

Does Financial Development Drive Entrepreneurship in Africa? A Panel Data Analysis

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Entrepreneurship in Africa faces a multitude of challenges, with financial issues being prominently discussed in scholarly literature. Thus, this study explores how financial development plays a crucial role in encouraging entrepreneurship in Africa, analysing both short- and long-term impacts alongside the direction of causality within the continent. The study utilises panel data regression techniques to analyse data from 28 African countries, spanning from 2006 to 2020. The analysis reveals that financial development, alongside the growth of financial institutions and markets, consistently boosts entrepreneurship development in both time frames. Even though this is more pronounced in the long run, this suggests that the influence of financial development and its components is uniformly positive, with no significant differential impacts observed in either the short or long run. Causality results establish unidirectional causality between entrepreneurship, financial development, and its components, flowing from financial development and its components to entrepreneurship development. Given these insights, the study underscores the necessity for policymakers to focus on sustainable financial development strategies that enhance stability and inclusivity within financial markets.

Keywords: Africa, entrepreneurship, financial development, panel regression

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Introduction

Entrepreneurship has emerged as a significant global phenomenon, gaining prominence since 1990. However, its scope, features, and socio-economic impact vary across different contexts. Recent evidence, facilitated by the accessibility of public datasets, indicates that entrepreneurship is flourishing more prominently in emerging economies, including Africa

(Bruton et al. 2008; Omri 2020). These economies are characterized by lower entry barriers, an increasing focus on the market, and an expansion of economic activity. Despite this, the potential of entrepreneurship to promote sustainable, long-term economic development and growth has not yet been completely realized in African countries. Some obstacles, including legislative barriers, market accessibility issues, competition, skill shortages, and inadequate infrastructure, are impeding the growth of entrepreneurship in Africa. Nonetheless, the issues of access to funds is seen as one of the key elements mentioned in the literature, which creates a vicious cycle of poverty by lowering production and earnings (Abubakar 2015; Bayar et al. 2018; Ojonta and Ogbuabor 2021).

Generally speaking, it is thought that an effective financial system should encourage the growth of entrepreneurship; nevertheless, the degree of financial development, particularly in African nations, is concerning. For example, even though the African financial system has undergone financial reforms in the past, ranging from financial diversification to financial integration to permit unrestricted inflows of foreign capital into the economy, the system's development status is still low. Global analysis of financial development reveals that African nations do badly in terms of total financial development (International Monetary Fund n.d.; Noah 2023; Noah et al. 2023).

To address finance-related issues impeding entrepreneurship development, a number of empirical researches have examined the relationship between finance and entrepreneurship (Dutta and Meierrieks 2021; Gaies et al. 2023; Léon 2019; Ojonta and Ogbuabor 2021). However, with a few notable exceptions, such as the works of Ajide and Ojeyinka (2022) and Babajide et al. (2020), these studies primarily concentrate on developed and emerging economies outside of Africa, particularly at the macro level. Individual, corporate, regional, and national levels are all included in the examination of entrepreneurship (Kraus et al. 2021). For example, risk preferences, education, experience, age, and other employment opportunities may be individual-level factors that affect entrepreneurial decisions (Brachert et al. 2020). On the other hand, competition, market size, firm size, and business culture are important factors at the firm or industry level (Silwal 2022).

On the relationship between entrepreneurship and financial development at the national level in Africa, there is, however, limited research. Concerning the distinct political, cultural, and economic environments of African countries, this gap suggests a partial understanding of the

true impact of financial development on entrepreneurship in Africa. In addition, a thorough analysis of the body of research indicates conflicting results about the relationship between finance and entrepreneurship. While some studies suggest a positive association between financial development and entrepreneurial success, others contend that various financial sector constraints, economic challenges, institutional shortcomings, inequality, and imperfect markets can all work against financial development and impede entrepreneurship, especially in developing economies (Amin et al. 2023). This ongoing discussion emphasizes the need for more research, especially in the African setting, to determine the true effects of financial development on entrepreneurship.

Comprehending the efficacy of domestic financial development is vital to grasping the development of entrepreneurship in Africa. Remarkably, this field has not gotten nearly enough attention in the pertinent literature, especially at the national level, where the current study is highly relevant. By investigating the effects of financial development and its components (financial markets and institutions) on the growth of entrepreneurship in the African environment, the study contributes to the body of literature. Except for the research by Ajide and Ojeyinka (2022) and Babajide et al. (2020), previous panel studies largely exclude Africa. However, these two studies also have their limitations. For instance, Babajide et al. (2020) focused solely on financial stability and encountered methodological constraints, including issues of endogeneity and cross-sectional dependence. Ajide and Ojeyinka (2022) addressed some of these limitations by adopting a broader measurement of financial development and the generalized method of moments (GMM) methodology but paid less attention to the causality and long-term effects of financial development on entrepreneurship.

Considering the potential differential impacts of short- and long-term credit on entrepreneurship, as highlighted by Léon (2019), our study investigates both periods and explores potential differential effects to address the mixed results in the financial-entrepreneurship development nexus. We also analyse the differential effects of financial development and its components, as well as the control variables during these periods. In addition, existing theories like Schumpeter's theory contend that financial development encourages entrepreneurship by supplying the capital required. But there is also potential for the link to go the other way: strong entrepreneurship can stimulate the demand for a range of financial services and products, which in turn can propel financial devel-

opment. Understanding the causality in this relationship within the African context is theoretically challenging and underexplored. Additionally, there is a dearth of empirical studies that are particularly concentrated on Africa and which thoroughly investigate the causal relationships between financial development and entrepreneurship.

Furthermore, neglecting cross-sectional dependency and slope heterogeneity in panel data may introduce bias and inconsistency in estimations in these studies, given the interconnectedness of nations in trade, economics, and finance. Therefore, it is necessary to test for cross-sectional dependency in the panel to select appropriate estimation techniques if this issue is identified in the panel data. Additionally, our study differs in terms of measurements of financial development. The measurement of financial development in the present study includes the overall financial development in terms of accessibility, efficiency, and depth, in contrast to nearly all previous research that only used one indicator or component. Similarly, this study employs a superior measurement of entrepreneurship from the World Bank dataset, termed 'new entry density', capturing the essential aspect of entrepreneurial venturing and available for the selected African countries, ensuring robust estimations.

The primary aim of this study is to address these gaps by investigating how financial development and its components (financial institutions and markets) affect entrepreneurship development in Africa. Specific objectives entail assessing the impacts of financial development and its components over both short and long durations. Employing the system SGMM, panel-corrected standard error (PCSE), and Dumitrescu-Hurlin Granger causality methodologies, the study further explores the varying effects of financial development and its components on entrepreneurship development, as well as the causal link between entrepreneurship development and financial development.

