

Financial inclusion in Africa: does it promote entrepreneurship?

Financial
inclusion in
Africa

Folorunsho M. Ajide

Department of Economics, University of Ilorin, Ilorin, Nigeria

Abstract

Purpose – Financial inclusion policy focuses on bringing the less privileged groups into the formal financial system. Financial inclusion has a lot of benefits in the society. It can reduce the level of poverty, inequality and encourage business startup. This study aims to examine the impact of financial inclusion on entrepreneurship in selected African countries.

Design/methodology/approach – This paper examines how financial inclusion impacts entrepreneurship in 13 selected African countries using data from World Bank Development Indicators, IMF's International Financial Statistics, doing business and World Bank Entrepreneurship Survey for the period of 2005-2016. It uses panel data regression techniques such as random effect, IV estimation and robust least square.

Findings – The results show that financial inclusion has a significant and positive effect on entrepreneurship in Africa. This result is robust to both alternative measures of financial inclusion and alternative estimators.

Originality/value – The possible relationship between financial inclusion and entrepreneurial development has been an ongoing debate in other developing countries. However, this issue has been neglected in the African region. There are little or no evidence to support the possible relationship in Africa. This paper makes an important contribution in this respect and further provides insightful information in the ongoing debate.

Keywords Financial inclusion, Firm creation, Random effect, Starting a business, Africa, Banks, Economic development, Financial markets, Financing policy

Paper type Research paper

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1. Introduction

Answering the question of whether financial inclusion promotes entrepreneurial success is very important for a number of reasons. First, finance is one of the major obstacles to entrepreneurial activities and every entrepreneur is vulnerable to financial restrictions because they need finance to start up and establish firms. Researchers consider finance as an ingredient that carries more weight in allocating effort for entrepreneurial activity (Claessens and Perotti, 2007; Goel and Madan, 2019). Schumpeter (1934) also points out that finance is an essential prerequisite for business activity. High levels of financial exclusion may bring two major threats to the economy. Financial exclusion can lead to the possibility of losing business growth. This is because financially excluded group would lack the opportunity of expanding businesses and maximizing growth. Furthermore, it can limit the growth potential opportunity of a nation with consequential high rate of unemployment and poverty level. Therefore, embracing financial inclusion in a country can serve as a direct solution to the financial opaque faced by every entrepreneur. Financial inclusion can provide suitable financial services to vulnerable groups including micro-enterprises, poor farmers and other low-income groups. It provides equal financial opportunities to all economic agents in an economy (Jiang *et al.*, 2019).



Inclusive finance also plays a major role in the efficient allocation of funds thereby promoting economic growth and social progress. (Fareed *et al.*, 2017). Better access to banking services, as well as increasing women users of these services, has a strong impact on growth through value creation by entrepreneurial activities, which have strong impact in improving the human social welfare (Nanda and Kaur, 2016). This means that financial inclusion can improve the level of firm creation, which has been one of the area of policy concern to every government of every nation because of its impact on job creation, economic growth, empowerment and poverty reduction (Fareed *et al.*, 2017; Sethi and Acharya, 2018; Inoue, 2019). It is against this background that researchers show interest in investigating the possible relationship between financial inclusion and entrepreneurship (Wang and Tan, 2017; Jiang *et al.*, 2019; Goel and Madan, 2019). While there are few evidences that focus on this phenomenon, there is no such evidence on it within our selected country data set. We take our motivation from this and extend the line of argument by investigating the impact of financial inclusion on entrepreneurial development in 13 selected African countries. Undoubtedly, investigating factors promoting entrepreneurship has been an interesting area in Africa; however, financial inclusion impact on entrepreneurial activities is yet to be explored (Munemo, 2015; Adusei, 2016; Munemo, 2018; Ajide *et al.*, 2019). This paper contributes to the literature in many ways. In addition to be the first paper in African context, it is one of the few papers that consider group of countries with similar features in investigating the impact of financial inclusion on entrepreneurship. This is because African countries have almost similar features in terms of economic structure and small size. For instance, average growth rate per annum in the continent ranges between 3-6 per cent. Population growth is increasing; per capita growth only 1-2 per cent pa in most countries, which is too slow to reverse the rising poverty. Africa is a resource-rich region. Most growth experienced in the continent could be attributed to sale in commodities, services and few/or no manufactured goods. However, of recent, most countries in the region have been said to achieve fast growing economic status due to various reforms being implemented (African Development Bank [ADB] Report, 2018). In addition, we contribute to the literature in the area of methodology by constructing financial inclusion index as a robustness check based on the peculiarity of African nations following the methodology of Sarma (2008) as modified by Park and Mercado (2018). Furthermore, we include remittance inflow as one of the explanatory variables to examine its effect on firm creation in Africa, which has been neglected in the literature (Gautam, 2017). Financial inclusion of a large set of remittance recipient households is likely to contribute to entrepreneurial development, thereby building a broader formal economy. Empirical studies show that remittances can provide households the necessary funds that can be invested in non-trivial up-front entrepreneurial projects (Mudanca, 2009; Gautam, 2017).

African nations have experienced remarkable development in access to financial services. In most African countries, more financial services in area of credit and loan to individual and enterprises have improved (Demirguc-Kunt and Klapper, 2012; Adusei, 2016). This is made possible due to introduction of new technologies into the financial sectors and adoption of mobile money banking services. In addition, more than 50 per cent of individuals and enterprises have account with commercial banks while ATM services have become popular in Africa (World Bank, 2018). High-growth small businesses now have increased access to formal financial services and are experiencing growth opportunities. This paper is organized into five sections. Section 2 discusses the literature on financial inclusion and entrepreneurship. Section 3 reveals the model specifications and estimation techniques. Section 4 provides the results of the estimation while Section 5 concludes the study.

