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The effects of financial inclusion on entrepreneurship in SSA and the role of institutions

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Abstract. *One of the major development problems facing sub-Saharan Africa (SSA) is the high rate of youth unemployment and the low activity rate of the working age population. Among the many solutions mentioned to combat this scourge, the entrepreneurial dynamic occupies a prominent place. This explains why the analysis of potential forces influencing entrepreneurship has received a lot of attention from researchers in the economic literature as well. In this sense, an interesting literature indicates that access to financial services in developing countries could play a key role in business creation. However, to date, there has been relatively little attention in the empirical literature on the role of financial inclusion in entrepreneurial dynamics and even less attention to the institutional environment of the countries in question in this relationship. This study seeks to fill this gap by examining the link between financial inclusion, institutional quality and entrepreneurship in a sample of 25 SSA countries over the 2006-2018 period. Using Generalized Least Squares (GLS), Two-Stage least squares (2SLS) and IV-GMM methods, the results reveal that financial inclusion has a positive effect on entrepreneurial dynamics and that institutional quality amplifies entrepreneurial dynamics both directly and indirectly through its impact on financial inclusion. Therefore, institutional quality and financial inclusion are complements in enhancing entrepreneurship in Sub-Saharan Africa Countries. Therefore, we posit policy implications based on the reported correlations and associations, tying financial inclusion and entrepreneurship to strengthened institutional environment.*

Keywords: financial inclusion, entrepreneurship, institutional quality.

JEL Classification: G21, M13, G 28, 055.

1. Introduction

Financial inclusion, defined by Sarma and Pais (2008) as a process that ensures the ease of access, availability, and usage of the formal financial system for all members of society, is seen as a fundamental determinant of economic development (Beck et al., 2007a; Bruhn and Love, 2014; Zins and Weill, 2016). The underlying reason is that with greater financial inclusion, previously financially excluded people will have the opportunity to invest in education, save and start businesses, which could contribute to economic growth and poverty reduction. Also, it is beneficial to economic activity as it facilitates savings and allows for asset accumulation and diversification (Ndung'u et al. 2016). In addition, financial inclusion can empower women (Swamy, 2014; Yang et al., 2022) and contribute to financial stability (Han and Melecky, 2013). An inclusive financial system is therefore desirable because it would provide opportunities for all, especially the poor, the majority of whom are in sub-Saharan African countries, to access and invest funds, build capital and reduce risk. Thus, as can be seen from the theoretical and empirical literature, financial inclusion contributes to improving the lives of the poor and marginalised or vulnerable groups in society by enabling them to access finance (Soumaré et al. 2016; Jiang et al., 2019).

Given the crucial role of financial inclusion for economic development, much of the empirical literature in recent years has focused on identifying and analysing the determinants of access to financial services (Allen et al. 2016; Zins and Weill, 2016; Soumaré et al. 2016). However, so far, there has been relatively little attention in the empirical literature on the role of financial inclusion in entrepreneurial dynamics(1) and even less to take into account the institutional environment of the countries in question in this relationship. Yet, one of the main problems facing entrepreneurship is funding constraint (Ajide, 2020).

There are two main reasons for investigating this relationship, specifically in the context of Sub-Saharan African countries. First, for a number of years, both policy makers and researchers have recognised entrepreneurship as a key factor in economic development(2) (Brixiová, 2010) particularly in developing countries such as those in sub-Saharan Africa. Indeed, one of the major development challenges facing sub-Saharan Africa is the existence of high youth unemployment(3) and low labour force participation rates among the working-age population (Anyanwu, 2014; Brixiová et al. 2015). In addition, Global Entrepreneurship Monitor's statistics (GEM, 2022), show that the African continent has the youngest population globally, with 65% below 25 and a median age of 19.6 years. Therefore, most governments in the region support intensified entrepreneurial activity because of its potential to bring about economic benefits and improve social cohesion.

Second, economists consider finance as an ingredient that carries more weight in allocating effort for entrepreneurial activity (Claessens and Perotti, 2007; Goel and Madan, 2019). Several theoretical studies have attempted to document how access to financial services

can stimulate business creation. In this regard, we can mention those of King and Levine (1993a) who identified two channels through which financial development can boost business creation, namely: (*i*) as the financial sector develops, ex ante screening by lenders improves and entrepreneurs with high skill potential who are short of funds are able to obtain funds and thus start their businesses; (ii) entrepreneurs are able to diversify risks more easily in more financially developed countries. Consequently, they invest in riskier and more profitable projects. In the same vein, the work of Evans and Jovanovic (1989), followed by Kan and Tsai (2006), demonstrates that financial constraints limit entrepreneurial activities. The theoretical work of Klapper et al. (2004) also points in the same direction. These authors argue that access to credit allows for greater market entry by talented new entrepreneurs, who would otherwise be constrained by lack of inherited wealth and lack of connection to the network of wealthy incumbents. Therefore, greater access to credit for both individuals and firms (since small and micro enterprises are often started by individual borrowers), will increase the productivity returns to investment. Fan and Zhang (2017) go even further by highlighting some channels through which financial inclusion could foster the dynamics of entrepreneurial activities. As a first step, financial inclusion can help reduce the costs of starting a business for those who cannot either self-finance or access external finance (Klapper et al., 2006). Financial inclusion can also enable established businesses to increase their opportunities for expansion (Beck et al., 2006). In addition, better financial inclusion increases businesses' innovative capacity (Claessens and Laeven, 2003; Ayyagari et al., 2007).

Although there are still substantial variations across regions, the Global Findex data reveal uninterrupted evolution of financial inclusion in Africa (Demirgüç-Kunt et al., 2017). Therefore, this improvement in financial inclusion could play a key role in the creation and development of micro and small businesses (Beck et al., 2008; Fan and Zhang, 2017; Kairiza et al., 2016; Koloma, 2021). Hence, an empirical study is important to provide more empirical evidence on the link between financial inclusion and entrepreneurial dynamics to address crucial economic issues such as job creation in the African continent.

