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Informal firms' adoption and use of mobile money under uncertain times: Evidence from Burkina Faso

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Abstract

This paper investigates how uncertainty driven by political instability or the Covid-19 crisis affects mobile money adoption and use by informal businesses in Burkina Faso. Notwithstanding the pervasive prevalence of the informal sector in developing countries and despite the fact that mobile money has been shown to be a formidable tool for financial inclusion, there has been very little empirical work exploring the drivers of adoption and usage among unregistered businesses. Besides, most of the extant studies precede covid-19 and were conducted under stable contexts. Therefore, our study aims at filling this gap by taking into account the impact of the Covid-19 shocks as well as the recent political turmoil in Burkina Faso that culminated in two Coups d'Etat in 2022. We consider three waves of business survey data from a quasi-experimental opening of mobile money merchant accounts that we initiated in March 2021. Using Linear Probability and random effects models, our findings indicate that, after controlling for business owner and business level characteristics, security is an important factor driving the adoption and usage of merchant accounts. However, we find that the temporary closure of businesses during the covid-19 crisis affects negatively the adoption of a merchant account while it has a positive impact on mobile money usage, particularly for payment reception, activities in the trade sector or allowing remote transactions. Overall, this study is in line with policymakers' agenda worldwide to improve financial inclusion among private sector businesses by using mobile technologies. While conducted in the specific context of the political and covid-19 crises, our results provide policymakers with a mapping of drivers of merchant account adoption and usage, thus acting as a springboard to increase financial inclusion for small and medium enterprises.

JEL Classification: D22, G20, O12, O17.

Keywords: Mobile money; Merchant account; Informal businesses; Financial inclusion; Uncertainty; Burkina Faso.

1. Introduction

The emergence and successful spread of mobile money in Sub-Saharan Africa is often considered as a vivid demonstration of high adoption of a new technology in developing countries. A decade ago, mobile money was mainly an East African phenomenon with Sub-Saharan Africa accounting for 84 per cent of all active accounts. Today, although other developing regions are gaining momentum, Sub-Saharan Africa still accounts for over half of all active accounts. Precisely, according to the latest figures from GSMA, at the end of 2021, mobile money services were available in 98 countries globally—with 316 live services, 1.35 billion registered accounts, 518 million active users on a 90-day basis and a trillion US $ processed annually. In Sub-Saharan Africa alone, there are 161 live services, 605 million registered accounts and 183 million active users on a 90-day basis, 700 billion US $ in transaction value (GSMA, 2022). The adoption and use of mobile money rapidly spread outside of the well-known and successful experience of M-Pesa in Kenya and besides the original person-to-person use. As such, mobile money services are currently used by individuals to pay bills, by institutions to pay salaries or make social transfers and, in mature markets, by firms to pay bills, suppliers, and employees or to receive payments from customers. At the firm level, the use of mobile money (often referred to as *merchant account*) has been initially promoted by small retailers, which started offering mobile money to their clients as a method of payment (Higgins et al., 2012). Interestingly, evidence from the East African experience show that mobile money merchant account exhibits a higher intensity of use compared to individual use. For instance, 80% of firms that use mobile money report using it once per week or more, compared to an average overall use of twice per month in Kenya and Tanzania (Bångens and Söderberg, 2011; Higgins et al., 2012).

Recent studies document that digital technologies can provide opportunities for small and medium businesses to change the nature of businesses, create better employment opportunities, and potentially transform lives (Dalton et al., 2019; Islam et al., 2018; Islam and Muzi, 2020). These digital technologies have modified the way customers pay for their purchase from cash or traditional credit card toward mobile phone devices. It is often argued that the innovation of mobile money can facilitate businesses build secure relationship with customers and spur sales and profits (Aron, 2018; Dalton et al., 2019; Islam et al., 2016; Klapper, 2017; Patnam and Yao, 2020; Riley, 2022). In fact, through its extraordinary power to reduce transaction costs, mobile money adoption is generally considered to be a windfall for adopters in developing economies. This is particularly the case for small and unregistered firms since they need to pay and be paid frequently sometimes in quite large amounts or over long distances. Furthermore, a merchant account enables them to have a record of transactions, as they often do not keep formal records but do deal with many customers and suppliers. Instead of holding many ledgers and receipts, mobile money offers an affordable and convenient alternative to record operations. On top of this convenience in terms of time savings, increased safety and resilience are reported among the main advantages of using mobile money by firms particularly in times of crisis (Abidi et al., 2023; Silva et al., 2023). Hence, in this study, we explore how the unique context combining the health crisis (Covid-19) and political instability in Burkina Faso plays out in the decision of informal firms to adopt and use mobile money.

Despite a large body of literature on the determinants of mobile money adoption based on the technology acceptance model (TAM) of Davis (1989) that explains the attitude and intention of individuals to adopt new technology, to our knowledge, this study is the first to empirically investigate mobile money adoption and use by informal businesses. The extant literature has considered cross-country determinants of mobile money adoption at individual or household level such as differences on institutional voids, regulatory quality, agent network, scope

of service offerings, educational institutions in target markets (Evans and Pirchio, 2014; Johnen et al., 2023; Kabengele and Hahn, 2021). Other studies consider differences in prices, levels of consumption (Granguillhome Ochoa et al., 2022) while another strand of literature examines how socio-economic factors such as age, level of education, the standard of living and mobile phone ownership affect the adoption and use of mobile money services (Batista and Vicente, 2020; Fall et al., 2020; Meli et al., 2022). However, as highlighted by Meli et al. (2022) most of these works implicitly equate adoption with use despite the fact that an individual can subscribe to a mobile money but fail to use it. Hence, our paper adds to the literature by explicitly distinguishing adoption from usage. Furthermore, although there are extensive studies on mobile money, the literature on the adoption and use of mobile money specifically designed for firms is a rarity. The few papers we are aware of focus on registered firms and consider almost exclusively East African countries as the setting[1] (Bastian et al., 2018; Beck et al., 2018; Dalton et al., 2019; Islam et al., 2018; Ky et al., 2019; Papadopoulos et al., 2020). This is primarily due to the fact that business registration is often a pre-requisite for firms to open a merchant account (Annan, 2022). Therefore, considering Burkina Faso adds to the literature in different ways. First, while our study is close in spirit to the study of Dalton et al. (2019) conducted in Kenya, only registered firms can adopt mobile money in Kenya. In contrast, Burkina Faso has a Bronze merchant account designed for informal firms that co-exist with a Gold merchant account for registered firms that mimics Lipa Na M-Pesa of Kenya. Hence, the aim of our paper is to bridge this gap by considering informal businesses that by nature are comparatively less financially included compared to their peers in the formal sector. Second, the recent political turmoil in Burkina Faso offers a unique context to investigate its potential impact on merchant account adoption and usage. Lastly, the timing of our investigation enables us to tackle unaddressed research questions in earlier studies. As such, existing evidence is based mainly on pre-covid 19 data while our paper considers a unique dataset collected in the midst of the health crisis and tailored to take into account these shortcomings.

The remainder of the paper is as follows. We present the related literature and our research questions in section 2. Section 3 describes our survey design, the data collection and presents the methodology used in the analysis. We present our results in section 4, and the conclusion in section 5.

2. Related literature and research questions

2.1. Do the ongoing political instability coupled with covid-19 crisis promote or hinder mobile money adoption by informal firms?

Since 2015, Burkina Faso is caught between escalating insurgent violence and widespread social discontent (International Crisis Group, 2019; World Bank Group, 2019). The situation has deteriorated dramatically, with the expansion of a Sahel-wide political crisis from Mali into Burkina Faso leading to acute security threats triggered by frequent terrorist attacks in most parts of the country; particularly the northern region (Ouahigouya). This instability resulted in two coups d'Etat in a space of eight months (January and September 2022). Despite multiple reforms and actions undertaken by the transition government, the security situation in Burkina Faso remains deleterious contributing to the stark increase in the number of internally displaced persons

[1] Few exceptions include Konte and Tetteh (2023) who investigate the interaction effect between mobile money and traditional finance on firm performance using data from 14 sub-Saharan Africa. In particular, they set firms from East Africa against those from other regions where mobile money is emerging, but uptake is relatively low.

(IDPs) with around 1,850,293 throughout the country[2]. The compounded impact of rising insecurity could dampen investor confidence and hinder private sector growth prospects. It follows that increased insecurity leads to violence and crime, which deteriorate the business environment. In this context, it is argued that the innovation of mobile money could be appealing as it has the potential to reduce the need to hold cash and all transactions made through this channel are recorded (Wright et al., 2017). In fact, cash may feed crimes because of its anonymity, whereas the use of electronic payment instruments whose transactions are traceable may tend to curb it. In this perspective, Economides and Jeziorski (2017) show that mobile money users are willing to pay to avoid walking with cash and to avoid storing money at home. They demonstrate that mobile money ameliorates significant amounts of crime-related risk. Close to our investigation, Dalton et al. (2019) show that registered businesses exposed to high risk of theft may adopt merchant accounts in Kenya. Hence, we assume that providing informal businesses with mobile money merchant accounts would help reduce perception of crime-risks and strengthen the business landscape in the current security and socio-political context of Burkina Faso.