2. Literature review

2.1 Stylized facts on business creation and financial reforms in Africa

Africa is a region with immense potential and different levels of opportunities. Its growing youth population and rapid urbanization have kept on attracting many investors into the region. However, exchange rate fluctuations and decline in commodity prices have created uncertainties in the region. Furthermore, African growth in terms of gross domestic product (GDP) is one of the highest in the world, which starts from a very low base. African economies have undergone one of the longest uninterrupted episodes of high growth (above 6 per cent on average) ever experience on the continent during the 2000s. High poverty and unacceptable levels of unemployment are prevalent in most African countries and some of these problems may be addressed through entrepreneurial activity. While entrepreneurship may not be a panacea, it can most certainly form part of the solution (GEM, 2012). It is also crucial to note that most citizens are financially excluded especially in the past. This adds to the structural imbalances in the economy. To tackle financial problems and to reduce the level of shadow banking in Africa, financial inclusion has been recognized as a key fundamental of socio-economic transformation.

It is a policy with high priority in most African countries, which aims at reducing poverty and creating new business opportunities for possible job creation and employment of youth (Varghese and Viswanathan, 2018). Recently, African countries have introduced various financial regulations and reforms targeted at bringing the low income group into the formal financial system while the government has been more of interventionist by bringing financing arrangements, building institutions and formulating policy frameworks that promotes financial inclusion. Most African governments through their Central Banks introduce and incorporate financial inclusion into financial system framework. The framework represents a roadmap for developing financial system, which aims at improving financial sector in Africa by developing innovative financial products, efficient payment system, inclusive credit policy and encouraging savings culture. At the same time, most African countries introduce Microfinance Bank Policy representing a framework for facilitating grassroots financial inclusion. This policy permits the participation of market associations, cooperatives and non-governmental organizations, self-help groups to own and facilitate microfinance institutions. In addition, most of these countries introduce non-interest financial institutions model. This model takes care of a particular group who are not interested in the conventional banking that is built of interest-based income. Following the introduction on financial inclusion strategies as described above, the African financial sector has taken a new shape.

For instance, in 2011, financial inclusion in sub-Saharan Africa was just over 23 per cent. In 2017, it was almost 43 per cent, with a significant increase coming from digital financial services. Most adults in Africa now have access to formal banking system. This development has created employment and entrepreneurship opportunities for youths. Micro and medium businesses are now enjoying an easy banking transaction, which has led to a reasonable level of growth, job creation and reduction in the level of poverty. Financial inclusion has brought opportunities in terms of technology, which improves the level of database analytics to businesses and new firm creation (Okpara and Koumbiachs, 2009; ADB report, 2018).

Furthermore, most African governments have policy in place that encourages entrepreneurial activities as early as possible within the region for possible catch up with other regions in the world. Meanwhile, a look at Table I reveals that Africa's ease-of-doing business indicators are still stable in some elements while some parameters are improving. This signifies that Africa is still at a developing stage and undergoing ease-of-doing

Table I.

Doing business indicators in sub-Saharan Africa

Indicators	Average score (2016)	Average score (2019)
Starting a business	24.4	24.5
Dealing with construction permits	24.5	24.5
Getting electricity	24.5	24.4
Registering property	24.1	24.5
Getting credit	24.5	22.3
Protecting minority investors	24.5	22.6
Paying taxes	24.5	24.5
Trading across borders	24.1	24.5
Enforcing contracts	23.8	24.5
Resolving insolvency	24.5	23.3

Source: Author’s computation but data from World Bank Doing Business (2016 and 2019)

business reforms. It is important to note that Doing Business scores capture the gap between an economy’s performance and a measure of best practice. It shows the assessment of absolute level of regulatory performance. An economy’s ease of doing business score is measured from 0 to 100. Table I shows that in all parameters, sub-Saharan African countries are still at the first quarters of doing business compared to the international best practice.

Table II shows the environmental and other factors that affect entrepreneurial activity in Africa. It breaks these factors into finance, government policies toward entrepreneurship programs such as entrepreneurial education, commercial and legal infrastructure. It also includes market dynamics, physical infrastructure, cultures and social factors. From Table II, it can be seen that there are insufficient Research and Development (R&D) transfer and entrepreneurial education at school level in Africa while other factors remain moderate (neither sufficient nor insufficient). For instance, internal market dynamics and physical infrastructure seem to be moderate while R&D and education are below average.

However, the recent Doing Business report (2018) states that about 107 reforms were carried out in Africa. The current reforms in Africa bring a significant improvement to the business climate in the region. In total, 83 reforms out of the 107 reforms that were implemented in the region during the previous years had been really effective. Year 2018

Table II.

Entrepreneurial conditions in Africa

Conditions	2016	2015
Entrepreneurial finance	3.6	3.8
Govt policies: Support & relevance	4.4	3.9
Govt policies: taxes and bureaucracy	4.1	3.7
Govt entrepreneurship programs	4.0	3.8
Entrep. education at school	2.2	2.4
Entrep. education at post school	4.1	4.0
R&D transfer	2.9	3.1
Commercial and legal infrastructure	4.8	4.9
Internal market dynamics	4.5	4.7
Entry regulations	3.7	3.7
Physical infrastructures	6.2	5.9
cultural and social norms	4.2	4.1

Notes: Score, 1 = Highly insufficient, 9 = Highly sufficient
Source: GEM (2015-2016)

also saw the highest number of countries carrying out reforms in Africa, with 40 countries implementing at least one reform, compared to 37 countries recorded in the past two years. The top countries among them are Togo, Kenya, Côte d'Ivoire and Rwanda while Mauritius has gained a position in the world's 20 top ranked economies in the world. These business reforms range from starting a business to getting credit, reduction of days to get business registered by introducing online registration and simplification of E-stamping of documents, transparency in the registration and granting permission for construction activities. Major improvements have been made in the areas of getting credits. This involves registration of borrowers' properties with credit bureau in which it would be very easy to assess the credit worthiness of the borrowers by financial institutions in Nigeria. New channels have been introduced to take care and make it easier to remit tax liabilities and among others (Doing Business, 2018).

2.2 Financial inclusion and entrepreneurship: theory and evidences

Theoretically, finance is one of the business fundamentals that can enhance entrepreneurial effectiveness and ensure alignment of goals with the economic development of a country (Schumpeter, 1934). In this case, financial inclusion is a concept that brings all groups into the financial net in such a way that they enjoy fair and sustainable financial services, especially low-income groups and vulnerable groups with financing difficulties (Jiang *et al.*, 2019). Inclusive finance is a formal way of getting access to formal financial services including credit, remittance, insurance and saving opportunities, which has been regarded as a critical engine of entrepreneurial activities through value creation and innovative finance (Claessens and Perotti, 2007; Sethi and Acharya, 2018). Access to financial services by household and rural dwellers would increase the level of productivities in an economy. Financial inclusion improves economic growth through value creation of small business with positive spillover effects on development indicators such as poverty and inequality (Nanda and Kaur, 2016; Park and Mercado, 2018). Inclusive finance normally encourages low-cost credit advances to low income and vulnerable groups and stimulates organized production activities in rural areas leading to increased output.