However, despite all these arguments, there are little or no evidence to support the possible relationship in Africa (Ajide, 2020). Moreover, the institutional framework has been largely ignored in explaining the results in terms of financial inclusion and entrepreneurship. Yet, when analyzing economic activities, including entrepreneurship, the formal and informal context must be considered (Williamson, 1975; Baumol, 1990; North, 1990; Tonoyan et al., 2010). According to Drucker (1985), entrepreneurship often takes place in uncertain and ambiguous environments (Sikalieh et al., 2012). Consequently, a country's institutional framework is decisive in promoting conditions that provide a minimum level of certainty that encourage risk taking (Asongu et al., 2018; Sendra-Pons and Mas-Tur, 2022). An adequate institutional environment would help to stimulate financial inclusion and increase its effect on entrepreneurship. On the contrary, a deficient institutional system would distort the functioning of markets and impedes on job creation.

Given that the institutional environment plays an important role in the development of financial inclusion and entrepreneurship and given that most SSA countries suffer from institutional weaknesses (Ondoa, 2013; Asiedu, 2013; Ajide et al, 2016; Kouadio and Gakpa, 2022), we investigate this link by considering the institutional environment of the countries in question. The aim is to find out: (i) whether access to financial services affects entrepreneurship in the case of SSA countries; (ii) how and to what extent institutional quality affects the level of financial inclusion and its contribution to entrepreneurship. The basic assumption that emerges from these two objectives is that financial inclusion can only promote entrepreneurial development when the economic system is anchored in a better institutional structure.

The rest of the paper is organized as follows. Section 2 is devoted to the review of the literature. Section 3 reveals the methodology. Section 4 provides the results of the estimation while Section 5 concludes the study.

2. Literature review

2.1. Finance and entrepreneurship: theory and evidences

From a theoretical point of view, Schumpeter (1911)'s contribution can be considered as one of the first in this sense. The author is one of the first to have linked finance to entrepreneurship via two of the main functions of banks, namely, the selection of the best borrowers and the provision of credit, which is paramount for the start-up and execution of innovative activities, which he assimilates to entrepreneurship. The author did not directly examine the link between financial development and entrepreneurship, but in his theory of economic evolution, he focused on two main phenomena, entrepreneurship as the realisation of new combinations of production and thus innovation, and the banker as the producer of purchasing power and the negotiator of this loan. For the author, entrepreneurship is central to the process of economic change. He emphasises the importance of the role of the banker in identifying entrepreneurs with promising innovation processes and providing the necessary credit for such innovative activities. It is based on the assumption that a new firm cannot be financed by the profits from the economic circuit, so it is necessary to borrow credit in money or money substitutes for the purchase by the entrepreneur of the means of production necessary for his new combination.

This vision of Schumpeter is confirmed by the work of Patrick (1966). The author (cited by Ghanem and Achouche, 2017), in his analysis of the role of the financial system, argues that the financial system performs two main functions which are, the transfer of resources from the traditional sectors to the modern sectors and the promotion of entrepreneurial initiative in these modern sectors. Following this seminal work by Schumpeter (1911), the literature has widely discussed the links between entrepreneurship and growth constraints of small firms and their limited access to financial services. Several reasons are given in

the literature to explain this limited access to financial services, especially in a context of underdevelopment. These include weak property rights, lack of financial skills of entrepreneurs, lack of collateral, information asymmetry, lack of traceability, lack of risk management infrastructure for lending institutions. Also, according to Van Stel et al. (2007), minimum capital requirements to start a business can hamper entrepreneurship if entrepreneurs lack the resources to meet these capital requirements. Authors such as Cassar (2004) suggest that financial constraints are important in determining the likelihood of new business creation. Hsu (2004) draws attention to the difficulty faced by entrepreneurs without an established reputation in convincing external sources to provide financial capital. Thus, the relaxation of financial constraints would have an impact on entrepreneurial activities.

Credit institutions can thus satisfy entrepreneurial demand for credit through access to sufficiently large amounts of credit, reducing the risk of economically inefficient economies of scale and thus increasing the attractiveness for potential entrepreneurs to launch capital-intensive business projects. In addition, the use of financial intermediaries also allows entrepreneurs to use a financial infrastructure to conduct business with low operating costs, thus providing a new incentive for entrepreneurial activity that would otherwise fail due to prohibitive operating costs. Following the above-mentioned authors, Aghion et al. (2007) have theoretically formalised the relationship between credit constraints and the creation and post-creation growth of new firms. The authors' findings state that an increase in the levels of financial development favours the entry of small firms, discourages entry by larger firms that do not have better long-term prospects and also favours the growth of all firms that survive after entry. In the same vein, De Gregorio and Guidotti (1995), argue that a well-functioning financial system can foster a response to business opportunities by competent entrepreneurs. Increased access to credit by the private sector, especially small and medium-sized firm, could stimulate the development of entrepreneurship. In this sense, lack of access to credit for households and potential entrepreneurs is often cited as a barrier to development in poor countries, many of which are in sub-Saharan Africa (Demirgüç-Kunt et al. 2015).

Most recently, Fan and Zhang (2017) extended the model developed by Aghion et al. (2007) to theoretically investigate how the development of financial inclusion could affect the entrepreneurs' training. The model results suggest that the development of financial inclusion alleviates credit constraints on entrepreneurial activities through the reduction of information asymmetry in financial transactions and furthermore, this effect is stronger in industries with fewer barriers to entry. They also argued that the development of financial inclusion is able to stimulate the growth of entrepreneurship through three main mechanisms, namely reducing the costs of starting a business for those who are unable to self-finance or access external finance, increasing the expansion opportunities and innovation capabilities of entrepreneurs. Also, other mechanisms that facilitate the link between financial inclusion and entrepreneurship have been mentioned in the literature.

One of them is the ability of individuals to save money in an appropriate way, through mobile bank accounts. Indeed, in addition to the security they offer, they also allow their users to better track and manage their savings, avoid carrying cash a lot of cash and more easily resist the temptations to spend them quickly (Jakiela and Ozier, 2016). The availability of such an instrument may, in some cases, encourage people to invest in setting up a business.

