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Abbi Kedir & Euphrasie Kouame

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FinTech and women's entrepreneurship in Africa: the case of Burkina Faso and Cameroon

Abbi Kedir^a and Euphrasie Kouame^b

^aSheffield University Management School, University of Sheffield, Sheffield, UK; ^bUnited Nations Development Programme, Yaoundé, Cameroon

ABSTRACT

Our article examines the role of financial technology (FinTech) in improving the occupational choices of women in the global South. We analyse the link between FinTech and entrepreneurship, drawing on large data sets from central and western Africa that hold important novel policy implications for the wider Africa region. Our study helps to clarify if and when financial technology use may translate into self-employment, and how it can contribute to the improvement of the livelihoods of marginalised social groups. The article calls for a critical view of financial inclusion and highlights the importance of considering gendered livelihood and resource access patterns. Most of the existing research on financial inclusion in Africa is linked to access to and use of formal bank-based finance. Hence, the expanding mobile money use in Africa is viewed as contributing to financial inclusion. We argue that the dynamics involved are much more complex, and FinTech enters into and interacts with a sophisticated web of informal and formal financial institutions and transactional patterns. Disaggregating our analysis by gender, we explore how the use of mobile money enhances women's entrepreneurship. The article also advances policy recommendations with important implications for the development of FinTech in the continent.

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FinTech; Burkina Faso; Cameroon; entrepreneurship; women

Introduction

Calling for a critical examination of FinTech in Africa, this study is aimed at investigating whether the use of mobile money leads to a higher likelihood of self-employment or entrepreneurship, particularly among women (Kouame and Kedir 2020). We, therefore, go beyond affirming the financial inclusion role of FinTech, and interrogate its potential for enhancing productive investment and enterprising behaviour among the unbanked. We also discuss context-specific challenges to the adoption of mobile money and some of the disadvantages associated with increasing cyber-security and data-protection concerns and uncertainties. Our research thus goes beyond the issue of access to formal-sector finance and credit. In this paper, we are not only interested in the evolution of FinTech and its beneficial impact on financial access, but rather aim to explore what it means on the ground for the lives of those involved. The goal of our study is to shed some light on the role of FinTech in tackling the intractable problems of job creation, poverty, and inequality in the context of two African countries, Burkina Faso and Cameroon.

CONTACT Abbi Kedir  a.m.kedir@sheffield.ac.uk  Sheffield University Management School, University of Sheffield, Sheffield, UK

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Households and individuals in poor countries are credit constrained. Lack of proper access to finance limits their potential to be entrepreneurial. For several decades, formal and informal finance have coexisted in these societies, with the latter playing a vital role, and we argue that this has continued in the current age of digital finance. Mutual help groups and rotating savings and credit associations are very common among the inhabitants of African countries (Aryeetey 2008, 2005, Kedir and Ibrahim 2011, Rodima-Taylor 2014, Rabie 2021). They also proliferate among low-income individuals who reside in wealthy countries but are excluded from the mainstream financial sector. Our analysis of the evidence from Burkina Faso and Cameroon shows that most individuals trust informal saving institutions more than other saving options. When we look at the economic structure of many of the least developed countries in Africa, most of the gross domestic product (GDP) comes from the informal sector. The prevalence of economic informality over the past several decades has led to the development of important social and economic networks that often serve as trusted sources of informal finance. Hence, trust in informal finance in these economies is intrinsically linked to their economic structure (see also Odera 2013). Reliance on informal economic institutions has not disappeared even in the global North. The latest available data from Global Findex Database 2017 shows that the informal sector provides 5.8% of the emergency financial needs of families in the United States as compared to the 6.5% coming from formal finance, such as bank borrowing. According to the 2014 data of the Global Findex, 6% of adults in the United States are members of informal savings groups, and immigrants and vulnerable households make up most of this figure. This shows that informal finance does not disappear with modern financial sector development and a proliferation of public and private sector financial intermediaries, such as banks, as these tend to be discriminatory to low-income households.

As new financial technologies continue to emerge, there is an increasing need to investigate the extent to which they are being accessed by and benefit low-income groups and marginal social categories (such as women and young people) in Africa. Financial technology (FinTech) in the form of mobile money accounts and transactions is presumed to be an important development catalyst by addressing problems central to financial access. Therefore, an important question to ask is: *are there modern solutions to old problems?* Current efforts to apply financial technology to expand access to finance face numerous challenges, and most mobile money accounts provide only payment services (Awel and Yitbarek 2021). Some encouraging developments have been noted with FinTech and mobile money accounts expanding financial inclusion in Africa (Asongu and Boateng 2018, Bongomin *et al.* 2018, Gosavi 2018, Teutio *et al.* 2021). It should be acknowledged, however, that financial inclusion is not an end by itself if it does not lead to poverty reduction (see also Bateman and Loubere 2019).

In our article, we strive to make several contributions. First, unlike the existing focus on supply-side factors that tends to prevail in the financial inclusion literature, we focus on the demand side — exploring the ways in which individuals save, invest, make payments, borrow, and manage risk using mobile money. Second, in addition to documenting the access and use of mobile money accounts, we relate it to entrepreneurship disaggregated by gender. The goal is to explore whether the use of mobile money transactions plays a significant role in promoting entrepreneurship among women. Our analysis will help clarify whether financial technology use translates into enhanced entrepreneurship and self-employment, and how it contributes to job creation and improvement of the livelihoods of marginalised social groups, enabling a reduction in poverty. Establishing the link between FinTech and women's entrepreneurship would illustrate the transformational or catalytic role FinTech plays in improving the occupational choices of low-income women in the global South. Third, we analyze the link between FinTech and entrepreneurship drawing on large data sets from central and western Africa with important policy implications for the wider Africa region. We use the Finscope Consumer Surveys collected in 2016 in Burkina Faso and in 2017 in Cameroon. Hence, we broaden the empirical literature on finance and entrepreneurship by introducing a relatively new way of accessing finance through financial technology, which constitutes a rapidly spreading addition to the conventional formal (e.g. banks) and informal sources of finance (e.g.