One of the main problems facing entrepreneurship is financing constraint. Under this situation, many developing countries have embraced financial inclusion as one of the strategies for encouraging entrepreneurial development not only because of its beneficial to the formal sector of the economy but it also leads to inclusion of rural dwellers in the informal sector. In this vein, Wang and Tan (2017) analyze the effect of financial inclusion on farmers' entrepreneurship on the basis of the macro level government, the meso-financial enterprise and the micro-entrepreneurial farmer. They document that financial inclusion is beneficial to farmers. This supports the work of Fan and Zhang (2017), who empirically show the relationship between financial inclusion and the formation of entrepreneurs. One of the important contributions of the study is the development of a theoretical model for examining the nexus between financial inclusion and entrepreneurs' formation. This model hints that financial inclusion can mitigate credit constraints on entrepreneurial activities by reducing information asymmetry in financial transactions. This theory is empirically tested using data from 31 provinces and 19 industries in China during the period 2005-2014.

There are studies that examine how financial inclusion can improve the level of women entrepreneurship spanning from job creation, reduction in level of women poverty in developing countries to macroeconomic objective of improving economic growth. Goel and Madan (2019) support the work of Fareed *et al.* (2017) by stressing that financial inclusion plays a major role in improving the number of women in entrepreneurial activities. Their work suggests that financial inclusion is positively linked with entrepreneurship and it can

open up economic opportunities for women entrepreneurs in both formal and informal sectors. In conclusion, [Goel and Madan \(2019\)](#) show that financial inclusion encourages entrepreneurship among women as a career choice after taking a sample size of 250 women entrepreneurs on the basis of convenience.

Based on the calculation of financial inclusion of 22 provinces and 4 municipalities in China from 2004 to 2017, [Jiang et al. \(2019\)](#) use the Kernel density estimation method to further analyze the evolution of the financial inclusion index. The results show that there are certain differences in financial inclusion development level in various provinces in China. Improving financial inclusion can better promote farmers' entrepreneurship. Urbanization level, economic openness and regional economic development level have a significant positive effect on farmers' entrepreneurship, while farmers' income and educational level have a significant negative effect on farmers' entrepreneurship.

3. Data and methodology

In this section, we describe source of the data used for this study, measurements of variables and estimation techniques.

3.1 Measuring financial inclusion index for Africa

Measuring financial inclusion has multiple dimensions. Over the years, several attempts have been made to construct inclusive financial index ranging from the use of individual dimensions to the use of econometric and statistical systems. For instance, [Chakravarty and Pal \(2010\)](#) used an axiomatic approach; [Yorulmaz \(2013\)](#) used three dimensions in Turkey. [Thakkar \(2014\)](#) used six selected indicators to study level of financial inclusion in BRICS economies. [Sethy \(2016\)](#) used six dimensions for India using the methodology of [Sarma \(2008\)](#) while [Park and Mercado \(2018\)](#) also used similar methodology with five financial inclusion dimensions. In our study, we first used principal component analysis (PCA) to compute financial inclusion index for 13 African countries and estimate our model. This procedure is consistent to [Anarfo et al. \(2019\)](#) and [Piñeyro \(2013\)](#). For robustness check, we developed another financial inclusion index that followed the methodology of [Sarma \(2008\)](#) and [Park and Mercado \(2018\)](#) with little modifications. We used six dimensions to compute the index instead of two/three and five dimensions used by [Sarma \(2008\)](#), [Park and Mercado \(2018\)](#), respectively. The six dimensions include: automated teller machines (ATM) per 100,000 adults, commercial bank branches per 1,000 adults, depositors with commercial banks per 1,000 adults, domestic credit to GDP ratio, banks' borrower per 1,000 adults and number of commercial bank accounts per 1,000 adults. All indicators were sourced from World Bank Development Indicators and International Financial Statistics of IMF.

As aforementioned, we also calculate the new financial inclusion index based on the specification of [Sarma \(2008\)](#) as stated below:

$$d_i = \frac{A_i - m_i}{M_i - m_i} \quad (1)$$

A_i is the actual value of dimension i , m_i represents minimum value of dimension i , M_i is the maximum value of dimension i . The financial inclusion index is measured by normalizing the inverse of Euclidean distance of point d_i , computed in [equation \(1\)](#) from ideal point I is one ([Park and Mercado, 2018](#)). The formula is hereby given as:

$$FII = 1 - \frac{\sqrt{(1 - d_i)^2 + \dots + (1 - d_n)^2}}{\sqrt{n}} \quad (2)$$

The normalization [equation \(2\)](#) makes the index to lie between 0 and 1; where 1 is the highest index meaning the country has higher level of financial inclusion and country with zero has little or the lowest level of financial inclusion among the countries ([Sarma, 2008](#); [Park and Mercado, 2018](#)). [Table III](#) presents our new financial inclusion index (average of year, 2005–2016) for 13 African nations. We limit our index to 13 countries due to non-availability of data for other African countries.

From [Table III](#), some important features are observed. Based on our sample, Tunisia ranked highest in the level of financial inclusion index (in percentage) followed by Botswana and Nigeria. This feature seems to be consistent with the index of [Park and Mercado \(2018\)](#) and [Sarma \(2008\)](#) despite that we have used six dimensions against the five and 2/3 dimensions used by [Park and Mercado \(2018\)](#) and [Sarma \(2008\)](#). In our index, Algeria is ranked above Ghana contrary to [Park and Mercado \(2018\)](#). The same applies to Uganda, Malawi and Ethiopia. This shows that computation of financial inclusion index based on peculiarities of a region or country is important in assessing the level of financial inclusion. It would enhance the possibility of diagnosing the state of the inclusion; agree on targets to identify barriers in developing policies and monitoring strategies. It can also enhance policy impact. For instance, some African countries use agent banking, which leverage on modern technology to provide financial services to under-served population, especially in rural areas while some countries in the continent also take financial inclusion as a national development policy with the use of modern financial payment platform.