Meanwhile, COVID-19 crisis and its management have brought about unprecedented challenges for the global economy (GSMA, 2020; UNCTAD, 2022). It has affected global health systems, affected peoples' livelihoods and created significant changes to how small and medium enterprises do business. To curb the speed of transmission of the virus many societies adopted self-imposed behavioural changes (social distancing) or government-imposed lockdown measures (Fu and Mishra, 2021; GSMA, 2020; Hossain et al., 2022). During the protracted lockdown and movement control period, business owners faced obstacles such as operational and supply chain disruptions, a shortage of internal funds to handle recurring operating expenditure, the risk of bankruptcy, and efficiency and profitability reduction (Hossain et al., 2022; Papadopoulos et al., 2020). These measures severely affected small and medium enterprises since they tend to have a lower capital reserve, fewer assets, and lower levels of productivity. Against this backdrop, several studies document that COVID-19 crisis created new opportunities for mobile money to accelerate financial inclusion and helps cope with health risks and adverse socioeconomic effects of the pandemic (Fu and Mishra, 2021; Hossain et al., 2022; Sahay et al., 2020)[3]. In fact, by reducing or eliminating the need for physical interactions and the need for cash, mobile money can ensure the continuity of activities. As such, several businesses that had to close due to COVID-19 restrictions leveraged social media platforms including Facebook, WhatsApp to continue operating their business. Hence, we postulate that this may lead to an increase in the adoption of mobile money merchant account by businesses. However, based on the GSMA supply-side data, McCaffrey (2022) argues that the loss in income and reduced ability to make purchases in countries that did not have developed e-commerce systems may have played a strong countervailing role. Moreover, mobile money is a cash-based system that relies on agents to cash people in and out of the system. If Covid-19 affected their ability to operate, mobile money services may have suffered.

[2] For more details, please see https://data.unhcr.org/fr/situations/sahelcrisis/location/8650

[3] This view is consistent with measures taken by several country authorities including Burkina Faso's Central Bank (BCEAO). They encouraged mobile money adoption and use by introducing new incentive mechanisms consisting in lowering costs and increasing the limits on transactions for digital transactions. For more details, see Financial Access COVID-19 Policy Tracker. Statistics Department (IMF, 2020).

2.2. How do political and covid-19 crises affect usage of merchant account?

Unlike most of the extant studies, this paper distinguishes adoption from use following Meli et al. (2022) who points out several reasons that can lead an individual to register to a mobile money account and fail to use it afterwards. Advertisements/promotions of mobile money providers or incentives from his entourage may result in an adoption that does not mount to usage of mobile money services. Furthermore, the adopter may lack money or have trouble in using these services, or he may simply find out that the services do not meet his expectations. Furthermore, the uncertainty associated with political and covid-19 crises considered in our paper make these arguments even more salient. As such, the CFI's survey data revealed that many business owners who sold on digital platforms in the early waves of the pandemic did not continue to do so in all the subsequent waves, indicating that many businesses experimented with digital platforms, but adoption was inconsistent and not sustained (Modi, 2022). Besides, the merchant account is a recent product and this lack of hindsight justifies why adoption may differ from usage. Some businesses may adopt the product for the sake of experimenting it. At the time of our surveys[4], only two services existed from the merchant account: i) receiving payments from customers and, ii) making withdrawals. Hence, other services such as paying bills, suppliers and making/receiving money transfers were unavailable possibly because most informal businesses do not have electricity or water bills to pay. Furthermore, the possibility of making money transfers from the merchant account seems inappropriate given that the personal mobile money account is earmarked for this purpose.

The usage of a merchant account for receiving payments on the one hand and making withdrawals on the other hand are essentially based on two distinct factors. Firstly, payment reception is closely tied to the number of users with personal mobile money accounts who are willing to make digital purchases. Thus, the ability of merchants to receive payments on their merchant accounts is contingent not only on their own willingness but primarily on the willingness of customers to use this payment channel. Secondly, while money withdrawal from the merchant account would seem to be entirely under the control of the merchant account holder, it somehow relates to the opportunity extended to him to make payments from his account to suppliers. In an ecosystem where not all players are equipped with the necessary infrastructure, this would induce merchants to withdraw funds for business-related payments such as suppliers. This is likely the case in Burkina Faso where merchant accounts are not only recent but do not allow users to make payments to their suppliers.

2.3. How heterogeneous are the effects of political and covid-19 crises on merchant account adoption and usage?

The effects of crises related to political instability and Covid-19 on the adoption and usage of the merchant account can vary depending on the sector, type of activities, and the geographic location of the business. Remote payments may be favoured in a context of insecurity and Covid-19, as it reduces the use of cash in commercial transactions. This is especially true during a health crisis like Covid-19 when it is recommended to avoid contact to mitigate the spread of the virus. Therefore, activities that enable remote payments or emphasize delivery services to avoid gatherings will be prioritized over activities that require physical presence, such as hair salons or mobile money agents. Existing evidence show that sectors of activities such as the entertainment, restaurants, and tourism, which require face-to-face interaction, suffered severe losses. In contrast, information, communication, and

[4] The next section discusses our data collection in detail.

delivery services experienced substantial growth during covid-19 crisis (Maria del Rio-Chanona et al., 2020). The economic consequences of Covid-19 also varied significantly between regions, depending on their economy's pre-pandemic conditions, the extent of public containment measures, and the quality of institutional settings (Muggenthaler et al., 2021; Silva et al., 2023). For instance, during the Covid-19 period[5], in Burkina Faso, some cities like Ouagadougou and Bobo-Dioulasso were subject to quarantine measures, whereas Ouahigouya was not. Conversely, in a context of insecurity, service-based businesses may tend to operate part-time or close down, while businesses in the trade sector are likely to continue functioning to supply essential goods like food to the population. Additionally, some cities in Burkina Faso are more exposed to terrorist attacks than others. For example, Ouahigouya, located in the northern part of the country, is more susceptible to terrorist attacks compared to cities like Ouagadougou and Bobo-Dioulasso, where such attacks are less frequent. All these factors are expected to have different effects on the adoption and usage of the merchant account and our paper contributes to the existing literature by taking into account these important dimensions.

3. Survey design and methodology

3.1. Survey design

Firm survey design

We started our research in January 2021, and we targeted three cities to form our sample of informal enterprises, the political capital Ouagadougou that has the highest concentration of firms (55.4%) followed by the economic capital Bobo-Dioulasso (17.3%) and Ouahigouya located in the North of the country which is subject to frequent terrorist attacks. We planned to target informal enterprises in three cities Ouagadougou, Bobo-Dioulasso and Ouahigouya based on the following criteria: firstly, we selected comparable businesses in the trade and service sectors such as retailers and wholesale traders, and restaurants. We propose two sectors because of the trade-off between representativeness and statistical power, as selecting two sectors increases power because the variance in outcomes is plausibly smaller within sectors than between sectors. The second criterion is the possession of a valid ID card, proof of the home address through utility (water or electricity) bill from the business owner or a guarantor.