This empirical study also contributes significantly to the body of knowledge on financial development and entrepreneurship from a theoretical standpoint. First of all, it makes clear how different financial development and its elements affect entrepreneurship in both short- and long-term scenarios. Second, the study improves our understanding of how financial systems influence entrepreneurship by identifying the direction of causality between financial development, its components, and entrepreneurial activity in Africa. This contradicts earlier theories that would have assumed a more reciprocal or context-dependent relationship between the two. Furthermore, by taking into account the varying

impacts of control variables, the research expands on our understanding of how particular policy contexts and economic circumstances affect the evolution of entrepreneurship across time. All things considered, this study contributes to the theoretical conversation by providing a more thorough and nuanced understanding of the elements that propel entrepreneurship in Africa.

The subsequent sections of the study are divided into five sections, where the second section reviews the related literature and theories, the third section presents the methodology, empirical results are presented and discussed in the fourth section, and the fifth section concludes the study.

Literature and Theoretical Review

As the field of entrepreneurship continues to expand, numerous opportunities emerge to further develop and refine its concepts (Chrisman et al. 2023). One of the earlier definitions of entrepreneurship is the one proposed by Wennekers and Thurik (1999), who defined entrepreneurship as the ability and readiness of individuals to identify and cultivate novel business opportunities and to communicate their ideas to potential stakeholders in the market effectively. This process often requires individuals with enterprising qualities, who may not fit the traditional mould of entrepreneurs but act as agents of change. An entrepreneur can be described as a forward-thinking individual who identifies emerging opportunities and is proactive in pursuing them to establish new ventures (Thompson 1999). Entrepreneurship, encompassing both high-growth ventures and self-employment, plays a crucial role in wealth creation for individuals and society as a whole (Sun et al. 2024).

The International Monetary Fund (International Monetary Fund n.d.) also classifies financial development into two main categories: market development and institutional development, which encompass the accessibility of financial services to individuals and businesses, market depth (size and liquidity), and efficiency (cost-effective delivery of financial services and sustainable revenues, as well as capital market activity). As noted by Čihák et al. (2012), the relationship between entrepreneurship and financial intermediation is relevant across all dimensions of financial development at the national level. Ayob (2021) adds that the level of economic underdevelopment within an economy influences the impact of financial development on entrepreneurship.

Theoretically, the relationship between the growth of the financial sector and entrepreneurship dates back to Schumpeter's (1912) seminal work, which emphasized the role of the financial system in enabling entrepreneurs to obtain loans and other financial resources. According to Schumpeter's theory, a dynamic economy needs a force that can explain both long-term growth and development and technological advancements. He maintained that the entrepreneur is the embodiment of this power. According to him, entrepreneurship is 'the carrying out of new combinations'. He described the entrepreneur as 'the agent of innovation' and 'the pivot on which everything turns' (Schumpeter 1912). He further stated that an entrepreneur innovates rather than invents. He clarified that the rate of capital expansion and whether or not it will entail innovation and change are determined by the calibre of entrepreneurial activity (Schumpeter 1912).

The aforementioned viewpoint is corroborated by later researchers who highlight the crucial role the financial sector plays in fostering entrepreneurial endeavours (Goldsmith 1969; Gurley and Shaw 1967; Patrick 1966). Meanwhile, Gerschenkron (1962) demonstrates that the degree of an economy's economic regression determines the influence of financial development on that sector. Furthermore, the four perspectives covered by Verheul et al. (2000) eclectic theory of entrepreneurship (ETE) includes the disciplinary approach, level of analysis, differentiation based on supply and demand, and differentiation between the short- and long-term equilibrium levels of entrepreneurship. Even though individual decisions are made while starting a business, supply and demand considerations are crucial in generating chances for new ventures (Ayob 2021).

From the demand side of the ETE, more financial development boosts the nation's entrepreneurial activity since it creates more innovative business chances and has regulations that work (Amin et al. 2023). According to Čihák et al. (2012), financial systems are seen as important for providing risk management, information management, resource allocation, corporate control, mobilizing and pooling funds, and facilitating economic transactions. The International Monetary Fund (n.d.) divides financial growth into two main categories: the development of markets and financial institutions. The ability of people and businesses to obtain financial services, their depth (size and liquidity), and their efficiency (the ability of institutions to deliver financial services at cheap cost and with sustainable revenues, and the level of activity of capital markets) are all taken into consideration. As noted by Čihák et al. (2012), the relationship

between entrepreneurship and financial intermediation is pertinent to each of these four aspects of financial development at the national level.

There has been extensive theoretical and empirical discourse on the role of entrepreneurship as a significant driver of economic growth and development (Urban and Mgwanya 2024; Matenda and Sibanda 2023; Oyeniran et al. 2015). Given its importance, understanding the factors that influence entrepreneurship development, particularly at the national level, is crucial. However, there remains an ongoing debate on the relationship between financial development and entrepreneurship, characterized by contradictory evidence. For example, Abubakar (2015) highlighted the challenges in access to finance, market access, policy support, and entrepreneurship culture as significant constraints on entrepreneurship in Africa. In contrast, Kar and Ozsahin (2016) found that financial development positively affects entrepreneurship in emerging markets.

Fan and Zhang (2017) used data from 31 provinces and 19 industries in China between 2005 and 2014 to examine the relationship between the development of financial inclusion and the emergence of entrepreneurs. The variables used include the financial inclusion index, business freedom index, GDP per capita, education, urbanization, infrastructure, degree of openness, and government policies, and entrepreneurship is measured by the number of registered enterprises. By lessening information asymmetry in financial transactions, the estimated models utilizing panel ordinary least square (OLS) indicate that the advancement of financial inclusion can lessen credit limitations for entrepreneurial endeavours. Furthermore, this effect is stronger in sectors of the economy where entry barriers are smaller. Furthermore, the impact varies depending on the industry.

Using data from 15 upper-middle-income and high-income nations between 2001 and 2015, Bayar et al. (2018) examined the effects of the development of the financial sector on entrepreneurship, including other variables like foreign direct investment (FDI) inflows, trade and financial openness. The study used domestic credit to the private sector for financial development and total early-stage entrepreneurial activity for entrepreneurship. According to the results of the random effect estimation, the expansion of the banking industry and capital markets, FDI inflows, and trade openness all have a positive impact on the overall amount of early-stage entrepreneurial activity. In addition, in their investigation of the relationship between human capital and entrepreneurship, Dutta and Sobel (2018) used data from the Global Entrepreneurship

Monitor (GEM) to clarify the mixed findings. The variables considered in the study include labour force participation, GDP per capita, urbanization, polity, financial development, and student enrolment. Business entities were employed as a measure of entrepreneurship. The results of the study, which used both the difference and system GMM, indicated that entrepreneurship gains most from an increase in tertiary enrolment when financial development is low. In comparison to nations with lower levels of financial development, the impact of tertiary enrolment on entrepreneurship is still beneficial for greater levels of financial development, but it is much smaller.