These various theses have generated a more or less extensive empirical literature on the subject. Some studies have sought to test the empirical validity of the theories by specifying entrepreneurship equations involving indicators of financial development. In contrast, others have sought to examine how propensities to start new businesses are related to personal wealth or changes in personal wealth (Evans and Jovanovic, 1989). Our research in this study falls within the context of the former literature. For example, in recent years, among the work at the empirical level that has examined the role of finance in promoting entrepreneurship are, among others, the studies by Demetriades and Rewilak (2019), Kar and Özşahin (2016), Ghanem and Achouche (2016), Cho and Honorati, (2013), Aghion et al. (2007), Beck et al. (2008), Klapper et al. (2006), Audretsch et al. (2009).

In addition to this theoretical and empirical work, which seems to be unanimous on the important role of access to financial services in entrepreneurial dynamics, in particular on the creation of new businesses, another equally stimulating part of literature argues that the efficiency of a financial system is closely linked to the characteristics of economies, including the institutional environment. The simultaneous consideration of the institutional environment and financial factors could therefore amplify the effect of the latter on entrepreneurship (Johnson et al. 2002; Grilo and Irigoyen, 2006).

2.2. Role of institutions in the relationship between financial inclusion and entrepreneurship

The consideration of the institutional framework is a contribution of the New Institutional Economy to explain the importance of the institutional environment as a determinant of financial sector development and entrepreneurship.

On the one hand, many arguments have been put forward to show that the quality of institutions happens to be a prerequisite of the financial development level and its capacity to contribute significantly to the real sector(4). Indeed, the development of the use of financial services requires sufficient trust between banks and potential clients for contracts to be properly executed. This trust depends on the institutional context in which the financial system operates (Guérineau and Jacolin, 2014). Thus, in a context characterised by an insufficiently favourable business climate (corruption, fragility of the rule of law, etc.), the protection of the property rights of private investors and the capacity to enforce contracts, in particular to mobilise the collaterals associated with a loan, are weak, which discourages banks from seeking new clients. The authors show through descriptive statistical analysis that there is a strong correlation between financial inclusion and the

variables “rule of law” and “cost of registering property titles”. They conclude that the backwardness of sub-Saharan African countries in terms of financial inclusion stems from their structural weaknesses. All these deep structural and economic constraints characteristic of the institutional fragility of SSA countries could lead to situations where the considerable improvement in financial inclusion that has been observed in this category of countries in recent years does not necessarily imply the development of entrepreneurship, as revealed in the literature.

From an empirical perspective, more recently, the importance of institutions (voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption) for the development of financial inclusion has been highlighted in the work of Allen et al., (2014). Using a composite index of institutional development constructed from the governance indicators of Kaufmann et al., (2007), the authors showed from a sample of sub-Saharan African countries that institutional variables have a significantly positive effect on the development of financial inclusion. In the same vein, Beck, (2016) also points out that governments in sub-Saharan African countries have an important role to play in setting up an adequate institutional and regulatory framework to boost financial inclusion in this category of countries. Such results were found by Cull and Effron (2008), in a sample of 106 developing countries. Ajide (2017), in an attempt to identify the main determinants of financial inclusion in a panel of 18 SSA countries over the 2004-2010 period, relied on the *system GMM*. The author uses three measures as proxies for financial inclusion, the number of ATMs (per 100,000 adults), commercial bank branches (per 100,000 adults) and the number of ATMs (per 1000 km^2). In his study, he finds that institutional variables are key factors in the development of financial inclusion.

On the other hand, the entrepreneurship literature incorporates the institutional component as a key factor that can foster or block entrepreneurial dynamics (Southall, 2008; Adejumobi, 2015, Belitski et al., 2016; Aidis et al., 2012; Stenholm et al., 2013; Aparicio et al., 2016). Indeed, according to the latter, an appropriate institutional environment would provide the necessary conditions for individuals to identify market opportunities, launch new activities, introduce innovations and new products or services and create jobs (Verheul et al., 2002; Baumol, 2005). Similarly, according to Deléchat et al. (2010), weak property rights due to poor quality institutions affect the investment decisions of entrepreneurs. Sobel (2008) also argues that an institutional structure that allows for respect of property rights, a fair judicial system and enforcement of contracts encourages entrepreneurship and economic development. Similarly, Klapper et al., (2006), in their study of the influence of regulations on entrepreneurship, find that relaxing regulations to facilitate business creation does not have a significant impact on entrepreneurship in countries with high levels of corruption, but happens to have a significant one in countries with low levels of corruption.

In summary, based on both theoretical and empirical results, the institutional framework appears to be, overall, an important stimulating factor for both financial inclusion and entrepreneurship.

3. Methodology

First, we present the specification of the models that will allow us to analyse the effect of financial inclusion on entrepreneurship on the one hand, and to analyse the consequences of the interaction between the institutional environment and financial inclusion on entrepreneurship in SSA countries on the other hand. Second, we specify the study variables and data sources. Third, we describe the empirical analysis that will be followed in order to carry out the estimates under conditions that are conducive to reliable results.

3.1. Model specification

Our study aims to verify whether financial inclusion contributes to entrepreneurship in the context of sub-Saharan African countries. Indeed, according to the literature, promoting entrepreneurship is one of the main solution to cope with the demographic surge, with its corollary high unemployment in sub-Saharan African countries. Thus, the current debate gives pride of place to the identification of the factors determining entrepreneurship. In this sense, an interesting literature indicates that access to financial services in developing countries could play a key role in the creation and development of micro and small businesses. Financial inclusion is therefore likely to increase the benefits associated with the decision to start a business own business. This justifies the extensive literature on modelling the relationship between finance and entrepreneurship in an endogenous growth framework (King and Levine, 1993b; Audretsch and Kielbach, 2007; Bettignies and Brander, 2007, Olukayode and Somoye, 2013).

