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Can mobile money adoption induce microenterprises to formalize? Evidence from a field experiment in Burkina Faso*

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ABSTRACT

This paper examines whether mobile money adoption can induce informal firms to formalize, an aspect that has been overlooked in the empirical literature. Despite several regulatory reforms such as simplifying tax systems and reducing the costs and time needed to register a business, informality is still pervasive and persistent in developing countries. Using the case of Burkina Faso, we test leading theories of demand of mobile money for enterprises and business registration in developing countries, combining a quasi-experiment with a randomized controlled trial conducted in March 2021. We find a strong positive impact of mobile money adoption on the decision to formalize. Furthermore, we show that the impact of adoption and usage of merchant account on formalization is stronger for businesses that are comparatively younger (less than 3 years old), lack sales records or located outside the capital city Ouagadougou. Therefore, mobile money appears as a springboard toward formalisation for this category of informal firms. According to our treatments, we find that while information about registration process, formal merchant account, and supporting 30% of registration fees (through reimbursement or payment in advance) increase formalization, the impact varies across several dimensions. Precisely, whether the recipient of the program indicated willing to formalize or adopted the merchant account at baseline appears to be of great importance. For instance, the subsidy of 30% of registration fees works better when paid as a reimbursement instead of payment in advance, particularly for business owners who responded willing to formalize at baseline. Thus, our findings cast doubt on universal incentives packages and suggest that incentives should be carefully designed and tailored to the characteristics of the targeted firms. Taken together, our results have important implications for both researchers and policy makers. (JEL codes: O33, O17, D22, O12, G23)

Keywords: Mobile money, Informality, field experiments, Fragile state, Burkina Faso

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I. Introduction

Burkina Faso, like most developing countries, is characterized by a large informal sector, populated mainly by small, unregistered firms having low productivity and not paying taxes. According to the latest estimates, there are approximately 1.5 million informal firms and 65,000 formal enterprises in Burkina Faso, with just 500 formal firms considered large. Meanwhile, the private sector accounts for 60% of non-agricultural employment and an estimated 90% of workers are in the informal sector. Moreover, the population is growing at around 3% per year but there is lack of enough creation of formal jobs to absorb its additional population into the labour force. The informality is prevalent and represents around 85% of the non-farm workforce (FinScope, 2016; World Bank Group, 2019).

The existence of a large informal sector raises several concerns: besides lower tax collection that reduces the government's ability to finance public goods and services, the literature often emphasises the adverse impact of the presence of informal firms competing against formal firms on the latter's business operations (Distinguin, Rugemintwari, & Tacneng, 2016). According to results of several waves of World Bank Enterprise Surveys, the practices of the informal sector are consistently ranked the second most serious constraint faced by registered SMEs after the lack of access to financing. Therefore, how can informal firms be encouraged to formalize is an agenda shared by many countries across the globe. As such, many countries have implemented several regulatory reforms designed to facilitate the formalization of firms by making it easier and cheaper for them to register. However, the literature shows that the majority of small firms in most developing countries choose to remain informal mainly because of the perception that costs of formalization usually outweigh benefits (Bruhn & McKenzie, 2014, 2018). In this context, we aim to investigate whether mobile money adoption could be a possible channel of increasing the benefits associated with formalization. In fact, mobile financial services have been spreading rapidly in developing countries with large informal financial sectors and low formal financial deepening and inclusion. For instance, while cash remains the predominant payment method, mobile money ranks second in Sub-Saharan Africa. Furthermore, although initially tailored for individuals to perform P2P (Person to Person) money transfers, Micro, Small and Medium Enterprises (MSMEs) are increasingly using mobile money services to perform a wide range of financial transactions. MSMEs can use mobile financial services: 1) to receive payments from their customers, both in-store and remotely; 2) to make payments to their suppliers or employees; 3) for government payments and for receiving government subsidies; 4) and even to access credit. This can help MSMEs 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. Against this backdrop, we argue that adopting/using mobile financial services could be a critical step for MSMEs to become financially included and join the formal economy.

At the same time, however, despite improvement in access to financial services in Burkina Faso driven by mobile money which ownership increased markedly from 3% in 2014 to 33% in 2017, gender income-based gaps still persist. Burkina Faso ranks 182 out of 189 countries in terms of gender inequality (UNDP, 2019) and has one of the largest gender gaps in account ownership in the WAEMU region at 17 percentage points, 5 percentage points higher than the Sub-Saharan African average (Demirgüç-Kunt et al., 2018). In general, female entrepreneurs often experience lower profitability and sales because of smaller business size and lower investments in business due to costs associated with opening and maintaining a formal account (GPFI, 2015). Likewise, women are often subject to family pressure and usually prefer to hide money from their spouse and family even if costly to do so (Boltz, Marazyan, & Villar, 2019; Castilla, 2019; Jakiela & Ozier, 2016). While socio-cultural issues and other factors might prevent women from controlling their own money and assets, digital payments might empower them by providing greater control and privacy (Leora Klapper, 2017; Riley, 2019). Besides, mobile money has been shown to hold promise for fragile and conflict affected countries (Blumenstock et al., 2021, p. 6). As such, since 2015, Burkina Faso is regularly subject to terrorist attacks that claimed lives of more than 250 civilians between April and December 2019 (HRW, 2020). Hence, our research aims at answering the following three intertwined questions: “Can mobile money adoption by informal MSMEs be a stepping stone towards joining the formal economy and becoming financially included?” And if so, is the outcome stronger for female entrepreneurs or those located in unstable locations plagued with terrorist attacks? To the best of our knowledge, these questions have received little attention so far in the empirical literature as briefly highlighted hereafter.

This research builds upon recent randomized experiments on policies designed to bring small firms into the formal sector (Benhassine et al., 2018; Campos et al., 2018), the effect of the costs of operating formally (Galiani et al., 2017) and barriers to mobile money adoption by SMEs and its consequences (Bastian et al., 2018; Dalton et al., 2019). More precisely, it examines whether mobile money technology could be leveraged to supplement existing policies aimed at lowering the costs of formalization that have proved to be less effective in inducing small firms to formalize. By so doing, this study extends the literature on the barriers

and opportunities associated with mobile money adoption and makes several contributions. In contrast to our focus on MSMEs, most empirical studies tackling mobile money adoption focus mainly on its impact on various socio-economic aspects at individual and household levels. In parallel with more than a decade of mobile money diffusion, an increasing body of literature (see Aron (2018) for an extensive review) has shown how mobile money can be welfare enhancing. It has shown to increase household resilience, consumption, income, remittances, financial inclusion, security, savings, travel costs and poverty reduction with a more pronounced outcome for female-headed households (Aker et al., 2016; Bharadwaj et al., 2019; Economides & Jeziorski, 2017; Jack & Suri, 2014, 2016; Ky et al., 2018; Munyegera & Matsumoto, 2016; Riley, 2018).

To our knowledge, this study is one of the first to empirically investigate mobile money use by firms and its potential to bring small-unregistered firms into the formal system. The literature on how mobile money affects firm outcomes is nascent and uses exclusively East African countries as the setting (Bastian et al., 2018; Beck et al., 2018; Dalton et al., 2019; Islam et al., 2018; Ky et al., 2019). This is primarily due to the high prevalence of mobile money in the region although it has rapidly spread from East to West Africa (Klapper & Hess, 2019; Ralthatha, 2017). Moreover, while our study is close in spirit to the field experiment of Dalton et al. (2019) who investigate whether ‘soft barriers’—information, know-how and small transaction costs—and aversion to transparency are obstacles to SMEs’ adoption of Lipa Na M-pesa in Kenya, considering Burkina Faso as our case study adds to the literature in several aspects. First, mobile money account for firms (merchant account) in Burkina Faso has unique features compared to Lipa Na M-pesa, a mobile money product introduced in 2014 in Kenya for merchants and that must be registered under the name of the business. While only officially licensed firms are allowed to register for Lipa Na M-Pesa, in Burkina Faso, there are two options for firms when opening an account with Orange or MOOV Africa, the two providers of merchant accounts. Although only registered firms can open a Gold merchant account that mimics Lipa Na M-Pesa, there is also a Bronze merchant account for which the *Registre du Commerce et du Crédit Mobilier* (RCCM) and the *Identifiant Financier Unique* (IFU) numbers become optional. Clearly, this latter account was designed for informal firms. Two key advantages distinguish Gold from Bronze merchant accounts. First, there are restrictions on the amount of money one can cash-out for informal firms (caped at FCFA 150,000 \approx \$230), while such restrictions are absent for formal firms. Second, only formal firms have the possibility to link their mobile money account with their bank account. With respect to Lipa Na M-Pesa, merchant accounts in Burkina Faso entail zero financial cost: cash-out, receiving and making

payments are free of charge while a business has to incur a payment receipt fee of 1% of the transaction value and withdrawal fees in the case of Lipa Na M-Pesa in Kenya. Hence, the absence of fees combined with the existence of the two types of merchant accounts offer an interesting case study compared to the case of Kenya that has been investigated so far. Following (Bennett, 2010), the informal merchant account can be perceived both as a stepping stone towards formal registration (upgrade from Bronze to Gold merchant accounts) and a consolation prize, with a firm entering into formal sector because it anticipates that if costs of formalization happen to outweigh gains, it can switch to informality (downgrade from Gold to Bronze). Overall, the premise at the core of our study is that adopting a merchant account would kill two birds with one stone: increase mobile money adoption as well as formalization.

