban areas. For example, owners of urban-located enterprises have greater access to credit than their rural counterparts. To the extent that higher sales growth is envisaged in cities owing to their rather larger population with relatively higher income groups is likely to spur aggregate demand for products from non-farm enterprises, this finding is particularly not surprising as this metrics may well contribute to higher firm growth in urban areas. The lower levels of growth experienced by rural-located non-farm enterprises are in line with previous studies (Koomson et al., 2016) that have linked rural areas with lower levels of financial inclusion which also in turn deprives them of inputs

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[3] We use the terms effect and impact interchangeably because an instrumental variable estimation is a quasi-experimental method and aids in asserting causality between two variables, upon which one can express the outcomes as impacts (Shadish, Cook, & Campbell, 2002; White & Sabarwal, 2014).

The age of a non-farm entrepreneur has an inverted-U relationship with growth. The implication is that younger owners of non-farm enterprises are likely to experience growth in the enterprises while the initial growth is likely to experience a decline as they grow older. Since non-farm enterprises are mainly handled by their owners, younger owners have the energy to see to the day-to-day activities and foster growth while older owners have less energy.

Formal education, gender and revenue from agriculture do not have an impact on growth of non-farm enterprises when this relationship is estimated using the IV approach. With regard to revenue from agriculture, it usually serves as a means of start-up capital and after the enterprises takes-off, owners seek finance from other sources and not from proceeds from farm business. Formal education also does not have an effect on growth of non-farm enterprises.

Table 3: Effect of financial inclusion on growth of non-farm enterprises

Growth [ln (sales revenue]	Full		Rural		Urban	
	OLS	IV	OLS	IV	OLS	IV
Financial Inclusion	0.112***	0.428***	0.123***	0.387**	0.104***	0.329**
	(0.018)	(0.112)	(0.028)	(0.152)	(0.023)	(0.154)
Number of employees (firm size)	0.105***	0.120**	0.081**	0.159**	0.117***	0.091
	(0.020)	(0.049)	(0.034)	(0.077)	(0.027)	(0.065)
Years of operation	0.025***	0.017***	0.019***	0.003	0.030***	0.031***
	(0.003)	(0.005)	(0.004)	(0.008)	(0.004)	(0.007)
Average hours of work per day	0.044***	0.029**	0.027**	0.006	0.056***	0.049**
	(0.008)	(0.015)	(0.011)	(0.021)	(0.010)	(0.020)
Rural (0=urban; 1=rural)	-0.384***	-0.449***	—	—	—	—
	(0.059)	(0.115)	—	—	—	—
Male owner	0.096*	0.068	0.159*	0.082	0.047	0.174
	(0.054)	(0.111)	(0.082)	(0.153)	(0.072)	(0.164)
Age of owner	0.055***	0.030*	0.043***	0.013	0.069***	0.056**
	(0.010)	(0.018)	(0.014)	(0.024)	(0.014)	(0.025)
Age of owner squared	-0.001***	-0.000**	-0.000***	-0.000	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (income from agriculture)	-0.004	0.011	-0.014	-0.007	0.010	0.027
	(0.008)	(0.014)	(0.012)	(0.021)	(0.012)	(0.020)
Formal education (0=not educated; 1=educated)	0.065	—	0.091	—	0.032	—
	(0.054)	—	(0.076)	—	(0.076)	—
Region (Base=Western)						
Central	-0.141	0.221	0.129	0.103	-0.375**	0.139
	(0.104)	(0.196)	(0.143)	(0.273)	(0.148)	(0.281)
Greater Accra	-0.682***	-0.582**	-0.316	-0.313	-0.737***	-0.575**
	(0.105)	(0.242)	(0.349)	(1.023)	(0.119)	(0.257)
Volta	-0.473***	-0.510***	-0.430***	-0.491**	-0.543***	-0.765***
	(0.088)	(0.170)	(0.121)	(0.233)	(0.131)	(0.264)
Eastern	-0.565***	-0.568***	-0.412***	-0.718***	-0.724***	-0.506**
	(0.091)	(0.169)	(0.132)	(0.265)	(0.127)	(0.212)
Ashanti	0.206**	0.013	0.011	-0.142	0.270**	0.067
	(0.085)	(0.159)	(0.140)	(0.250)	(0.108)	(0.200)
Brong Ahafo	-1.437***	-2.354***	-1.300***	-2.393***	-1.593***	-2.395***