3.2 Entrepreneurship: concept and measurement

Firm creation or entry is one of the important functions of an entrepreneurial process. However, entrepreneurship process is complex. It includes but not limited to the creation of ideas, firms, and patents and it encapsulates the thinking process behind the firm creations. Meanwhile, there are different modes of entrepreneurship (firm creation) in an industry. First, formal entrepreneurship occurs when the creation of legally registered firms exists in

Country	New FII	Rank	FII of Park and Mercado (2018)	FII of Sarma (2008)
Tunisia	67.92	1	29.29	n/a
Botswana	49.98	2	23.60	8.50
Nigeria	30.81	3	11.92	4.80
Algeria	25.00	4	9.62	n/a
Ghana	24.50	5	10.23	4.40
Gabon	18.90	6	6.82	n/a
Rwanda	13.43	7	3.97	n/a
Uganda	12.11	8	4.82	1.60
Malawi	12.10	9	6.54	n/a
Zambia	11.86	10	5.08	3.10
Sierra Leone	8.20	11	4.35	n/a
Congo, Rep.	6.80	12	2.38	n/a
Ethiopia	4.70	13	6.76	6.70

Note: *FII figures are in percentage form

Source: Author's computation

Table III.
Countries used in this
study and new
financial inclusion
index (new FII)

a country (Klapper and Love, 2011). Secondly, informal entrepreneurship occurs when firms are created but not legally registered and unregulated (Nystrom, 2008; Jiménez *et al.*, 2015). Entrepreneurship can also be described as the willingness and ability of an individual to seek for investment opportunities, establish and run an enterprise successfully. Entrepreneurship spirit is a pre-requisite to an entrepreneurial society and culture. This spirit is required for the overall economic growth of any nation especially developing ones. This is in line with the view of Munemo (2018) and Hartwell (2014). They describe entrepreneurship as the willingness and the ability of an individual, a firm or an organization to identify an environmental change and exploit such an opportunity to produce goods and services for public consumption. Therefore, the individual that perceives this opportunity is called an entrepreneur. Empirically, it is almost difficult to measure the entrepreneurship process. For the purpose of this study, we capture entrepreneurship process as new registrations per 1,000 people age 15-64 years old. This is termed “new business density.” New businesses registered are the number of new limited liability corporations registered in the calendar year. The data on new business density can be found in World Bank’s Entrepreneurship Survey and database (<https://data.worldbank.org/indicator/IC.BUS.NDNS.ZS>). In case of Ethiopia, which data are missing from 2010 upward, we consulted the Ministry of Trade in the country and obtained data for number of new limited liability corporations registered in the concerned calendar year and computed the new business density for the missing years following World Bank’s Entrepreneurship Survey Group Methodology.

To start with, we plot data on new business density (EN) and financial inclusion index (FII). Figure 1 shows that the two variables are moving toward the same direction. This implies that financial inclusion may influence entrepreneurial development. Meanwhile, we still need further investigation to know the actual causal factors in such a relationship.

3.3 Measurements of other variables considered

There are number of variables that influence entrepreneurship in the literature. For the purpose of this study, we consider remittances inflow as one of the variables influencing entrepreneurship. Remittances can be described as personal transfer from migrants to their

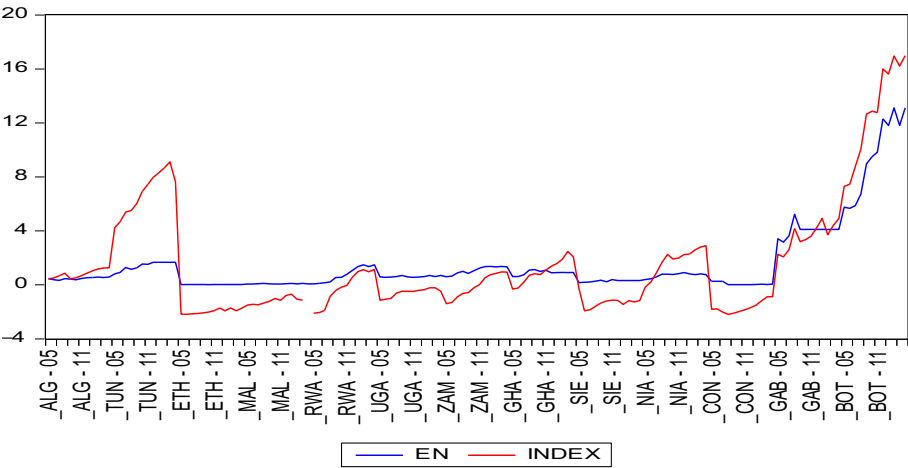


Figure 1.
Tends of new
business density and
FII

friends, neighbor and families. They are targeted to the needs of their recipients. Most entrepreneurs often face financial constraints. Literature shows that remittance as a source of finance for the small entrepreneur influences entrepreneurial development (Mundaca, 2009; Gautam, 2017). Data on remittances as a percentage of the GDP are sourced from World Bank Development Indicators. Furthermore, we consider number of start-up procedure and time to start up business (days) to proxy government regulation and startup cost, respectively (Munemo, 2018; Klapper and Love, 2011; Sriram and Mersha, 2010). Time required to start up a business is described as:

[. . .] the number of calendar days needed to complete the procedures to legally operate a business. Start up procedures is described as those procedures required to start a business, including interactions to obtain necessary permits and licenses and to complete all inscriptions, verifications, and notifications to start operations. The data are meant for businesses with specific characteristics of ownership, size, and type of production (Kiggundu and Pal, 2018; Doing Business, 2018).

The data were collected from the Doing Business website. In addition, we include growth of GDP and dummy for financial crisis as the control variables of our model. GDP growth rate is sourced from World Bank Development Indicators while financial crisis dummy is computed by the author following the work of Klapper and Love (2011).