The rest of the paper is structured as follows: Section II describes our data collection on informal businesses, studies the determinants of merchant account adoption and its effects on formalization decision. In section III, we describe our experimental design and in section IV we discuss our experimental results. We conclude in Section V.

II. Digital and formalization

1. Data: Selection of informal businesses

The purpose of this project is to investigate whether mobile money adoption could be a possible channel of increasing the benefits associated with informal firms' formalization. To do so, we propose to conduct a field experiment designed to stimulate the adoption of mobile money by informal firms in three targeted cities of Burkina Faso: Ouagadougou, Bobo-Dioulasso and Ouahigouya. In the first step, the intervention aims at understanding the determinants of adopting and using mobile money merchant account. In the next step, we evaluate its effects on informal firms' decision to formalize. In this perspective, we adopted a quasi-experiment strategy to form our target sample. As such, we started by elaborating a questionnaire covering several topics: enterprise identification, business owner characteristics (demographic, education, financial assets, usage of mobile phone, resilience to shocks), knowledge, adoption and perceptions of mobile money (personal and merchant), commercial activities (type of activity, customers and business practices), activity performance (profits, sales, expenses, savings, investments, labour), impact of covid-19, behavioural game (time preference and present bias, risk aversion), psychological traits (trust and short-term memory). Then, from March to June 2021, we conducted a baseline survey and obtained a total sample of 1,387 informal enterprises coupled with our first intervention, which equipped 649 informal businesses with merchant mobile money accounts.

Table 1. Descriptive statistics and variable definitions

	Definition	Baseline					Midline				
		Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
<u>Dependent variable</u>											
Formalized	Indicates whether firm owner formalized her/his business or not. Encoded as Yes = 1, No = 0						982	0.095	0.293	0	1
Formalization score	Is a composite formalization process score with value ranging from 0 to 10. It is calculated by adding one point for each required document provided by the business owner.						982	1.462	3.243	0	10
Experienced merchant account	Indicates whether firm decided to receive a mobile money merchant account or not. Encoded as Yes = 1, No = 0	1,387	0.468	0.499	0	1	982	0.555	0.497	0	1
<u>Control variables</u>											
Age	Indicate the logarithm of the business owner age	1,385	33.844	9.875	15	77	980	33.936	9.903	15	77
Female	Indicate the gender of business owner, Encoded as Female = 1, Male = 0	1,387	0.185	0.389	0	1	982	0.185	0.389	0	1
Formal education	Indicate the education level of business owner. Encoded as (Primary, Secondary, Professional formation, University) = 1, Otherwise = 0	1,36	0.693	0.461	0	1	962	0.683	0.465	0	1
Financial literacy	Reply to the question: Suppose you borrow money in the amount of CFA 10 000 with an interest rate of 10% per year. How much interest do you have to pay at the end of the year? Encoded as correct response (1 000) =1, wrong response. = 0.	1,315	0.666	0.472	0	1	924	0.663	0.473	0	1
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	1,387	0.051	0.220	0	1	982	0.039	0.193	0	1
User of mobile money account	Indicate whether business owner has a mobile money account or not. Encoded as Yes = 1, Not = 0	1,385	1.139	0.722	0	3	980	1.160	0.704	0	3
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	1,338	0.146	0.353	0	1	952	0.167	0.373	0	1
Household living rooms (number)	Indicates the number of habitable rooms that the household has in its main dwelling	1,336	2.506	0.908	1	4	946	2.521	0.918	1	4
Firm turnover	Indicates the turnover level of the business	1,387	944467.2	8695288	0	2.50e+08	982	553598.8	1924754	0	2.50e+07
Fledgling firm (using the median==3 years)	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	1,387	0.534	0.499	0	1	982	0.537	0.499	0	1
Number of employees (median = 1)	Indicates the median number of permanent employees working with the business owner. Encoded as (number of employees equals or more than one) = 1, (less than one) = 0.	1,387	0.701	0.458	0	1	982	0.688	0.463	0	1
Pay taxes	Reply to the question: Do you paid taxes? Encoded as Not paying taxes = 1, Paying taxes = 0.	1,315	0.624	0.484	0	1	936	0.641	0.480	0	1
Not recording sales	Indicate whether business owner record sales in a register or not. Encoded as Not recording = 1, Recording = 0	1,305	0.760	0.427	0	1	926	0.772	0.420	0	1
Hyperbolic time preferences	Indicates whether a business owner had hyperbolic time preferences, meaning she/he was impatient by always preferring money now over the future in the near-far time frame. Encoded as (Impatient) = 0, (Patient) = 1.	1,387	0.161	0.367	0	1	982	0.150	0.357	0	1
Having bank account	Indicates whether the business owner uses a bank account. Encoded as Yes = 1, No = 0.	1,387	0.353	0.478	0	1	982	0.329	0.470	0	1
Sector of activity	Indicates the sector of activity of the business. Encoded as Trade = 1, Service = 0	1,387	0.745	0.436	0	1	982	0.737	0.440	0	1
Ouagadougou	Refers to the city of Ouagadougou	1,387	0.399	0.490	0	1	982	0.309	0.462	0	1
Bobo-Dioulasso	Refers to the city of Bobo-Dioulasso	1,387	0.390	0.488	0	1	982	0.440	0.497	0	1
Ouahigouya	Refers to the city of Ouahigouya	1,387	0.211	0.408	0	1	982	0.250	0.433	0	1

Precisely, our quasi-experiment on merchant account introduction in the informal sector consisted of randomly assigning businesses operating in the sub-sectors of trade and service to receive support for merchant account opening.

A follow-up survey was administrated from January to February 2022 and succeeded to reach a total of 982 informal enterprises. Surprisingly, our midline survey reveals that a sizable proportion of our participants are willing to formalize (554 out of 982) and more interestingly, 61% of them are those who experienced the merchant mobile money account (opened at baseline). Moreover, we find that 294 business owners of those 428 informal enterprises not willing to formalize a priori would register if specific incentives (such as advantages of having a gold merchant account designed for registered firms or subsidies of 50% to 100% of formalization fees²) are provided. Hence, we launch our second intervention with the aim of evaluating whether experiencing merchant account can induce informal enterprises to formalize. Precisely, we perform a randomized control trial³ consisting of randomly assigning businesses willing to formalize in four treatment groups and a control group while those that could register conditional on the incentives provided are randomly assigned into three treatment groups and a control group (see Figures 1 and 2 in the Appendix for details). We also check whether our sample is balanced after randomization. We find no difference for all our considered variables between treatment and control groups meaning that randomization succeeded (Table A.1 in the Appendix).

2. *What drives mobile money adoption by informal firms?*

In the literature much has been written on the drivers as well as impacts of personal mobile money adoption contrary to merchant mobile money account for which little is known. We present hereby the first quasi-experiment evidence on the determinants of mobile money merchant account adoption. To do so, we use the following specification:

$$\mathbf{Adoption}_i = \alpha + \beta \mathbf{Business_Charact}_i + \lambda \mathbf{Owner_Charact}_i + \gamma \mathbf{City}_i + \varepsilon_i \quad (1)$$

where $\mathbf{Adoption}_i$ is a dummy variable that stands for mobile money merchant account adoption and takes the value 1 if the business opened an account and 0 otherwise. $\mathbf{Business_Charact}_i$ is a vector of informal business characteristics including business age, turnover, number of permanent employees and sector of the activity. The vector

² Note that due to budget restriction, we offer a subsidy of 30% of formalization fees to the corresponding treatment groups (Section III provides the details).

³ We consider three strata variables: experienced merchant account, female and cities (Ouagadougou, Bobo-Dioulasso and Ouahigouya).

Owner_Charact_i stands for business owner characteristics including age, gender, education, awareness of merchant account, usage of personal mobile money account, house and room characteristics. We also control for the city where the business operates, *City_i*.

We report descriptive statistics on both businesses and business owners at the second wave survey in Table 1. In the sample, around 60% of opened and experienced merchant account, only 4% were aware about the product while more than 50% own a personal mobile money account. Around 19% of our sample are composed of women, 68% have a formal education (at least primary). Regarding business characteristics, around 54% of businesses are 3 years old or less, the average turnover is around 553 599 FCFA (~ \$1,000)⁴ and around 64% have at least 1 permanent employee. 74% of businesses operate in the trade sector, 31% are located in Ouagadougou, 44% in Bobo-Dioulasso and 25% in Ouahigouya.