Rotating Savings and Credit Associations and other types of self-help in saving mobilisation). Finally, from a conceptual point of view, we bring together two strands of literature. The first strand focuses on the relationship between finance and entrepreneurship, while the second identifies the channels through which innovations in financial technologies (i.e. FinTech proxied by access to and the use of mobile money transactions) affect entrepreneurship. Our work calls for a more critical examination of the relatively frequent arguments that present FinTech as a silver bullet to the outstanding challenges of financial inclusion. Challenges are manifold, including access and ownership of mobile phones among women and low-income households, as well as unsteady electricity supply in many rural areas (but also in many urban settlements where low-income households reside). There are increasing problems and uncertainties surrounding data protection of FinTech consumers, as well as emerging policy challenges as governments introduce mobile and digital tax, which serves as a disincentive to the poor. Our article attempts to provide a critical reflection of the power of FinTech in enhancing women's entrepreneurship in financially underdeveloped countries of Africa, such as Burkina Faso and Cameroon.

The rest of the article is organised as follows: the second section provides an overview about the linkages between financial access through formal and informal sector institutions, and the evolution of mobile money in Africa. In the third section, we review relevant theoretical and empirical literature before explaining the data used in our analysis and outlining the method of analysis for generating the empirical results of the paper that are presented in section four. Section five discusses the findings in detail. It also presents a thorough examination of the constraints of FinTech in transforming the lives of low-income women via entrepreneurship. The discussion carries important policy implications that can be extended to many regions of Africa. The conclusion summarises the key implications of our findings for the fight against unemployment, poverty, and inequality in Africa.

Formal and informal finance and mobile money in Africa

Much of the existing development literature affords a central place to financial sector development in the overall economic growth of a country (Aryeetey 2005, 2008). Advanced countries have well-functioning financial systems and they often grow faster than developing countries. Well-functioning financial systems provide adequate access to finance for small and medium-sized enterprises, which feature as a source of job creation. If access to finance is broad-based, this leads to reduction in poverty and inequality in society. Therefore, financial access constitutes the link through which financial sector development is linked to broader economic development. Financial sector development can reduce poverty and inequality by broadening access to finance to the poor and vulnerable groups. This can happen only if financial inclusion is effective in facilitating risk management by reducing vulnerability to climate and other shocks and increasing investment and productivity that lead to higher income generation. Financial sector development can help with the growth of small and medium-sized enterprises (SMEs) by providing them with access to finance for firm growth and expansion via additional investment. In developing countries, SMEs are labour-intensive and create more jobs than large firms. Thus, they play a major role in economic development by creating employment and reducing poverty.

Informal finance

Despite the expansion of formal banking institutions under both public and private ownership, Africa lags behind other regions globally in terms of financial sector development. For instance, the development of capital markets and stock exchanges is at its early stage. The informal sector is still a dominant source of finance for much of Africa. Rotating Savings and Credit Associations (ROSCAs) provide indispensable services to those excluded from access to formal sector capital, insurance, and public assistance. This is mainly achieved through informal savings mobilization among neighbours, friends, and relatives in Africa and in other regions of the developing world.

ROSCAs and other forms of traditional self-help institutions are significant devices for the poor in their attempts to diffuse risks as well as build trust and ties of mutual support (Etang *et al.* 2007). ROSCAs also play a vital cultural role in many societies of Africa, where the group members meet to settle community disputes and share information about matters of vital importance, such as health and education. ROSCAs tend to attract more women than men and hence provide them with vital access to finance for their household consumption needs and investment activities (Alvi and Dendir 2009, Kedir and Ibrahim 2011).

In ROSCAs, groups of individuals voluntarily pool their savings, with disbursements determined either by random draw or bidding until every member has received the ‘pot’ (Kedir *et al.* 2011). Once savings are mobilised by all participating ROSCA members, the allocation procedure of the ROSCA determines the net benefit that each member derives, and could thus be an important factor in the success of ROSCAs. Usually, the ROSCA leader (often selected by members) or ‘banker’ decides on the order of recipients, often based on a random drawing rule. In practice, the ROSCA judge/banker can consider the immediate financial need of some members and let them take the ROSCA pot in earlier rounds. For instance, a member might want the money for setting up a small enterprise, to finance urgent medical expense, or might need the pot for other emergencies. A random ROSCA (common in some parts of Africa, such as Ethiopia) allocates its pool of funds based on random drawing of lots, with the winning member receiving the pool. This process is repeated with each previous recipient of the pool being excluded from the draw until each participant has received the pool once. A bidding ROSCA (which are common in Asia, such as Taiwan) is one where participants bid competitively for the pool, which is allocated to the highest bidder. In some ROSCAs, participants receive the pool only once over the life cycle of the specific group. As it could be seen, the functioning of ROSCAs is characterised by a high degree of transparency and significant member participation in determining and negotiating the rules of transactions. ROSCAs also make it easy for their members to access funds in case of emergency.