Following this logic, we can deduce that entrepreneurship can be modelled as a function of financial inclusion. Thus, to investigate the relationship between financial inclusion, institutional quality and entrepreneurship, we specify the following model:

$$\mathrm{Ent}_{i,t} = \alpha_0 + \alpha_1 \mathrm{FI}_{i,t} + \beta \mathrm{X}_{i,t} + \eta_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

Where Ent, is the entrepreneurship proxy, FI, the variable measuring financial inclusion, i, the individual dimension, t, the time dimension, X, vector of control variables that are assumed to influence entrepreneurial activities. η_i, represents the individual specific effects, μ_t, the time specific effect and $\varepsilon_{i,t}$, the error term of the model which is independent and identically distributed.

As a starting point, we do not include any institutional quality variables. We only test the direct effect of financial inclusion on entrepreneurship.

However, as another objective of this study is to find out whether the financial inclusion-entrepreneurship relationship is conditioned by the institutional environment in sub-Saharan African countries, we then assume that it is likely that the institutional variables influence entrepreneurial activities in a multiplicative manner through their combined effects on the financial inclusion variables. Taking into account the interaction between the financial inclusion and institutional quality variables allows us to obtain the following specification, derived from equation **(1)**. The model to be estimated is thus defined as follows:

$$\mathrm{Ent}_{i,t} = \alpha_0 + \alpha_1 \mathrm{FI}_{i,t} + \alpha_2 \mathrm{Ins}_{i,t} + \alpha_3 \mathrm{Fincl} * \mathrm{Ins}_{i,t} + \beta \mathrm{X}_{i,t} + \eta_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

As explained above, equation (2) tests the hypothesis that the institutional quality of the recipient country influences the ability of financial inclusion to affect entrepreneurship. Institutions are defined as the rules of the game in a society or more formally, where human constraints shape human interactions (North, 1990). Indeed, this study focuses on α_1 and α_3, which inform on the effect of financial inclusion on entrepreneurship as a function of the level of institutional quality. α_1 and α_3, assess whether financial inclusion has influences on entrepreneurship when the country has good quality institutions. A positive interaction ($\alpha_3 > 0$), would indicate that institutional quality reinforces the positive effect of financial inclusion on entrepreneurial activities ($\alpha_1 > 0$). Otherwise, when the interaction is negative ($\alpha_3 < 0$), the quality of the institutional framework decreases or worsens the negative effect of financial inclusion on entrepreneurship. If $\alpha_1 < 0$ and $\alpha_3 > 0$, then financial inclusion has a negative effect on entrepreneurship development and the institutional environment mitigates this negative impact.

3.2. Definition of Variables and data

3.2.1. Study period and data sources

Our sample consists of 25 sub-Saharan African countries and covers the 2006-2018 period. The choice of this period is linked to the availability of data on financial inclusion over this period. The data we use in this study are mainly be taken from the *Doing Business World Bank Database (2020)*, *Worldwide Governance Research Indicators (2020)* and the *World Development Indicators database of the World Bank (2020).*

3.2.2. Presentation of variables

Dependent variable

It should be noted that researchers are not unanimous on the measurement of entrepreneurship (Adusei, 2016). In this sense, various indicators have been used in the literature to measure the concept of entrepreneurship.

Dau and Cuervo-Cazurra (2014), identify two types of entrepreneurship: formal and informal entrepreneurship. Formal entrepreneurship refers to 'activities of an individual or group aimed at starting economic activities in the formal sector under a legal business form (Klapper et al., 2007). On the other hand, informal entrepreneurship refers to the creation of new businesses that are not legally registered and are mainly unregulated but are legal in all other aspects (Dau and Cuervo-Cazurra, 2014; Nyström, 2008; ILO, 2002).

Due to data constraints on informal entrepreneurship in our sample countries, we focus, as in the work of Klapper et al., (2007), Munemo (2012, 2015, 2016) and Adusei (2016) on formal entrepreneurship and use a measure of entrepreneurship that is widely used in empirical work. This is the entry density of new firms to measure the dynamics of business creation. This indicator is defined as the number of new formal private sector limited liability companies per 1000 persons of working age (between 15 and 64 years) (*New business density*).

Financial inclusion variable

In this study, we focus on the demographic penetration of financial services measured by the number of branches per 100,000 people (*Bank branches*) to capture financial inclusion because it provides a better understanding of access to financial services (Coulibaly et Yogo, 2016). This indicator, which relates to banking outlets (offices, branches, ATMs, etc.), assesses countries' progress in promoting an inclusive financial system that provides equitable access opportunities. This measure of financial inclusion was originally calculated by Beck et al., (2007a), and subsequently updated by the World Bank (WDI, 2019).

Institutional variables

To better appreciate the role of institutional variables in the financial inclusion-entrepreneurship relationship in sub-Saharan African countries, we use the six governance indicators of Kaufmann et al., (2007) namely political stability, voice and accountability, government effectiveness, regulatory quality, rule of law and corruption control. These variables measuring institutional quality within a country have been widely used in the recent institutional literature (Allen et al., 2014; Munemo, 2015; Asongu et al. 2018; Ondoa, 2013; Yerrabit and Hawkes, 2015; Andrés and al. 2015) and are scored on a scale ranging from -2.5 to 2.5, with a high score indicating more efforts at good governance.

Other control variables

In the choice of explanatory variables, we have retained those used in most empirical studies on entrepreneurship (Munemo, 2012, 2015, 2016; Glaeser et al., 2012). The choice of these indicators calls for some comments. These variables are:

- Education represents the human capital stock approximated by the rate of primary school in the population and is measured by the proportion of the population with

primary education to the total of primary school age population. Its sign should be positive because a higher human capital stock favours the adoption and assimilation of new technologies and thus increases the creation of new businesses (Bilic et al., 2011, Ashby and Seck, 2012).

- The level of development is captured by the growth rate of real per capita GDP (*GDP per capita*). A positive coefficient is expected since the level of development of a country is likely to have a stimulating effect on entrepreneurial activities (Munemo, 2015, 2016).
- To capture the level of infrastructure development in the countries, we use the mobile phone subscriptions variable (per 100 inhabitants) (*Mobile phone*). We expect this variable to positively affect entrepreneurship.
- Following previous literature (see e.g., Munemo, (2015, 2016); Djankov et al., (2002) and the World Bank, (2004)), the time (in days) required to start a business is used as a measure of regulations to start a business (*start-up time*). A negative sign is expected as according to Munemo (2015, 2016), Klapper et al., (2006), the increase in the above measure has a negative and significant effect on the creation of new businesses.
- Domestic investments are approximated by gross fixed capital formation. A positive coefficient is expected as domestic investment is seen as a key driver of innovation.
- Inflation is the domestic inflation rate variable measured by the rate of change in the consumer price index. This variable is used to proxy for macroeconomic instability. The inflation rate is likely to have an adverse effect on entrepreneurship.