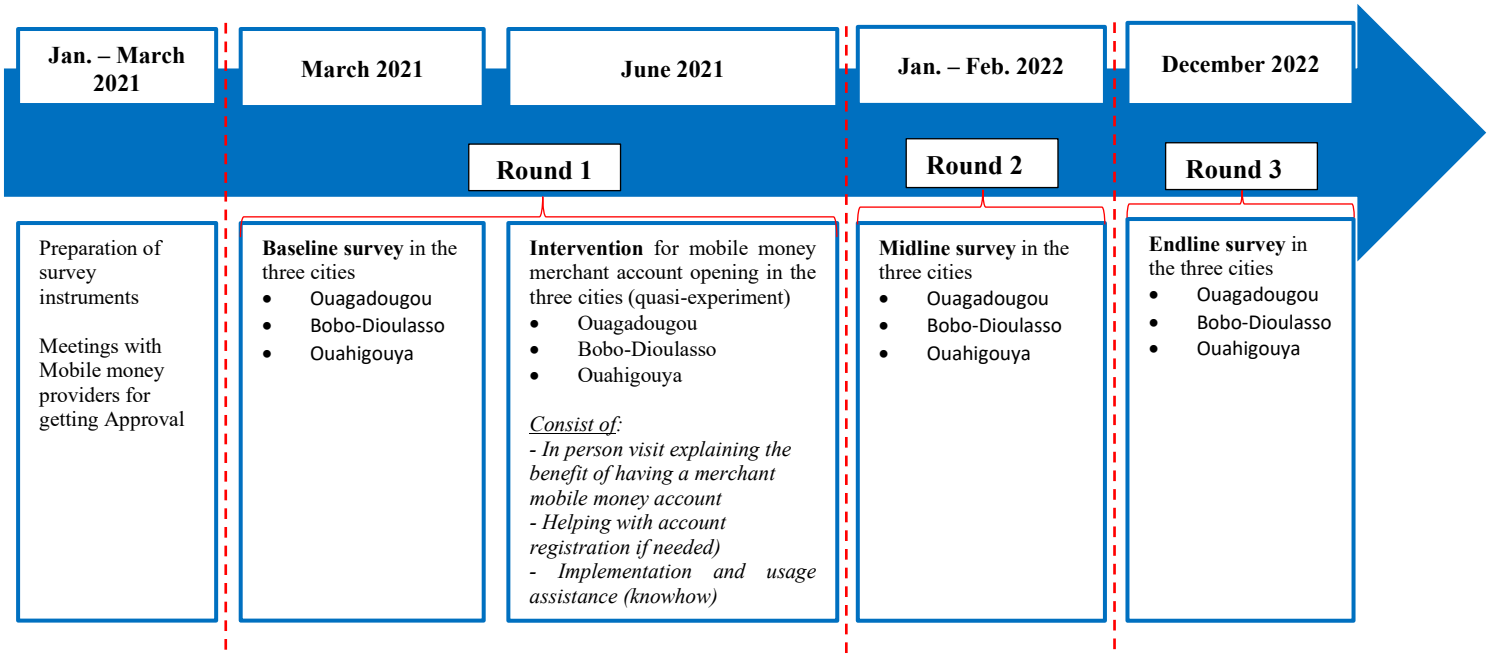
In the meantime, we elaborated the questionnaire to collect information about business and business owners' characteristics. We launched the baseline survey in March 2021 in each city using the database of the Centre de Gestion Agréé (CGA), a branch of the Chambre de Commerce du Burkina Faso in charge of the registration of informal businesses. These data cover informal enterprises operating in the two sectors of our study (trade and services) and distributed in the different urban districts of the three cities. These data were collected during an awareness-raising campaign on formalization carried out in the 13 regions of Burkina by the CGA. However, the database was incomplete and allowed us to obtain only around 40% of our targeted sample once firms such as those with inactive phone numbers, closed or not interested were disregarded. Thus, to complete our sample, we undertook a direct approach in the field in each city. To do so, we randomly assigned each enumerator to a selected district. In fact, in Ouagadougou there is 1 urban municipality with 12 districts; in Bobo-Dioulasso 1 urban municipality with 7 districts, while Ouahigouya there is 1 urban municipality with 15 departments. As our

[5] The Burkinabé government issued a decree on March 27, 2020, imposing a two-week quarantine on some cities, including Ouagadougou, Bobo-Dioulasso, Boromo, Houndé, Dédougou, Banfora, Manga, and Zorgho. During this quarantine period, the entry and exit of individuals in these cities were strictly prohibited, but the movement of goods was not affected. For more details, please see: https://www.gouvernement.gov.bf/informations/actualites/

study focuses on urban areas, enumerators interviewed informal enterprise owner in each district by following an nth informal firm starting from the centre of the district along the main directions of walk in the district or department. Each enumerator was instructed to respect a minimum distance of 50 metres between two informal enterprises interviewed through an elaborated questionnaire.

After the baseline survey and the intervention (see Figure 1), we conduct two follow-up surveys on the same informal businesses, the first in December 2021 (six months after the intervention) and the second in December 2022, and we reach respectively 982 and 899 businesses.

Figure 1. Timeline and outputs.



Intervention process for opening mobile money merchant accounts

While carrying out the listing of informal enterprises, we realized that the majority of respondents were not aware of the merchant account for informal businesses. Too often, it was confused with the personal mobile money account, which is only dedicated to personal transactions and not to business operations. We therefore decided to conduct a quasi-experiment, which consisted of randomly assigning businesses to receive support for merchant account opening. Our aim was to have half of our sample equipped with a merchant account and for this purpose the interviewers should invite the respondent to open a merchant account following an odd order. To facilitate the opening of mobile money merchant accounts, we partnered with the two leading mobile money providers in Burkina Faso (ORANGE and MOOV Africa) that enabled us to draw up a list of the documents required for account opening and to have agents designated to support the processing of applications. Hence, all informal enterprises selected to receive assistance for merchant account have to provide a copy of the national ID, as well as a copy of the utilities bill for those who own one or that of a guarantor, and signed a formal contract involving the provider and the user (business owner). We supported business owners by providing them the contract (that is available upon request to the MNO) and helping to fill in it and sign. We also collected the

remaining documents and transmitted them to the mobile network operators. As there are two merchant account providers (ORANGE and MOOV Africa), we propose the two types of accounts to our sample of informal enterprises with a full description of each product (see Table A.2 in the Appendix).

This is particularly interesting because the two products do not have the same characteristics. For one of the providers, prior our fieldwork we received the SIM cards, an application for the identification of the SIM cards, as well as the advertising posters allowing businesses to be identified as mobile payment receivers. For the other provider, we just received the contracts to apply for merchant accounts opening, which should be processed before we can receive the SIM cards and the advertising posters for distribution. This was critical as the majority of business owner opted for the first provider merchant account as the SIM card was readily available. The initial

Table 1. Merchant account adoption and usage during the study period.

	Round 1					
	(Baseline survey)			**Intervention**		
	Obs.	Sample	Percentage	Obs.	Number	Percentage
Merchant account adoption						
Not opened	***1,387***	*1,387*	*100*	***1,387***	*738*	*53.21*
Opened		*0*	*0*		*649*	*46.79*
Number of accounts opened						
One					620	
Two					29	

	Round 2			**Round 3**		
	Midline survey			Endline survey		
	Obs.	Sample	Percentage	Obs.	Sample	Percentage
Merchant account adoption						
Not opened	***982***	*460*	*46.84*	***899***	*410*	*46.70*
Opened		*522*	*53.16*		*468*	*53.30*
Usage of the account						
Receive payments from customers		*265*	*50.67*		*404*	*86.32*
Withdraws money from the account		*211*	*40.42*		*303*	*64.74*

promise to speed up the process and set up the merchant accounts in less than 2 weeks was not respected by our MNOs providers. On average, the processing of the files took about 2 months due mainly to the lack of communication between agencies of the same provider in the different cities, the need to send documents to the main agency in Ouagadougou for authorization, weak commitment of agents in the three cities to process the merchant accounts opening. This emphasizes the contribution of our study which highlights the difficulties that a business owner has to overcome when willing to open a merchant account. In addition, there were issues related to the maximum number of SIM cards held by business owner that should not exceed five. For those who had reached this maximum, there were two possibilities: i) choose a number between the five allowed to be configured as a merchant SIM or ii) delete the SIM cards not used to keep the one offered. In this way, the SIM numbers are used as agent codes that would allow through the USSD codes to receive payments or make withdrawals. Finally, each entrepreneur who has received the merchant SIM card was invited to insert it into a phone to facilitate its activation and to receive the pin code for its reset to a personal code to validate the various operations that would be initiated.

Data and Sample characteristics

At the end of the baseline survey and the intervention, we reached a sample of 1,387 informal enterprises. These data combine both those obtained using the dataset of CGA and those from our field survey. The two follow-

up surveys reach respectively 982 and 899 informal businesses. Our questionnaire covered a wide-range of topics spanning from business owner characteristics (demographic, education, financial assets, usage of mobile phone, resilience to chocks) to behavioural games (time preference and present bias, risk aversion) and psychological traits (trust and shot-term memory). Most importantly, we asked specific questions related to the impact of covid-19 crisis and political instability that are at the core of the present paper.

Table 1 reports statistics on merchant account opening during our baseline survey and intervention. At the baseline none of the informal businesses own a merchant account and only 5% of them are aware about this account. Our intervention succeeds to open 649 merchant accounts (around half of our sample, 47 percent) while among them 2% opted for the two merchant accounts. During the second wave of the surveys none of the businesses opened or enrolled for a merchant account. At this stage, around 53 percent of the informal businesses experienced the account and among them 51 percent used it to receive payments from customers while 40 percent report cash out operations (withdrawals). The third wave of the surveys report similar statistics, around 53 percent of business still experienced the merchant account. Almost all informal business that experienced the merchant account (86 percent) use it to receive payments, similarly 65 percent withdraw money from their account. These statistics indicate that in the space of about one year (from surveys round 2 to round 3), the usage of merchant account for receiving payments or for withdrawals increases by around 36 percentage points and 24 percentage points.

Table 2 presents summary statistics[6] of the informal businesses in our sample by the status of merchant account (the correlation matrix is reported in Table A.II in the Appendix). We find that the average age of business owner is 32 years on the study period and around 44 percent are 30 years old or less. Moreover, the average informal firm age is 3 years and 53 percent are 3 years old or less in average on study period. In average, around 12 percent of business owner responded that their business is located in unsafe area, 47 percent faced difficulties related to small change management, 43 percent closed temporarily their business due to covid-19, and 31 percent operated remotely. We also see that 62 percent of the respondents have primary education level or less. There is 74 percent informal business operating in the trade sector and 26 percent in the service sector. We succeeded to reach in average around 35 percent of informal business in Ouagadougou, 42 percent in Bobo-Dioulasso, and 23 percent in Ouahigouya.