Besley *et al.* (1993, 1994) rationalises the existence of ROSCAs as informal response mechanisms to diverse financial market failures that are deemed commonplace in developing countries and among immigrant communities in developed economies. Pointing to the wider social relevance of these groups, the findings of Kedir and Ibrahim (2011) from urban Ethiopia show that individuals who live in wealthier households, self-employed individuals, and employees of private companies or international organisations are more likely to be ROSCA members. This indicates that financial exclusion goes beyond the mere focus on the poor; middle classes, too, may have insufficient access to finance. This is consistent with the recent shift in the development discourse that calls for a broader access agenda that includes middle-class households and SME entrepreneurs (Rajan 2006, World Bank 2008, AfDB 2013). Informality thus prevails despite the proliferation of financial technologies, such as mobile money accounts and formal financial intermediaries in African communities. A particular emphasis on studying ROSCAs has been placed on their role in resource mobilization for not only consumption smoothing but also investments in income-generating activities.

Despite its centrality in many African economies, it is also important to recognise the disadvantages of informal finance. For instance, ROSCAs involve high levels of opportunity cost due to the time spent in regular meetings, which might take place daily, weekly or biweekly. In addition, in anonymous urban settings, there is a higher risk of attracting defaulting participants who may disappear after receiving the pot without making further contributions to future saving rounds (Ghebregiorgis and Mehreteab 2019). The groups may also be limited in scope and size and are not suitable for financing all economic activities of low-income households. Hence, there have been attempts to integrate informal finance mobilised by ROSCAs and other self-help groups with formal financial intermediaries, including microfinance institutions and banks. This has been more common in Asia than in Africa. Policy initiatives that promote the reach and sustainability of the savings groups could help to mobilize funds for investment and enterprise development, particularly for those excluded from the formal financial sector such as women, youth, and the poor.

FinTech and mobile money transactions

Mobile money has originated and proliferated in Africa and the developing regions of Asia where formal banking operations are limited in reach (Kusimba 2018). According to the Global Financial Development report, there was a five-fold increase in mobile money and electronic payments between 2014 (6% of those aged 15 and above) and 2017 (33%) in Burkina Faso (Klapper *et al.* 2019). Large jumps also occurred in Cameroon as in other African countries such as Ethiopia, Gabon, Ghana, and Namibia. The top 10 African FinTech start-ups raised \$300 million in 2018. Mobile money accounts are particularly valuable in the absence of bank branches, or when we have more mobile phones than bank accounts (Munyegera and Matsumoto 2018). By enabling faster mobile money payment and transfer platforms, FinTech helps reduce transaction costs and improve access to financial services for the unbanked, and persons in low-income groups, rural dwellers, and other financially underserved sections of society. As a tool likely to shape the future of the financial landscape in developing economies, it also comes with risks. For instance, there are increasing dangers of cyber-attacks. Strong regulatory and supervision frameworks should be developed to mitigate security risks associated with financial technology. This would help to build the trust in mobile money account users who need to be educated about fundamental data protection and confidentiality concerns. New data protection laws have been introduced recently by some African countries such as Kenya. After several years of discussion, the Kenyan Data Protection Bill was passed into law in November 2019. This bill appeals to the principles enshrined in the General Data Protection Regulation (GDPR) of the European Union, which came into force in May 2018. So far, the introduction of data protection laws has been undertaken only by a handful of countries in Africa. For the African region as a whole, there is a long way to go before putting forth a system for personal data protection.

Africa has thus embraced FinTech enthusiastically, but there is a lot to do before the technology is fully embedded in the financial landscape. The buffering and mitigating capabilities against potential technology risks are in their infancy. If conventional formal financial institutions are seen with some degree of skepticism, as is the case in many African societies, mobile money transactions will also be viewed with suspicion. Therefore, the growing role of FinTech in the financial development of the continent can be seen as positive and encouraging, but also wrought with multiple challenges. Digital financial technology is still a new phenomenon, and its progress is slow in many parts of Africa. Internet penetration is low in the continent compared to other parts of the world. Energy and electricity infrastructures are woefully inadequate, with significant portions of the continent without regular access to electricity. FinTech development is therefore limited, despite the rapid rise in mobile phone ownership. Mobile applications bring security threats, and in environments where data protection laws are weak, trust in FinTech can be undermined. This will be a challenge for consumers as well as service providers. Trust issues in financial institutions can pose significant challenges even in well-developed financial markets, as recent empirical evidence from Germany reveals (Stewart and Jürjens, 2018).

Furthermore, recent initiatives to tax mobile and digital financial services may hinder the broader adoption of FinTech in Africa (Ndung'u 2019a, 2019b). In their quest for expanding fiscal space to finance the development needs outlined in the 2030 Sustainable Development Goals (SDGs) and other public expenditures, African governments are embarking on aggressive tax measures that include taxing mobile money users (Kedir *et al.* 2011). Rendering basic financial access more expensive, such policies have the potential to perpetuate the existing digital divide and further exclude the marginalised, women, and the poor, especially in remote and rural locations.

Theory and related literature

Despite the claims of the neo-classical financial theory that formal financial institutions and markets allocate capital resources efficiently, one can often observe structural barriers to financial

inclusion, particularly in poor countries. Formal financial services frequently marginalize the unbanked, failing to serve vulnerable groups such as women, youth, migrants, and low-income households. Credit market imperfections and information asymmetries characterize financial access in developing countries. This is well argued by the Stiglitz-Weiss credit constraints model that shows the importance of adverse selection (e.g. hidden information in project implementation) and moral hazard (i.e. hidden action by borrowers) in contributing to poor access to finance (Stiglitz and Weiss 1981). In addition, market segmentation further discriminates the borrowers of formal financial institutions. There are high levels of transaction costs that have to be navigated by an average citizen in Africa who has severely limited means for saving and borrowing. Due to the subsistence nature of economic livelihoods, lack of buffers during economic downturns, and the general low level of asset ownership, the capacity to put forward a collateral to borrow is absent. Hence, financial inclusion in the formal sector is still very low in much of Africa. But technological diffusion in the form of FinTech is one channel through which financial inclusion is achieved (Klapper *et al.* 2019, Kanga *et al.* 2021). Its prevalence helps to reduce the barriers faced by individuals in accessing finance, especially for women who are frequently excluded from the formal financial sector.