Léon (2019) looked into how business entry was impacted by short- and long-term financing in 85 different countries between 1995 and 2014. The study used household credits, business contracts and laws, GDP per capita, and both the Total Entrepreneurial Activity (TEA) and GEM measurements as proxies for entrepreneurship. According to the econometric results (fixed and random effect estimations), short-term credit had a positive relationship with the creation of firms from the point of birth to registration, but long-term credit did not encourage company entry. Also, in 19 emerging economies between 2001 and 2014, Omri (2020) showed how the relationship between financial development and good governance influences formal and informal entrepreneurship differently. Formal entrepreneurship was quantified in the study by counting the number of newly registered firms as a percentage of working-age individuals (registered enterprises). On the other hand, informal entrepreneurship was measured by the number of new unregistered businesses per 1,000 working-age adults. The results of the two-step GMM method demonstrated that financial development has a significant positive influence on formal, while negatively influencing informal entrepreneurship.

Between 2004 and 2017, Dutta and Meierriecks (2021) also looked into how financial development affected entrepreneurship across a panel of 136 nations. The study used business density to proxy entrepreneurship, and domestic credit to the private sector to proxy financial development. Indicators of governance, population, GDP per capita, trade openness, tax burden, and education are other variables considered. The study's findings from the instrumental-variable approach showed that higher levels of financial development cause higher levels of entrepreneurial activity, particularly in the presence of strong political and economic institutions.

Using data from 20 specifically chosen African countries between 2006 and 2017, Ajide and Ojeyinka (2022) investigated the effect of finan-

cial development on entrepreneurship in the continent. As proxies for financial development and entrepreneurship, they used the business entity and financial development index. The study also takes into account other factors including infrastructure, GDP growth rate, inflation rate, FDI inflow, financial stability, and the regulatory climate of the nation. They used the dynamic panel threshold approach and system GMM. Their results showed that financial development in Africa did not promote entrepreneurship. They went on to say that there is a threshold beyond which financial development raises the degree of entrepreneurship in Africa.

Amin et al. (2023) investigated whether financial development influences entrepreneurship and how financial openness moderates this relationship using panel data made up of 781 country-year observations of 48 Asian nations from 2001 to 2018. As a proxy for financial development, the study employed domestic lending to the private sector. Other factors included in the study are GDP growth, population growth, primary, secondary, and tertiary education levels, foreign investment, unemployment, and innovation. The study's conclusions showed that the nation's entrepreneurial activity is increased by efficient resource allocation and simple transaction processes. Furthermore, the laxer regulations that permit international trade also make more capital available to entrepreneurs, spurring their creativity and the launch of new ventures. In addition to finding a U-shaped association between financial depth and emerging entrepreneurship in European nations, Gaies et al. (2023) concluded that financial stability, rather than banking intermediation or venture capital, drives new business growth at a macro level. These diverse perspectives highlight the complexity of the financial development-entrepreneurship nexus and underscore the need for further research to elucidate its mechanisms and implications.

This study's hypotheses are supported by a substantial body of theoretical and empirical research that emphasizes how important entrepreneurship is for promoting economic development and progress (Matenda and Sibanda 2023; Urban and Mgwanya 2024). The relationship between financial development and entrepreneurship has been the subject of numerous researches, although the results are still conflicting and situational. For example, whilst one of the early studies, Abubakar (2015), highlights barriers like financial access in Africa, others such as Kar and Ozsahin (2016) find benefits of financial development in emerging markets. Studies such as those conducted by Bayar et al. (2018), and Fan and Zhang (2017) strengthen the case for financial infrastructure's promotion

of entrepreneurship through lending availability or financial inclusion. The importance of financial markets and institutions is also highlighted because they supply vital resources that make it possible for new businesses to succeed (Dutta and Sobel 2018; Léon 2019).

In light of this, this study's hypotheses suggest that financial development, institutions, and markets positively influence entrepreneurship in Africa. These hypotheses, which are backed by empirical evidence from several locations, are in line with Schumpeter's theory, which contends that financial systems are crucial to the success of entrepreneurs. The study fills gaps in the literature by examining these links in the African setting, paying particular attention to the region's distinct institutional and economic structure. Therefore, the hypothesis claims as follows:

H₁ Financial development and its components – financial institutions and financial markets – positively promote entrepreneurship in Africa.

In addition, although several studies have examined the impact of financial development on entrepreneurship, very few have considered the impact of entrepreneurship on financial development. Entrepreneurship development plays a crucial role in enhancing financial development by driving economic growth and development (Kraus et al. 2021; Matenda and Sibanda 2023). When entrepreneurs establish new businesses, they contribute to the creation of new jobs, which in turn increases household incomes and stimulates demand for goods and services. This job creation helps reduce unemployment and poverty, which are key indicators of financial development. Moreover, as businesses grow, they often need to secure financing, leading to the development of financial institutions and markets, which further supports financial inclusion (Yang and Zhang 2020).

Entrepreneurship also contributes to financial development by encouraging innovation and competition. New businesses often introduce innovative products, services, and technologies that can enhance productivity and efficiency across the economy. This innovation leads to increased economic output, which boosts national income and expands the financial resources available for investment in further development (Surya et al. 2021). Furthermore, entrepreneurship development can enhance financial development by promoting financial inclusion. Entrepreneurs often target underserved markets or develop solutions that make financial services more accessible to a broader population. Thus, countries with high levels of entrepreneurial activity tend to experience faster

economic growth and greater financial development (Cervelló-Royo et al. 2020). From the foregoing, we can therefore test for the directional causality between entrepreneurship and financial development in the context of Africa to clarify their causal relationship. We therefore state the second and third hypotheses as follows:

- H_2 *Financial development and its components cause entrepreneurship in Africa.*
- H_3 *Entrepreneurship activities cause financial development and its components in Africa.*

Methodology

DATA SOURCES AND MEASUREMENTS

The primary aim of this study is to investigate the extent to which the financial sector, including financial institutions and markets, influences entrepreneurship development across a panel of 28 African countries. These countries encompass Algeria, Botswana, Burkina Faso, Democratic Republic of the Congo, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Morocco, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, South Africa, South Sudan, Togo, Tunisia, Uganda, and Zambia. Spanning from 2006 to 2020, data sourced from the World Bank and IMF databases are used to measure both entrepreneurship and financial development.