3.3. Empirical analysis

3.3.1. Descriptive statistics of variables

Table 1 summarises the statistical properties of the variables used in the study.

Table 1. *Descriptive statistics of variables*

Variables	Obs	Mean	Std. Dev.	Min	Max
Financial Inclusion (Bank branches)	325	7.682	10.697	0.360	54.36
Entrepreneurship (New business density)	325	1.893	3.840	0.008	24.104
Political stability	325	-0.346	0.930	-2.40	1.200
Voice and accountability	325	-0.323	0.693	-1.571	0.998
Government effectiveness	325	-0.596	0.644	-1.745	1.056
Regulation quality	325	-0.498	0.574	-2.156	1.127
Rule of law	325	-0.493	0.664	-1.852	0.996
Corruption control	325	-0.441	0.692	-1.525	1.039
Start-up time	325	32.086	25.904	4.000	133.500
Mobile phone	325	69.439	41.257	3.414	184.298
Human capital (Education)	325	106.170	20.595	48.987	149.307
Economic development (GDP per capita)	325	2.349	3.906	-22.312	18.066
Domestic Investment	325	23.975	7.880	2.224	52.418
Inflation	325	5.854	5.6262	-8.974	36.964

Source: Author's calculations.

The results of the table reveal that the level of financial inclusion is still low. Indeed, it appears that on average this region has 7 bank branches per 100,000 people. This result supports the work of Guérineau and Jacolin (2014) and Coulibaly and Yogo (2016), who found that bank branches tend to be concentrated in the largest cities.

Regarding the values of the governance indicators, as indicated above, they range from -2.5 to 2.5, where -2.5 indicates the worst performance and +2.5 the best. For these indicators, the majority of African countries are below zero in terms of governance. This shows their weakness in these countries.

For entrepreneurship, we observe that on average the density of new business creation is still low in all the countries in the sample.

3.3.2. Correlation matrix

The correlation matrix is used to ascertain whether or not there is any multicolinearity in the model due to a strong dependence between two or more of the model's variables. It is presented in Appendix A. We can see that the variables measuring institutional quality are strongly correlated two by two. To correct this strong correlation between these variables, we construct, following Soumaré et al., (2016) work, a synthetic Indicator of Institutional Quality (ISQI), through a simple average of six governance indicators.

For the other variables, the correlations between them are acceptable, because this is less than 0.8. Multicollinearity only becomes a concern if the correlation coefficient between the variables is greater than 0.8 (Keho, 2016). To check the robustness of the results, we use the VIF (variance inflation factors) test. The results of the tables in Appendix A show that there is no significant multicollinearity between the economic variables and that there is strong multicollinearity between the institutional variables. For the economic variables, no VIF is greater than or equal to 10 (the highest values are 1.58 and 1.57 respectively). The average VIF is less than 2 (1.23). This is not the case for institutional variables. The test leads to the conclusion that there is no significant multicollinearity between the economic variables, and that there is a strong correlation between the institutional variables.

3.3.3. Unit root test

The study of the stationarity of our series requires the performance of unit root tests. As the variables in the model are inter-individually dependent, we use the CIPS test, which is a second generation panel unit root test. This test is an Augmented Dickey-Fuller regression with the cross-sectional average of lagged levels and first differences of individual series. The CIPS test is based on the null hypothesis of unit root. When the test statistic is below the critical value, the null hypothesis is rejected.

The result of the unit root test is presented in Table 2. The test tests the null hypothesis of non-stationarity in the different level and difference series. At the 5% threshold, when comparing the different values of the calculated statistics to the critical value, except for

the variables "Start-up time", "mobile telephone", "Human capital", "Economic Development", domestic investment and inflation which are stationary at level, the other three variables are stationary in first difference.

Table 2. *Results of the unit root test*

Variables	Level		Difference		Critical value at 5%
	CIPS1	CIPS2	CIPS1	CIPS2	
Entrepreneurship	-1.311	-1.492	-2.873***	-2.873***	-2,17
Financial Inclusion	-1.910	-2.031	-3.082***	-2.856***	-2,17
ISQI	-1.426	-1.426	-3.094***	-3.094***	-2,17
Start-up time	-1.899	-2.262**	-2.811***	-2.846***	-2,17
Mobile telephone	-2.320**	-2.320**	-2.951***	-2.951***	-2,17
Human Capital	-2.077*	-2.624***	-2.703***	-2.703***	-2,17
Economic Development	-2.481***	-2,481***	-3.908***	-3.925***	-2,17
Domestic investment	-2.033	-2.105*	-3.198***	-3.198***	2.17
Inflation	-2.838***	-3.138***	-4.221***	-4.364***	2.17

Note: CIPS 1 and CIPS 2 are the statistics calculated for lags of order 1 and order 2, respectively. ***significant at 1%; **significant at 5%; *significant at 10%.
Source: Authors, using Stata.

To correct for unit root issues, we standardised the series by doing a logarithmic transformation of the variables. After standardization of the series, the results showed that all the variables are stationary at level (see annex B).

3.3.4. Empirical strategy

The econometric estimation method adopted for this study is the panel data estimate, and the estimation used is the Generalized Least Squares (GLS). The justification for using panel data method is rooted in the nature and type of variables considered in the study. Thus, as a result of presence of autocorrelation and heteroscedasticity in the panel data model, we use the generalized least squares (GLS) correction model.