In the advent of artificial intelligence (AI), discrimination against potential borrowers is increasingly widespread, even in the financial institutions of advanced countries. There is increasing evidence that the new, 'impersonal' algorithms are neither impartial nor correct in their profiling of potential borrowers and the capability of borrowers to repay their loans. AI-driven algorithms use some socio-economic characteristics to decide who should get a loan and who should not (Mhlanga 2021). This does not always lead to well-informed decision-making on loan applications. This technology-driven, subtle, and impersonal decision-making tool sustains the ongoing marginalization of vulnerable social groups both in developing and developed countries. In the context of Africa, AI is increasingly used to assess the creditworthiness of potential borrowers without credit-scoring records or other financial footprint. The applications rely on certain demographic and sociological characteristics that can provide arbitrary and discriminating outcomes (e.g. location of residence, type of occupation of borrowers, etc.). Even if women can be favourably profiled in loan applications, those who are unemployed and working in the informal sector can be put at a disadvantage, as the algorithm may favour those engaged in wage employment. Therefore, gendered digital divide and women's limited access to finance may continue to intensify with the use of new technologies (Nieburg 2021). Despite its potential weakness in assessing credit worthiness of borrowers, a growing number of studies testify to the increasing use of AI and machine learning in credit risk assessment. Hence, one needs to acknowledge the challenges and biases entailed in AI use for credit risk assessment when individuals without access to formal finance apply for loans.

The failure of formal finance to serve the population is often addressed through recourse to self-help groups among the poor in Africa (Rodima-Taylor 2014), and one of the most important institutions that provides informal finance is the Rotating Savings and Credit Association that goes under different names in many parts of Africa (Kedir and Ibrahim 2011). Informal financial institutions can mitigate most of the shortcomings associated with formal finance, such as imperfect information, hidden action (e.g. risky and unviable entrepreneurial projects), restrictive collateral requirements, and excessive transaction costs and distance (Kedir *et al.* 2011).

The divide between formal and informal finance is further obscured with the emergence of innovative technologies, which are changing the financial access landscape. The UN 2030 Agenda for Sustainable Development (UN-2030-ASD) and the G20 High-Level Principles for Digital Financial Inclusion (G20-HLP-DFI) highlight the importance of FinTech in reducing financial exclusion (Demir *et al.* 2020). We suggest that the question to ask is: *does the FinTech innovation allow new ways to overcome the existing barriers of access to formal finance among the poor and marginalized?*

While FinTech expands financial access among the unbanked, one should also acknowledge the costs and risks associated with mobile money use. Despite the new technologies in the finance

sphere, financial exclusion might still leave too many behind. In our analysis of the access and use of finance in developing countries, we will add another layer for FinTech, evaluating the access and use of formal and informal finance and mobile money services by entrepreneurs. There is well-developed literature that highlights the key role of microenterprises for job creation (Banerjee and Duflo, 2007), poverty reduction, and tackling inequality (Demir *et al.* 2020). In our study, we build on two strands of the existing literature. The first strand emphasises the relationship between financial access and entrepreneurship, while the second focuses on the role of the novel channel through which ICT innovations, such as new financial technologies, affect entrepreneurship.

There is a still sparse but growing literature that enhances our understanding of the debates on women's entrepreneurship and FinTech (Boamah 2021, Mohamed *et al.* 2021). Recent studies, such as Coffie *et al.* (2021), acknowledge the intricate and complex relationship between entrepreneurship and financial technology. As suggested by technology diffusion theory, the study found a positive correlation between financial technology use and the entrepreneurship among women in the context of Ghana. On the other hand, a different perspective from Asia is provided on unequal diffusion of FinTech and its impact on unequal development outcomes in the global South (Boamah 2021). This study is based on Sen's Capability Approach¹ and adopts the network theory to examine factors reinforcing uneven access to FinTech instruments, such as mobile money (MM) or m-banking services. Likewise, we believe that in contexts where structural inequality is prevalent as in Africa, and is particularly acutely felt among women, income levels and access to savings are important factors in the ownership of mobile phones. Beyond this micro reality, macro factors, such as provision of mobile phone networks, mobile agents, and access to reliable and regulated mobile money networks, are important. Hence, we argue that context matters and access to financial technology should not be seen as a sufficient condition for promoting entrepreneurship in Africa – while its existence may be necessary for the growth of entrepreneurship.

Data and methodology

Our analysis is based on FinScope Consumer surveys undertaken by FinMark Trust, a non-profit organisation based in South Africa, with the support of the country's National Statistics Offices. Our analysis will focus on the surveys conducted in Burkina Faso in 2016 and Cameroon in 2017. Our study provides evidence about the relationship between FinTech and entrepreneurship, with a focus on women in Central Africa (Cameroon) and West Africa (Burkina Faso). The data collected is based on face-to-face interviews. A total of 5,066 and 6,826 individuals were surveyed in Burkina Faso and Cameroon respectively. The data contains detailed information about the demographic and socio-economic characteristics of the individuals, and their access to and use of formal, informal and mobile money/digital financial services. In addition, there are important variables in the data collection, such as financial literacy, financial capability, income, and employment (including occupational choices such as entrepreneurship). The financial capabilities of individuals are proxied by variables like financial awareness and literacy. One of the strengths of our data is its comprehensive information regarding all financial products (i.e. credit, transfers and remittances, savings, risk and insurance, and mobile money). The data covers economic sectors including agriculture, energy, water and sanitation, etc. To answer the question of whether FinTech use advances entrepreneurship, we will examine the factors that significantly affect the probability of engaging in self-employment/entrepreneurship, conditional on access and use of finance (i.e. formal, informal, and mobile money) and other relevant characteristics.