The financial development measure adopted here is a composite index that encompasses various dimensions of financial development, ranging from 0 to 1, where 0 signifies weak financial development and 1 indicates greater financial development. Unlike most of the previous studies that often use a single indicator or component, this measurement includes dimensions such as financial deepening, stability, and growth, encompassing both financial institutions and markets development. Specifically, it examines aspects like depth (size and liquidity), access (availability of financial services), and efficiency (cost-effectiveness of financial services provision and capital market activity). This approach aligns with studies such as those of Munemo (2018; 2022). The financial development and its components are sourced from the IMF database. In contrast, the new business entry density metric, which measures the number of registered businesses per 1,000 working adults, is used to quantify entrepreneurship. The extensively used measure provides thorough coverage across nations, periods, and variables, in line with earlier studies by Chambers

TABLE 1 Related Reviewed Studies

Review	Focus	Method	Findings
Dutta and Sobel (2018)	Examined the role of financial development on human capital-entrepreneurship nexus in 28 countries (Schumpeter's theory).	System generalized method of moment (SGMM) and Random Effect Model (REM)	Human capital benefits entrepreneurship in countries with lower financial development than in those with higher financial development.
Munemo (2018)	Examined the relevance of financial development and FDI in Entrepreneurial Success in 28 African countries (Bjornskov and Foss 2013).	Fixed effect model (FEM), dynamic GMM (DGM), and SGMM	Developed financial institutions and markets enhance entrepreneurial success in African countries.
Bayar et al. (2018)	Investigated the influence of financial sector development, FDI inflows, and trade and financial openness on entrepreneurship in 15 upper-middle-income and high-income countries.	REM	The banking sector and capital market development affect the total early-stage entrepreneurial activity positively.
Léon (2019)	Examined the impact of long-term finance on entrepreneurship in 85 countries (King and Levine 1993).	REM, FEM, and IV-FEM	Long-term credit does not stimulate firm entry but short-term credit does.
Jiang et al. (2019)	Investigated the impact of inclusive financial development index on farmer entrepreneurship in China (Sarma and Pais 2011).	SGMM	Improving the inclusion development level of inclusive finance can better promote farmers' entrepreneurship.
Babajide et al. (2020)	Examined the relationship between financial stability and entrepreneurship development in 24 Sub-Saharan Africa economies (Schumpeter's theory).	Pooled ordinary least squares (OLS) and RE techniques	Financial stability has a significant positive effect on entrepreneurship development.
Omri (2020)	Examined the roles of governance and the financial sector in formal and informal entrepreneurship in 19 emerging economies (Schumpeter's and the eclectic theories).	SGMM	There exists a positive (negative) impact of financial development on formal (informal) entrepreneurship.

Review	Focus	Method	Findings
Ajide and Ojeyinka (2022)	Examined the impact of financial development on entrepreneurship in 20 African countries (Schumpeter's theory).	SGMM and dynamic panel threshold based on dynamic panel GMM.	Financial development does not spur entrepreneurship in Africa, but only at a threshold level.
Dutta and Meierrieks (2021)	Investigated the effect of financial development on entrepreneurship in 136 countries (Schumpeter's theory).	FEM	Financial development beneficially contributes to entrepreneurial activity.
Gaies et al. (2023)	Examined the impact of financial development on nascent entrepreneurship in 22 European economies (Schumpeter's theory; King and Levine 1993).	FEM, REM, and Panel Generalized Least Square (Panel GLS)	With a high level of financial deepening, the banking sector only favours established businesses and nascent entrepreneurship.
Amin et al. (2023)	Examined whether financial development affects entrepreneurship, and how financial openness moderates the relationship, using the eclectic theory of entrepreneurship in 48 Asian countries (Schumpeter's and the eclectic theories).	GMM and SGMM	Effective allocation of resources and ease of transactions increase the entrepreneurial activities in the country.

and Munemo (2019), and Klapper et al. (2004). The data on the new business entry density metric which measures the number of registered businesses per 1,000 working adults is sourced from the World Bank's World Development Indicators

Furthermore, in line with previous studies, we incorporate control variables that are all obtained from the World Bank database. These variables include the GDP per capita, population growth, urbanization, institutional quality, economic openness, inflation rate, labour force participation, and business start-up regulations. GDP per capita (Current US\$) serves as a proxy for the country's income level, which has been demonstrated to regulate the establishment of new businesses (Gaies et al. 2023; Omri 2020). Population growth rate and urbanization, measured by the ratio of urban population to the total population, are expected to positively influence entrepreneurship, as they offer entrepreneurs more opportunities and choices (Amin et al. 2023; Fan and Zhang 2017; Gaies et al. 2023; Jiang et al. 2019).

Economic openness, represented by the ratio of total import and export to GDP, indicates a more developed financial environment, fostering entrepreneurship (Bayar et al. 2018; Fan and Zhang 2017; Gaies et al. 2023). The inflation rate, measured by the GDP deflator, reflects price stability, which is crucial for entrepreneurial success (Kar and Ozsahin 2016). The number of start-up procedures to register a business serves as a measure of business start-up regulations, with mixed effects on entrepreneurship: bureaucratic regulations may deter entrepreneurship (Munemo 2022), while favourable regulatory environments can encourage it (Omri 2020). However, it is expected to promote entrepreneurship development in this study. Institutional quality, measured by a governance index comprising six indicators, is identified as a driver of entrepreneurship development, supported by eclectic theory and recent studies (Amin et al. 2023; Ayob 2021). Theoretical justifications and empirical findings support the *a priori* expectations that all explanatory variables (except the inflation rate) influence entrepreneurship development in Africa positively.

MODEL SPECIFICATION

Based on the theoretical and previously mentioned relevant study justifications, we apply panel data analysis to accurately achieve the objectives, with a primary focus on the impact of financial development and its components on the development of entrepreneurship in Africa. This is because panel data analysis offers a better modelling capacity of

economic reality, particularly by capturing variations both between and within countries, allowing us to analyse the individual and temporal dynamics of African countries. The theoretical foundation for this study is rooted in Schumpeter’s theory of economic development and the eclectic theory of entrepreneurship. Together, these theories highlight how financial development supports entrepreneurship by facilitating access to the capital and resources necessary for business creation and growth. However, since these theories lack a mathematical foundation, we choose panel data analysis in response to a number of recent macro-level assessments of entrepreneurship, including those by Dutta and Meierrieks (2021) and Gaies et al. (2023) with modifications to achieve the objectives of this study. As a result, we develop the following panel data model:

$$EEP_{it} = \vartheta_0 + \vartheta_1 OFD_{it} + \vartheta_2 X_{it} + \varepsilon_{it} , \tag{1}$$

where *EEP* stands for the national level of entrepreneurship development in country *i* (*i* = 1, 2 . . . 28) and in year *t* (*t* = 2006 . . . 2020), *OFD* stands for financial development, *X* stands for the explanatory control variables (GDP per capita - *GGR*, institutional quality - *GOP*, labour force participation - *LFP*, inflation rate - *IFG*, population growth - *POG*, urbanization - *UBT*, economic openness - *EOP*, and business start-up regulations - *REG*), ϑ_0 is the slope, $\vartheta_1 - \vartheta_n$ are the coefficients of explanatory variables, and ε represents the error terms.