Table 2 presents our results. We find that formal education, usage of personal mobile money, the number of the household living rooms, fledgling businesses, number of employees and businesses located in Bobo-Dioulasso are positively and significantly associated with merchant account adoption. Our results may suggest that business owners who are formally educated are more likely to understand the appropriateness of merchant account for business operations compared to other financial services available increasing their likelihood to adopt merchant account. The results also suggest that the number of the household living rooms that proxy the relative wealth of the business owners increases the likelihood of merchant account adoption. Similarly, businesses with greater turnover have more likelihood to adopt merchant account than those with low level of turnover. Interestingly, we find that younger businesses (those of less than 3 years of existence) are more likely to adapt and adopt more rapidly new technologies compared to older businesses. Regarding the number of employees, the results may suggest the size effect which emphasises that businesses with at least one employee would have more likelihood to adopt merchant account than those without employees. Furthermore, we find that being located in economic capital Bobo-Dioulasso increases the likelihood of businesses' adoption of merchant account.

⁴ Throughout, FCFA (Franc of the African Financial Community) refers to the local currency. The exchange rate at the time of the survey was about 550.3 FCFA = US \$1.

Table 2. Determinants of mobile money merchant account adoption

	Opened merchant account	Experienced merchant account		
	wave 1 (baseline)	wave 2 (Midline)	pooled	Panel
	(1)	(2)	(3)	(4)
Age	-0.030*** (0.008)	-0.023** (0.010)	-0.027*** (0.008)	-0.027*** (0.008)
Age squared	0.000*** (0.000)	0.000* (0.000)	0.000*** (0.000)	0.000*** (0.000)
Female	-0.064* (0.035)	-0.027 (0.043)	-0.050 (0.035)	-0.057* (0.034)
Formal education	0.055* (0.032)	0.041 (0.038)	0.033 (0.031)	0.022 (0.030)
Awareness about mobile money merchant account	-0.032 (0.066)	-0.077 (0.082)	-0.037 (0.063)	-0.007 (0.061)
User of mobile money account	0.034* (0.019)	0.061*** (0.023)	0.047** (0.019)	0.040** (0.018)
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	-0.015 (0.044)	-0.027 (0.049)	-0.040 (0.043)	-0.041 (0.042)
Household living rooms (number)	0.031** (0.016)	0.027 (0.018)	0.030* (0.015)	0.030** (0.015)
Firm turnover	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Fledgling firm (using the median=3 years)	0.110*** (0.031)	0.127*** (0.037)	0.123*** (0.030)	0.124*** (0.029)
Permanent employees	0.084*** (0.030)	0.078** (0.036)	0.088*** (0.030)	0.085*** (0.029)
Sector of activity	0.021 (0.032)	0.010 (0.037)	0.022 (0.031)	0.018 (0.027)
Ouagadougou	0.041 (0.041)	0.115** (0.048)	0.038 (0.040)	0.023 (0.039)
Bobo-Dioulasso	0.089** (0.041)	0.094** (0.045)	0.081** (0.040)	0.086** (0.039)
Constant	0.759*** (0.174)	0.676*** (0.207)	0.744*** (0.173)	0.765*** (0.165)
Observations	1,303	925	2,338	2,338
R-squared/overall	0.069	0.063	0.061	0.061
F-statistic/Wald chi2	8.822***	5.184***	7.196***	110.3***
Number of clusters	1,303	925	1,413	1,413

Note: Dependent variable: Experienced merchant account is a dummy variable that takes the value 1 if the business opened (at baseline) experienced (at midline) a mobile money merchant account and 0 otherwise. Robust standard errors in parentheses, clustered at the firm level.

***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level

3. *Can mobile money adoption increase business formalization?*

In this section, we analyse the relationship between adoption of merchant account and formalization decision. We want to assess whether providing informal businesses with mobile money account designed for payments can induce formalization compared to those not having this account. Hence, we use the OLS regression of the form:

$$\mathbf{Formalization}_i = \alpha + \beta \mathbf{Merchant_Account}_i + \lambda \mathbf{X}_i + \varepsilon_i \quad (2)$$

where **Formalization_i** is the dependent variable computed as a dummy variable that takes the value 1 if the business formalized and 0 otherwise. Alternatively, we proxy formalization using a composite formalization score ranging from zero to ten. The score is computed using the sum of each of the ten documents required for formalization and provided by business owners: 2 identity photos, 1 legalised photocopy of identity card, 1 police record less than 3 months old, 1 certificate of reservation of Business name (trade name, acronym), 1 copy of the wedding certificate (if applicable), 1 signed declaration of honour form, 1 application form for a professional trader's card, 1 certificate of residence for the current year, 1 location statement endorsed by the tax office, and 1 registered commercial lease agreement. **Merchant_Account_i** is our independent variable of interest. It is a dummy variable that takes the value 1 if the business experienced a mobile money merchant account and 0 otherwise. **X_i** stands for control variables including both business and business owner characteristics. Descriptive statistics and variable definitions are reported in Table 1.

Table 3 reports our results with and without control variables on the effects of merchant account on formalization decision. In all specifications, we find that business owners that experienced merchant account have more likelihood to formalize their business compared to those who do not have the merchant account (columns 1 to 3). Specifically, we show that experiencing merchant account increases formalization by around 3 to 5 percentage points (columns 1 and 2). Moreover, we also find that having a merchant account increases the likelihood of engagement in the formalization process proxied by the formalization score (columns 4 to 6). These results support the fact that digital payments such as merchant accounts appear as mechanism that may increase business formalization. Regarding our control variables, we find that only bank account is positively and significantly associated with formalization and engagement in the formalization process. These findings may indicate that business owners having a bank account are more likely to identify the advantage associated

Table 3. Effects of mobile money merchant account on business formalization.

	Formalized			Formalization Score		
	wave 2	Pooled	Panel	wave 2	Pooled	Panel
	(1)	(2)	(3)	(4)	(5)	(6)
Experienced merchant account	0.051*** (0.018)	0.027*** (0.007)	0.027*** (0.007)	1.274*** (0.197)	0.611*** (0.081)	0.611*** (0.081)
Control variables included	No	No	No	No	No	No
Observations	982	2,483	2,483	982	2,483	2,483
R-squared/overall	0.008	0.005	0.005	0.038	0.020	0.020
F-statistic/Wald chi2	7.841***	13.63***	13.63***	41.82***	56.81***	56.81***
Number of clusters	982	1501	1501	982	1501	1501

	Formalized			Formalization Score		
	wave 2	Pooled	Panel	wave 2	Pooled	Panel
	(1)	(2)	(3)	(4)	(5)	(6)
Experienced merchant account	0.047** (0.020)	0.026*** (0.008)	0.026*** (0.008)	1.250*** (0.217)	0.613*** (0.089)	0.613*** (0.089)
Age	0.002 (0.005)	0.001 (0.002)	0.001 (0.002)	0.026 (0.055)	0.013 (0.022)	0.013 (0.022)
Age squared	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)
Female	-0.039* (0.021)	-0.017** (0.008)	-0.017** (0.008)	-0.217 (0.245)	-0.110 (0.096)	-0.110 (0.096)
Financial literacy	-0.009 (0.024)	-0.004 (0.009)	-0.004 (0.009)	-0.006 (0.252)	-0.005 (0.099)	-0.005 (0.099)
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	0.006 (0.028)	0.005 (0.012)	0.005 (0.012)	-0.131 (0.306)	-0.018 (0.131)	-0.018 (0.131)
Household living rooms (number)	0.017 (0.011)	0.006 (0.005)	0.006 (0.005)	0.176 (0.128)	0.060 (0.051)	0.060 (0.051)
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)	-0.007 (0.024)	-0.002 (0.010)	-0.002 (0.010)	-0.229 (0.256)	-0.080 (0.104)	-0.080 (0.104)
Number of employees (median = 1)	-0.008 (0.021)	-0.004 (0.009)	-0.004 (0.009)	-0.052 (0.232)	-0.051 (0.093)	-0.051 (0.093)
Pay taxes	0.035 (0.022)	0.011 (0.009)	0.011 (0.009)	0.305 (0.239)	0.089 (0.094)	0.089 (0.094)
Hyperbolic time preferences	-0.005 (0.028)	-0.005 (0.011)	-0.005 (0.011)	0.114 (0.316)	0.010 (0.121)	0.010 (0.121)
Having a bank account	0.050** (0.024)	0.017* (0.009)	0.017* (0.009)	0.573** (0.262)	0.181* (0.101)	0.181* (0.101)
Sector of activity	-0.024 (0.024)	-0.014 (0.010)	-0.014 (0.010)	-0.574** (0.263)	-0.292*** (0.106)	-0.292*** (0.106)
Ouagadougou	-0.009 (0.027)	-0.012 (0.011)	-0.012 (0.011)	-0.098 (0.301)	-0.134 (0.120)	-0.134 (0.120)
Bobo-Dioulasso	-0.009 (0.030)	-0.004 (0.013)	-0.004 (0.013)	0.101 (0.324)	0.039 (0.136)	0.039 (0.136)
Constant	0.037 (0.120)	0.018 (0.047)	0.018 (0.047)	0.538 (1.341)	0.259 (0.536)	0.259 (0.536)
Observations	858	2,176	2,176	858	2,176	2,176
R-squared/overall	0.032	0.015	0.014	0.067	0.032	0.031
F-statistic/Wald chi2	2.429			4.079	4.858	77.72***
Number of clusters	858	1,318	1,318	858	1,318	1,318