To check the robustness of the results, we mobilise an instrumental variable method (i.e. 2SLS) in order to control for endogeneity issues suspected in the literature between finance and entrepreneurship. Indeed, it is highly likely that entrepreneurship can also influence financial inclusion (reverse causality), in the sense that entrepreneurs offer more collaterals than those without businesses to better access to credit and other financial services. Other sources of endogeneity may also arise from the existence of unobserved factors that may be correlated with both the dependent and independent variables. Ignoring this potential interdependence could lead to misleading conclusions about the actual relationship between financial inclusion and entrepreneurship and potentially over or underestimate the true impacts of each. This, in turn, can have important consequences in terms of the effectiveness of economic strategies and policies to foster both financial inclusion and entrepreneurship in developing countries.

It is therefore necessary to identify an effective instrument for measuring access to financial services. Such a variable should be highly correlated with the assumed endogenous variable

but not with the residuals, which means that it should not directly affect the dependent variable. In this study, following the work of Djankov et al., (2007) and Beck et al., (2007), we use the existence of credit bureaus(5) as a proxy for our measure of financial access (number of bank branches per 100,000 adults). Indeed, an extensive literature highlights the positive correlation between credit information sharing and access to financial services (Ayyagari et al., 2008; Baer et al., 2009; Beck et al., 2007b). By sharing information on borrower behaviour, credit bureau improve access to banking services, support responsible lending, reduce credit losses and strengthen banking supervision (Baer et al., 2009). We argue that better information on borrower behaviour leads to the establishment of banks and financial institutions close to households, thereby improving their access to financial services and leading to the stimulation of entrepreneurial activities. The World Bank data provides a measure of credit information sharing, namely the coverage of private credit bureau. They represent the number of individuals or businesses listed as a credit bureau as a percentage of the adult population. These data are available since 2004.

As 2SLS estimates may be biased if the chosen instruments are weak, we test the robustness of the instrument by performing the following tests: (i) First, we apply the F-test of the instrument coefficient in the first regression of the first stage and use the rule of thumb of Staiger and Stock (1997), according to which for an F-statistic greater than 10, one does not need to worry about the problem of weak instruments; (ii) Second, we compare the F-statistic of Cragg and Donald (1993) with the critical values of Stock and Yogo (2005), as a further check to confirm the robustness of the instrument in our study.

4. Empirical Results and discussion

4.1. Financial inclusion and entrepreneurship relationship

The results of the estimation of model (1) are presented in the table below.

Table 3. Link between financial inclusion and entrepreneurship

Variables	Dependent variable: Log_ Entrepreneurship	
	Coef.	Std.Err.
Log_Financial Inclusion	0.439***	0.0386
Log_ start-up_times	0.185***	0.0319
Log_mobile_telephone	0.039	0.0425
Log_Human Capital	0.052	0.1871
Economic Development	0.001	0.0028
_cons	1.794*	0.7988

Note: (***), (**), (*) significance at the 1%, 5% and 10% threshold respectively.
Source: Authors' calculations.

This table presents the results obtained from the regression of the panel data using the GLS method. The results show a positive and significant effect of financial inclusion on entrepreneurship. Specifically, a one percent increase in the number of bank branches leads to a 0.43 percent increase in the entry density of new businesses. In terms of economic

implications, such a result implies that increasing financial inclusion can boost entrepreneurship. This result joins the family of studies that suggest that financial sector development affects business creation. In this regard, we can cite those of Kar and Özşahin (2016) who by examining the role of financial development on entrepreneurship using panel data estimation methods on a sample consisting of 17 emerging countries over the period 2004-2009, found that financial development exerts a positive and significant impact on entrepreneurship. Similar results were also found by Rusu and Roman (2017), on a sample of 18 European Union countries, who by applying the panel data fixed effect method, show that access to financial services is a main driver of entrepreneurship. These results are also in line with those found by Wujung and Fonchamnyo (2016), who in examining the effect of financial development on private entrepreneurship, find that financial development (domestic credit and savings mobilisation) positively affects private entrepreneurship in Cameroon.

Concerning the control variables, the sign of the coefficient of the start-up time variable shows a counter-intuitive result. Finally, the effects of human capital, level of development and infrastructure are insignificant.

4.2. Role of institutional factors in the relationship between financial inclusion and entrepreneurship

In this section we discuss the hypothesis that the quality of the institutional environment improves the effect of financial inclusion on entrepreneurship. The regression results of equation (2) are reported in Table 4.

Table 4. estimates results.

Variables	Dependent variable: Log_ Entrepreneurship	
	Coef.	Std.Err.
Log_Financial Inclusion	0.705***	0.0569
ISQI	0.347***	0.1071
Log_ Financial inclusion#ISQI	0.206***	0.0532
Log_ start-up_time	-0.896***	0.0337
Log_mobile_telephone	0.368***	0.0389
Log_Human capital	-1.016***	0.1683
Economic development	-0.0001	0.0021
_cons	1.794*	0.7989

Note: (***), (**), (*) significance at the 1%, 5% and 10% threshold respectively; (#) interaction symbol,
Source: Authors, using STATA.

The results confirm our theoretical intuition that good quality institutions affect entrepreneurship on the one hand directly and on the other hand indirectly through their effect on financial inclusion. Taking into account the interaction between financial inclusion and institutional quality reinforces the positive effect of financial inclusion on entrepreneurial dynamics. Indeed, the coefficients of institutional quality and the interaction term of financial inclusion and institutional quality are positive and statistically significant at conventional levels. Moreover, the introduction of institutions in the

regression increases the coefficient of the financial inclusion variable from 0.439 to 0.705. Such results imply that a good quality level of institutions could heighten the positive effect of financial inclusion on entrepreneurship. In other words, countries with good institutional quality could benefit from access to financial services. Therefore, in Sub-Saharan African countries, financial inclusion and institutional quality are found to be complementary in strengthening entrepreneurship. These results corroborate those of Baumol (1990), Nyström (2008), Boettke and Coyne (2009) and Djankov et al. (2010) that the benefits of entrepreneurial activities are directly related to the existence of good quality institutions.