To clarify the relationship between financial development and entrepreneurship, this study further performs the Granger causality test to determine the direction of causality between financial development and entrepreneurship. Thus, the specific Granger equations for entrepreneurship, financial development, and its components are specified as follows:

$$EEP_{it} = \pi_{1j} + \sum_{j=i}^{k_1} \gamma_{1ij} EEP_{it-j} + \sum_{j=i}^{k_2} \tau_{1ij} OFD_{it-j} + \sum_{j=i}^{k_3} \delta_{1ij} OFI_{it-j} + \sum_{j=i}^{k_4} \psi_{1ij} OFM_{it-j} + \mu_{1it} \tag{2}$$

$$OFD_{it} = \pi_{2j} + \sum_{j=i}^{k_1} \gamma_{2ij} OFD_{it-j} + \sum_{j=i}^{k_2} \tau_{2ij} EEP_{it-j} + \sum_{j=i}^{k_3} \delta_{2ij} OFI_{it-j} + \sum_{j=i}^{k_4} \psi_{2ij} OFM_{it-j} + \mu_{2it} \tag{3}$$

$$\begin{aligned}
OFI_{it} = & \pi_{3j} + \sum_{j=i}^{k_1} \gamma_{3ij} OFI_{it-j} + \sum_{j=i}^{k_2} \tau_{3ij} EEP_{it-j} \\
& + \sum_{i=i}^{k_3} \delta_{3ij} OFD_{it-j} + \sum_{i=i}^{k_4} \psi_{3ij} OFM_{it-j} + \mu_{3it} \quad (4)
\end{aligned}$$

$$\begin{aligned}
OFM_{it} = & \pi_{4j} + \sum_{j=i}^{k_1} \gamma_{4ij} OFM_{it-j} + \sum_{j=i}^{k_2} \tau_{4ij} EEP_{it-j} \\
& + \sum_{i=i}^{k_3} \delta_{4ij} OFD_{it-j} + \sum_{i=i}^{k_4} \psi_{4ij} OFI_{it-j} + \mu_{4it} \quad (5)
\end{aligned}$$

where *OFI* is financial institution development, *OFM* is financial market development, $k_1 - k_4$ is lag lengths, and $\mu_1 - \mu_4$ are the stochastic error terms; all other variables are as defined. We employed Dumitrescu and Hurlin's (2012) panel causality technique because it is a dynamic panel test, which is more reliable and effective in terms of estimation.

ANALYTICAL TECHNIQUES

The data analysis methods encompass descriptive analysis, simple correlation, and panel data regression techniques. The long-term association between financial and entrepreneurship development is examined utilizing the PCSE in the panel data regression analysis. The study additionally performs the pre-estimation tests to ensure the validity of conclusions taken from the findings of the estimated regression models. The PCSE estimate technique is more reliable than panel OLS, fixed, and random effect models due to its adaptability in managing possible problems with serial correlation, heteroscedasticity, and cross-sectional dependency. Although feasible generalized least squares (FGLS) can also be employed, PCSE is more appropriate in this study since the number of periods (T) is fewer than the cross-sectional dimension (N) (Beck and Katz 1995; Reed and Webb 2010).

A significant concern is the possibility of endogeneity, which could result from the theories and empirical research suggesting a bidirectional causal relationship between the development of finance and entrepreneurship. Consequently, the model is estimated in the study using the GMM in addition to the static panel analysis. When there is a connection between the lagged dependent variables and the unobserved panel-level effects, GMM provides a consistent estimator for the model's parameters. It is also optimized for panel datasets with a bigger nation dimension and a shorter time dimension, like the one used in the present study, and it is

more efficient when there is autocorrelation, heteroscedasticity, and endogeneity. We employ the first lagged level of the dependent variable, which is produced automatically by the over-identifying restriction technique, as instruments in the estimate process. The over-identifying limits would change depending on how many instruments were used (Roodman 2009). Therefore, to verify the validity of the instruments and the dependability of the estimations, we perform the Arellano-Bond and Sargan tests.

Presentation and Discussion of Results

DESCRIPTIVE AND CORRELATION ANALYSES

Table 2 presents the findings of the descriptive analysis. It indicates that the average number of entrepreneurs per 1,000 people is 1.972, with a maximum value of 20.091, a minimum value of 0.022, and a standard deviation of 3.441, which appears to be reasonable. These suggest that there is a wide differential in the number of entrepreneurs among African countries.

Additionally, the financial development index's average, maximum, minimum, and standard deviation values are 0.188, 0.593, 0.035, and 0.129, respectively. Although the standard deviation indicates that financial development is not significantly different across African countries, the index's value range indicates that financial development is low in the continent. Except for labour force participation, urbanization, and economic openness, which all exhibit significant variation, this also applies to all other explanatory variables, with the GDP per capita showing the most deviation. Table 2's correlation analysis shows that entrepreneurship has a positive relationship with financial development, GDP per capita, institutional quality, urbanization, and economic openness.

It has a negative relationship with population growth, but not with labour force participation or business start-up regulations. Furthermore, there was no evidence of a multicollinearity issue in our sample because the correlation coefficients were all less than 0.7. The values of the variable's variance inflation components also corroborate this. However, as correlation coefficients simply show how strongly the variables are linearly related to one another, a more succinct and detailed examination of the causal effects is required for this intuitive claim. To test this hypothesis further, the study creates multivariate models using the PCSE and system GMM techniques.

A panel series must also be checked for unit-roots and stationarity because discontinuities can significantly affect econometric estimations. In

TABLE 2 Descriptive Statistics and Correlation Matrix

Variables	EEP	OFD	GGR	GOP	LFP	IFG	POG	UBT	EOP	REG
Mean	1.972	0.188	2592.093	-0.933	62.013	6.053	2.202	43.507	71.456	8.302
Maximum	20.091	0.593	16851.12	2.143	89.450	85.353	3.867	90.092	168.971	17.000
Minimum	0.022	0.035	191.751	-4.106	42.057	-18.075	-0.033	16.208	24.006	2.000
Std. dev.	3.441	0.129	2981.923	1.255	11.446	8.487	0.931	17.929	27.051	2.955
EEP	1.000									