3.4 Descriptive statistics and correlation matrix of the variables

Tables IV and V show descriptive statistics and correlation matrix of the variables. The data were collected from the period of 2005-2016 making 12 years over 13 African countries as listed in Table III. We are limited to the use of 13 selected African countries because of non-availability of data. The new business density has maximum of 13.11, and minimum values of 0.01 with standard deviation (2.65) seems moderate, implying that the number of entrepreneurs is almost similar across Africa. Second, the mean of financial inclusion index (4.01) is significantly small considering the value range of this index, which suggests a low level of financial inclusion in Africa over the period under study. Moreover, for the financial inclusion index, the maximum, 7.44, and minimum, -2.28 are significantly different, but the standard deviation (2.19) is not high, implying that financial inclusion is not very different across African countries. In the correlation matrix, most of the financial inclusion dimensions correlate with each others. This reveals that we cannot include them at the same

	EN	FII	ACCT	ATM	BORR	BRAN	DEPO	DOME	GR	REM	CRISIS	DAYS	PROCED
Mean	1.54	4.01	256.7	7.40	43.81	5.03	301.43	17.44	6.11	1.88	0.16	32.89	9.95
Median	0.62	-0.82	186.54	4.63	19.84	4.22	192.16	13.34	5.65	0.47	0.00	26.00	10.00
Maximum	13.11	7.44	900.97	31.65	242.68	19.69	1013.28	79.60	20.71	13.27	1.00	158.50	17.00
Minimum	0.01	-2.28	2.84	0.02	0.05	0.62	1.53	0.81	-7.65	0.00	0.00	4.00	5.00
Std. Dev.	2.65	2.19	215.9	8.05	60.67	3.95	247.30	16.99	3.58	2.77	0.37	30.16	2.74
SKEW	2.83	1.48	1.03	1.49	1.91	1.90	0.92	2.32	0.42	2.22	1.77	2.69	0.48
KURT	11.21	1.46	3.18	4.38	5.32	6.83	2.84	8.18	7.01	8.44	4.16	11.11	2.78

Notes: Financial inclusion index, (FII), remittance (REM), GDP growth rate (GR), financial crisis (CRISIS), time required to register (DAYS) and number of procedures to register a business (PROCED), automated teller machines per 100,000 adults (ATM), commercial bank branches per 1,000 adults (BRAN), depositors with commercial banks per 1,000 adults (DEPO), domestic credit to GDP ratio (DOME), bank borrower per 1,000 adults (BORR) and number of commercial bank accounts per 1,000 adults (ACCT)

Source: Author's computation

Table IV.
Descriptive statistics

Table V.
Correlation

	EN	FII	ACCT	ATM	BORR	BRAN	DEPO	DOME	GR	REM	CRISIS	DAYS	PROCED
EN	1.00												
FII	0.50	1.00											
ACCT	0.34	0.87	1.00										
ATM	0.75	0.88	0.68	1.00									
BORR	0.70	0.90	0.67	0.91	1.00								
BRAN	0.35	0.93	0.75	0.76	0.81	1.00							
DEPO	0.26	0.85	0.86	0.66	0.63	0.73	1.00						
DOME	0.25	0.90	0.71	0.69	0.78	0.93	0.68	1.00					
GR	-0.17	-0.33	-0.26	-0.29	-0.26	-0.32	-0.31	-0.32	1.00				
REM	-0.15	0.32	0.46	0.10	0.12	0.31	0.39	0.37	-0.01	1.00			
CRISIS	-0.021	-0.048	-0.063	-0.058	-0.014	-0.034	-0.08	-0.007	-0.08	-0.01	1.00		
DAYS	0.21	-0.11	-0.14	0.096	0.041	-0.15	-0.24	-0.18	-0.098	-0.23	0.055	1.00	
PROCED	-0.052	-0.086	-0.091	-0.083	-0.036	-0.13	-0.045	-0.074	-0.11	-0.11	0.026	0.24	1.00

Notes: *Financial* inclusion index (*FII*), remittance (*REM*), GDP growth rate (*GR*), financial crisis (*CRISIS*), time required to register (*DAYS*) and number of procedures to register a business (*PROCED*), automated teller machines per 100,000 adults (*ATM*), commercial bank branches per 1,000 adults (*BRAN*), depositors with commercial banks per 1,000 adults (*DEPO*), domestic credit to GDP ratio (*DOME*), bank borrower per 1,000 adults (*BORR*) and number of commercial bank accounts per 1,000 adults (*ACCT*)

Source: Author's computation

time in our estimation. We also report the variance inflation factors of the variable as shown in [Appendix](#). This shows clearly that our estimations do not suffer multicollinearity.

3.5 Empirical model specification

To examine the impact of financial inclusion on entrepreneurship in Africa, this paper used panel regressions. Estimation techniques such as OLS, fixed effect, random effect were considered ([Fan and Zhang, 2017](#); [Munemo, 2018](#); [Jiang et al., 2019](#)). We also used IV estimators and robust least square for robustness checks. In total, 13 selected African countries were considered over the period 2005-2016. The baseline model is specified below:

$$EN_{it} = \rho_0 + \rho_1 FII_{it} + \delta' X_{it} + u_i + e_t + \varepsilon_{it} \quad (3)$$

In [equation \(3\)](#), i and t stand for country and year respectively; the dependent variable (EN) stands for entrepreneurship, (FII) stands for financial inclusion index and X is the vector of control variables. Control variables include; remittance (REM), GDP growth rate (GR), financial crisis ($CRISIS$), time required to register ($DAYS$) and number of procedures to register a business ($PROCED$). Intercept is ρ_0 , while ρ_1 and δ are coefficients. u_i and e_t are fixed and year effects respectively. ε_{it} is the error term.

4. Empirical results and discussion

4.1 Main results

The main panel regressions are reported in [Table VI](#). The table shows 7 columns with fixed effects (FE) and REs' results. The first column show the main estimations. We use principal components analysis (PCA) to compute the FII as used in the literature ([Anarfo et al., 2019](#)). The random effect results show that financial inclusion has positive effect on new business density. Although pooled OLS and fixed effect show the same results, we prefer to report and interpret random effect based on the results of Hausman Test. An increase in financial inclusion by 1-per cent point would increase the entrepreneurship in Africa by 39.8 per cent point. This result supports previous empirical findings in other regions/countries that financial inclusion improves entrepreneurial development ([Fareed et al., 2017](#); [Goel and Madan, 2019](#)). The composite index of FII strongly supports growth effect of financial inclusion on number of entrepreneurship in Africa. The estimated coefficient is significantly positive at 1 per cent level, which supports theoretical propositions of economists. This indicates that inclusive finance has higher impact in the formation of entrepreneurs, and therefore, country with a higher level of financial inclusion has more entrepreneurs.