Note: Dependent variable: Formalized equals to 1 if the business owner formalize her/his business, and 0 otherwise; Formalization score correspond to a composite formalization score ranging from 0 to 10, and computed using the sum of each of the 10 documents provided for formalization: 2 identity photos, 1 legalised photocopy of identity card, 1 police record less than 3 months old, 1 certificate of reservation of Business name (trade name, acronym), 1 copy of the wedding certificate (if applicable), 1 signed declaration of honour form, 1 application form for a professional trader's card, 1 certificate of residence for the current year, 1 location statement endorsed by the tax office, and 1 registered commercial lease agreement. Experienced merchant account is the independent variable of interest, it is a dummy variable that takes the value 1 if the business experienced a mobile money merchant account and 0 otherwise. Robust standard errors in parentheses, clustered at the firm level. ***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level.

with a professional account specific to their business account. Looking at the negative and significant association, we find that female business owners have less likelihood to formalize their businesses. Similarly, the results show that businesses operating in the trade sector are less likely to engage in the formalization process than businesses operating in the retail sector. Furthermore, businesses with high turnover have less likelihood to formalize or engage in the formalization process than those with low turnover. These findings may suggest that small and medium businesses found formalization as a channel of potential growth.

Furthermore, we also check the heterogeneous effects of merchant account on formalisation decision by modifying our equation (2) to include interaction terms:

$$\mathbf{Formalization}_i = \alpha + \beta_h \mathbf{Merchant_Acc}_i + \beta'_h \mathbf{Merchant_Acc}_i \times \mathbf{X}_i + \lambda \mathbf{X}'_i + \varepsilon_i \quad (3)$$

where \mathbf{X}'_i stands for the same control variables from which we remove those used in the interaction including female vs male, fledgling vs older businesses, paying vs not paying tax businesses, recording vs not recording sales and businesses located respectively in Bobo-Dioulasso and Ouahigouya v those in Ouagadougou. The coefficients of interest are the total effects provided by the sum of $(\beta_h + \beta'_h)$ and β_h .

Table 4 highlights the heterogeneous effects by gender, business age, tax payment, sales records and business location on formalization decision. Two major findings emerge: across all dimensions, experiencing merchant account does not make a difference when considering the dependent variable *formalization score* that stands for the engagement in the formalization process. The coefficients associated with the independent variables of interest are positive and significant irrespective of the characteristics. More interestingly however, our findings are reversed when looking at the dependent variable *formalized* that stands for whether the firm switched from informality to formality status. As such, while gaps in terms of gender as well as closeness to formality persist despite experiencing merchant accounts, we notice the opposite for the remaining characteristics (age, sales recording and business location). Precisely, among business owners that experienced merchant account, male as well as those who already pay taxes have 5 to 6 percentage points more likely to formalize their business than female or those not paying taxes for whom we do not find any significant effect. Hence, men-led businesses or those that tend to comply with the regulations by paying taxes are comparatively more inclined to formalize. By contrast, we find that businesses which seem to be comparatively disadvantaged in terms of their shorter existence (age of the business), management behaviour (no sales records) or location (outside the capital city) toward formalization, benefit more from the merchant account effects. Our findings suggest that,

Table 4. Heterogeneous effects of mobile money merchant account on business formalization.

	Female				Fledgling firm (using the median=3 years)				Not paying taxes			
	Formalized		Formalization Score		Formalized		Formalization Score		Formalized		Formalization Score	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Experienced merchant account	0.055**	0.054**	1.245***	1.275***	0.037	0.037	1.159***	1.247***	0.063**	0.063**	1.377***	1.419***
Characteristics	(0.021)	(0.023)	(0.227)	(0.246)	(0.027)	(0.029)	(0.301)	(0.329)	(0.025)	(0.027)	(0.264)	(0.283)
	-0.042*	-0.020	-0.496**	-0.148	-0.013	-0.018	-0.244	-0.232	-0.020	-0.013	-0.242	-0.067
	(0.024)	(0.025)	(0.239)	(0.261)	(0.024)	(0.028)	(0.243)	(0.289)	(0.024)	(0.027)	(0.247)	(0.277)
Experienced merchant account x Characteristics	-0.033	-0.038	0.052	-0.135	0.027	0.019	0.248	0.005	-0.043	-0.043	-0.359	-0.462
	(0.037)	(0.042)	(0.434)	(0.484)	(0.037)	(0.039)	(0.398)	(0.434)	(0.037)	(0.039)	(0.408)	(0.427)
Total effects	0.022	0.017	1.297***	1.140***	0.064***	0.056**	1.407***	1.252***	0.021	0.020	1.018***	0.956***
	(0.030)	(0.036)	(0.370)	(0.426)	(0.025)	(0.027)	(0.261)	(0.283)	(0.027)	(0.028)	(0.311)	(0.325)
Control variables included	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	982	858	982	858	982	858	982	858	936	858	936	858
R-squared	0.014	0.032	0.041	0.067	0.008	0.032	0.039	0.067	0.013	0.033	0.043	0.068
F-statistic	5.827***	2.313***	17.92***	4.068***	2.830**	2.299***	14.69***	3.834**	3.774**	2.299***	14.20***	3.924***
Number of clusters	982	858	982	858	982	858	982	858	936	858	936	858

	Not recording sales				Bobo-Dioulasso vs Ouagadougou				Ouahigouya vs Ouagadougou			
	Formalized		Formalization Score		Formalized		Formalization Score		Formalized		Formalization Score	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Experienced merchant account	0.057	0.060	1.323***	1.412***	0.034	0.025	1.064***	0.997***	0.034	0.030	1.064***	0.967***
Characteristics	(0.042)	(0.045)	(0.449)	(0.479)	(0.032)	(0.033)	(0.345)	(0.369)	(0.032)	(0.033)	(0.346)	(0.366)
	-0.013	-0.008	-0.184	-0.087	-0.003	-0.004	0.016	0.133	-0.000	-0.015	-0.103	-0.320
	(0.032)	(0.035)	(0.333)	(0.372)	(0.029)	(0.032)	(0.302)	(0.338)	(0.032)	(0.036)	(0.321)	(0.369)
Experienced merchant account x Characteristics	-0.009	-0.021	-0.108	-0.232	0.023	0.035	0.323	0.550	0.031	0.013	0.259	0.192
	(0.046)	(0.049)	(0.502)	(0.531)	(0.042)	(0.045)	(0.460)	(0.493)	(0.050)	(0.052)	(0.533)	(0.553)
Total effects	0.047**	0.039*	1.215***	1.181***	0.057**	0.060*	1.387***	1.547***	0.065*	0.043	1.323***	1.159***
	(0.021)	(0.022)	(0.225)	(0.243)	(0.028)	(0.032)	(0.304)	(0.347)	(0.039)	(0.038)	(0.405)	(0.406)
Control variables included	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	926	834	926	834	736	629	736	629	550	492	550	492
R-squared	0.009	0.030	0.040	0.069	0.007	0.043	0.037	0.083	0.008	0.049	0.035	0.072
F-statistic	2.680**	2.226***	13.40***	3.833***	1.828	2.138***	10.14***	3.483***	1.322	1.848**	6.946***	2.706***
Number of clusters	926	834	926	834	736	629	736	629	550	492	550	492

Dependent variable: Formalized equals to 1 if the business owner formalize her/his business, and 0 otherwise; Formalization score correspond to a composite formalization score ranging from 0 to 10, and computed using the sum of each of the 10 documents provided for formalization: 2 identity photos, 1 legalised photocopy of identity card, 1 police record less than 3 months old, 1 certificate of reservation of Business name (trade name, acronym), 1 copy of the wedding certificate (if applicable), 1 signed declaration of honour form, 1 application form for a professional trader's card, 1 certificate of residence for the current year, 1 location statement endorsed by the tax office, and 1 registered commercial lease agreement. Experienced merchant account is the independent variable of interest, it is a dummy variable that takes the value 1 if the business experienced a mobile money merchant account and 0 otherwise. All specifications include control variables (business owner age, gender, financial literacy, household living conditions, business age, turnover, number of employees, tax payments, hyperbolic time preferences, having bank account, sector of activity and location). According to the characteristic used we remove it from the control variables. Robust standard errors in parentheses, clustered at the firm level. ***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level.

fledgling businesses benefit from merchant accounts by increasing their likelihood toward formalization by 6 percent points compared to older businesses. These results emphasize our earlier findings showing that fledgling businesses have the capacity to adopt rapidly an innovation and adapt their organization consequently than older businesses. Similarly, the results show that for businesses that do not record sales benefit from the merchant account by increasing their likelihood toward formalization by 4 percentage points compared to those recording sales. Thus, the merchant account can be seen as a helpful tool for recording sales as well as a stepping-stone toward formalization. Regarding the geographical location, we take as a benchmark the capital city Ouagadougou where we assume that registration process may be simpler compared to the other two cities (Bobo-Dioulasso and Ouahigouya). We show that among businesses that experienced merchant accounts, those located in the economic capital Bobo-Dioulasso and the city of Ouahigouya prone to terrorist attacks have more likelihood to formalize their businesses respectively by 6 percentage points than those in Ouagadougou (the coefficient associated with Ouahigouya is not significant when including control variables).