OFD	0.594 ^a	1.000								
	(0.000)	-----								
GGR	0.604 ^a	0.675 ^a	1.000							
	(0.000)	(0.000)	-----							
GOP	0.679 ^a	0.679 ^a	-0.071	1.000						
	(0.000)	(0.000)	(0.156)	-----						
LFP	-0.031	-0.184 ^a	0.158	0.006	1.000					
	0.542	(0.000)	(0.002)	(0.907)	-----					
IFG	-0.085 ^c	-0.054	0.073	-0.043	0.115 ^b	1.000				
	(0.091)	(0.281)	(0.147)	(0.392)	(0.022)	-----				
POG	-0.479 ^a	-0.599 ^a	0.239	-0.578 ^a	0.305 ^a	0.069	1.000			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.173)	-----			
UBT	0.327 ^a	0.358 ^a	-0.242	0.264 ^a	-0.529 ^a	-0.122 ^b	-0.247 ^a	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	-----		
EOP	0.324 ^a	0.249 ^a	-0.135	0.427 ^a	-0.263 ^a	-0.049	-0.590 ^a	0.232 ^a	1.000	
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.333)	(0.000)	(0.000)	-----	
REG	-0.052	-0.090 ^c	0.044	-0.049	0.098 ^c	0.186 ^a	0.001	-0.080	-0.053	1.000
	(0.303)	(0.073)	(0.384)	(0.325)	(0.052)	(0.000)	(0.987)	(0.109)	(0.292)	-----
Source	WDI	IMF	WDI	WDI	WDI	WDI	WDI	WDI	WDI	WDI

NOTES Values in parentheses () are the *p*-values of the test statistic; 'a', 'b', and 'c' imply significance at 1, 5, and 10 percent, respectively. EEP is entrepreneurship development, OFD is overall financial development, GGR is GDP per capita, GOP is institutional quality, LFP is labour force participation, IFG is inflation rate, POG is population growth, UBT is urbanization, EOP is economic openness, REG is business start-up regulations, WDI is World Development Indicators (Doing Business database), and IMF is International Monetary Fund.

addition, a panel series must be examined for stationarity or unit-roots because discontinuities can seriously impair econometric estimates. We conducted panel unit root tests to assess the variables' integration order. Table 3 displays the results of the PP-Fisher, ADF-Fisher, Levin, Lin, and Chu (LLC), and Im, Pesaran, and Shin (IPS) stationarity tests. The null hypothesis of all the stationarity tests is that the panel series contains a unit root. The results show that entrepreneurship (EEP), financial development (OFD), economic growth (GGR), institutional quality (GOP), labour force participation (LFP), and urbanization (UBT) are integrated

TABLE 3 Panel Unit Roots Test Results

Series	Stationarity	PP-Fisher	ADF- Fisher	LLC	IPS	Decision
EEP	Level	72.656 (0.456)	70.376 (0.532)	-0.809 (0.209)	1.206 (0.886)	I(1)
	First difference	144.583 ^a (0.000)	227.289 ^a (0.000)	-3.297 ^a (0.001)	-4.856 ^a (0.000)	
OFD	Level	104.632 ^a (0.007)	82.386 (0.189)	-2.707 ^a (0.003)	-0.485 (0.314)	I(1)
	First difference	-	188.863 ^a (0.000)	-	-7.337 ^a (0.000)	
GGR	Level	108.086 ^a (0.004)	54.333 (0.940)	-2.400 ^a (0.008)	1.346 (0.911)	I(1)
	First difference	-	114.645 ^a (0.000)	-	-2.3393 ^a (0.009)	
GOP	Level	96.556 ^b (0.028)	85.728 (0.129)	-6.493 ^a (0.000)	-1.099 (0.136)	I(1)
	First difference	-	205.107 ^a (0.000)	-	-5.206 (0.000)	
LFP	Level	67.519 (0.562)	37.433 (0.999)	-0.793 (0.214)	6.440 (1.000)	I(1)
	First difference	181.952 ^a (0.000)	105.593 ^a (0.004)	-2.452 ^a (0.007)	-1.319 ^c (0.093)	
IFG	Level	186.897 ^a (0.000)	142.235 ^a (0.000)	-7.769 ^a (0.000)	-5.206 ^a (0.000)	I(0)
	First difference	-	-	-	-	
POG	Level	113.111 ^a (0.001)	102.253 ^b (0.011)	-4.644 ^a (0.000)	-1.806 ^b (0.036)	I(0)
	First difference	-	-	-	-	
UBT	Level	158.150 ^a (0.000)	128.060 ^a (0.000)	1.653 (0.951)	-0.188 (0.425)	I(1)
	First difference	-	-	-3.405 ^a (0.000)	-3.209 ^a (0.001)	
EOP	Level	318.961 ^a (0.000)	208.959 ^a (0.000)	-11.910 ^a (0.000)	-9.492 ^a (0.000)	I(0)
	First difference	-	-	-	-	
REG	Level	129.608 ^a (0.000)	114.351 ^a (0.000)	-18.884 ^a (0.000)	-6.620 ^a (0.000)	I(0)
	First difference	-	-	-	-	

NOTES Values in parentheses () are the p-values of the test statistic, 'a' and 'b' imply significance at 1 and 5 percent, respectively. EEP is entrepreneurship development, OFD is overall financial development, GGR is GDP per capita, GOP is institutional quality, LFP is labour force participation, IFG is inflation rate, POG is population growth, UBT is urbanization, EOP is economic openness, REG is business start-up regulations.

TABLE 4 Kao-Engle-Granger Panel Cointegration Results

Tests	Statistic	p-value	Conclusion (H_0)
Modified Dickey-Fuller	2.771 ^a	0.003	Reject
Dickey-Fuller	2.449 ^a	0.007	Reject
Augmented Dickey-Fuller	1.541 ^c	0.062	Reject

NOTE: H_0 : No cointegration, 'a' implies significance at 1 percent and H_0 is rejected

TABLE 5 Cross-sectional Dependence Test

Test	Statistic	Prob.
Breusch-Pagan LM	2321.311 ^a	0.000
Pesaran scaled LM	46.633 ^a	0.000
Pesaran CD	2.800 ^a	0.005

NOTE: 'a' implies significance at 1 percent

of order one or $I(1)$. In contrast, inflation rate (IFG), population growth (POG), economic openness (EOP), and business start-up regulations (REG) are integrated of order zero or $I(0)$. The results of the stationarity tests clearly show that the panel series' integration sequence varies. It is evident from the stationarity tests that there are differences in the integration sequence of the panel series.

The cointegration test is also required to verify whether there is the existence of a long-term relationship between the variables once the unit root tests have been completed. This is determined by the Kao-Engle Granger test displayed in table 4. The reason for using this method is that it can handle a larger number of regressors than the restricted Pedroni and Westerlund cointegration tests. The Kao cointegration test findings show that each panel series is cointegrated, and every statistic at the one percent significance level supports this.