It is important to note that our earlier interpretation is based on the composite index of financial inclusion generated through PCA. This index is measured by six components of financial inclusion as discussed under the section on "measuring financial inclusion index". Moreover, we present the impact of each component of financial inclusion index in our estimation as shown in columns (2-7). All the six components show positive and significant effect of financial inclusion on new business density. These results suggest that inclusive finance is strongly and positively linked to entrepreneurial development and it opens up entrepreneurial opportunities for all and sundries in Africa. These results are consistent with [Fareed et al. \(2017\)](#). [Fan and Zhang \(2017\)](#), who prove that a country with various financial access points such as POS terminals, bank branches and ATM has opened a gateway for its entrepreneurs to explore the opportunities that come through financial services, which encourage business development.

In our estimations, GDP growth rate (GR) effect remains insignificant on entrepreneurship. This means growth rate in Africa does not necessarily translate to new

Variables	Dependent variable: New business density			
	(1) RE	(2) RE	(3) FE	(4) RE
<i>FII</i>	0.398*** (0.00)	0.00202*** (0.0014)		
<i>ACCT</i>			0.05464* (0.0113)	0.0034 (0.1024)
<i>ATM</i>				
<i>BORR</i>				
<i>BRAN</i>				
<i>DEPO</i>				
<i>DEMO</i>				
<i>GR</i>	−0.0045 (0.823)	−0.0092 (0.653)	−0.00939 (0.651)	−0.0147 (0.1024)
<i>REM</i>	−0.042 (0.206)	−0.0469 (0.204)	−0.016 (0.672)	−0.043 (0.250)
<i>CRISIS</i>	0.0420 (0.792)	0.0188 (0.907)	0.0184 (0.9102)	−0.039 (0.810)
<i>DAYS</i>	−0.013*** (0.0001)	−0.0153*** (0.000)	−0.152*** (0.000)	−0.156*** (0.000)
<i>PROCED</i>	−0.109* (0.081)	−0.153** (0.0129)	−0.152** (0.018)	−0.156** (0.013)
<i>C</i>	3.189*** (0.0007)	3.190*** (0.0009)	3.246*** (0.000)	3.623*** (0.000)
<i>R</i> ²	0.290	0.258	0.930	0.204
Adj. (<i>R</i> ²)	0.262	0.228	0.921	0.172
<i>F</i> -stat	10.113***	8.643***	101.85***	6.366***
Prob. (<i>F</i> -stat.)	(0.000)	(0.000)	(0.000)	(0.000)
Hausman test	$\chi^2 = 7.23$ PV = 0.299	$\chi^2 = 7.984$ PV = 0.239	$\chi^2 = 26.722$ PV = 0.0002	$\chi^2 = 0.00$ PV = 1.00
LM test (Breusch-Pagan)	$\chi^2 = 453.25$ PV = 0.000	$\chi^2 = 452.13$ PV = 0.000	$\chi^2 = 230.22$ PV = 0.000	$\chi^2 = 321.90$ PV = 0.000
Redundant effects tests	F = 87.730PV = 0.000	F = 104.894PV = 0.000	F = 46.851PV = 0.000	F = 69.41PV = 0.000

Notes: *Financial* inclusion index, (*FII*), remittance (*REM*), GDP growth rate (*GR*), financial crisis (*CRISIS*), time required to register (*DAYS*) and number of procedures to register a business (*PROCED*), automated teller machines per 100,000 adults (*ATM*), commercial bank branches per 1000 adults(*BRAN*), depositors with commercial banks per 1000 adults(*DEPO*), domestic credit to GDP ratio(*DOME*), bank borrower per 1000 adults(*BORR*) and number of commercial bank accounts per 1000 adults (*ACCT*); Figures in () are *p*-value. * *p*-value < 0.1; ** *p*-value < 0.05; *** *p*-value < 0.01

Source: Author's computation

(continued)

Variables	Dependent variable: New business density	
	(5) RE	(6) RE
<i>FII</i>		
<i>ACCT</i>		
<i>ATM</i>		
<i>BORR</i>		
<i>BRAN</i>		
<i>DEPO</i>		
<i>DEMO</i>		
<i>GR</i>	0.109** (0.0311)	0.0018*** (0.0019)
<i>REM</i>	−0.0125 (0.548)	−0.0068 (0.741)
<i>CRISIS</i>	−0.0467 (0.218)	−0.032 (0.380)
<i>DAYS</i>	−0.0203 (0.901)	0.049 (0.759)
<i>PROCED</i>	−0.0160*** (0.00)	−0.0141*** (0.0001)
<i>C</i>	−0.132* (0.0516)	−0.166*** (0.007)
<i>R²</i>	3.0031*** (0.0087)	3.190*** (0.0018)
Adj. (<i>R²</i>)	0.237	0.2606
<i>F</i> -stat	0.207	0.230
Prob. (<i>F</i> -stat.)	7.703***	8.755***
Hausman test	(0.000)	(0.00)
LM-test (Breusch-Pagan)	$\chi^2 = 5.006$ PV = 0.542	$\chi^2 = 0.00$ PV = 1.00
Redundant effects tests	$\chi^2 = 518.62$ PV = 0.000	$\chi^2 = 517.96$ PV = 0.000
	F = 106.49PV = 0.000	F = 117.30PV = 0.000
		$\chi^2 = 3.732$ PV = 0.712
		$\chi^2 = 573.5$ PV = 0.000
		F = 122.52PV = 0.000

Financial
inclusion in
Africa

Table VI.

business start-up because of its non-inclusive nature despite the fact that most countries in the region experience impressive economic growth in recent time (Munemo, 2018). Time to start a business and starts up registration requirements have significant negative effects on entrepreneurship. These results are in line with previous studies (Asongua *et al.*, 2017; Munemo, 2018). Higher number of procedures can serve as one of the major setbacks in entrepreneurial development. Cost of business start-up procedure, the time to build a warehouse and the time to resolve an insolvency and increase in time to enforce a contract, to register a property and to prepare and pay taxes can be harmful to entrepreneurship success. Our results are also consistent with the submission of Chambers and Munemo (2017), who investigate the impact of start-up regulations and institutional quality on the level of new business activity in a panel of 119 countries. They found that new business creation is significantly lower in countries with excessive barriers to entry. Table VI also shows that financial crisis and remittances are not significant in the model. This supports the work of Vasco (2013), who reveals that remittance inflows do not motivate entrepreneurial initiatives. This means that remittance inflows are driven by the need to support migrant worker's families, rather than by investment considerations (Vaaler, 2011). However, Zheng and Musteen (2018) report that remittances have significant effect on entrepreneurship.