III. Experimental design

1. Formalization intervention

This study involved two target groups formed on the following basis. First, business owners are invited to evaluate difficulties associated with providing the documents required for formalization. Second, in the light of required documents, business owners are questioned whether they are willing to formalize their businesses. Hence, the first target group is made of business owners who indicated willing to formalize at baseline (Panel A) while the second is composed of those not willing to formalize (Panel B). Then, we designed several treatments for each of the two target groups.

Panel A: business owners willing to formalize

Treatment 1: In person visit explaining the benefits and the process of formalization; and helping with registration process.

Treatments 2 and 3: In person visit explaining the benefits and process of formalization; and helping with registration process with monetary support of 30% of formalization fees. The amounts offered were 13 500 FCFA⁵ as reimbursement and payment in advance respectively.

⁵ The exchange rate at the time of the survey was about 550.3 FCFA = US \$1.

Treatment 4: In person visit explaining the benefits and the process of formalization and the benefits associated with formal merchant account (Gold); and helping with registration process.

Panel B: business owners not willing to formalize

Treatment 5: In person visit explaining the benefits and the process of formalization and the benefit associated with formal merchant account (Gold); and helping with registration process.

Treatments 6 and 7: In person visit explaining the benefits and the process of formalization and the benefits associated with formal merchant account (Gold); and helping with registration process; with monetary support of 30% of formalization fees. The amounts offered were 13 500 FCFA as reimbursement and payment in advance respectively.

2. Estimation methods

We start our empirical strategy by first analysing our intervention take-up among treatment groups. We notice that not every informal business assigned to our treatment groups accepted to receive the corresponding treatments. To analyse the relationship between assignment to treatment and actual take-up, we use the following regression approach:

$$Take_up_i = \alpha + \beta_k Treatment_{i,k} + \lambda Strata_i + \epsilon_i \quad (4)$$

where the dependent variable is a dummy that takes the value of 1 if informal business i takes up the treatment that it has been assigned to, and 0 otherwise; $Treatment_{i,k}$ is a vector of treatment dummy variables that takes the value 1 if business is assigned to a specific treatment group. With k the number of treatment groups, for the Panel A, $k = 1, 2, 3, 4$ (T1, T2, T3 or T4) or Panel B with $k = 5, 6$ or 7 (T5, T6 or T7) or either of them. $Strata_i$ is a vector of strata variables (experienced mobile money merchant account, female and cities). All the regressions are reported with and without strata variables.

Second, we want to determine which of our treatments affect business owners' decision to register the business. Specifically, we estimate both the intention-to-treat effects (effect of being randomized into one of the seven different treatment groups), and treatment effect on the treated (effect of being randomized into one of the seven different treatment groups and actually being offered the treatment). To do so, we use the following specification:

$$Formalized_i = \alpha + \beta_k Treatment_{i,k} + \gamma Strata_i + \epsilon_i \quad (5)$$

Where $\mathbf{Formalized}_i$ is the same outcome of interest. We consider both the dummy variable and the score (see equation (2)). $\mathbf{Treatment}_i$ is our same independent variable of interest, and \mathbf{Strata}_i the vector of strata variables. We check the marginal contribution of the different treatments by comparing each of our treatments with the first treatment as benchmark ($MC = T_{n+1} - T_1$), with $1 \leq n \leq 3$ for Panel A, and $5 \leq n \leq 6$ for Panel B with ($MC = T_{n+1} - T_5$). This allows to test whether providing 30% cost reimbursement, 30% cost payment in advance or information about gold merchant account (particularly for Panel A) is cost efficient in the formalization decision of the business owner. We rely on instrumental variables (IV) identification strategy to analyse the causal relationship between treatments and formalization. Hence, we estimate the treatment effects on the treated where we instrument the fact of being offered the treatment with assignment to treatment.

Furthermore, we also check the effect of the treatment on formalization depending on whether the business experienced or not mobile money merchant account. We use the following specification:

$$\mathbf{Formalized}_i = \alpha + \beta_k \mathbf{Treatment}_{i,k} + \beta'_k \mathbf{Treatment}_{i,k} \times \mathbf{MMA}_{i,k} + \gamma \mathbf{Strata}_i + \epsilon_i \quad (6)$$

Where $\mathbf{MMA}_{i,k}$ is a dummy variable that denotes whether the business in Panel A or Panel B experienced mobile money merchant account before the intervention. The coefficient of interest is provided by the total effect given by the sum of $(\beta_k + \beta'_k)$, with $k = 1, 2, 3$ and 4 for Panel A; and $k = 5, 6, \text{ and } 7$ for Panel B.

IV. Experiment results

1. Take-up

Take-up rates matter given that business owners can reject or accept the treatment. Overall, 246 of 772 businesses assigned to the treatment groups either Panel A (Businesses willing to formalize) or Panel B (Businesses not willing to formalize) receive the treatment. From Panel A, among the 116 businesses assigned to treatment 1, 41 receive it. 40 of the 110 businesses assigned to treatment 2 accept the treatment. Additionally, of the 111 businesses assigned to treatment 3, 34 accept the treatment. Similarly, 110 businesses assigned to treatment 4, 27 accept the treatment. In the Panel B, among the 112 businesses assigned to treatment 5, 30 businesses accept the treatment. 35 of the 105 businesses assigned to treatment 6 accept the treatment. And 39 of the 108 businesses assigned to treatment 7 receive it. Possible reasons why some businesses assigned to treatment groups do not receive the

Table 5. Experimental sample of informal businesses and relationship between treatments and take-up.

		Sample composition							
		Obs.	Percent	Formalized businesses					
				Obs.	Percent				
Target Informal businesses		982							
Experienced merchant account	Yes	545	55.5%	64	12%				
	No	437	44.5%	29	7%				
Businesses willing to formalize		554	56%						
Information about formalization (T1)		116	21%	14	12%				
T1+Reimbursement of 30% of formalization fees (T2)		110	20%	27	25%				
T1+Payment in advance of 30% of formalization fees (T3)		111	20%	16	14%				
T1+Information about formal merchant account (T4)		110	20%	15	14%				
Control group		107	19%						
Businesses not willing to formalize		428	44%						
Information about formalization and formal merchant account (T5)		112	26%	8	7%				
T5+Reimbursement of 30% of formalization fees (T6)		105	25%	9	9%				
T5+Payment in advance of 30% of formalization fees (T7)		108	25%	4	4%				
Control group		103	24%						

	Take-up (treated = 1)							
	Informal businesses willing to formalize				Informal businesses not willing to formalize			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.318*** (0.022)	0.321*** (0.023)			0.320*** (0.026)	0.322*** (0.026)		
Information about formalization (T1)			0.353*** (0.045)	0.360*** (0.044)				
T1+Reimbursement of 30% of formalization fees (T2)			0.364*** (0.046)	0.366*** (0.046)				
T1+Payment in advance of 30% of formalization fees (T3)			0.306*** (0.044)	0.310*** (0.044)				
T1+Information about formal merchant account (T4)			0.245*** (0.041)	0.247*** (0.042)				
Information about formalization and formal merchant account (T5)							0.268*** (0.042)	0.273*** (0.042)
T5+Reimbursement of 30% of formalization fees (T6)							0.333*** (0.046)	0.333*** (0.046)
T5+Payment in advance of 30% of formalization fees (T7)							0.361*** (0.046)	0.363*** (0.046)
Strata variables included	No	Yes	No	Yes	No	Yes	No	Yes
Observations	554	554	554	554	428	428	428	428
R-squared	0.083	0.122	0.092	0.131	0.102	0.117	0.108	0.123
F-statistic	207.4***	48.51***	52.29***	28.19***	152.2***	37.29***	51.02***	25.04***
Number of clusters	554	554	554	554	428	428	428	428

Note: Dependent variable: Take-up is dummy variable that equals to 1 if informal business takes up the treatment that it has been assigned to, and 0 otherwise. All specifications include randomization strata dummies (Experienced merchant account, female, city). Robust standard errors in parentheses, clustered at the firm level. ***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level.

treatment include unavailability or travelled, phone number not working, or not reached after several phone calls and planned meetings. Table 5 presents the experimental sample of informal businesses along with the relationship between treatments and take-up.

Regarding the relationship between treatments and take-up, we find that being assigned to either treatment in Panel A or B raises the likelihood of take-up by 32 percentage points. Specifically, from Panel B, being assigned to treatment 1 raises the likelihood of take-up by 35 percentage points, treatment 2 by 36 percentage points, treatment 3 by 30 percentage points, and treatment 4 increases the likelihood of take-up by 24 percentage points.