The statistical technique that we used to analyze the data and produce the results is the probit model – an appropriate regression model applicable when the dependent variable can take only two values. This model was used as the outcome of interest is being engaged in entrepreneurship, which is a binary outcome. The probit model is instrumental to enable us to identify factors that are associated with the likelihood of being an entrepreneur. Below, we provide the details of the model formally. Suppose E_{ij} indicates whether an individual is an entrepreneur. The probit model for

predicting the likelihood of being an entrepreneur is given by:

$$P(E_{ij=1}) = \alpha X_{ij} + \beta MM_{ij} + \delta_j + \varepsilon_{ij}$$

where E_{ij} takes a value of 1 if individual i in region j is an entrepreneur and 0 otherwise. The likelihood of entrepreneurship depends on a range of factors, such as socio-economic characteristics represented by a vector X_{ij} that includes several explanatory variables (e.g. age, gender, marital status, level of education, etc.). In addition, the key variable of interest for our work is access and use of finance as captured by the use of mobile money by individual i in region j . i.e. MM_{ij} . One important factor that is important to consider is the role of region-specific factors that are associated with entrepreneurship, and this can take the form of unique regional features, which are invariant across individuals but vary from region to region. This is represented by δ_j . For instance, some regions or contexts might be more entrepreneurial than others due to their supportive attitude towards entrepreneurial aspirations of individuals. Finally, for completeness, the error term, ε_{ij} , is normally distributed with zero mean and constant variance as suggested in probit model formulation.

Findings and discussion

In our analysis, those who own their businesses are classified as entrepreneurs, and this is regardless of their registration status. This is because both formal (registered) and informal (unregistered) enterprises are widespread in Africa, with a larger proportion of enterprises being informal. [Table 1](#) provides information on entrepreneurship, which is measured by the prevalence of self-employment or business ownership. The data predominantly represents the ownership of micro and small enterprises based on the responses from the consumer surveys conducted in Burkina Faso and Cameroon. The information is presented both for females and males.

As it can be seen, more males than females are owners of registered enterprises. Even as this is true for both countries, female enterprise ownership is slightly smaller in Burkina Faso as compared to Cameroon. The rate of informal entrepreneurship is fairly similar across gender lines in both countries. When one considers ownership of either formal or informal enterprise, the picture is better in Burkina Faso than in Cameroon. While the percentage of ownership of any enterprise in Burkina Faso is similar between female and male entrepreneurs, a higher percentage of males as compared females own either formal or informal businesses in Cameroon.

Financial inclusion is a development problem in Africa. Access is not a guarantee for financial inclusion, and the use of finance is critical to assess its impact on development endeavours such as entrepreneurship. Therefore, we use both access and use of finance as measures of financial inclusion and we report the evidence for the two countries. [Table 2](#) provides both financial inclusion indicators. The first panel of the table summarizes the statistics in relation to accessing banks, other formal financial institutions, informal finance, and the extent of exclusion by gender

Table 1. Entrepreneurship in Burkina Faso and Cameroon disaggregated by gender.

	Percentage (%) of Self-employed or Entrepreneurs		
	Burkina Faso		Male
	All	Female	
Formal/Registered	2.7	2.5	2.9
Informal/Unregistered	24.3	23.8	24.5
Formal or Informal	26.9	26.2	27.6
Cameroon			
Formal/Registered	2.4	1.7	3.1
Informal/Unregistered	27.5	26.5	28.6
Formal or Informal	29.5	27.9	31.3

Source: Computed from FinScope Surveys of Burkina Faso (2016) & Cameroon (2017).

Table 2. Financial inclusion in Burkina Faso and Cameroon.

Panel 1: Access to Finance			
Burkina Faso			
	All	Female	Male
Burkina Faso			
Banked	15.4	12.4	18.2
Other formal	22.1	18.3	25.7
Informal	23.1	24.3	22.0
Excluded	39.4	45.1	34.1
Cameroon			
Banked	11.5	8.2	15.0
Other formal	38.9	36.6	41.3
Informal	17.1	18.9	15.3
Excluded	32.5	36.4	28.5
Panel 2: Use of Mobile Money			
Burkina Faso			
Airtel Money (A)	27.1	21.8	32.0
Mobi Cash (B)	2.1	1.7	2.5
Mobile Money (A + B)	27.5	22.0	32.6
Cameroon			
MTN mobile (A)	19.8	16.7	23.1
Orange (B)	26.9	22.6	31.4
Express (C)	7.7	6.5	8.9
Sahel (D)	0.1	0.1	0.1
Mobile Money (A)-(D)	37.6	32.5	42.9

Source: Computed from FinScope Surveys of Burkina Faso (2016) & Cameroon (2017).

and for the overall sample. The second panel relates to the main thrust of our study, as it focuses on the extent of the use of mobile money in the two countries.