4.2 Robustness checks

4.2.1 Alternative estimations. We conduct a number of robustness tests for this study by first of all re-estimating our baseline model using alternative estimation such as robust least square. One of the advantages of using robust least square is that it works with less restrictive assumptions of ordinary least square regression (OLS). It provides better estimates when outliers are involved, which may lead to serious distortions in OLS. In addition, we also estimate our model using instrumental variable estimation method of two stage least square to follow the work of Ferede (2019) and Ajide *et al.* (2019). The instrumental variable estimation takes care of relevant omitted determinants of entrepreneurship. We do not include the lag of dependent variable as one of the explanatory variables because our proxy for entrepreneurship (new business density) is not dependent on the level of development like other measures of entrepreneurship (Munemo, 2018; Ajide *et al.*, 2019). Table VII reports the results of the two techniques.

From the results, the J-statistic indicates that the null hypothesis of valid instruments cannot be rejected at the conventional level of 5 per cent significance. As reported earlier, the financial inclusion index, which is based on PCA still remains positive and significant. All the control variables are in accordance with our baseline results.

4.2.2 Estimation based on alternative measure of financial inclusion index. Furthermore, we re-estimate our baseline model by constructing another measure of financial inclusion using Sarma (2008) and Park and Mercado (2018) approach as described above. We construct the index on yearly basis for a period of 2005-2016 and re-estimate our model using OLS, random and fixed effect as shown in Table VIII.

From Table VIII, our results do not change from the one reported earlier. The new financial inclusion index (*New FII*) has positive and significant effect on the level of entrepreneurship in Africa. The number of registration procedures (*PROCED*) and time to start up business (*DAYS*) remain negative and have significant effect on new business density.

Variables	Dependent variable: new business density		Financial inclusion in Africa
	RSL	IV	
<i>FII</i>	0.1363*** (0.000)	3.4584*** (0.0000)	Table VII. Regression results (alternative estimations)
<i>GR</i>	−0.00485 (0.5639)	3.4337*** (0.0003)	
<i>REM</i>	0.00758 (0.4847)	−0.5576*** (0.0071)	
<i>CRISIS</i>	0.01418 (0.4847)	2.8259 (0.1516)	
<i>DAYS</i>	−0.00365*** (0.0002)	−0.009328*** (0.6055)	
<i>PROCED</i>	−0.02767*** (0.0085)	0.6389*** (0.0332)	
<i>C</i>	1.00028*** (0.0000)	−25.2256*** (0.0016)	
Rn-Sq. Stat.	172.0713***		
Prob. (Rn-sq. Stat.)	(0.0000)		
<i>F</i> -stat.		248.196***	
Prob. (<i>F</i> -stat)		(0.0000)	
Instrument rank		8	
Prob. (<i>J</i> -stat)		(0.8969)	

Notes: Financial inclusion index (*FII*), remittance (*REM*), GDP growth rate (*GR*), financial crisis (*CRISIS*), time required to register (*DAYS*) and number of procedures to register a business (*PROCED*); Figures in () are *p*-value **p*-value < 0.1 ***p*-value < 0.05 ****p*-value < 0.01
Source: Author's computation

Variables	Dependent variable: new business density		
	OLS	FE	RE
<i>New FII</i>	9.3233*** (0.000)	4.4774*** (0.0002)	4.8879*** (0.000)
<i>GR</i>	0.04405 (0.3809)	−0.00416 (0.8372)	−0.00430 (0.8316)
<i>REM</i>	−0.31063*** (0.000)	−0.04299 (0.2387)	−0.05063 (0.1620)
<i>CRISIS</i>	−0.31063*** (0.0000)	0.0383 (0.8093)	0.03907 (0.8053)
<i>DAYS</i>	0.02119*** (0.0004)	−0.01438*** (0.0000)	−0.01317*** (0.0001)
<i>PROCED</i>	−0.08204 (0.1906)	−0.10909 (0.0911)	−0.09810 (0.1140)
<i>C</i>	−0.08019 (0.9231)	2.2124*** (0.0062)	1.9882*** (0.0424)
<i>R</i> ²	0.428	0.934	0.2944
Adj. <i>R</i> ²	0.405	0.925	0.2660
<i>F</i> -stat.	18.588***	108.201***	10.365***
Prob. (<i>F</i> -stat)	(0.0000)	(0.0000)	(0.0000)
Hausman test	χ ² = 8.0191	Prob. (χ ²) = 0.236	

Table VIII.
Regression results
(using new financial inclusion index)

Notes: Financial inclusion index (*FII*), remittance (*REM*), GDP growth rate (*GR*), financial crisis (*CRISIS*), time required to register (*DAYS*) and number of procedures to register a business (*PROCED*). Figures in () are *p*-value. **p*-value < 0.1; ***p*-value < 0.05; ****p*-value < 0.01
Source: Author's computation

5. Conclusion and policy implications

The importance of every government's promotion of the culture of entrepreneurship among the citizens cannot be overemphasized. Entrepreneurship is the ability to get things done, that is, ability that involves creativity, vision, willingness to accept risk and a talent for translating vision into reality. Entrepreneurs create small, medium and large firms; create new products; and transform the landscape of the economy. Governments at different levels in Africa have enacted various policies to promote entrepreneurship, innovation and to increase the level of employment. These policies focus on microeconomic incentives such as favorable tax regimes, subsidies, growth, innovation financing and simplified business

regulations for small- and medium-sized enterprises (SEMs). Inclusive finance policy is a policy that focuses on bringing the less-privileged groups into the formal financial system. Financial inclusion has a lot of benefits in the society. It can reduce the level of poverty, and inequality by ensuring effective monetary policy. This phenomenon has been supported with empirical evidences (Anarfo *et al.*, 2019; Park and Mercado, 2018). Another interesting fact is that financial inclusion can deliver financial services at affordable cost to the formal and informal sector of the economy. It takes participation of vulnerable section and low income group of the society into consideration based on the degree of their access to financial services such as payment account, savings, credit insurance and pension.