Table 3. *(Continued)*

	(0.130)	(0.284)	(0.192)	(0.448)	(0.175)	(0.369)
Northern	-0.665***	-0.554***	-0.753***	-0.847***	-0.570***	-0.456
	(0.102)	(0.206)	(0.137)	(0.300)	(0.154)	(0.280)
Upper East	-0.810***	-0.765***	-0.819***	-0.890***	-0.789***	-0.670**
	(0.116)	(0.194)	(0.144)	(0.250)	(0.217)	(0.317)
Upper West	-0.999***	-0.810***	-1.037***	-0.999***	-0.613***	-0.284
	(0.099)	(0.211)	(0.121)	(0.260)	(0.233)	(0.449)
Constant	6.829***	6.679***	6.770***	6.993***	6.523***	6.197***
	(0.250)	(0.504)	(0.344)	(0.672)	(0.359)	(0.663)
Observations	5,388	1,508	2,535	746	2,853	762
R-squared	0.138	0.171	0.109	0.124	0.131	0.205
Ramsey Reset (Prob > F)	0.224		0.153		0.131	
Endogeneity						
Wu–Hausman F (1,1488)		(p=0.024)				
Robust regression F (1,1488)		(p=0.031)				
Weak Identification						
F-Statistic (Staiger & Stock)		11.35				
Cragg-Donald Wald F-statistic		11.35				
Overidentification: Score test		0.065				

Robust standard errors in parentheses

Source: Author's computation using GLSS6 data   *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Instruments: *Sources of obtaining credit (no credit used, bank, other financial agencies, cooperative, money lender, family/friend and other sources); means of receiving remittance [Western Union, MoneyGram, Vigo (Merchant Bank), Fast Money Transfer (GCB), bank accounts, post office, friends/relations, brought home by migrant and other means] and formal educational status (0=no education; 1=educated)*

Conclusion and recommendation

This study aimed at determining the effect of financial inclusion on growth of non-farm enterprises using a multi-dimensional measure of financial inclusion. Unlike previous studies that have treated financial inclusion as exogenous, we treated the financial inclusion index, generated from 14 indicators, as endogenous and employed an instrumental variable estimation. This estimation technique permitted the use of source of credit, means of receiving remittance and formal education as instruments to rectify the endogeneity problem. We address the endogeneity problem eminent in financial inclusion–firm growth nexus. Our evidence suggests that, any improvement in non-farm entrepreneurs' level of financial inclusion has a higher proclivity of spurring firm growth by about 43 percent. This result is explained by increment in the financial base and stability in enterprise operations that a non-farm entrepreneur realises because of improvements in levels of financial inclusion. The rural-urban dimension shows that improvements in financial inclusion results in growth of non-farm enterprises located in the rural areas more than it does for those in the urban areas. This also makes financial inclusion as a means of growing non-farm enterprises pro-rural.

Further finding shows that, increasing employees of a non-farm enterprise results in about 12 percent growth of the enterprise which contradicts Gibrat's law. We also found that siting a non-farm enterprise in the rural area permits lower firm growth relative to those located in the urban area. Interestingly, the age of a non-farm entrepreneur has an inverted-U relationship with firm growth. This means younger owners of non-farm enterprises

experience improvements in growth of their enterprises while this phenomenon is reversed as these entrepreneurs age. This effect is likely linked to loss of energy and zeal to work when owners become very old.

We recommend that strategic policies be put in place to close the financial inclusion gap at two levels: (i) closing the gap between Ghana and other countries in the world that are considered as great performers in financial inclusion (ii) closing the rural-urban gap in financial inclusion so that the positive effects of financial inclusion will be experienced by all regardless of location. This can be done by better regulation of the financial system so that financial institutions do not charge usurious interest rates while incentivizing financial institutions that site start-up or site branches in the rural areas. This will lead to an increase in the stock of loanable funds available to rural folks and reduce their vulnerability to financial exclusion. The results of these strategies are expected to bring greater growth of enterprises and improve employment levels as these enterprises grow to become large firms. Large firms will also become formal and hence contribute to the national income through payment of taxes.

References

Abbott, P., Murenzi, I., & Musana, S. (2012). The Role of Non-farm Household Enterprises in Poverty Reduction, Employment Creation and Economic Growth in Rwanda. *Rwanda Journal*, *26*(1), 68–92.

Abor, J., & Quartey, P. (2010). Issues in SME development in Ghana and South Africa. *International Research Journal of Finance and Economics*, *39*(6), 215–228.

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

Ahiawodzi, A. K., & Adade, T. C. (2012). Access to credit and growth of small and medium scale enterprises in the Ho Municipality of Ghana. *British Journal of Economics, Finance and Management Sciences*, *6*(2), 34–51.

Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *The Journal of Economic Perspectives*, *24*(3), 207–232.

Akudugu, M. A. (2013). The determinants of financial inclusion in Western Africa: insights from Ghana. *Research Journal of Finance and Accounting*, *4*(8), 1–9.

Amu, N. J. (2005). *The role of women in Ghana's economy*. Friedrich Ebert Foundation. Retrieved from http://library.fes.de/pdf-files/bueros/ghana/02990.pdf

Ardishvili, A., Cardozo, S., Harmon, S., & Vadakath, S. (1998). Towards a theory of new venture growth. In *Babson entrepreneurship research conference, Ghent, Belgium* (pp. 21–23).

Basmann, R. L. (1960). On finite sample distributions of generalized classical linear identifiability test statistics. *Journal of the American Statistical Association*, *55*(292), 650–659.

Calvo, J. L. (2006). Testing Gibrat's law for small, young and innovating firms. *Small Business Economics*, *26*(2), 117–123.

Cameron, A. C., & Trivedi, P. K. (2010). Microeconometrics using stata. Retrieved from http://www.stata.com/stata-news/statanews.23.4.pdf

Chauvet, L., & Jacolin, L. (2017). Financial Inclusion, Bank Concentration, and Firm Performance. *World Development*. Retrieved from http://www.sciencedirect.com/science/article/pii/S0305750X17300803

Daunfeldt, S.-O., Elert, N., & Lang, A. (2012). Does Gibrat's law hold for retailing? Evidence from Sweden. *Journal of Retailing and Consumer Services*, *19*(5), 464–469.

Davidsson, P. (1991). Continued entrepreneurship: Ability, need, and opportunity as determinants of small firm growth. *Journal of Business Venturing*, *6*(6), 405–429.

Delmar, F. (2006). Measuring growth: methodological considerations and empirical results. *Entrepreneurship and the Growth of Firms*, *1*(1), 62–84.

Delmar, F., Davidsson, P., & Gartner, W. B. (2003). Arriving at the high-growth firm. *Journal of Business Venturing*, *18*(2), 189–216.

Delmar, F., & Shane, S. (2006). Does experience matter? The effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization*, *4*(3), 215–247.

Demirguc-Kunt, A., & Klapper, L. (2012). Measuring Financial Inclusion: The Global Findex Database. Retrieved from https://openknowledge.worldbank.org/handle/10986/6042

Demirgüç-Kunt, A., Klapper, L. F., Singer, D., & Van Oudheusden, P. (2015). The global findex database 2014: Measuring financial inclusion around the world. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2594973

Donovan, K. (2012). Mobile money for financial inclusion. Retrieved from http://elibrary.worldbank.org/doi/abs/10.1596/9780821389911_ch04

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

Field, A. (2005). Factor analysis using SPSS. *University of Sussex*, *17*, 2009.

Fitzpatrick, K. (2015). The effect of bank account ownership on credit and consumption: Evidence from the UK. *Southern Economic Journal*, *82*(1), 55–80.

Geroski, P., & Gugler, K. (2004). Corporate growth convergence in Europe. *Oxford Economic Papers*, *56*(4), 597–620.

GSS. (2008). *Ghana Living Standards Survey, report of the fifth round (GLSS 5)*. GSS Accra.

GSS. (2014). *Ghana Living Standards Survey: Main Report*. Ghana Statistical Service, Accra. Retrieved from http://www.statsghana.gov.gh/docfiles/glss6/GLSS6_Main%20Report.pdf

Hamilton, L. C. (2012). *Statistics with Stata: version 12*. Cengage Learning. Retrieved from https://books.google.com.au/books?hl=en&lr=&id=pUELAAAAQBAJ&oi=fnd&pg=PP1&dq=Statistics+with+Stata+version+12&ots=F2uyT2GWbz&sig=fXJNROTHiqn80B74rDvpzoaJJtM

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251–1271.

Hermelo, F. D., & Vassolo, R. (2007). The determinants of firm's growth: an empirical examination. *Revista Abante*, *10*(1), 3–20.

Horst, H. A. (2006). The blessings and burdens of communication: cell phones in Jamaican transnational social fields. *Global Networks*, *6*(2), 143–159.