Considering the two sub-samples of those experienced or not merchant account, we find roughly similar structure in average on the study period. However, we see that among those who experienced merchant account 16% perceive that their business is located in unsafe area compared to 9% of those who did not experience the merchant account. Around 52% of business owners who experienced merchant account are 30 years old compared to 37% of those who did not experienced the merchant account. Further, 60% of businesses are 3 years old among those that experienced merchant account while they are only 47% of those who did not experience the merchant account.

[6] The definition of the variables is reported in Table A.1 in the Appendix.

Table 2. Descriptive Statistics.

	Round 1			Round 2			Round 3			Overall		
	Full sample	Equipped	Not equipped	Full sample	Equipped	Not equipped	Full sample	Equipped	Not equipped	Full sample	Equipped	Not equipped
Firm located in unsafe area												
Yes	12.62	16.18	9.49	12.32	16.09	8.04	12.5	16.14	8.5	12.48	16.14	8.68
No	87.38	83.82	90.51	87.68	83.91	91.96	87.5	83.86	91.5	87.52	83.86	91.32
Firm closed temporarily due to COVID-19												
Yes	43.81	39.67	47.31	42.33	40.28	44.59	43.58	40.81	46.65	43.24	40.25	46.18
No	56.19	60.33	52.69	57.67	59.72	55.41	56.42	59.19	53.35	56.76	59.75	53.82
Firm operated remotely												
Yes	31.07	35.59	27.1	31.36	33.91	28.48	31.16	33.62	28.36	31.20	34.37	27.98
No	68.93	64.41	72.9	68.64	66.09	71.52	68.84	66.38	71.64	68.80	65.63	72.02
Age of business owner												
Less or equal to 30	44.84	54.01	36.77	44.18	50.67	36.82	44.28	51.29	36.27	44.43	51.99	36.62
More than 30	55.16	45.99	63.23	55.82	49.33	63.18	55.72	48.71	63.73	55.57	48.01	63.38
Gender												
Female	18.53	15.72	21	18.53	16.09	21.3	18.72	16.49	21.27	18.59	16.1	21.19
Male	81.47	84.28	79	81.47	83.91	78.7	81.28	83.51	78.73	81.41	83.9	78.81
Education level												
Illiterate	30.07	24.32	35.02	31.08	25.79	37	31.69	25.17	38.73	30.95	25.09	36.92
Primary	31.91	33.55	30.51	31.91	35.24	28.19	31.2	34.41	27.85	31.67	34.4	28.85
Secondary	28.46	30.68	26.54	28.27	28.15	28.41	28.19	28.87	27.34	28.31	29.23	27.43
Professional formation	2.28	1.91	2.6	2.39	2.17	2.64	2.29	2.31	2.28	2.32	2.13	2.51
University	6.62	8.9	4.65	5.72	7.87	3.3	5.9	8.31	3.29	6.08	8.36	3.75
Other	0.66	0.64	0.68	0.62	0.79	0.44	0.72	0.92	0.51	0.67	0.78	0.54
Aware about mobile money merchant account												
Yes	5.12	5.24	5.01									
No	94.88	94.76	94.99									
User of mobile money account												
Yes	82.91	83.2	82.66	84.62	85.25	83.91	84.55	85.43	83.75	84.03	84.63	83.44
No	17.09	16.8	17.34	15.38	14.75	16.09	15.45	14.57	16.25	15.97	15.37	16.56
Age of business												
Less or equal to 3	53.42	61.17	46.61	53.67	59.58	46.96	53.08	59.31	45.97	53.39	60.02	46.51
More than 3	46.58	38.83	53.39	46.33	40.42	53.04	46.92	40.69	54.03	46.61	39.98	53.49
Main dwelling floor												
Wood, Earth or Other	14.57	14.31	14.8	16.7	15.2	18.36	16.28	15.7	16.91	15.85	15.07	16.69
Cement, or Tiles	85.43	85.69	85.2	83.3	84.8	81.64	83.72	84.3	83.09	84.15	84.93	83.31
Household living rooms												
less or equal to 2	53.89	50.89	56.45	52.54	50.7	54.57	52.02	50	53.96	52.82	50.53	54.99
More than 2	46.11	49.11	43.55	47.46	49.3	45.43	47.98	50	46.04	47.18	49.47	45.01
Turnover												
Les or equal to 80000 FCFA	50.9	53.47	48.64	51.63	53.07	50	50.35	52.69	47.5	50.96	53.08	48.71
More than 80000 FCFA	49.1	46.53	51.36	48.37	46.93	50	49.65	47.31	52.5	49.04	46.92	51.29
Sector of activity												
Trade	74.55	75.5	73.71	73.73	74.71	72.61	73.08	74.95	71.39	73.79	75.05	72.57
Service	25.45	24.5	26.29	26.27	25.29	27.39	26.92	25.05	28.61	26.21	24.95	27.43
Cities												
Ouagadougou	39.87	40.22	39.57	30.75	33.91	27.17	33.59	34.26	29.34	34.74	36.13	32.03
Bobo-Dioulasso	39.01	42.21	36.18	44.2	45.02	43.26	44.27	45.61	45.23	42.49	44.28	41.56
Ouahigouya	21.12	17.57	24.25	25.05	21.07	29.57	22.14	20.13	25.43	22.77	19.59	26.42

Note: Throughout, FCFA (Franc of the African Financial Community) refers to the local currency. The exchange rate during the survey period was about 552 FCFA = $1 US.

3.2. Methodology

To investigate the effects of political and Covid-19 crises on adoption of mobile money merchant account by the informal sector businesses, we use the ordinary least square or linear probability model and clustering standard errors at the firm level as follows:

$$\boldsymbol{MMAdoption_i = \alpha_1 + \alpha_2 Crisis_i + \alpha_3 X_i + \alpha_4 R_c + \varepsilon_i} \qquad \textbf{(1)}$$

where $\boldsymbol{MMAdoption_i}$ stands for adoption of a merchant mobile money account by informal firm i. It is a dummy variable that takes the value 1 if the informal firm agreed to open an account (bronze), 0 otherwise. $\boldsymbol{Crisis_i}$ stands alternatively for our independent variables of interest, political and Covid-19 crises. Political crisis is a dummy variable that refers to businesses owners who perceive that their activities are located in an unsafe area due to political unrest. It takes the value 1 if the respondents report that their businesses are located in an unsafe area, and 0 otherwise. Covid-19 crisis is a dummy variable that stands for business owners who report that they closed temporarily during the period of Covid-19. It takes the value 1 for informal business owners who closed temporarily during the period of Covid-19, and 0 otherwise. $\boldsymbol{X_i}$ represents a vector of variables related to business and business owner characteristics, and $\boldsymbol{R_c}$ is a location-cities level vector of controls. We report in Table II the variable definitions along with some summary statistics.

Next, we investigate the effects of political and Covid-19 crises on the usage of the merchant mobile money account by informal sector businesses. To do so, we use the following specification:

$$\boldsymbol{MMUsage_i = \alpha_1 + \alpha_2 Crisis_i + \alpha_3 X_i + \alpha_4 R_c + \varepsilon_i} \qquad \textbf{(2)}$$

where $\boldsymbol{MMUsage_i}$ proxies the usage of the merchant mobile money account by informal firm i, and stands alternatively for receiving *payments* or making *withdrawals*. Hence, when ($\boldsymbol{MMUsage_i = Receiving\ payments}$), this variable indicates whether the business owner effectively uses his merchant account to receive a payment from a customer. When ($\boldsymbol{MMUsage_i = Withdrawals\ from\ account}$), this variable assesses whether the informal firm owner withdraws money from his account. Thus, $\boldsymbol{MMUsage_i}$ is a dummy variable that takes the value 1 if the business owner receives payments or withdraws money from the merchant account, 0 otherwise.

Finally, we check the heterogeneous effects of political and covid-19 crises on mobile money merchant account adoption and usage using an array of business and business owner characteristics. Therefore, we slightly modify our specifications (1) and (2), and include interaction terms as follows:

$$\boldsymbol{MMAcc_i = \alpha_1 + \alpha_2 Crisis_i + \alpha_3 Charact_i + \alpha_4 Crisis_i \times Charact_i + \alpha_5 X'_i + \alpha_6 R_c + \varepsilon_i} \quad \textbf{(3)}$$

where $\boldsymbol{MMAcc_i}$ is a dummy variable that stands alternatively for merchant account adoption or usage by informal firms as defined in equations (1) and (2). $\boldsymbol{Charact_i}$ is a dummy variable that stands for business and business owner characteristics that we consider to assess the heterogeneous effects. These are: remote vs in-person transactions, trade vs service sector, Bobo-Dioulasso (economic capital) vs Ouagadougou (political capital), and Ouahigouya (prone to terrorist attacks vs Ouagadougou. The coefficient of interest is the total effect given by the sum of $\boldsymbol{\alpha_2 + \alpha_4}$. And $\boldsymbol{X'_i}$ is our vector of control from which we remove business and business owner characteristics considered for the dummy $\boldsymbol{Charact_i}$.