According to the results summarised in Table 2, women suffer disproportionately from financial exclusion in both countries. The absolute number, as well as the percentage of men, is far greater than women when accessing finance via banks and other formal institutions. However, the reverse is true when it comes to accessing finance through informal financial institutions – more women than men are represented in these. 45.1% of women in Burkina Faso and 36.4% in Cameroon do not have access to any formal financial sector institutions. Amidst FinTech adoption in the two countries which benefits more men than women, informal financial institutions offer women a life-line to mobilize their savings and access credit. However, the adequacy of funds mobilised via self-help groups such as ROSCAs may not be sufficient, as discussed in the concluding part of the paper.

One can also observe the recent expansion in the use of mobile money in Africa. In Burkina Faso, there are two mobile money account providers (Airtel Money and Mobi Cash) while Cameroon has four (MTN, Orange, Express, and Sahel). There are other providers, which we expect to play an important role in the mobile money transaction in the future, but currently their share is not significant. Hence, we did not report them here. It is worth noting the different nature of the mobile money providers in the two countries. Orange is a French company, which is very active in former French African colonies. We can clearly see the historical ties of rich countries with their former colonies as reflected in the provision of mobile money accounts. Even if we do not have Orange as a major provider of mobile money in 2016 in Burkina Faso, its presence in the country has been prominent since 2020, when it opened two important remittance corridors.

Note that the mobile money variable is not only about accessing mobile money, but it also refers to the use of mobile money. What we consistently observe in the two countries is that the use of mobile money by men is far greater than by women. This is mainly due to the mobile gender divide (GSMA 2020). Many women do not own a mobile phone due to their disadvantaged economic position, the location where they live (e.g. remote rural communities), and higher rates of illiteracy as compared to men. However, our findings show that a much larger number and proportion of

women use mobile money as compared to women who use banks and other formal financial intermediaries. This pattern is clearly evident from the summary statistics from both countries.

According to the data discussed above, FinTech is revealed to be a conduit for financial inclusion, and this is an important finding. However, financial inclusion is not an end by itself. The key question of our paper is whether the use of mobile money leads to higher likelihood of the self-employment, particularly among women. We investigated that issue based on a description regression model results that are summarized in Tables 3 and 4. The two tables provide the results based on the association between entrepreneurship and several socio-economic variables including our key variable of interest: the use of mobile money. Table 3 contains the estimates for Burkina Faso and Table 4 provides estimates for Cameroon. Both tables provide regression results based on comparable set of variables except for the francophone variable, which we include in the Cameroon estimates. The inclusion of the francophone variable in Cameroon is warranted because there are historical tensions between francophone and anglophone Cameroon. We conjecture that the economic fortunes of these two groups are potentially different, and the inclusion of the variable is to control for this reality.

The results for both countries reveal a statistically significant role of financial inclusion in entrepreneurship development. We focus our discussion by using the second financial inclusion indicator we discussed earlier, which is based on the use of mobile money. For Burkina Faso as well as Cameroon, the use of mobile money is significantly associated with higher likelihood of entrepreneurship. This is true for the overall sample, females and males. The use of mobile money accounts leads to higher entrepreneurship among women. It is encouraging to see that all social groups benefit from FinTech innovations such as mobile money to bring about a change in their livelihood (which is proxied here via enterprise ownership or self-employment). As we pointed out in the introductory part of the paper, we are also interested in looking at the effect of age for entrepreneurship. Anticipating a non-linear relationship between age and enterprising behaviour, which we believe will wane in old age, we included both age and the square of age in the probit models we used to produce the results summarized in Tables 3 and 4. According to our findings, being young is associated with a higher likelihood of entrepreneurship as the positive and significant coefficient on age indicates, while old age is linked with a lower probability of self-employment. This is true for the overall sample, females as well as males. If being young is associated with business ownership and the use of mobile money leads to a higher probability of entrepreneurship, there is scope to target the youth in the provision of FinTech services. This can help reduce the worrying youth unemployment trend in the two countries we studied. We argue that our evidence has

Table 3. Probability of engaging in entrepreneurship, Burkina Faso.

Variable	Coefficient estimates		
	All Entrepreneurs	Female	Male
Age	0.046***(0.008)	0.0295***(0.009)	0.067***(0.012)
Age squared	-0.001***(0.000)	-0.000***(0.000)	-0.001***(0.000)
Female	-0.086***(0.042)	-	-
Married	0.481(0.901)	0.089(0.129)	0.478(0.937)
Single	0.042(0.821)	-0.324(0.148)	0.439(0.831)
Divorced	0.647(0.931)	0.221(0.277)	0.429(0.785)
Primary	0.231****(0.059)	0.228****(0.093)	0.235****(0.075)
Secondary	-0.361****(0.071)	-0.279****(0.104)	-0.423****(0.098)
University	-1.539****(0.193)	-1.616****(0.415)	-1.517****(0.223)
Use of Mobile money	0.295****(0.049)	0.298****(0.076)	0.281****(0.064)
Urban	0.454****(0.056)	0.471****(0.079)	0.424****(0.079)
Constant	-0.254(0.0651)	-1.369****(0.234)	-0.0651(1.475)
LR chi-squared (<i>p</i> -value)	447.5****(0.000)	164.8****(0.000)	296.7****(0.000)
No of observations	5066	2436	2630

N.B. standard errors are reported in parentheses. ***, ** & * = 1%, 5% and 10% of level of significance respectively.

Table 4. Probability of engaging in entrepreneurship, Cameroon.