Insurance Europe. (2012). *How insurance works: The basics*. Insurance Europe aisbl, Belgium. Retrieved from https://www.insuranceeurope.eu/sites/default/files/attachments/How%20insurance%20works.pdf

Jack, W., & Suri, T. (2011). *Mobile money: The economics of M-PESA*. National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w16721

Jha, M., Amerasinghe, S., & Calverley, J. (2014). *Financial Inclusion: Reaching the unbanked. Standard Chartered Bank, Canada*. Retrieved from https://www.sc.com/en/resources/globalen/pdf/Research/Financial_Inclusion__Reaching_the_unbanked_04_09_14.pdf

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, *20*(1), 141–151.

Koomson, I., Annim, S. K., & Peprah, J. A. (2016). Loan refusal, household income and savings in Ghana: a dominance analysis approach. *African Journal of Economic and Sustainable Development*, *5*(2), 172–191.

Korir, L. K., Lagat, J. K., & Njehia, B. K. (2012). Farm households' livelihood diversification and its implications for young people's Engagement in agriculture, the case of Uasin Gishu County, Kenya. In *Young People, Farming & Food Conference. Future Agricultures, Accra, Ghana*.

Kunreuther, H. (2015). The role of insurance in reducing losses from extreme events: The need for public–private partnerships. *The Geneva Papers on Risk and Insurance Issues and Practice*, *40*(4), 741–762.

Leyshon, A., & Thrift, N. (1996). Financial exclusion and the shifting boundaries of the financial system. *Environment and Planning A*, *28*(7), 1150–1156.

Mensah, M. M. (2009). *The Role and Challenges of Savings and Loans Companies in Ghana*. Kwame Nkrumah University of Science and Technology. Retrieved from http://dspace.knust.edu.gh:8080/xmlui/bitstream/handle/123456789/686/Mercy%20Muriel%20Mensah.pdf?sequence=1.

Musah, A., Ibrahim, M., & Adam, O. (2016). Poverty, Income Diversification and Welfare in Northern Ghana. *Journal of African Political Economy and Development*, *1*(1), 76–102.

Nandram, S. S., & Samson, K. J. (2000). Successful entrepreneurship: more a matter of character than of knowledge. *Nyenrode Centre for Entrepreneurship, Breukelen, The Netherlands*, 242.

Nunoo, J., Darfor, K. N., Koomson, I., & Arthur, A. (2016). *Employment Security and Workers' Moonlighting Behaviour in Ghana*. AGDI Working Paper. Retrieved from https://www.econstor.eu/bitstream/10419/149930/1/agdi-wp16-006.pdf

Oeconomiae, D. (2011). *Top Management team age structure and firm performance*. University of St. Gallen. Retrieved from http://www1.unisg.ch/www/edis.nsf/www DisplayIdentifier/3834/$FILE/dis3834.pdf

Pagano, P., & Schivardi, F. (2003). Firm size distribution and growth. *The Scandinavian Journal of Economics*, *105*(2), 255–274.

Pencavel, J. (2015). The productivity of working hours. *The Economic Journal*, *125*(589), 2052–2076.

Pentland, J. (2006). Can Financial Counsellors add value to financial literacy initiatives? In *Financial literacy, banking and identity conference, RMIT* (pp. 25–26). Retrieved from http://mams.rmit.edu.au/kwt8y7hkx9ybz.pdf

Peprah, J. A., & Koomson, I. (2015). Capital and credit sources and household non-farm income in Ghana. *Journal of Arts and Social Sciences*, *3*(1). Retrieved from https://journal.ucc.edu.gh/index.php?journal=jass&page=article&op=view&path%5B%5D=65

Peprah, Jame Atta, Afoakwah, C., & Koomson, I. (2015). Savings, entrepreneurial trait and self-employment: evidence from selected Ghanaian Universities. *Journal of Global Entrepreneurship Research*, *3*(1), 1.

Petrunia, R. (2008). Does Gibrat's Law hold? Evidence from Canadian retail and manufacturing firms. *Small Business Economics*, *30*(2), 201–214.

PHC. (2012). *2010 population and housing census: Final fesults*. Ghana Statistical Service.

PricewaterhouseCoopers, Ghana. (2013). *2013 Ghana Banking Survey: Harnessing the SME potential*. Retrieved from https://www.pwc.com/gh/en/pdf/ghana-banking-survey-2013-pwc.pdf

Quaye, I., Abrokwah, E., Sarbah, A., & Osei, J. Y. (2014). Bridging the SME financing Gap in Ghana: The role of microfinance institutions. *Open Journal of Business and Management*, *2*(04), 339.