Regarding our specifications, we complement our analysis by pooling all the follow-up rounds of surveys to estimate the average effects across rounds. We also perform panel estimations with random effects because differences across individuals in our study stem from between differences rather than within individual characteristics that influence our dependent variables. We also perform a Breusch and Pagan Lagrangian multiplier test for the choice of random effects compared to ordinary least square regressions. As the LM test[7] suggests random effects for some estimations and OLS for others, we report both regression results and obtain consistent findings.

4. Results

4.1. Adoption of merchant account

Expectedly, we find that security issues have a positive and significant effect on mobile money merchant adoption when considering all our specifications (Table 3, columns 1, 2 and 3). As such, the probability to adopt mobile money merchant account increases by around 7 percentage points for business owners who are located in insecure areas. These results are consistent with previous studies showing that in the presence of insecurity or street crimes businesses may prefer electronic payments instead of cash for transactions (Dalton et al., 2019; Economides and Jeziorski, 2017; Wright et al., 2017). Turning to the results associated with covid-19 crisis (Table 3, columns 4, 5 and 6), we find a negative and significant effect on mobile money merchant adoption. Thus, the probability to adopt mobile merchant account decreases by 5 percentage points for businesses affected by covid-19 containment measures such as business closures and lockdowns. This unexpected result is however consistent with the 2020 GSMA Global Adaptation Survey which shows how mobile money agents struggled during the beginning of the pandemic. As such, during lockdowns, several agents closed their businesses and were subject to significant liquidity issues. In the meantime, they experienced substantial decreases in customers who were cautious of the health risks of cash transactions. The report highlights for instance that agents in Uganda had limited ability to travel to rebalance, and had to use working capital to support their families. Similarly, agents in Kenya reported income dropping by over 50% during the initial lockdown in 2020 (Awanis and Gamble, 2021; McCaffrey, 2022). Our findings are also consistent with the Center for Financial Inclusion (CFI)'s longitudinal survey of micro, small, and medium businesses (MSMEs) owners in Colombia, India, Indonesia, and Nigeria. The study based on data collected every two months over a 12-month period in 2020 and 2021 shows that while MSMEs' owners saw a benefit in marketing and communicating via digital platforms, when it came to selling or conducting transactions digitally, many MSMEs were hesitant to adopt digital tools into their business. Few MSMEs in the sample conducted direct-to-consumer digital transactions during the pandemic. Precisely, it shows that the percentage of MSMEs selling on digital platforms remained steady at around 10 percent across all survey waves in Nigeria while in India and Indonesia, the number of MSMEs selling on digital platforms decreased during CFI's study (Modi, 2022).

Regarding individual characteristics, we find that younger, male, formal education, users of mobile money and household living conditions of businesses owners increase the likelihood to adopt merchant mobile money accounts. These results suggest that younger business owners are more likely to adapt to new payment technology than older business owners. Similarly, our findings imply that female are disadvantaged compared to

[7] A Breusch and Pagan Lagrangian multiplier test for random effects, for each estimation, with a Chibar2 p-value less than 0.05 suggests that random effects are required for the analysis.

Table 3. Effects of political and covid-19 crises on merchant account adoption.

	Dependent variable: Adoption of merchant account					
	Unsafe area			Closed temporarily due to COVID-19		
	Round 1	Pooled	Panel	Round 1	Pooled	Panel
	(1)	(2)	(3)	(4)	(5)	(6)
Crisis	0.069***	0.072***	0.068***	-0.056**	-0.052*	-0.051**
	(0.018)	(0.019)	(0.018)	(0.028)	(0.029)	(0.026)
Age	-0.031***	-0.030***	-0.030***	-0.031***	-0.030***	-0.030***
	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.008)
Age squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.073**	-0.059	-0.071**	-0.085**	-0.068*	-0.082**
	(0.035)	(0.037)	(0.034)	(0.035)	(0.037)	(0.034)
Formal education	0.060*	0.069**	0.060*	0.062*	0.068**	0.061*
	(0.032)	(0.033)	(0.031)	(0.032)	(0.034)	(0.031)
Aware about mobile money merchant account	-0.035	-0.076	-0.014	-0.032	-0.070	-0.013
	(0.067)	(0.071)	(0.064)	(0.066)	(0.070)	(0.064)
User of mobile money account	0.034*	0.052***	0.042**	0.032	0.050**	0.040**
	(0.019)	(0.020)	(0.019)	(0.019)	(0.020)	(0.019)
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	-0.003	-0.012	-0.028	-0.027	-0.033	-0.050
	(0.044)	(0.045)	(0.042)	(0.044)	(0.045)	(0.043)
Household living rooms (number)	0.040***	0.037**	0.039***	0.040***	0.038**	0.039**
	(0.015)	(0.016)	(0.015)	(0.016)	(0.016)	(0.015)
Firm turnover	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fledgling firm (using the median==3 years)	0.094***	0.101***	0.100***	0.101***	0.108***	0.107***
	(0.030)	(0.031)	(0.029)	(0.030)	(0.032)	(0.030)
Sector of activity	0.018	0.029	0.022	0.017	0.028	0.021
	(0.032)	(0.033)	(0.026)	(0.032)	(0.033)	(0.026)
Constant	0.738***	0.652***	0.707***	0.920***	0.846***	0.895***
	(0.176)	(0.185)	(0.171)	(0.169)	(0.179)	(0.165)
Observations	1,303	3,058	3,058	1,285	3,019	3,019
R-squared / Overall	0.070	0.073	0.068	0.065	0.066	0.062
F-statistics / Wald chi2	9.126***	11.55***	182.0***	8.382***	10.42***	168.5***
City	Yes	Yes	Yes	Yes	Yes	Yes
Time	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	1,303	1,340	1,340	1,285	1,321	1,321

Note: Adoption of merchant account is the dependent variable, it is a dummy variable that takes the value 1 if the business adopts merchant account and 0 otherwise. The variable of interest, Crisis is also a dummy variable that stands alternatively for Political crisis and Covid-19 crisis that equals to 1 if business indicates located in an unsafe area (or closed temporarily due to the Covid-19), and 0 otherwise. Control variables include business or business owner characteristics. Robust standard errors cluster at business level are in brackets. ***Significant at the 1 per cent level,**Significant at the 5 per cent level,*Significant at the 10 per cent level.

men in the adoption of merchant accounts. Moreover, low levels of formal education of business owners can prevent their adoption of merchant account. Interestingly, we find that business owners that use a personal mobile money account are more likely to adopt merchant account than non-users of mobile money account. Furthermore, the number of households living rooms, which is a proxy for wealthy, shows that the wealthiest business owners are more likely to adopt merchant account than the poorest. Turning to business level characteristics, the results show that turnover and fledgling firm have a positive and significant effect on mobile money merchant adoption. Hence, as increased turnover and start up business with less than three years (median age of businesses) are more likely to transition to merchant account compared to those businesses that are accustomed to cash and may be reluctant to switch to merchant account.

4.2. Usage of merchant account

The results reported in Table 4 show that both political and covid-19 crises affect the usage of merchant account for reception of payments as well as making withdrawals. It is worth to note that from the merchant account only two services are currently available in Burkina Faso. Merchants can use the account to receive payments from customers or withdraw money from their account. Moreover, making withdrawals from the merchant account does not need to be perceived negatively. Like in the traditional banking system, mobile money account holders can choose to make withdrawals based on their personal financial patterns.

Our findings show that insecurity issues affect positively and significantly the usage of merchant account both for reception of payments and withdrawals. Thus, from the demand side, the probability to receive merchant payments increases by around 5 percentage points for business owners who are located in insecure areas. Similarly, we find that the probability to withdraw money from merchant account increases by 4 percentage points for business owners located in insecure areas. The results also show that covid-19 crisis have a positive and significant effect on receiving payments from merchant account (pooled and Panel data specifications) while We find a negative and significant effect on withdrawals (midline specification). Hence, the probability to receive merchant payments increases by around 7 percentage points for business owners affected by the business closure due to covid-19 crisis. But the results show that the probability to withdraw money from the merchant account decreases by around 9 percentage points for business owners impacted by covid-19 crisis. Regarding the positive effect of insecurity issues on withdrawals, we conjecture that this finding may be linked to the fact that the merchant account is a recent product in Burkina Faso. As such, very few actors in the business value chain, suppliers for instance, have merchant account to reduce cash payments. As regards the negative effect of covid-19 crisis on withdrawals from the merchant account, this result is consistent with the idea of reducing cash payments during the acute period of covid-19 pandemic (which corresponds to our midline period) to reduce the proliferation of the virus. As such, we notice that this negative effect fades away as time passes by and the coefficient becomes positive (although non-significant) twelve months after business closure (Table 4, columns 11 and 12).