For the control variables, the variable measuring the level of infrastructure development captured by the number of mobile phone subscribers was found to have a positive influence on entrepreneurial activity. One channel through which mobile phone penetration affects entrepreneurship would be mainly easy access to the internet. Indeed, it has been shown that the internet promotes entrepreneurship mainly by facilitating entrepreneurs' access to information and by helping entrepreneurs to obtain informal financing (Tan and Li, 2022). The ‘‘time’’ variable to start a new business shows the expected sign. Indeed, the results show a negative and statistically significant relationship between the time required to start a new business and entrepreneurial dynamics. This means that the increase in the time required as a regulatory measure has a dissuasive effect on new business creation. Such a result is consistent with that found by Munemo (2018). With regard to the level of human capital, the results show a statistically negative relationship between the level of human capital and business creation. In other words, the probability of starting a business decreases when the level of education improves in SSA countries. This result could mean that people with no or very low levels of education are more likely to engage in entrepreneurship than people with a good level of education who are more likely to move into more secure or stable permanent jobs. Finally, in all specifications, the growth rate of real GDP per capita does not seem to affect entrepreneurial dynamics. The increase in real GDP per capita growth does not significantly translate into greater opportunities for the creation of new businesses. This result, which is in line with Munemo (2018) could be explained by the non-inclusive nature of economic growth in SSA countries (Regional Economic Outlook Report, 2015).

4.3. Analysis of the robustness of the results

With a view to analysing the sensitivity of the results, we subject these results to robustness tests. To do so, we mobilise instrumental variables methods (i.e. 2SLS and IV-GMM) in order to control for possible endogeneity between finance and entrepreneurship. In addition, a second set of robustness tests consists of adding new control variables to the specification and observing the sensitivity of the regressions.

The results of the estimations are shown in Tables 5 and 6.

Table 5. *Instrumental variable estimates of the effects of institutional variables in the relationship between financial inclusion and entrepreneurship*

Variables	Dependent variable: Log_ Entrepreneurship			
	2 SLS estimates			
	Coef.	Std.Err.	Coef.	Std.Err.
Log_Financial Inclusion	0.738***	0.177	0.728***	0.205
ISQI	0.678**	0.267	0.686**	0.290
Log_ Financial inclusion#ISQI	0.367***	0.110	0.366***	0.120
Log_ start-up_time	-0.012	0.110	-0.019	0.116
Log_mobile_telephone	0.134	0.163	0.135	0.162
Log_Human capital	1.463**	0.651	1.436**	0.745
Economic Development	0.024	0.023	0.024	0.023
Log_Investment	---	---	0.054	0.393
Inflation	---	---	0.002	0.012
_cons	-8.445***	3.026	-8.475	3.123
F-stat for weak ident.	97.615		73.900	
Underidentification test	52.199		45.607	
Weak identification test	97.615		73.900	
Hansen (*p-value*)	(0.709)		(0.868)	

Note: *, **, and *** indicates the statistical significance and 10, 5, and 1% level, respectively; (#) interaction symbol.
Source: Authors, using STATA.

The test results for the F-test of the instrument coefficient in the first stage regression and the Cragg-Donald F-Statistic indicate that we do not have to consider the weak instrument issue. The reported statistics are well above the critical values of Stock and Yogo (2005) and the value of 10 suggested by the "rule of thumb" of Staiger and Stock (1997). The relevance of the instruments is assessed through the Hansen test of overidentifying restrictions. Based on the Hansen p-values, we cannot reject the null hypothesis that the instruments are uncorrelated with the errors terms and that the excluded instruments are correctly excluded from the estimated equation. These tests therefore confirm the robustness of the chosen instrument. Also, the statistics of the Hansen over-identification test and the Arellano and Bond second-order autocorrelation test do not allow us to reject, respectively, the hypothesis of the validity of the instruments used and the hypothesis of the absence of autocorrelation.

Table 6. *Result of dynamic panel-data estimate, two-step system GMM*

Variables	Dependent variable: Log_ Entrepreneurship			
	Coef.	Std.Err.	Coef.	Std.Err.
Log_ Entrepreneurship (-1)	-0.813***	0.066	-0.789***	0.112
Log_Financial Inclusion	0.729***	0.144	0.725***	0.295
ISQI	0.224**	0.289	0.212**	0.299
Log_ Financial inclusion#ISQI	0.299**	0.221	0.306**	0.235
Log_ start-up_time	-0.085*	0.048	-0.103	0.085
Log_mobile_telephone	0.102	0.117	0.261	0.215
Log_Human capital	0.383*	0.563	0.398*	0.912
Economic Development	0.032	0.008	0.038	0.015
Log_Investment	---	---	0.022	0.163
Inflation	---	---	0.035	0.036
_cons	-2.543	2.682	-4.695	4.344
AR2 (p-value)	-1.30 (0.192)		0.73(0.464)	
Hansen J test (p-value)	17.29 (1.000)		16.55 (1.000)	

Note: *, **, and *** indicates the statistical significance and 10, 5, and 1% level, respectively; (#) interaction symbol.
Source: Authors, using STATA.

The estimates undertaken by the Two-Stage least squares (2SLS) and IV-GMM regressions confirm the results previously found. The coefficients of the variables of interest in the different equations have the expected signs. In summary, the results reveal that the effect of financial inclusion on entrepreneurship is more pronounced in the presence of better quality institutions, thus highlighting the crucial role of institutions in the relationship between financial inclusion and entrepreneurship in SSA countries.

5. Conclusion

This paper investigates the effects of financial inclusion on entrepreneurship and the role of institutions, using a sample of 25 Sub-Saharan African (SSA) countries over the period 2006-2018. We first mobilized the Generalized Least Squares (GLS) technique and then an instrumental variables method, namely the Two-Stage least squares (2SLS) and IV-GMM methods to control for endogeneity problems suspected in the literature between our variables of interest. The results suggest that financial inclusion has a positive and significant influence on entrepreneurial activity. Furthermore, the study revealed that the quality of institutions directly and indirectly affects entrepreneurial dynamics through its effect on financial inclusion. Indeed, the results show that taking into account institutional variables and financial inclusion simultaneously improves the effect of financial inclusion on entrepreneurial activity. In other words, financial inclusion and institutional quality are complementary in stimulating new business creation.