Variable	Coefficient estimates		
	All Entrepreneurs	Female	Male
Age	0.074***(0.006)	0.088***(0.008)	0.058***(0.009)
Age squared	-0.000***(0.000)	-0.001***(0.000)	-0.001***(0.000)
Female	-0.054(0.037)	-	-
Married	0.100(0.071)	0.041(0.085)	0.325*(0.173)
Single	0.126*(0.078)	0.064(0.095)	0.371***(0.179)
Divorced	0.388***(0.114)	0.461***(0.144)	0.462***(0.226)
Primary	0.091*(0.049)	0.075(0.066)	0.108(0.076)
Secondary	-0.035(0.052)	-0.028(0.072)	-0.027(0.077)
University	-0.573***(0.077)	-0.744***(0.123)	-0.472***(0.104)
Francophone	-0.110***(0.042)	-0.042(0.053)	-0.256***(0.077)
Use of Mobile money	0.262***(0.039)	0.211***(0.057)	0.310***(0.054)
Urban	0.399***(0.037)	0.408***(0.053)	0.391***(0.525)
Constant	-2.188***(0.144)	-2.438***(0.185)	-2.118***(0.255)
LR chi-squared (<i>p</i> -value)	570.7***(0.000)	319.1***(0.000)	262.9***(0.000)
No of observations	6826	3505	3321

N.B. standard errors are reported in parentheses. ***, ** & * = 1%, 5% and 10% of level of significance respectively.

implications for Africa more broadly, where mobile money is expanding with a growing population of young people who are often marginalized in the labor market.

The above findings have important public policy implications. Governments in Africa should leverage financial technology, as it has a potential to improve the livelihoods of women and youth. However, there are several challenges and constraints that limit the potential benefit of mobile money in Africa. We discuss them in turn before concluding the paper.

Energy infrastructure

Limited digital connectivity, particularly in remote locations, constrains the potential reach of FinTech among the poor in Africa. Additionally, in a continent where access to electricity is at its lowest among all global regions, there is a severe shortage of battery-charging facilities and power. Having a mobile phone does not mean that you have it in working order all the time. More than 50% of the continent's population does not have the luxury of accessing electricity and that means a staggering number of the population (about 592 million in Africa) are cut off from modern sources of energy that are often taken for granted elsewhere. This is a reality even for the most advanced countries of the continent such as South Africa, which has a crippling electricity problem. The infrastructure financing gap in Africa is estimated as 90 billion USD per year, significantly limiting the adoption of financial technologies that rely on a constant supply of energy. For effective use of the opportunities afforded by FinTech, access to energy is crucial. If individuals cannot charge their mobile devices, the discussion of the benefits of mobile money for entrepreneurship development is irrelevant. Access to energy is a broader economic development issue.

Mobile tax

So far, mobile money is used mainly as a payment platform, but the system is rapidly growing in diversity to include other financial products, such as transfer of remittances and provision of loans. Providing access to basic financial services is fundamental for the expansion of mobile money use for enterprise development. Some recent policy changes provide further challenges to the access of mobile money particularly among low-income populations. One of these is the introduction of digital or mobile tax by African governments (Njuguna 2019a, 2019b).

Governments frequently fail to tax the right target groups such as top earners or fund managers, but instead impose heavy taxes on vulnerable social groups. Every cent matters for small-scale

entrepreneurs in Africa. The push for taxation is extractive and predatory. It is often seen as an easier tax to collect and as a good source of government revenue. However, it is an exploitative practice, the rationale of which stems from neo-classical economic principles that have failed the poor. Taxation capitalises on the limited chance of the poor and vulnerable for financial inclusion, and can deepen inequality and exclusion. The policy initiatives to introduce of social media tax, digital tax and/or mobile tax are increasingly prevalent in African countries (Ndung'u 2019b). This is already having a negative impact on internet and mobile money users as the numbers show a significant drop in Uganda (Pollicy 2018, Nanfuka 2019), and has led to mass-scale public protests, like those in Tanzania after the introduction of a mobile tax in June 2021.

Echoes of colonialism

The taxation drive in Africa is often based on copying fiscal measures of the economies in the global North and ill-suited to the realities of local African economies. It contains echoes of the past colonial extraction of economic benefit from the poor in Africa. Those paying the taxes and shouldering bigger financial burdens should be the multinational enterprises operating in Africa. The remnants of colonialism are evident in the presence and activities of Western companies in Africa. These companies often supply the technology infrastructures used in the digital ventures, and are frequently preferred to local companies when awarding operating licenses. These companies often benefit from their historical ties in the region to gain operating permits and access big markets on the continent. For instance, the companies that are operating in Burkina Faso and Cameroon FinTech sectors often hail from France. The government of France is enthusiastic about its economic, cultural, and political ties with its former colonies in Africa – a continent of speakers of the French language spread across 20 countries. France has a strong grip on mobile phone service provisioning in the region, with major French telecom companies like Orange operating in many countries that include Cameroon and Burkina Faso. French banks and retail giants are present in these countries, as well as in the Democratic Republic of Congo, Egypt, Mali, Morocco, and Senegal.

Contemporary links between the big companies of the West and the countries hosting them carry echoes of the past. Trade and investment studies have shown intensified ties between developing countries and their former colonial masters. Colonial heritage guides also the ongoing development of financial services in Africa, by uniting informal and formal entrepreneurs under mobile money systems and transactions. In addition, governments are spreading their tax nets to introduce mobile tax to expand their fiscal space. If executed unfairly (e.g. by sparing the multinational companies), the taxation practice will be regressive, exploitative, and extractive, limiting the potential entrepreneurial development that one may associate with the expansion of FinTech.