Table 4. Effects of political and covid-19 crises on merchant account usage (payments and withdrawals).

	Dependent variable: Usage of merchant account to Receive Payments						Dependent variable: Usage of merchant account to Withdraw money					
	Unsafe area			Closed temporarily due to COVID-19			Unsafe area			Closed temporarily due to COVID-19		
	Round 2	Pooled	Panel	Round 2	Pooled	Panel	Round 2	Pooled	Panel	Round 2	Pooled	Panel
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Crisis	0.045*	0.047***	0.048***	-0.008	0.069**	0.072**	0.026	0.037**	0.037**	-0.092**	0.023	0.025
	(0.027)	(0.018)	(0.018)	(0.044)	(0.029)	(0.029)	(0.026)	(0.017)	(0.017)	(0.043)	(0.029)	(0.029)
Age	0.004	0.012	0.012	0.006	0.012	0.012	-0.004	0.002	0.002	-0.001	0.002	0.002
	(0.012)	(0.008)	(0.008)	(0.012)	(0.007)	(0.007)	(0.011)	(0.008)	(0.008)	(0.011)	(0.008)	(0.008)
Age squared	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	0.066	0.045	0.045	0.066	0.036	0.036	-0.068	0.011	0.011	-0.058	0.013	0.013
	(0.057)	(0.037)	(0.037)	(0.058)	(0.037)	(0.037)	(0.057)	(0.037)	(0.037)	(0.058)	(0.037)	(0.037)
Formal education	0.083*	0.023	0.023	0.093*	0.030	0.029	0.028	0.005	0.005	0.029	0.011	0.011
	(0.049)	(0.032)	(0.032)	(0.049)	(0.032)	(0.032)	(0.048)	(0.031)	(0.031)	(0.048)	(0.031)	(0.031)
Aware about mobile money merchant account	0.169*	0.058	0.057	0.178*	0.055	0.054	-0.052	0.028	0.028	-0.033	0.028	0.028
	(0.097)	(0.079)	(0.079)	(0.098)	(0.080)	(0.080)	(0.098)	(0.072)	(0.072)	(0.100)	(0.073)	(0.073)
User of mobile money account	0.006	0.039*	0.039*	0.008	0.035	0.035	0.003	0.020	0.020	0.010	0.018	0.018
	(0.031)	(0.021)	(0.021)	(0.032)	(0.021)	(0.021)	(0.031)	(0.021)	(0.021)	(0.031)	(0.021)	(0.021)
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	0.026	0.064	0.063	0.011	0.057	0.057	-0.043	0.009	0.009	-0.064	-0.001	-0.001
	(0.075)	(0.044)	(0.044)	(0.075)	(0.045)	(0.045)	(0.073)	(0.042)	(0.042)	(0.073)	(0.043)	(0.043)
Household living rooms (number)	0.014	-0.015	-0.015	0.019	-0.011	-0.011	0.032	0.000	0.000	0.031	0.001	0.001
	(0.024)	(0.016)	(0.016)	(0.025)	(0.016)	(0.016)	(0.024)	(0.015)	(0.015)	(0.025)	(0.015)	(0.015)
Firm turnover	-0.000	-0.000*	-0.000*	-0.000	-0.000**	-0.000**	-0.000**	-0.000	-0.000	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fledgling firm (using the median==3 years)	0.063	0.086***	0.086***	0.080*	0.097***	0.097***	0.013	0.014	0.014	0.027	0.023	0.023
	(0.046)	(0.030)	(0.030)	(0.046)	(0.030)	(0.030)	(0.045)	(0.029)	(0.029)	(0.045)	(0.029)	(0.029)
Sector of activity	0.070	-0.007	-0.006	0.070	-0.006	-0.005	0.026	0.000	0.000	0.029	0.002	0.002
	(0.050)	(0.032)	(0.032)	(0.050)	(0.032)	(0.032)	(0.049)	(0.032)	(0.032)	(0.048)	(0.032)	(0.032)
Constant	0.366	-0.013	-0.012	0.412	0.063	0.062	0.422*	0.268	0.268	0.462*	0.344*	0.343*
	(0.264)	(0.182)	(0.182)	(0.254)	(0.174)	(0.174)	(0.252)	(0.182)	(0.182)	(0.245)	(0.178)	(0.178)
Observations	543	1,196	1,196	536	1,181	1,181	543	1,196	1,196	536	1,181	1,181
R-squared / Overall	0.078	0.074	0.074	0.076	0.074	0.075	0.028	0.045	0.045	0.036	0.045	0.045
F-statistics / Wald chi2	3.865***	8.712***	119.9***	3.900***	8.570***	118.1***	1.659*	4.418***	61.83***	2.133**	4.420***	62.01***
City	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	543	797	797	536	787	787	543	797	797	536	787	787

Note: Adoption of merchant account is the dependent variable, it is a dummy variable that takes the value 1 if the business adopts merchant account and 0 otherwise. The variable of interest, Crisis is also a dummy variable that stands alternatively for Political crisis and Covid-19 crisis that equals to 1 if business indicates located in an unsafe area (or closed temporarily due to the Covid-19), and 0 otherwise. Control variables include business or business owner characteristics. Robust standard errors cluster at business level are in brackets. ***Significant at the 1 per cent level,**Significant at the 5 per cent level,*Significant at the 10 per cent level.

4.3. Heterogeneous effects on adoption and usage of merchant account

In Tables 5 and 6 we check the heterogeneous effects of political and covid-19 crises on merchant account adoption and usage. Precisely, we set remote vs in-person transactions, trade vs service sector, economical capital (Bobo-Dioulasso) vs political capital (Ouagadougou), and the northern city Ouahigouya subject to frequent terrorist attacks vs Ouagadougou. From Table 5 (Panel A), we find similar impact of insecurity on the adoption of merchant account when comparing remote to in-person transactions, or economical to political cities. However, we find that in a political crisis context, business owners involved in the trade sector are more likely to adopt merchant account compared to those in the service sector. Similarly, business owners located in cities with fewer terrorist attacks are more likely to adopt merchant account than business owners located in cities plagued with higher terrorist attacks. Regarding the usage of merchant account (Panels B and C), the results show that in a political crisis context, business owners involved in face-to-face transactions, the trade sector and located in the capital city (Ouagadougou have more likelihood to receive merchant payments and, to some extent, make withdrawals (Panel data specification).

In Table 6 (Panel A), the results show that the negative effect of lockdowns on the decision to register for mobile money merchant account is more pronounced for in-person transactions, activities in the service sector or businesses located in the capital city (Ouagadougou) where covid-19 containment measures were the most stringent. Turning to the usage of merchant account (Panels B and C), we find that the covid-19 crisis effect depends on the nature and the sector of the activity. More precisely, business owners able to operate remotely or involved in the trade sector are more likely to receive merchant payments and make withdrawals from their merchant account than those requiring in-person operations or in the service sector during lockdowns. Hence, the possibility of businesses to operate remotely and in the trade sector help mitigate the negative impact associated with the temporary closure of businesses during the period of covid-19. These findings are in line with Fu and Mishra (2021), Hossain et al. (2022) and Sahay et al. (2020) who document that mobile money can help businesses build resilience during lockdowns given growing preference for cashless and contactless transactions to mitigate the spread of the covid-19.

Table 5. Effects of political crisis on merchant account adoption and usage.

Panel A	Dependent variable: Adoption of merchant account											
	Round 1				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unsafe area	0.047**	-0.018	0.090***	-0.012	0.049**	-0.015	0.089***	0.004	0.044**	-0.018	0.093***	-0.027
	(0.022)	(0.040)	(0.027)	(0.061)	(0.023)	(0.041)	(0.028)	(0.064)	(0.022)	(0.038)	(0.026)	(0.060)
Characteristics	-0.120	-0.293**	-0.019	-0.136	-0.152	-0.281**	0.014	-0.078	-0.137	-0.283**	-0.009	-0.189
	(0.105)	(0.126)	(0.106)	(0.206)	(0.112)	(0.130)	(0.111)	(0.213)	(0.103)	(0.123)	(0.104)	(0.200)
Unsafe area x Characteristics	0.072**	0.113**	-0.008	0.076	0.073*	0.113**	-0.008	0.057	0.073**	0.109**	-0.011	0.087
	(0.037)	(0.044)	(0.037)	(0.066)	(0.039)	(0.045)	(0.039)	(0.069)	(0.036)	(0.042)	(0.036)	(0.065)
Total effects	0.119***	0.095***	0.083***	0.064**	0.122***	0.098***	0.081***	0.060**	0.117***	0.092***	0.082***	0.060**
	(0.030)	(0.020)	(0.026)	(0.026)	(0.032)	(0.021)	(0.027)	(0.028)	(0.029)	(0.019)	(0.025)	(0.025)
Observations	1,303	1,303	1,031	780	3,058	3,058	2,370	1,734	3,058	3,058	2,370	1,734
R-squared / Overall	0.077	0.075	0.084	0.091	0.077	0.078	0.083	0.102	0.0724	0.0733	0.0786	0.0935
F-statistics / Wald chi2	8.668***	9.237***	8.438***	6.749***	10.80***	11.54***	9.275***	9.325***	191.3***	193.2***	156.0***	156.2***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	1303	1303	1031	780	1340	1340	1050	805	1340	1340	1050	805