Table 5 presents the results of the cross-sectional dependency tests utilizing the Pesaran and Breusch-Pagan LM tests. The results validate the presence of cross-sectionally dependent factors among the variables at the one percent significance level. This issue is intensified by the high level of economic interconnectedness among African countries. Ignoring this could cause the study's findings to be distorted and contradictory. At the one percent significance level, the findings confirm the existence of cross-sectionally dependent factors among the variables. The greater degree of economic interdependence among the African nations makes this worse. Ignoring this could lead to skewed and contradictory findings

TABLE 6 PCSE and SGMM Estimations

Variables	PCSE			SGMM		
	(1)	(2)	(3)	(4)	(5)	(6)
L.EEP	—	—	—	0.080 ^a (17.90)	0.081 ^a (32.54)	0.082 ^a (12.53)
OFD	7.701 ^a (8.638)	—	—	2.761 ^a (5.574)	—	—
OFI	—	5.752 ^a (6.670)	—	—	4.033 ^a (11.00)	—
OFM	—	—	6.146 ^a (7.132)	—	—	1.025 ^a (4.413)
GGR	0.004 ^a (6.548)	0.005 ^a (6.107)	0.005 ^a (7.509)	-0.035 ^a (-15.57)	-0.0342 ^a (-30.24)	-0.032 ^a (-9.136)
GOP	1.842 ^a (6.761)	1.916 ^a (6.742)	2.169 ^a (8.938)	0.188 (0.804)	-0.046 (-0.329)	0.413 (1.477)
LFP	0.048 ^a (10.54)	0.043 ^a (9.107)	0.051 ^a (12.09)	0.114 ^a (15.89)	0.117 ^a (38.22)	0.117 ^a (14.33)
IFG	-0.009 (-1.175)	-0.002 (-0.286)	-0.015 ^c (-1.799)	0.003 ^a (2.980)	0.003 ^a (4.246)	0.003 ^a (3.090)
POG	-0.245 ^a (-2.551)	-0.309 ^a (-3.018)	-0.396 ^a (-3.969)	-0.215 ^a (-2.833)	-0.160 ^a (-3.563)	-0.269 ^a (-4.200)
UBT	0.026 ^a (5.819)	0.028 ^a (6.897)	0.028 ^a (5.750)	0.088 (7.805)	0.079 (9.626)	0.094 (8.476)
EOP	0.013 ^a (4.458)	0.008 ^b (2.560)	0.014 ^a (4.577)	0.023 ^a (11.83)	0.025 ^a (29.82)	0.021 ^a (8.325)
REG	0.039 (1.572)	0.012 (0.494)	0.063 ^b (2.221)	0.031 ^a (4.050)	0.021 ^b (2.474)	0.031 ^a (3.911)
Constant	-3.257 ^a (-5.247)	-2.547 ^a (-3.468)	-2.392 ^a (-4.024)	-12.27 ^a (-12.24)	-12.87 ^a (-42.90)	-11.99 ^a (-10.52)
R-squared	0.522	0.515	0.522			
Wald χ^2 -statistic	843.18 {0.000}	526.29 {0.000}	995.38 {0.000}	369791.36 {0.000}	401655.16 {0.000}	280419.89 {0.000}
AR1	—	—	—	-1.410 {0.158}	-1.439 {0.150}	-1.423 {0.155}
Sagan	—	—	—	25.817 {1.000}	26.812 {1.000}	26.877 {1.000}
Multicollinearity (VIF)	1.81	1.95	1.63	1.68	1.77	1.59

NOTES Figures between () and { } are z-statistic and probability values respectively. 'a', 'b', and 'c' imply significance at 1, 5, and 10 percent, respectively. L.EEP is the first lag of entrepreneurship development, OFD is overall financial development, OFI is financial institutions development, OFM is financial market development, GGR is GDP per capita, GOP is institutional quality, LFP is labour force participation, IFG is inflation rate, POG is population growth, UBT is urbanization, EOP is economic openness, and REG is business start-up regulations.

in the study. This is one of the explanations, as previously acknowledged, for using the PCSE technique in this study, which is suitable for dealing with these kinds of issues and related ones.

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS

The findings from the PCSE regarding the long-run effects of overall financial development, its components, and the control variables on entrepreneurship are presented in columns (1), (2), and (3) of table 6, respectively. As part of a robustness analysis aimed at verifying potential factors responsible for the differential effects of financial development on entrepreneurship, we further employed the system GMM (SGMM) method to examine the short-run effects of financial development and its components of financial development, as indicated in columns (4), (5), and (6). Importantly, post-estimation tests confirm the robustness of the estimates derived from both the PCSE and SGMM models. The variance inflation factors (VIF) for financial development, financial institutions and markets development models are relatively low, with values of 1.81, 1.95, and 1.63, respectively, indicating no significant multicollinearity among the explanatory variables. The correlation analysis supports this finding. Additionally, the Wald Chi-square (X^2) statistics, all significant at the 1 percent level, and the R-square (R^2) statistics, ranging from 0.524 to 0.513, suggest that the model estimations are reliable and valid for decision-making purposes. Furthermore, results from the SGMM indicate no second-order serial correlation, and the Sargan test confirms the validity of the instruments used for estimation, thus passing diagnostic tests.

Based on the empirical findings derived from the PCSE analysis, the coefficients associated with financial development, financial institutions and markets demonstrate positive and statistically significant relationships at the 1 percent level. This indicates that, considering the direct impacts of financial development, financial institutions, and markets, they positively influence entrepreneurship development over the long run. Specifically, a one percentage increase in financial development, financial institutions, and markets corresponds to a 7.701, 5.752, and 6.146 units increase in entrepreneurship development, respectively.

The observed beneficial relationship between financial development, financial institutions, and markets development and entrepreneurship activities may arise from financial development's role in creating a conducive environment for entrepreneurship. This includes providing access

to capital, mitigating risks, facilitating transactions, offering support services, and fostering market confidence. These findings align with previous studies such as those by Amin et al. (2023) and Dutta and Meierrieks (2021), which suggest that improved access to finance promotes entrepreneurial activities. However, this contradicts some earlier research that proposed no significant influence of financial development on entrepreneurship activities due to various complexities (Ajide and Ojeyinka 2022; Gaies et al. 2023).

The empirical findings derived from the SGMM analysis presented in table 6 reveal that the coefficients associated with financial development, financial institutions and markets are all positive and statistically significant at the 1 percent level. This indicates that financial development, financial institutions and markets have a positive impact on entrepreneurship activities in the short run. Specifically, a one percentage point increase in financial development, financial institutions and markets corresponds to a 2.761, 4.033, and 1.025 units increase in entrepreneurship activities, respectively. Moreover, it suggests that the coefficients of financial development and its components are lower in the short run compared to the long run. These results support our first hypothesis.