The main policy implication that emerges from these results is that the promotion of entrepreneurship in SSA should focus on strengthening financial inclusion. Moreover, the effect of policies aimed at increasing financial inclusion would be more pronounced if SSA countries focus on cleaning up their institutional environment through the practice of good governance, namely, ensuring political stability, fighting corruption, enforcing laws and regulations, making government effective, promoting freedom of expression, and having quality regulation. This could be done, on the one hand, by increasing the number of bank branches per 100,000 adults to ease the access of both the poor and the excluded non-poor to financial services in developing countries and, on the other hand, by intensifying awareness campaigns among all political and economic actors on the evils of bad governance in a country.

Notes

(1) In line with Baliamoune-Lutz, Brixiová and Ndikumana (2011), entrepreneurship is understood here as the number of new businesses registered during a fiscal year in each country.

(2) Entrepreneurship is essential for increasing the number of new business start-ups, thus promoting competition and consequently economic growth (Harper, 2003; Klapper and Love, 2011; OECD, 2009). It is considered an important driver for promoting innovation and structural transformation of economies (Audretsch et al. 2002).

(3) According to estimates in an International Labour Organisation report, in 2018 the unemployment rate in sub-Saharan Africa reached 7.2%, remaining almost unchanged. However, the number of unemployed has increased by a further one million due to high labour force growth rates in the region.

(4) Detragiache, Gupta and Tressel (2005) and McDonald and Schumacher (2007) find that countries with governance problems have shallower financial sectors, thus limiting their effects. Economies without an effective legal system suffer from weak incentives for lending activities and the establishment of financial transactions. They also create a market for unproductive activities such as rent-seeking or corruption, which generate high transaction costs and misallocation of resources. Improving the institutional framework is expected to reduce these market imperfections (Keho, 2012).

(5) A private credit bureau is defined as a private commercial enterprise or non-profit organisation that maintains a database on the position of borrowers in the financial system and has the main objective of facilitating the exchange of information between banks and financial institutions (Djankov et al., 2007). The variable is coded as follows: it takes the value one if a credit bureau operates in the country and zero otherwise.

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Appendix A: *Correlation matrix of variables*

	Entrep	FI	stab	VA	GE	RQ	RL	Corr	startup time	Mobile phone	Human Capital	Eco Dev	Inv	Infl.
Entrep	1													
FI	0.4383*	1												
Stab	0.4908*	0.5091*	1											
VA	0.4543*	0.4568*	0.7274*	1										
GE	0.5893*	0.5922*	0.7709*	0.7678*	1									
RQ	0.4860*	0.3312*	0.6710*	0.7639*	0.8780*	1								
RL	0.5744*	0.5312*	0.8185*	0.8493*	0.9390*	0.9136*	1							
Corr	0.5840*	0.5965*	0.7829*	0.7443*	0.9012*	0.7884*	0.9058*	1						
startup time	0.0834	-0.0250	-0.0711	-0.2809*	-0.2136*	-0.3651*	-0.2599*	-0.1852*	1					
Mobile phone	0.3928*	0.5505*	0.4282*	0.4240*	0.4981*	0.4206*	0.4807*	0.4651*	-0.1731*	1				
Human Capital	-0.1016	-0.0795	0.1054	0.0133	0.0034	0.0238	0.0256	0.1336*	-0.2281*	-0.0982	1			
Eco Dev	0.1004	0.0697	0.1059	0.1040	0.1572*	0.1191*	0.1193*	0.1487*	-0.0507	0.0194	0.0573	1		
Inv.	0.3076*	0.3421*	0.4046*	0.3492*	0.3663*	0.3527*	0.4569*	0.4720*	-0.1335*	0.2205*	-0.0115	0.1181*	1	
Infl.	-0.0319	-0.0664	-0.0747	-0.0122	-0.0113	-0.0169	-0.0335	-0.0201	0.0249	-0.1899*	-0.0332	0.0236	-0.0374	1

Notes: Entrep=Entrepreneurship; FI=Financial Inclusion; Stab=political stability; VA= voice and accountability; GE= government effectiveness; RQ= regulatory quality; RL= rule of law; Corr=Corruption control.

Multicollinearity test based on VIF calculation between Economic variables

Variable	VIF	1/VIF
Financial Inclusion (Bank branches)	1.58	0.634095
Mobile phone	1.57	0.638766
Domestic Investment	1.16	0.858799
Start-up time	1.13	0.887642
Human capital (Education)	1.08	0.922592
Inflation	1.04	0.957761
Economic development (GDP per capita)	1.02	0.979251
Mean VIF	1.23	

Source: Author's calculations.

Multicollinearity test based on VIF calculation between institutional quality variables

Variable	VIF	1/VIF
Rule of law	23.88	0.041877
Government effectiveness	10.38	0.096330
Regulation quality	7.45	0.134160
Corruption control	7.06	0.141668
Voice and accountability	3.76	0.266219
Political stability	3.48	0.287428
Mean VIF	9.33	

Source: Author's calculations.

List of countries

Benin	Ghana	Mauritius	Rwanda	Chad
Botswana	Guinea	Namibia	Seychelles	Togo
Cabo Verde	Lesotho	Niger	Sierra Leone	Zambia
Cote d'Ivoire	Madagascar	Nigeria	Senegal	Uganda
Gabon	Mali	DR Congo	Tanzania	Zimbabwe

Appendix B: *Results of the unit root test (logarithm variables)*

Variables	Level		Critical value at 5%
	CIPS1	CIPS2	
logEntrepreneurship	-2.872***	-2.872***	-2,17
logFinancial Inclusion	-2.197**	-2.260**	-2,17
logISQI	-2.426**	-2.426**	-2,17
logStart-up time	-2.937***	-2.221**	-2,17
logMobile telephone	-2.259**	-2.265**	-2,17
logHuman Capital	-2.189**	-2.479***	-2,17
logEconomic Development	-2.481***	-2,481***	-2,17
logDomestic investment	-2.175**	-2.225**	2.17
logInflation	-2.838***	-3.138***	2.17

Note: CIPS 1 and CIPS 2 are the statistics calculated for lags of order 1 and order 2, respectively. ***significant at 1%; **significant at 5%; *significant at 10%.

Source: Authors, using Stata.