Panel B	Dependent variable: Usage of merchant account to Receive Payments											
	Round 2				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unsafe area	0.051	0.007	0.028	-0.086	0.056***	0.052	0.007	-0.057	0.057***	0.053	0.007	-0.051
	(0.033)	(0.058)	(0.038)	(0.121)	(0.022)	(0.035)	(0.023)	(0.062)	(0.022)	(0.036)	(0.023)	(0.063)
Characteristics	0.042	-0.070	0.023	-0.147	-0.009	0.009	0.238**	-0.049	-0.010	0.011	0.238**	-0.030
	(0.164)	(0.188)	(0.158)	(0.386)	(0.105)	(0.114)	(0.097)	(0.198)	(0.105)	(0.115)	(0.097)	(0.201)
Unsafe area x Characteristics	-0.018	0.051	0.055	0.176	-0.027	-0.006	0.068**	0.111*	-0.027	-0.006	0.068**	0.104
	(0.058)	(0.066)	(0.056)	(0.127)	(0.037)	(0.041)	(0.034)	(0.066)	(0.038)	(0.041)	(0.034)	(0.068)
Total effects	0.033	0.058*	0.082**	0.090**	0.029	0.046**	0.075***	0.053**	0.029	0.046**	0.075***	0.053**
	(0.048)	(0.030)	(0.040)	(0.042)	(0.031)	(0.020)	(0.025)	(0.025)	(0.031)	(0.020)	(0.025)	(0.025)
Observations	543	543	487	285	1,196	1,196	1,011	580	1,196	1,196	1,011	580
R-squared / Overall	0.078	0.079	0.067	0.135	0.080	0.074	0.177	0.274	0.0796	0.0737	0.177	0.274
F-statistics / Wald chi2	3.339***	3.680***	2.720***	3.626***	8.260***	8.132***	19.52***	19.55***	130.8***	119.8***	292.8***	291.4***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	543	543	487	285	797	797	650	403	797	797	650	403

Panel C	Dependent variable: Usage of merchant account to Withdraw money											
	Round 2				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Unsafe area	0.023	0.021	0.022	-0.033	0.038*	0.028	0.004	-0.024	0.038*	0.028	0.004	-0.019
	(0.032)	(0.055)	(0.038)	(0.144)	(0.021)	(0.036)	(0.022)	(0.080)	(0.021)	(0.036)	(0.022)	(0.080)
Characteristics	-0.048	0.006	-0.051	0.081	-0.059	-0.032	0.089	0.065	-0.059	-0.032	0.089	0.082
	(0.155)	(0.177)	(0.150)	(0.149)	(0.098)	(0.117)	(0.100)	(0.258)	(0.098)	(0.117)	(0.100)	(0.258)
Unsafe area x Characteristics	0.010	0.007	0.026	-0.101	0.035	0.039**	0.070***	0.053**	-0.002	0.012	0.066*	0.072
	(0.056)	(0.062)	(0.054)	(0.461)	(0.028)	(0.019)	(0.026)	(0.025)	(0.035)	(0.041)	(0.034)	(0.084)
Total effects	0.033	0.028	0.049	0.049	-0.002	0.012	0.066*	0.077	0.035	0.039**	0.070***	0.053**
	(0.046)	(0.030)	(0.038)	(0.038)	(0.035)	(0.041)	(0.034)	(0.084)	(0.028)	(0.019)	(0.026)	(0.025)
Observations	543	543	487	285	1,196	1,196	1,011	580	1,196	1,196	1,011	580
R-squared / Overall	0.029	0.028	0.028	0.047	0.049	0.046	0.081	0.162	0.0492	0.0455	0.0814	0.162
F-statistics / Wald chi2	1.466	1.538*	1.480	0.983	4.258***	4.131***	6.877***	9.578***	68.14***	61.96***	103.2***	144.5***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	543	543	487	285	797	797	650	403	797	797	650	403

Note: Dependent variables Adoption of merchant account, Usage of merchant account to Receive Payments, and Usage of merchant account to Withdraw money are all dummies. The variables of interest, Unsafe area a dummy variable that equals to 1 if business indicates located in an unsafe area, and 0 otherwise, and its interaction with Characteristics that stand for remote vs in-person transactions, trade vs service sector, economical capital (Bobo-Dioulasso) vs political capital (Ouagadougou), and the northern city Ouahigouya subject to frequent terrorist attacks vs Ouagadougou. Control variables include business or business owner characteristics. Robust standard errors cluster at business level are in brackets. ***Significant at the 1 per cent level,**Significant at the 5 per cent level,*Significant at the 10 per cent level.

5. Conclusion

In this paper, we set to explore how political instability coupled with covid-19 crisis affect mobile money adoption and use by informal businesses using a quasi-experiment approach for merchant account opening. Despite the formidable capacity of mobile money to bridge the financial inclusion gap, to the best of our knowledge, the extant literature focuses exclusively on registered firms and this study is the first to use this strategy to fill this gap. East Africa has been the center stage of studies on mobile money and therefore, considering West Africa and Burkina Faso in particular, that is plagued with terrorist tacks and political instability adds to the literature. More interestingly, we take advantage of the specific case of Burkina Faso where a mobile money account designed for informal businesses (better known as a Bronze merchant account) was recently introduced.

Overall, our results show that business owners who perceive that their activities are located in an unsafe area are more likely to adopt and use mobile money merchant accounts. Moreover, our main findings show that business owners in the trade sector and able to conduct their activities remotely are more likely to adopt and use mobile money merchant accounts and overcome the negative effect of the temporary closure of businesses during the covid-19. We also show that business and business owner characteristics affect mobile money merchant account adoption. Considering individual characteristics, our findings indicate that younger, male, formal education and household living conditions of businesses owners affect the decision to adopt merchant accounts. Regarding business level characteristics, the results show that turnover and fledgling firm impacts the likelihood to adopt mobile money merchant account.

The adoption of merchant account by micro, small, medium enterprises can help them address some of their financial challenges, including overall bookkeeping capabilities, cash flow and liquidity management and limited access to credit. The transaction records produced by mobile money can also help foster a shift to the formal economy by integrating informal sector users in business networks, formal finance, and linking them to the government. Hence, a key outstanding question left for future investigation is whether and how the adoption of merchant account can induce informal businesses toward formalization.

Table 6. Effects of covid-19 crisis on merchant account adoption and usage

Panel A	Dependent variable: Adoption of merchant account											
	Round 1				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Closed temporarily due to COVID-19	-0.063*	-0.081	0.012	-0.082	-0.065*	-0.098*	0.027	-0.051	-0.053*	-0.070*	-0.002	-0.069
	(0.033)	(0.055)	(0.047)	(0.060)	(0.035)	(0.057)	(0.048)	(0.061)	(0.030)	(0.041)	(0.037)	(0.058)
Characteristics	0.066	0.001	-0.004	0.064	0.026	0.000	0.069	0.105*	0.060	0.011	-0.001	0.052
	(0.040)	(0.043)	(0.044)	(0.057)	(0.041)	(0.044)	(0.045)	(0.058)	(0.039)	(0.030)	(0.042)	(0.055)
Closed temporarily due to COVID-19 x Characteristics	0.019	0.034	-0.097	0.008	0.041	0.063	-0.167**	-0.071	0.006	0.028	-0.081	-0.009
	(0.059)	(0.063)	(0.064)	(0.075)	(0.062)	(0.066)	(0.067)	(0.078)	(0.057)	(0.049)	(0.053)	(0.073)
Total effects	-0.044	-0.047	-0.085*	-0.074*	-0.024	-0.035	-0.140***	-0.123***	-0.047	-0.041	-0.082**	-0.078*
	(0.050)	(0.032)	(0.044)	(0.044)	(0.052)	(0.034)	(0.047)	(0.048)	(0.049)	(0.031)	(0.042)	(0.044)
Observations	1,285	1,285	1,016	771	3,019	3,019	2,338	1,715	3,019	3,019	2,338	1,715
R-squared / Overall	0.070	0.065	0.073	0.089	0.068	0.067	0.075	0.107	0.063	0.062	0.069	0.097
F-statistics / Wald chi2	7.694***	7.770***	7.053***	6.616***	9.331***	9.739***	8.174***	10.02***	172.1***	167.9***	124.5***	158.2***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	1285	1285	1016	771	1321	1321	1034	796	1321	1321	1034	796