The observed beneficial relationship between financial development, financial institutions and markets and entrepreneurship activities in the short run may also be attributed to their crucial role in enhancing liquidity, acting as a price discovery mechanism, and establishing institutional infrastructure. This finding is consistent with related studies such as those by Amin et al. (2023), Munemo (2018), and Omri (2020). However, it contradicts the findings of Gaies et al. (2023) and Léon (2019), which indicate that rising borrowing prices and a lacklustre financial sector constitute major obstacles to the expansion of entrepreneurship. Additionally, the results indicate that labour force participation, urbanization, and economic openness positively influence entrepreneurship activities in the long and short run, while population growth and inflation rate negatively impact entrepreneurship activities over both time frames. Furthermore, GDP per capita and start-up business regulations exhibit differential effects on entrepreneurship activities in the short and long run.

The positive effects of labour force participation, urbanization, and economic openness are supported by the findings reported by Dutta and Sobel (2018) and Gaies et al. (2023), while the results of the economic openness and urbanization contradict the results of the study reported by Dutta and

TABLE 7 Causality Between Entrepreneurship and Financial Development

Null Hypothesis:	F-Statistic	Probability value	Decision
OFD does not homogeneously Granger-cause EEP	10.0298 ^a	0.0000	Unidirectional
EEP does not homogeneously Granger-cause OFD	0.01008	0.9900	
OFI does not homogeneously Granger-cause EEP	8.23180 ^a	0.0003	Unidirectional
EEP does not homogeneously Granger-cause OFI	0.05808	0.9436	
OFM does not homogeneously Granger-cause EEP	6.46435 ^a	0.0017	Unidirectional
EEP does not homogeneously Granger-cause OFM	0.07576	0.9271	

NOTE Probability value 'a' implies significant at 1 percent significance level. EEP is entrepreneurship development, OFD is overall financial development, OFI is financial institution development, and OFM is financial market development.

Meierrieks (2021). The positive effects of GDP per capita in the long run are also supported by studies by Dutta and Meierrieks (2021), Gaies et al. (2023), and Omri (2020), while the negative effects of the GDP per capita on entrepreneurship in the short run are supported by Ajide (2022), Amin et al. (2023), and Dutta and Sobel (2018). Notably, the unexpected negative impact of GDP per capita on entrepreneurship activity in Africa may stem from a preference for wage employment over self-employment, wherein higher GDP per capita tends to drive more individuals towards wage employment, making it more appealing than self-employment.

The beneficial short- and long-term effects of financial development, financial institutions and markets on entrepreneurship in Africa may be attributed to the distinct economic environment of the continent and the different phases of financial maturity. Short-term financial development can boost entrepreneurship right away by expanding credit availability and financial services, especially for small and medium-sized businesses (SMEs), which are frequently hampered by inadequate access to funding. If there is more money available to entrepreneurs, more innovative ideas and jobs can be created as they launch and grow their enterprises. Over time, as financial markets and institutions grow more complex and inclusive, they also help to create a more stable economic climate that supports long-term entrepreneurship. Well-developed financial systems eventually lower transaction costs, boost market effectiveness, and offer a wider variety of financial products, all of which are essential for assisting high-growth

businesses and drawing in foreign capital. The steady enhancement of financial infrastructure can result in long-term growth in entrepreneurship, economic diversification, and a more robust private sector in Africa, where numerous economies are in the process of forming.

The empirical findings presented in table 7 demonstrate that the development of entrepreneurship is Granger-caused by financial development and its components. However, financial development and its components are not Granger-caused by the growth of entrepreneurship. This demonstrates the unidirectional causal relationship between financial development, entrepreneurship, and its constituent parts. That is, the development of entrepreneurship is causally related to financial development and its components. This lends credence to Schumpeter's argument that entrepreneurial activity is driven by financial development. This supports the idea that entrepreneurship requires access to financial resources, supporting the significance of financial infrastructure in economic theories of development. Nonetheless, it casts doubt on any assumptions about reciprocal causality and emphasizes how important financial institutions are to support entrepreneurial activities. The results of the Granger causality address the second and third hypotheses. This evidence further enhances existing theories and empirical studies by clarifying the direction of causality between financial development and entrepreneurship activity in Africa.

Conclusions

This study validates the impact of financial development and its components on entrepreneurship development across 28 African economies from 2006 to 2020. Its contributions to existing literature lie in examining how financial development influences entrepreneurship and exploring both short- and long-term effects. Utilizing PCSE and SGMM estimations, the study also analyses the differential effects of financial development, financial institutions and markets development as well as other control variables on entrepreneurship development over varying time frames. The study further examines the causal relationship between entrepreneurship, financial development, and its components.

Findings indicate a positive influence of financial development, financial institutions, and markets on entrepreneurship development in both short and long-run contexts. This suggests a consistent relationship without significant differential effects between the two time frames across Africa. Additionally, causality results establish unidirectional causality

between entrepreneurship, financial development, and its components, flowing from financial development and its components to entrepreneurship development. Moreover, the results of the control variables reveal positive impacts of labour force participation, urbanization, and economic openness on entrepreneurship development. At the same time, population growth and inflation rates exhibit negative influences over both the short and long term. Only GDP per capita and start-up business regulations demonstrate differential effects on entrepreneurship development in short and long-run scenarios.

The study significantly contributes to existing studies by demonstrating a consistent positive relationship between financial development, financial institutions and markets with entrepreneurship activities in Africa across both short- and long-run contexts. This study suggests that financial development constantly fosters entrepreneurial growth regardless of time, challenging earlier notions about differential consequences over time. Furthermore, the study's demonstration of unidirectional causality, according to which entrepreneurship is driven by financial development and its components, contributes to a more sophisticated comprehension of the dynamic interplay between financial systems and entrepreneurial activity. This emphasizes how important financial development is as an entrepreneurship stimulant.

Drawing from these empirical findings, recommendations emerge to enhance entrepreneurship development in Africa. Firstly, policymakers should prioritize sustainable, long-term financial development through policies promoting stability and inclusivity in financial markets. Emphasis should also be placed on initiatives enhancing access to finance for entrepreneurs by improving financial infrastructure and reducing barriers to financial services. Moreover, fostering conducive environments for entrepreneurship through policies promoting job creation, urban development, and economic diversification is crucial. Measures to control inflation, manage population growth, and promote sustainable economic growth are essential for creating an enabling environment. Finally, the differential effects of GDP per capita and start-up business regulations on entrepreneurship development in the short and long run suggest the need for tailored policy interventions that can promote sustainable economic growth and streamline regulatory processes to facilitate entrepreneurship activities over time.

This empirical study offers insightful information about entrepreneurship and financial development in African economies. Nonetheless, one

must also take into account its limitations. First, the study's emphasis on formal entrepreneurship ignores informal entrepreneurship, which may limit how broadly applicable the conclusions can be. Furthermore, the study focuses on the financial development effect on entrepreneurship across African countries, possibly omitting sub-regional differences and the various stages of financial development. Finally, the study's emphasis on unidirectional causality restricts the investigation of possible feedback loops between financial development and entrepreneurship, providing an opportunity for other research to delve deeper into these dynamics.

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