2. *Which treatments increased formalization?*

In Table 6 we report results of the intention-to-treat effects of being assigned to a treatment group on formalization decision. In columns 1 to 2 (Panel A), our findings show that being assigned to treatment 1 increases the likelihood of formalization by 12 percentage points. Similarly, assignment to treatment groups 3 and 4 increases the likelihood of formalization by respectively 14 percentage points. Interestingly, being assigned to treatment 2 (information and reimbursement of 30% of formalization fees) increases the likelihood of formalization by 24 percentage points. Thus, the impact associated with the treatment 2 is almost twice as high as that of other treatments. Moreover, we estimate the marginal contribution of treatments 2, 3 and 4 compared to treatment 1. It reveals that only the treatment 2 has a positive and significant marginal effect on formalization decision. We find similar results with the formalization score (columns 3 and 4) indicating that assignment to each of the treatment groups increases engagement in the formalization process. Regarding the results using instrumental variables (treatment-on-the-treated effects), it appears that receiving treatment 1 increases the likelihood of formalization by 34 percentage points. Receiving respectively treatment 3 and 4 increases the likelihood of formalization by 47 and 56 percentage points. While receiving treatment 2 increases the likelihood of formalization by 67 percentage points. Hence, our findings on treatment 2 (reimbursement of 30% of formalization fees) compared to treatments 1 and 4 may highlight that financial incentives play a key role in the business decision to formalize their business. However, comparing treatments 2 to 3 (payment in advance of 30% of formalization fees), it seems that the first takes over from the second. We conjecture from this finding that the reimbursement appears as a “benefit/reward” after bearing the costs of formalization. By contrast, payment in advance has a direct reducing effect on the costs of formalization, the business owners pay a fixed amount, and in this case, they do not perceive the notion of “benefit” but just an outflow of money.

Table 6. Impacts of treatments on businesses formalization.

	ITT (Intention-to-treat effect)				TOT (Treatment effect on the treated)			
	OLS Regressions				IV Regressions (2SLS)			
	Formalized (1)	(2)	Formalization Score (3)	(4)	Formalized (5)	(6)	Formalization Score (7)	(8)
PANEL A: Businesses willing to formalize								
Information about formalization (T1)	0.121*** (0.030)	0.125*** (0.030)	1.578*** (0.315)	1.620*** (0.316)	0.341*** (0.077)	0.344*** (0.076)	4.463*** (0.735)	4.453*** (0.740)
T1+Reimbursement of 30% of formalization fees (T2)	0.245*** (0.041)	0.247*** (0.041)	3.791*** (0.424)	3.792*** (0.411)	0.675*** (0.085)	0.676*** (0.085)	10.425*** (0.846)	10.400*** (0.838)
<i>T2-T1 (Marginal contribution)</i>	<i>0.125** (0.051)</i>	<i>0.122** (0.050)</i>	<i>2.213*** (0.528)</i>	<i>2.172*** (0.506)</i>	<i>0.333*** (0.114)</i>	<i>0.332*** (0.114)</i>	<i>5.961*** (1.121)</i>	<i>5.948*** (1.114)</i>
T1+Payment in advance of 30% of formalization fees (T3)	0.144*** (0.033)	0.147*** (0.034)	2.081*** (0.350)	2.114*** (0.359)	0.471*** (0.086)	0.473*** (0.086)	6.794*** (0.885)	6.816*** (0.883)
<i>T3-T1 (Marginal contribution)</i>	<i>0.023 (0.045)</i>	<i>0.022 (0.044)</i>	<i>0.503 (0.470)</i>	<i>0.493 (0.463)</i>	<i>0.129 (0.115)</i>	<i>0.129 (0.115)</i>	<i>2.331** (1.151)</i>	<i>2.364** (1.144)</i>
T1+Information about formal merchant account (T4)	0.136*** (0.033)	0.138*** (0.033)	1.700*** (0.338)	1.701*** (0.338)	0.556*** (0.096)	0.557*** (0.095)	6.926*** (0.990)	6.890*** (0.978)
<i>T4-T1 (Marginal contribution)</i>	<i>0.016 (0.045)</i>	<i>0.013 (0.044)</i>	<i>0.122 (0.462)</i>	<i>0.081 (0.448)</i>	<i>0.214* (0.123)</i>	<i>0.214* (0.122)</i>	<i>2.462** (1.233)</i>	<i>2.437** (1.216)</i>
Strata variables included	No	Yes	No	Yes	No	Yes	No	Yes
Observations	554	554	554	554	554	554	554	554
R-squared	0.053	0.080	0.112	0.158				
P-value for testing equality of treatments	0.092	0.093	0.000	0.000	0.029	0.030	0.000	0.000
PANEL B: Businesses not willing to formalize								
Information about formalization and formal merchant account (T5)	0.071*** (0.024)	0.072*** (0.024)	1.420*** (0.302)	1.423*** (0.295)	0.267*** (0.084)	0.264*** (0.084)	5.300*** (0.872)	5.242*** (0.848)
T5+Reimbursement of 30% of formalization fees (T6)	0.086*** (0.027)	0.085*** (0.028)	1.562*** (0.324)	1.555*** (0.331)	0.257*** (0.074)	0.256*** (0.074)	4.686*** (0.766)	4.666*** (0.783)
<i>T6-T5 (Marginal contribution)</i>	<i>0.014 (0.037)</i>	<i>0.014 (0.037)</i>	<i>0.142 (0.443)</i>	<i>0.131 (0.438)</i>	<i>-0.009 (0.112)</i>	<i>-0.008 (0.112)</i>	<i>-0.614 (1.160)</i>	<i>-0.577 (1.139)</i>
T5+Payment in advance of 30% of formalization fees (T7)	0.037** (0.018)	0.037** (0.018)	0.880*** (0.220)	0.875*** (0.217)	0.103** (0.049)	0.102** (0.049)	2.436*** (0.531)	2.399*** (0.514)
<i>T7-T5 (Marginal contribution)</i>	<i>-0.034 (0.030)</i>	<i>-0.035 (0.030)</i>	<i>-0.540 (0.374)</i>	<i>-0.548 (0.359)</i>	<i>-0.164 (0.097)</i>	<i>-0.163 (0.097)</i>	<i>-2.864*** (1.020)</i>	<i>-2.843*** (0.972)</i>
Strata variables included	No	Yes	No	Yes	No	Yes	No	Yes
Observations	428	428	428	428	428	428	428	428
R-squared	0.023	0.025	0.052	0.087				
P-value for testing equality of treatments	0.269	0.271	0.145	0.129	0.099	0.099	0.005	0.003

Note: Dependent variable: Formalized equals to 1 if the business owner formalize her/his business, and 0 otherwise; Formalization score correspond to a composite formalization score ranging from 0 to 10, and computed using the sum of each of the 10 documents provided for formalization: 2 identity photos, 1 legalised photocopy of identity card, 1 police record less than 3 months old, 1 certificate of reservation of Business name (trade name, acronym), 1 copy of the wedding certificate (if applicable), 1 signed declaration of honour form, 1 application form for a professional trader's card, 1 certificate of residence for the current year, 1 location statement endorsed by the tax office, and 1 registered commercial lease agreement. All specifications include randomization strata dummies (Experienced merchant account, female, city). Robust standard errors in parentheses, clustered at the firm level. ***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level.

Turning to Panel B, the results show that being assigned to each of the treatment group (5, 6 and 7) increases the likelihood of formalization by respectively 7, 8 and 4 percentage points. Similar to Panel A, these results suggest that being assigned to treatment 6 (information on formalization, formal merchant account, and reimbursement of 30% of formalization fees) has a greater effect on formalization decision compared to the remaining treatments. Also, the results on formalization score indicating that assignment to each of the treatment groups increases engagement in the formalization process. The instrumental variable estimations reveal that specifically receiving treatment 5 increases the likelihood of formalization by 26 percentage points, 26 percentage points increase from receiving treatment 6 and 10 percentage points increase from receiving treatment 7 (columns 5 and 6). Again, we find that receiving each of the three treatments (5, 6 and 7) increases engagement in the formalization process. Surprisingly, the marginal contribution of treatment 6 compared to treatment 5 is not significant while the marginal contribution of treatment 7 compared to treatment 5 is negative and significant (columns 7 and 8) suggesting that financial supports has no added value and could even be counterproductive compared to simply providing information about registration process and formal merchant accounts (T5). These findings are possibly highlighting issues related to lack of trust. Recall that businesses in Panel B indicated at baseline not willing to formalize. Therefore, these results may suggest that they do not trust the promised reimbursement fees and may even consider our payment in advance offer as suspicious.