Panel B	Dependent variable: Usage of merchant account to Receive Payments											
	Round 2				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Closed temporarily due to COVID-19	-0.025	-0.080	-0.105	-0.036	0.020	0.045	-0.027	0.060	0.022	0.052	-0.021	0.069
	(0.051)	(0.085)	(0.066)	(0.123)	(0.035)	(0.055)	(0.043)	(0.061)	(0.035)	(0.055)	(0.043)	(0.061)
Characteristics	-0.030	0.028	0.079	0.275**	-0.155***	-0.020	0.388***	0.267***	-0.154***	-0.017	0.390***	0.273***
	(0.064)	(0.068)	(0.065)	(0.112)	(0.039)	(0.042)	(0.040)	(0.059)	(0.039)	(0.042)	(0.040)	(0.060)
Closed temporarily due to COVID-19 x Characteristics	0.056	0.097	0.196**	0.138	0.165***	0.034	0.070	-0.008	0.162***	0.027	0.065	-0.020
	(0.093)	(0.099)	(0.092)	(0.140)	(0.060)	(0.065)	(0.059)	(0.074)	(0.061)	(0.065)	(0.059)	(0.075)
Total effects	0.031	0.017	0.091	0.102	0.184***	0.078**	0.043	0.052	0.184***	0.079**	0.043	0.049
	(0.079)	(0.051)	(0.066)	(0.067)	(0.051)	(0.035)	(0.041)	(0.040)	(0.051)	(0.034)	(0.041)	(0.041)
Observations	536	536	480	283	1,181	1,181	998	574	1,181	1,181	998	574
R-squared / Overall	0.077	0.078	0.071	0.130	0.086	0.075	0.172	0.271	0.086	0.075	0.172	0.271
F-statistics / Wald chi2	3.472***	3.844***	3.132***	4.114***	8.712***	8.095***	18.27***	19.33***	138.1***	119.3***	273.9***	287.6***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	536	536	480	283	787	787	642	398	787	787	642	398

Panel C	Dependent variable: Usage of merchant account to Withdraw money											
	Round 2				Pooled				Panel			
	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya	Remote vs In-Person Transactions	Trade vs Service	Ouagadougou vs Bobo	Ouagadougou vs Ouahigouya
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Closed temporarily due to COVID-19	-0.109**	-0.217***	-0.126**	-0.061	-0.006	-0.095*	-0.016	0.110	-0.003	-0.087	-0.011	0.116
	(0.050)	(0.081)	(0.064)	(0.112)	(0.035)	(0.054)	(0.042)	(0.073)	(0.035)	(0.054)	(0.042)	(0.073)
Characteristics	-0.043	-0.044	0.003	0.126	-0.105***	-0.068	0.286***	0.352***	-0.104***	-0.065	0.288***	0.358***
	(0.063)	(0.066)	(0.065)	(0.112)	(0.039)	(0.042)	(0.044)	(0.073)	(0.039)	(0.042)	(0.044)	(0.072)
Closed temporarily due to COVID-19 x Characteristics	0.058	0.168*	0.069	0.015	0.097*	0.162**	-0.024	-0.134	0.095	0.154**	-0.029	-0.141
	(0.091)	(0.095)	(0.092)	(0.130)	(0.059)	(0.063)	(0.063)	(0.088)	(0.059)	(0.063)	(0.063)	(0.088)
Total effects	-0.052	-0.048	-0.057	-0.046	0.091*	0.067**	-0.040	-0.024	0.091*	0.067**	-0.040	-0.025
	(0.077)	(0.050)	(0.066)	(0.068)	(0.049)	(0.034)	(0.046)	(0.047)	(0.049)	(0.034)	(0.046)	(0.047)
Observations	536	536	480	283	1,181	1,181	998	574	1,181	1,181	998	574
R-squared / Overall	0.037	0.042	0.035	0.045	0.051	0.051	0.079	0.163	0.051	0.050	0.079	0.163
F-statistics / Wald chi2	1.887**	2.187**	1.838**	1.015	4.430***	4.822***	6.247***	9.093***	70.84***	71.77***	93.62***	136.9***
Controls included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	536	536	480	283	787	787	642	398	787	787	642	398

Note: Dependent variables Adoption of merchant account, Usage of merchant account to Receive Payments, and Usage of merchant account to Withdraw money are all dummies. The variables of interest, Closed temporarily due to COVID-19 a dummy variable that equals to 1 if business indicates closed temporarily due to COVID-19, and 0 otherwise, and its interaction with Characteristics that stand for remote vs in-person transactions, trade vs service sector, economical capital (Bobo-Dioulasso) vs political capital (Ouagadougou), and the northern city Ouahigouya subject to frequent terrorist attacks vs Ouagadougou. Control variables include business or business owner characteristics. Robust standard errors cluster at business level are in brackets. ***Significant at the 1 per cent level,**Significant at the 5 per cent level,*Significant at the 10 per cent level.

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APPENDIX

Table A.1. Definition of variables.

Variable	Definition
Dependent variables	
Adoption of merchant account	Indicates whether business owners decided to adopt a mobile money merchant account or not. Encoded as Yes = 1, No = 0
Usage of merchant account to receive money	Indicates whether business owners received merchant payments or not. Encoded as Yes = 1, No = 0
Usage of merchant account to withdraw money	Indicates whether business owners withdraw money from merchant payments or not. Encoded as Yes = 1, No = 0
Independent variables of interest	
Business located in unsafe area	Reply to the question: how safe is the area where your business is located in terms of security and/or terrorist attacks? Encoded as (Very dangerous, Dangerous) = 1, Otherwise = 0
Business closed temporarily due to covid-19	Reply to the question: Has your business been temporarily closed due to covid-19? Encoded as Yes = 1, No = 0
Control variables	
Age	Indicate the logarithm of the business owner age
Female	Indicate the gender of business owner, Encoded as Female = 1, Male = 0
Formal education	Indicate the education level of business owner. Encoded as (Primary, Secondary, Professional formation, University) = 1, Otherwise = 0
Awareness about mobile money merchant account	Indicates whether business owner already ear about mobile money merchant account or not. Encoded as Yes = 1, No = 0
User of mobile money account	Indicate whether business owner has a mobile money account or not. Encoded as Yes = 1, Not = 0
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	Indicates the type of soil in the main house of business owner. Encoded as (Wood, Earth or Other) = 1, (Cement, or Tiles) = 0
Household living rooms (number)	Indicates the number of habitable rooms that the household has in its main dwelling
Business turnover	Indicates the turnover level of the business
Fledgling business	It is a dummy variable that indicates the age of the business. Encoded as age less of or equal to the median (3 years) = 1, otherwise = 0
Heterogeneous variables	
Business type of operation remotely	Indicates whether the businesses activities can be conducted remotely or in-person. Encoded as Remotely = 1, In-person = 0
Sector of activity	Indicates the sector of activity of the business. Encoded as Trade = 1, Service = 0
Ouagadougou	Refers to the political capital city, which is under fewer terrorist attacks and was subject to quarantine during covid-19 crisis.
Bobo-Dioulasso	Refers to the economical city, which is under fewer terrorist attacks and was less subject to quarantine during covid-19 crisis.
Ouahigouya	Refers to the city of Ouahigouya, which is under higher terrorist attacks and was not subject to quarantine during covid-19 crisis.

Table A.2. Description of mobile money merchant accounts accessible by informal enterprises in Burkina Faso.

	PRODUCTS	ACCESS	ADVANTAGES	DISADVANTAGES
For informal businesses	Merchant Account Bronze from ORANGE	• Copy of valid ID card or passport • Electricity or water bill or fill in a declaration on honour plus a copy of valid ID card or passport of a neighbour • Fill in a description of the activities • Fill in and sign the contract to open the account	• Minimum payment receipt: any amount • Maximum payment receipt: up to the ceiling amount of F 2 000 000 • Account limit: 2 000 000F / month • Free withdrawals: limited to the ceiling amount of 2,000,000 F / month, which can be split into several amounts	• Still an informal company • Low ceiling amount • +/- Low amount of withdrawals • The number of possible free withdrawals is limited to the ceiling amount of 2,000,000 F / month which can be split into several amounts • Additional fees when the maximum of 2 000 000 F is exceeded in a month
	Merchant Account for informal firms from MOOV Africa	• Copy of valid ID card or passport • Electricity or water bill or fill in a declaration on honour plus a copy of valid ID card or passport of a neighbour • Fill in a description of the activities • Fill in and sign the contract to open the account	• Receipt of minimum payments of 100F • Maximum payment receipt 10 000 F • Account limit 500 000 F • Withdrawals free of charge at the rate of one withdrawal per day with a maximum of 30 000 F	• Still an informal company • Low ceiling amount • +/- Low amount of withdrawals • The number of possible free withdrawals is limited to 1 withdrawal/day • Additional fees for more than 1 withdrawal/day

Note: Author's analysis of merchant account in the case of Burkina Faso. Throughout, FCFA (Franc of the African Financial Community) refers to the local currency. The exchange rate during the survey period was about 552 FCFA = $1 US.