Rae, A., & Rea, W. (2016). How many components should be retained from a multivariate time series PCA? *arXiv Preprint arXiv:1610.03588*. Retrieved from https://arxiv.org/abs/1610.03588

Sargan, J. D. (1958). The estimation of economic relationships using instrumental variables. *Econometrica: Journal of the Econometric Society*, 393–415.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Wadsworth Cengage learning. Retrieved from https://pdfs.semanticscholar.org/f141/aeffd3afcb0e76d5126bec9ee860336bee13.pdf

Shylendra, H. S. (2006). Microfinance institutions in Andhra Pradesh: crisis and diagnosis. *Economic and Political Weekly*, 1959–1963.

Staiger, D. O., & Stock, J. H. (1994). *Instrumental variables regression with weak instruments*. National Bureau of Economic Research Cambridge, Mass., USA. Retrieved from http://www.nber.org/papers/t0151

Weinzimmer, L. G., Nystrom, P. C., & Freeman, S. J. (1998). Measuring organizational growth: Issues, consequences and guidelines. *Journal of Management*, *24*(2), 235–262.

Welter, F. (2001). Who wants to grow up? Growth intentions and growth profiles of (nascent) entrepreneurs in Germany. Retrieved from https://www.researchgate.net/profile/Friederike_Welter/publication/38173322_Who_wants_to_grow_growth_intentions_a

nd_growth_profiles_of_(nascent)_entrepreneurs_in_Germany/links/54f48a950cf2f28 c1361dbf0.pdf

White, H., & Sabarwal, S. (2014). Quasi-experimental design and methods. *Methodological Briefs: Impact Evaluation*, *8*. Retrieved from https://beamexchange.org/uploads/filer _public/63/94/639467e9-9bc1-45f6-bc3b-7c3e296e418b/quasi-experimental_design_ methods.pdf

Wooldridge, J. M. (1995). Score diagnostics for linear models estimated by two stage least squares. *Advances in Econometrics and Quantitative Economics: Essays in honor of Professor CR Rao*, 66–87.

Wu, D.-M. (1974). Alternative tests of independence between stochastic regressors and disturbances: Finite sample results. *Econometrica: Journal of the Econometric Society*, 529–546.

Yasuda, T. (2005). Firm growth, size, age and behaviour in Japanese manufacturing. *Small Business Economics*, *24*(1), 1–15.

Zhou, H., & de Wit, G. (2009). Determinants and dimensions of firm growth. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1443897

Appendix 1: Principal component analysis for financial inclusion

Rotation: (unrotated = principal)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.101	0.563	0.175	0.175
Comp2	1.538	0.375	0.128	0.303
Comp3	1.163	0.083	0.097	0.400
Comp4	1.080	0.040	0.090	0.490
Comp5	1.040	0.013	0.087	0.577
Comp6	1.027	0.066	0.086	0.662
Comp7	0.960	0.043	0.080	0.742
Comp8	0.917	0.107	0.076	0.819
Comp9	0.810	0.112	0.068	0.886
Comp10	0.697	0.167	0.058	0.944
Comp11	0.530	0.394	0.044	0.989
Comp12	0.137	.	0.011	1.000

Source: Author's computation using GLSS6

Appendix 2: Component matrix loadings

Principal Components based on Eigen vectors

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Unexplained	KMO
Ownership of Financial Products								
Ownership of current or cheques account	0.465	-0.361	0.029	0.165	0.132	0.220	0.247	0.303
Ownership of investment account	-0.017	-0.007	-0.384	0.722	0.177	-0.122	0.218	0.150
Ownership of savings account	-0.240	0.657	0.114	-0.106	0.069	0.006	0.183	0.234
Ownership of fixed deposit account	-0.081	-0.218	-0.010	0.068	-0.843	-0.043	0.167	0.319
Ownership of insurance policy	0.361	0.153	0.367	0.090	-0.126	0.235	0.452	0.669
Ownership of any other account	-0.087	-0.270	-0.405	-0.234	0.275	0.240	0.485	0.247
Use of Financial Products								
Transact using cheque book	0.559	0.216	-0.102	-0.076	0.027	-0.025	0.252	0.337
Transact using ATM	0.156	0.445	-0.199	0.290	-0.042	0.012	0.505	0.383
Transact using e-zwich card	-0.068	0.101	0.045	0.094	-0.074	0.868	0.184	0.245
Transact using e-banking	-0.484	-0.091	0.111	0.200	0.133	0.212	0.373	0.282
Access to credit	0.024	-0.160	0.568	-0.015	0.344	-0.129	0.444	0.333
Receipt of remittance	-0.075	-0.071	0.391	0.484	-0.018	-0.085	0.541	0.564
Overall KMO								**0.307**

Source: Author's computation using GLSS6