Trust

Traditional financial institutions are still important. Mobile money accounts will not solve all of the problems of financial inclusion and entrepreneurship in Africa. Informal finance remains relevant. Hence, the policy interventions should be multidimensional, and besides developing the formal financial sector, include support for self-help groups and community initiatives. Modern finance is also less trusted. Therefore, there is a long way to go before mobile money is widely adopted. However, the trust issue is not likely to be a major problem. According to the Cameroon data we analyzed for this study, mobile money accounts are already at par with microfinance institutions (MFIs) as far as trust is concerned, and it is expected that they will surpass traditional banks. Given their historical importance and the sustained buffer they provide for most of Africa, informal financial institutions are ahead of banks and mobile money accounts in terms of trust. The data indicates that 16.5%, 10.3%, and 10.3% of the survey respondents in Cameroon trust banks, MFIs, and mobile money account respectively, compared to 27.8% of those who put their trust in informal financial institutions.

Conclusion

By providing evidence of the role of FinTech in the development of women's entrepreneurship, this study shows its potential importance as a gateway for business opportunities for excluded social groups. This unlocking of the economic growth potential of women via FinTech is revealed by the survey evidence collected from Burkina Faso and Cameroon. The use of mobile money is significantly associated with a higher likelihood of self-employment and entrepreneurship among women. The same is true for men, too. This points to the economy-wide importance of the use of mobile money for transforming livelihoods and job creation.

Even if mobile money is found to be vital for entrepreneurship, there are several outstanding challenges that should be tackled by policy measures and strategic initiatives. To broaden coverage, outreach, and sustainability of the use of mobile money, the energy infrastructure should be improved in the two countries. Urban residents are more likely to benefit from entrepreneurial ventures mediated via mobile money. Therefore, there should be a concerted effort to target the poor and those living in rural areas for better financial inclusion in the future. Given the relatively advanced nature of mobile technology, and the uncertainty surrounding data protection, a lot of strategic work needs to be done to raise the awareness and skills of the population, along with the introduction of the data protection laws.

According to the GSMA 2020 Report, there still remains a substantial mobile gender gap around the access and use of mobile financial services. Only 35% of women use mobile internet in Sub-Saharan Africa (GSMA 2020). This is not just due to lacking key infrastructures such as electricity. For many rural and urban poor, it is also a matter of affordability, literacy, and skills. The gender gap in accessing mobile technology can be reduced through a concerted effort among key stakeholders such as mobile network operators, internet companies, policymakers and regulators, and the development community. It is important to identify and solve country-specific barriers of gendered access to mobile money accounts. More attention is also needed to identify the livelihood activities, priorities, and alternatives of low-income women, and the social and cultural constraints around their access to informal and formal finance, when assessing the role of digital financial innovation in their livelihoods.

The findings of this study have broader implications for future studies using data from other parts of Africa. With the recent emergence of large survey data on these topics, possibly on a longitudinal basis, further research can focus on the significance of the use of mobile money for entrepreneurship in a dynamic and temporal context among women and other social groups that are often financially excluded. A conceptual and an empirical challenge to be undertaken by future studies is to examine the complementarity or substitutability between traditional formal and informal finance and FinTech.

Note

1. The Capability Approach focuses on the moral significance of individuals' capability of achieving the kind of lives they have reason to value. This distinguishes it from other approaches to ethical evaluation with a focus on subjective well-being or the availability of means to lead the good life. The Capability Approach was first articulated by the Indian economist and philosopher Amartya Sen in the 1980s, and has been employed in the context of human development, such as by the United Nations Development Program, which developed the Human Development Index (HDI) as a broader, deeper alternative to narrowly economic metrics such as growth in GDP per capita. Such framework understands 'poverty' as deprivation in the capability to live a good life, and 'development' as capability expansion. It underscores the importance of life expectancy, income as well as literacy. Available at <https://iep.utm.edu/sen-cap/>

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No potential conflict of interest was reported by the author(s).

Notes on contributors

Dr **Abbi M. Kedir** is an associate professor/senior lecturer in international business in the Management School of the University of Sheffield, UK. He got his PhD in Economics from the University of Nottingham in 2003. In addition to long years of services in UK academia, he has experience of working both in government and international organisations such as the United Nations. In addition to his numerous peer-reviewed international publications, book chapters and commissioned reports in areas such as entrepreneurship, international development and international business, he serves as a member of editorial board of international journals such as *Journal of Development Studies*, and *Journal of Entrepreneurial Behaviour and Research*.

Dr **Euphrasie Koume** is a Development Economist currently working at the United Nations Development Programme based in Yaoundé, Cameroon. With over 12 years of experience, her expertise includes project management, rural finance and multisectoral interventions to support SDGs, formulation of policy and strategic plan for delivery of financial services, market research to inform the design of innovative, responsible and more valuable formal financial services for the poor, scoping and segmentation for DFS, customer centric product development and process design. She has provided training and technical assistance to a variety of financial institutions, policy makers and community-based organizations throughout West and Central Africa. Before joining UNDP, she worked for United Nations Capital Development Fund (UNCDF) as an inclusive finance specialist, and prior to that worked as a research fellow at the United Nations University-Institute for Natural Resources in Africa. She is fluent in English and French and she is also a lecturer at the Felix Houphouët-Boigny University in Abidjan, Côte d’Ivoire. Acknowledgement The authors would like to thank the two anonymous referees and the editor to their constructive comments which immensely helped to improve the quality of the paper. In addition, we are grateful to comments received from participants of the “Fintech in Africa” workshop organised by Paul Langley and Daivi Rodima-Taylor on the 8th of January 2021. We would also like to acknowledge to Dr Kameshnee Naidoo (Global Programme Advisor @ UNCDF), and Mathieu Soglonou (Senior Financial Inclusion Expert) for their leadership in FinScope data collection through the implementation of the Making Access Possible (MAP) Programme in West and Central Africa.

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