3. Heterogeneous treatment effects

In Table 7 we present results of the effect of the treatments on formalization depending on whether the business experienced or not mobile money merchant account. Considering businesses that reported willing to formalize at baseline (Panel A), we find that the effects of treatments on formalization are stronger for businesses that experienced merchant accounts than those that did not (with some few exceptions). Specifically, we find that treatments 1, 2 and 4 increase the likelihood of formalization by respectively 15, 31 and 18 percentage points for businesses that experienced merchant accounts compared to 9, 14 and 7 percentage points for those that did not experience merchant accounts. By contrast, we find that while treatment 3 increases the likelihood of formalization of businesses that experienced or did not experience merchant account, this effect is greater for the latter. These findings may suggest that our treatment 2 (reimbursement of 30% of formalization fees) has greater effect on formalization for businesses that experienced merchant account while treatment 3 (payment in advance of 30% of formalization fees) benefits more businesses that did not experience merchant account.

Table. 7. Impacts of treatments and mobile money merchant account on businesses formalization.

	ITT (Intention-to-treat effect)			
	Formalization		Formalization Score	
	Total effect		Total effect	
	(1)	(2)	(3)	(4)
PANEL A: Businesses willing to formalize				
Information about formalization (T1)	0.090** (0.041)		1.019** (0.416)	
T1 x Experienced merchant account	0.057 (0.058)	0.147*** (0.042)	0.984 (0.598)	2.003*** (0.434)
T1+Reimbursement of 30% of formalization fees (T2)	0.143** (0.056)		1.619*** (0.575)	
T2 x Experienced merchant account	0.169** (0.079)	0.312*** (0.057)	3.539*** (0.782)	5.158*** (0.530)
T1+Payment in advance of 30% of formalization fees (T3)	0.157*** (0.054)		1.706*** (0.541)	
T3 x Experienced merchant account	-0.019 (0.069)	0.138*** (0.043)	0.658 (0.711)	2.364*** (0.463)
T1+Information about formal merchant account (T4)	0.071* (0.041)		0.714* (0.414)	
T4 x Experienced merchant account	0.108* (0.062)	0.180*** (0.046)	1.620** (0.630)	2.335*** (0.475)
Observations	554		554	
R-squared	0.090		0.185	
P-value for testing equality of treatments	0.525		0.395	
PANEL B: Businesses not willing to formalize				
Information about formalization and formal merchant account (T5)	0.035 (0.024)		0.343 (0.245)	
T5 x Experienced merchant account	0.076 (0.049)	0.111*** (0.043)	2.235*** (0.583)	2.577*** (0.530)
T5+Reimbursement of 30% of formalization fees (T6)	0.132*** (0.047)		1.472*** (0.488)	
T6 x Experienced merchant account	-0.094* (0.054)	0.038 (0.027)	0.187 (0.652)	1.659*** (0.431)
T5+Payment in advance of 30% of formalization fees (T7)	0.000 (0.001)		0.216** (0.105)	
T7 x Experienced merchant account	0.075** (0.037)	0.076** (0.037)	1.353*** (0.430)	1.569*** (0.417)
Observations	428		428	
R-squared	0.051		0.117	
P-value for testing equality of treatments	0.007		0.041	

Note: Dependent variable: Formalized equals to 1 if the business owner formalize her/his business, and 0 otherwise; Formalization score correspond to a composite formalization score ranging from 0 to 10, and computed using the sum of each of the 10 documents provided for formalization: 2 identity photos, 1 legalised photocopy of identity card, 1 police record less than 3 months old, 1 certificate of reservation of Business name (trade name, acronym), 1 copy of the wedding certificate (if applicable), 1 signed declaration of honour form, 1 application form for a professional trader's card, 1 certificate of residence for the current year, 1 location statement endorsed by the tax office, and 1 registered commercial lease agreement. All specifications include randomization strata dummies (Experienced merchant account, female, city). Robust standard errors in parentheses, clustered at the firm level. ***Significant at the 1 per cent level, **Significant at the 5 per cent level, *Significant at the 10 per cent level.

As regards to businesses willing to formalize conditional to incentives (Panel B), we find that only treatment 6 (information on formalization, formal merchant account, and reimbursement of 30% of formalization fees) benefits businesses that did not experience merchant account. It increases their likelihood to formalise by 13 percentage points (there is no significant effect for those that experienced merchant account). However, treatments 5 and 7 benefit only businesses that experienced merchant account by increasing their likelihood of formalisation by respectively 11 and 8 percentage points. Overall, our results suggest that the effects on formalisation of the treatments 1, 2 and 4 (Panel A) and treatments 5 and 7 (Panel B) are greater for businesses that experienced merchant accounts while the effects of treatments 3 and 6 (of respectively Panels A and B) appear to be stronger for businesses that did not experience merchant accounts.

V. Conclusion

Mobile money account for firms (merchant account) is a recent product throughout Burkina Faso, and many informal businesses were either ignorant of or broadly underestimated its capacity to improve business operations as evidenced by the responses obtained in our survey. In this paper, we start by examining the determinants of merchant account adoption and usage by informal firms before investigating how this adoption may impact formalization decision using an array of field experiments. We rely on a quasi-experiment strategy for merchant account adoption by informal businesses and conduct a randomized controlled trial for assessing the effects of seven treatments on two targeted groups of informal businesses defined on the basis of their willingness to formalize at baseline.

Our results show that both business owner and business characteristics (business owner age, education, gender, usage of personal mobile money account, household living conditions, business age, turnover, number of employees and location) affect merchant account adoption. Considering our first intervention, we found that merchant account adoption increases formalization by around 5 and 3 percentage points. Considering the second intervention, we found that information about registration process, formal merchant account, and supporting 30% of registration fees (through reimbursement or payment in advance) increase formalization for both targeted groups.

Overall, our findings suggest that the adoption of mobile money designed for businesses could be leveraged as a possible channel of increasing the benefits that come with formalization. We show in particular that subsidies designed to alleviate registration fees are not only important but the disbursement channel as well as the characteristics of the targeted

firms are equally important in increasing formalization. These results are particularly important for government, international bodies and development agencies that are currently supporting financial inclusion and enterprise development initiatives in developing countries.

Appendix

Table A.1. Summary statistics and balance test.

	Businesses willing to formalize							Businesses not willing to formalize					
	All	Control	Treatment group 1	Treatment group 2	Treatment group 3	Treatment group 4	Test of equality (p-value)	All	Control	Treatment group 1	Treatment group 2	Treatment group 3	Test of equality (p-value)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Experienced merchant account	0.606	0.607	0.595	0.618	0.595	0.618	0.992	0.488	0.485	0.482	0.495	0.491	0.998
Firm located in unsafe area	2.755	2.701	2.836	2.800	2.775	2.655	0.359	2.778	2.796	2.661	2.781	2.880	0.156
Firm found difficult to search coins	3.370	3.262	3.517	3.355	3.288	3.418	0.345	3.479	3.485	3.438	3.457	3.537	0.880
Use personal mobile money to receive payments	0.451	0.449	0.491	0.445	0.360	0.509	0.203	0.481	0.476	0.482	0.476	0.491	0.996
Firm closed temporarily due to COVID-19	0.444	0.402	0.526	0.509	0.369	0.409	0.065*	0.367	0.340	0.402	0.381	0.343	0.737
Firm operated remotely	0.305	0.243	0.284	0.291	0.360	0.345	0.318	0.325	0.340	0.384	0.286	0.287	0.346
Age	33.996	35.505	33.948	33.527	33.730	33.318	0.547	33.699	33.806	34.259	32.962	33.731	0.800
Female	0.173	0.159	0.190	0.173	0.171	0.173	0.985	0.201	0.184	0.223	0.190	0.204	0.898
Formal education	0.653	0.626	0.724	0.664	0.604	0.645	0.380	0.689	0.738	0.696	0.686	0.639	0.487
Financial literacy	0.639	0.617	0.690	0.636	0.577	0.673	0.416	0.605	0.680	0.536	0.629	0.583	0.165
Awareness about mobile money merchant account	0.036	0.009	0.069	0.045	0.018	0.036	0.130	0.042	0.019	0.045	0.048	0.056	0.596
User of mobile money account	1.166	1.140	1.241	1.082	1.207	1.155	0.548	1.147	1.136	1.170	1.114	1.167	0.912
Main dwelling floor (1=Wood, earth or other; 0=Cement, or tiles)	0.135	0.159	0.121	0.127	0.144	0.127	0.923	0.196	0.204	0.188	0.200	0.194	0.991
Household living rooms (number)	2.421	2.533	2.362	2.309	2.405	2.500	0.456	2.439	2.563	2.402	2.429	2.370	0.532
Firm turnover	6.39e+05	4.29e+05	8.29e+05	5.12e+05	6.48e+05	7.60e+05	0.598	4.43e+05	6.39e+05	4.30e+05	4.43e+05	2.71e+05	0.461
Fledgling firm (using the median==3 years)	0.542	0.542	0.500	0.491	0.640	0.536	0.181	0.530	0.476	0.536	0.505	0.602	0.293
Number of employees (median = 1)	0.713	0.748	0.664	0.727	0.784	0.645	0.122	0.657	0.709	0.643	0.657	0.620	0.582
Pay taxes	0.596	0.505	0.664	0.627	0.604	0.573	0.157	0.631	0.583	0.670	0.667	0.602	0.438
Hyperbolic time preferences	0.153	0.150	0.172	0.182	0.153	0.109	0.615	0.145	0.175	0.143	0.152	0.111	0.620
Having bank account	0.361	0.336	0.345	0.445	0.333	0.345	0.369	0.287	0.291	0.295	0.276	0.287	0.992
Sector of activity	0.733	0.729	0.776	0.709	0.730	0.718	0.820	0.743	0.709	0.768	0.733	0.759	0.756
Ouagadougou	0.401	0.393	0.397	0.400	0.405	0.409	0.999	0.192	0.184	0.205	0.181	0.194	0.969
Bobo-Dioulasso	0.384	0.393	0.379	0.391	0.378	0.382	0.999	0.512	0.524	0.500	0.514	0.509	0.988
Ouahigouya	0.215	0.215	0.224	0.209	0.216	0.209	0.999	0.297	0.291	0.295	0.305	0.296	0.997
Sample size	554	107	116	110	111	110		428	103	112	105	108	

Appendix

Figure 1. Randomization and informal enterprises assignment.