This paper examines how financial inclusion impacts entrepreneurship in 13 selected African countries using data sourced from World Bank Development Indicators and IMF's International Financial Statistics for the period of 2005-2016. We used panel data estimations techniques such as random effects, robust least square and instrumental variable technique to estimate the data. We controlled for economic growth, time required to startup business, number of procedures to startup a business, financial crisis and remittances. Our results showed that financial inclusion had a significant effect on entrepreneurship development in Africa. Remittances, financial crisis and growth did not have significant effect on entrepreneurship while start up procedures and time required to establish a business discouraged entrepreneurship development.

This study provides some useful insights on factors influencing entrepreneurship in African countries. Firstly, the results show that financial inclusion has positive and significant effect on entrepreneurship. African governments need to intensify efforts in bringing in more citizens into the formal financial system. By doing this, it would boost the level of entrepreneurship activities in the region with establishment of business ventures at different level of sizes, employment would be created, productivity output will be generated and social welfare would improve. An effective financial inclusion policy can reduce the financial obstacle normally faced by entrepreneurs, which includes higher interest rate. Financial inclusion can mobilize savings and ensure effective allocation of financial resources. It can provide households and firms with greater opportunity to gain access to finance in running business venture at a lower interest rate; boosts firm formalization and generate revenue to the government through improvement in tax base.

In addition, as suggested in our results, loans and advances to adults and business borrowers play important roles in promoting entrepreneurship in Africa. This may be due to the fact that as SMEs have access to loans and advances, more employment and investment opportunities are being created, which have resultant effects on income available to individual investors for further investment and/or consumption, thereby increasing per capita consumption of people and reducing poverty level in a country. It is, therefore, recommended that monetary authorities should give high priority to young entrepreneurship, SMEs and other private sectors by directing the Deposit Money Banks (DMBs) to make more funds available to SMEs in form of loans and other advances at a reduced rate of interest such that the poor could better benefit from financial inclusion. The results also show that financial inclusion can open up economic opportunities for entrepreneurs. Specifically, we find that various financial access points like banking branches and ATMs are positively linked with entrepreneurial development. It is recommended that adequate financial education should be encouraged to hasten African entrepreneurship.

Furthermore, implementation of effective business regulation that ensures that all economic actors have fair and equal opportunities to participate in a competitive market is a key to entrepreneurial success in Africa. More specifically, effective business regulation can

encourage firm creation and growth and minimize market distortions or failures. The results also show that startup time and registration procedures reduce the level of firm creation in Africa. Government policies toward entrepreneurship should encourage fast registrations and reduce the cost of startup. This can be achieved by lowering the tax, legal and administrative burden on start-ups. Finally, financial inclusion plays an important role in male and women entrepreneurship. In this regard, it is important to create more awareness, make systems easy, and create enabling environment for African entrepreneurs.

While we have been able to provide some interesting insights in the field of entrepreneurship, our study should be viewed in the light of its limitation. First, new business density used in this study as a proxy for entrepreneurship does not take care of informal entrepreneurship of an economy. We are unable to provide the difference between necessity and opportunity entrepreneurship in our study. Future studies can overcome this shortcoming.

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Corresponding author

Folorunsho M. Ajide can be contacted at: ajide2010@gmail.com

Table AI.
Variance inflation
factors (based on
regression results in
[Table IV](#))

Variable	(1)			(2)			(3)		
	Coef. variance	Uncentered VIF	Centered VIF	Coef. variance	Uncentered VIF	Centered VIF	Coef. variance	Uncentered VIF	Centered VIF
<i>FII</i>	1.207011	1.389275	1.231562						
<i>ATM</i>				0.000453	8.163098	1.185624			
<i>BORR</i>							4.51E-06	1.105642	1.072761
<i>GR</i>	0.000408	1.071190	1.030086	0.000429	5.544871	1.019871	0.000443	1.074730	1.016585
<i>REM</i>	0.001298	1.029960	1.017648	0.001446	2.486260	1.052301	0.001417	1.031241	1.013758
<i>CRISIS</i>	0.025048	1.040493	1.038617	0.026619	1.251937	1.043281	0.027274	1.027118	1.024459
<i>DAYS</i>	1.13E-05	1.124648	1.091496	1.21E-05	4.795287	1.085484	1.20E-05	1.094860	1.049405
<i>PROCED</i>	0.003809	2.177514	1.162005	0.004098	1.4103	1.113651	0.003915	2.466831	1.108964
<i>C</i>	0.943685	2.545353	NA	0.526717	1.6331	NA	0.729118	2.558537	NA
		(4)			(5)			(6)	
<i>BRAN</i>		1.329946							
<i>DEPO</i>	0.002532		1.225540		1.189769	1.132550			
<i>DEMO</i>				3.50E-07					
<i>GR</i>	0.000438	1.043193	1.016400	0.000425	1.059049	1.030248	0.000174	1.303714	1.219592
<i>REM</i>	0.001429	1.032849	1.024628	0.001354	1.023717	1.015080	0.000420	1.050897	1.025826
<i>CRISIS</i>	0.026989	1.029495	1.028250	0.026558	1.060461	1.059122	0.001427	1.083992	1.075979
<i>DAYS</i>	1.19E-05	1.072490	1.051312	1.19E-05	1.121139	1.097698	0.025481	1.024524	1.023394
<i>PROCED</i>	0.004534	1.967373	1.232365	0.003682	1.722294	1.061719	1.19E-05	1.123411	1.102801
<i>C</i>	1.275330	2.087418	NA	1.007528	1.828593	NA	0.003844	1.717669	1.110657
							1.154694	1.844409	NA