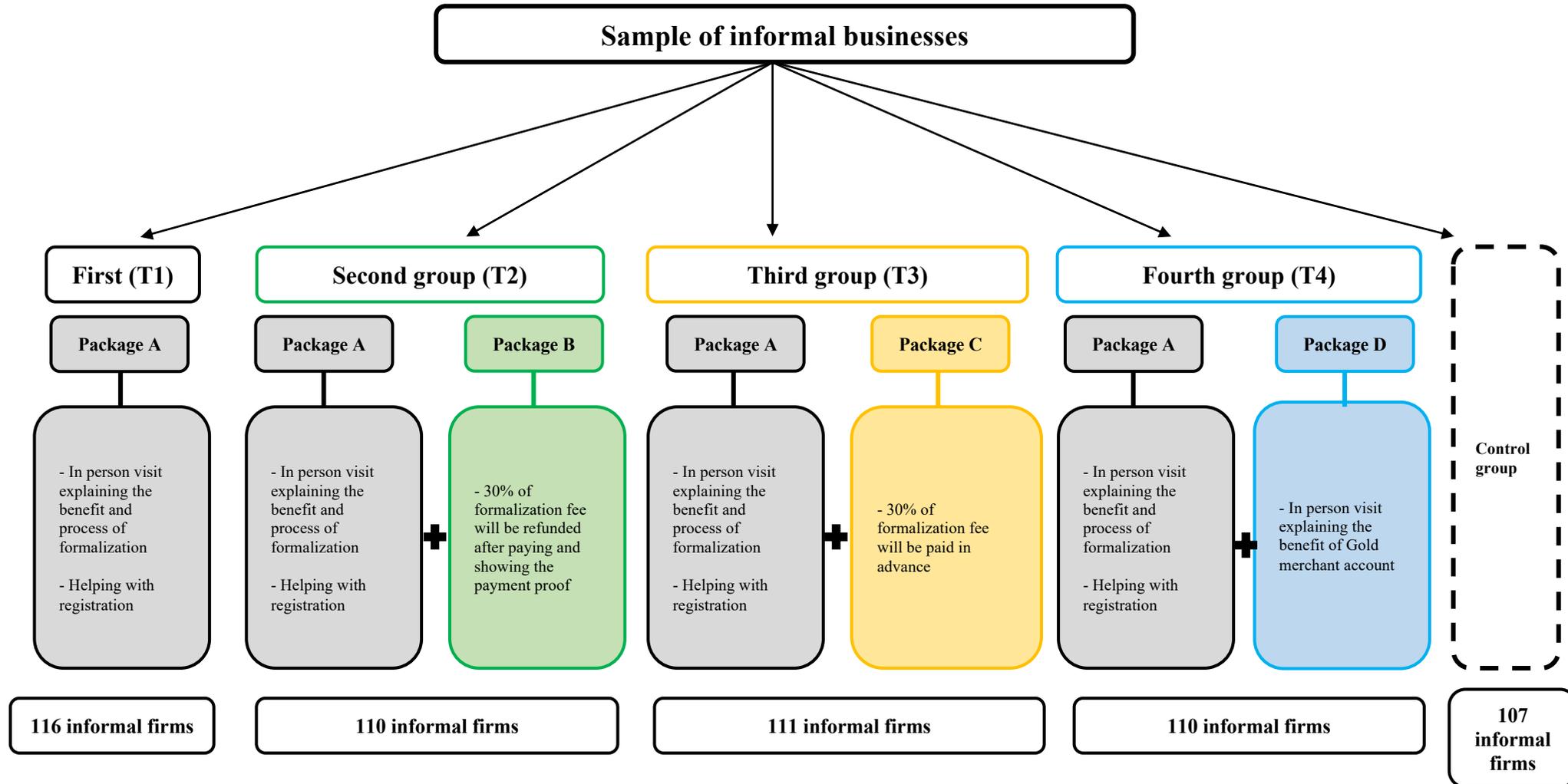
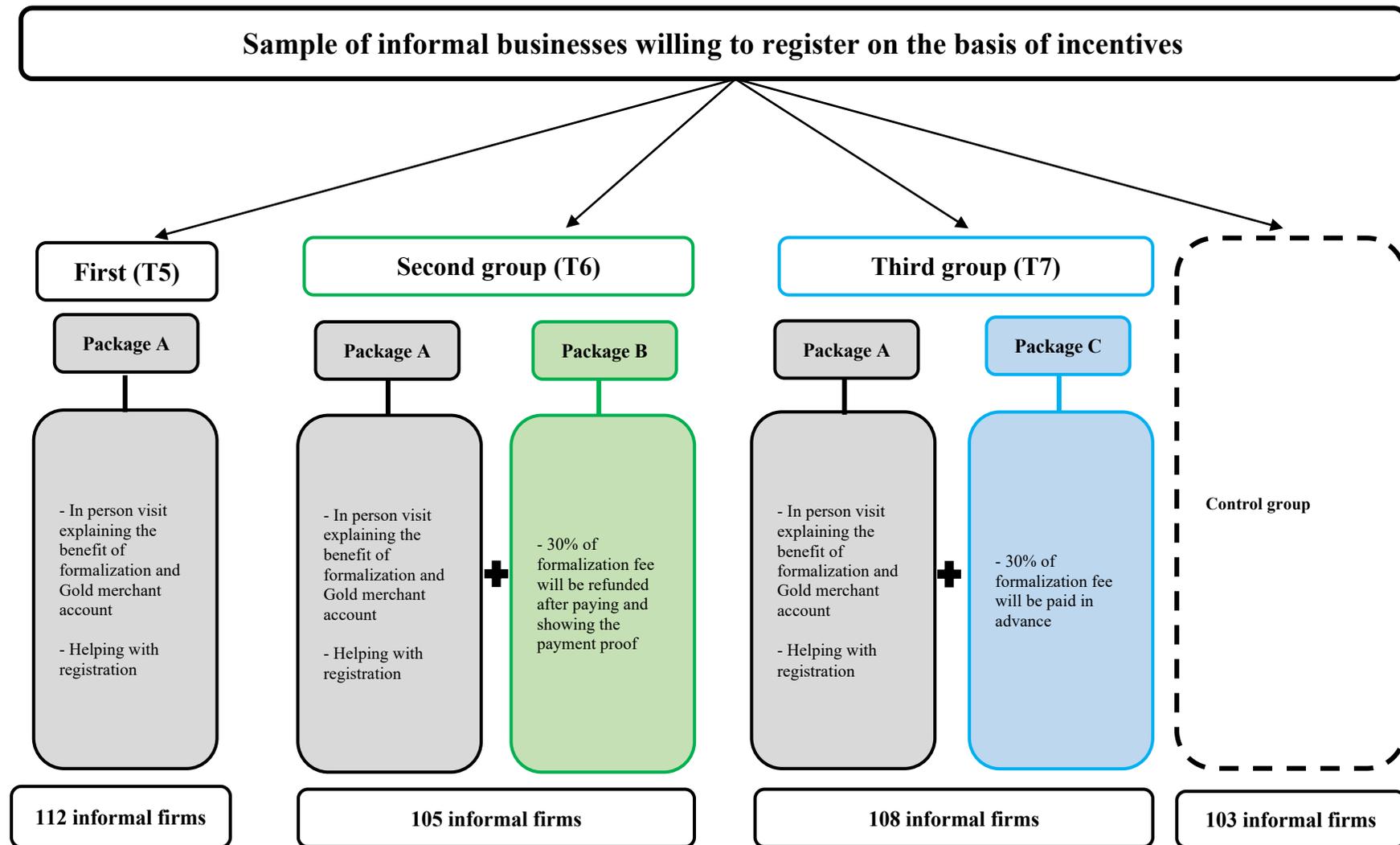


Figure 2. Randomization and informal enterprises assignment. (Continued)



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