Arndt-Corden Department of Economics
Crawford School of Public Policy
ANU College of Asia and the Pacific

Australian National University

Out of the shadow: Encouraging online registration of micro and small businesses through a randomized controlled trial

Sarah Xue Dong
Crawford School of Public Policy
The Australian National University

Dewi Meisari
UKM Centre, Faculty of Economics and Business, University of Indonesia

Banu Rinaldi
UKM Centre, Faculty of Economics and Business, University of Indonesia,

March 2021

Working Papers in Trade and Development

No. 2021/05

Out of the shadow: Encouraging online registration of micro and small businesses through a randomized controlled trial[♦][♣]

Sarah Xue Dong[*], Dewi Meisari and Banu Rinaldi

Abstract: This paper presents the findings of a large scale randomized controlled field trial that informs micro and small businesses about a free and easy to use online registration portal for business registration. We find that in the context of Indonesia, a country with a large informal sector and complicated business registration process, simple online registration can be attractive to micro and small businesses. Sending three rounds of short WhatsApp or text messages resulted in 3.4% of recipients clicking the registration link in the messages. Only 0.1% of recipients registered through the portal, however, indicating that the registration portal is not easy enough to use. Different phrasing of messages results in different click rate, different registration rate, and different rates the sender's number is blocked. Neutral message performs the best, followed by message that emphasize that registration is easy. Message that appeals to people's patriotic feelings or message that emphasize the registration is free performs the last, depending on the outcome.

Keywords: business registration; micro and small enterprises; informal sector; randomized controlled trial; behavioural insights;

JEL codes: C93; O17; O29

[*] All correspondence to Sarah Dong, Crawford School of Public Policy, College of Asia and the Pacific, JG Crawford Building, Lennox Crossing, The Australian National University, Canberra ACT 2601, Tel: +61 2 6125 8282, E-mail: sarah.dong@anu.edu.au.

1. Introduction

The shadow economy is large in the developing world. La Porta and Shleifer (2008) estimated that informal activity counts for at least 30% of total economic activity and even a larger share of total employment in the poorer half of the world's countries. Much debate in the literature is on the role of the shadow economy in a country's development. Some view the informal sector as a pool of entrepreneurships waiting for the opportunity to grow; some view it as part of a dual economy where most businesses are at the subsistence level and have no intention to grow. The literature so far has tilted more towards the latter view (La Porta and Shleifer 2014; Bruhn and McKenzie 2018).

The existing research has, however, largely failed to meet the need of collecting better data on this sector. Estimates of even the size of the informal sector are based on guesses and assumptions, not to mention understanding more of its characteristics and dynamics.[1] From the government point of view, it is important to have updated data on the informal sector to (1) monitor the state of the economy, (2) address poverty and increase welfare of people employed in the informal economy, (3) address problems arising from a transition from the informal economy to the formal economy such as migration, unemployment and skill mismatch, and (4) address negative externalities brought by the informal economy such as congested sidewalks. Therefore, registration and frequent update of businesses in the

---

[1] The size of the informal sector in the literature is usually measured by (1) guess by country experts (2) percentage of total sales an establishment reports for tax purpose, obtained from enterprise surveys that usually do not cover micro businesses (3) percentage of establishments that do not have government registration, obtained from enterprise surveys that usually do not cover micro businesses (3) percentage of working age population that is self-employed and not in agriculture (4) electricity consumption not explained by official GDP. None of these measures are direct. There is also little empirical evidence of their accuracy.

informal economy is desirable for the government. To achieve this, however, is difficult. Full registration of a business is usually difficult and time consuming involving many levels of governments and ministries in developing countries. Empirical studies on how to incentivize informal businesses to register is yet to reach a conclusion on what works (refer to Bruhn and McKenzie (2014) for a review of these studies).

This paper presents the findings of an attempt to introduce simple online registration system tailored to the informal sector that involved using social media and text messages to inform people about the online registration site. Different messages are used to test the effectiveness of different incentives for registration including being free, being easy, or helping the country. Working with the very research organization that collaborated with the government to create the registration portal, we are able to test the treatments through a randomized controlled trial on a large sample of 50,000 businesses across the country. We are also able to directly obtain the percentage of treated businesses who have accessed the website and the actual registration status for each business from the registration portal.

The country we conduct the trial in is Indonesia. Indonesia is an ideal setting to study the informal sector since various measures indicate that its informal sector is large.[2] Business registration in Indonesia, on the other hand, is difficult. Various legal documents, permits, and operating licenses are needed from different levels of government for full registration of any business. Furthermore, clear information of what is required for registration and how to obtain them is hard to find. To deal with this problem, our collaborator, the Micro and Small

---

[2] 30% of working age population in Indonesia are self-employed and not in agriculture in 2016 ((Dong and Manning 2017). The World Bank Enterprise Survey shows that 67% of small firms are not registered with the government in 2009 (Rothenberg, et al. 2016). A walk along the streets in any city in Indonesia will reveal the size of the informal sector as makeshift restaurants, cafes and kiosks occupy the sidewalks.

Business Centre at the University of Indonesia, created an online education and registration portal that clearly states the permits and licenses required and the process involved for full registration for different industries in different cities. It also allows micro and small businesses to register on the website to obtain a certificate from the Ministry of Cooperatives and Small and Medium Enterprises that will help them obtain other permits and access government assistance. The main goal of the registration portal is to create a live and up-to-date database of micro and small businesses in Indonesia. Our trial aims to send information about the registration portal to micro and small businesses to find out (1) if businesses have an interest in online registration (2) whether the portal is effective in resulting in actual registration (3) what kind of messages provide more incentives for businesses to register.

We find that the social media and text messages had zero effect on actual registration of the treatment group compared to the control group. The messages did result in 3.5% of treated businesses accessing the website by clicking the link provided in the messages. The click rate is high compared with average click rate of message-based marketing campaigns in Indonesia (2.74%).[3] The 3.5% click rate did not result in actual registration, which is probably related to the design of the registration portal. Moreover, the click rates are statistically different between the treatment groups. The neutral message performed the best, while the messages that further indicates registration is free or easy performed the second. The patriotic message that adds "let's grow the economy" performed the last. The differences in click rates between these messages are large. Since we can also observe who has blocked our account after receiving the first round of messages through social media (WhatsApp), we find that 3% of businesses who received the first round of social media messages blocked the

---

[3] According to GetResponse (2017). Southeast Asia Email Marketing Benchmarks. https://gr-dms.s3.amazonaws.com/resources/sites/2/2020/08/1136/sea-email-marketing-benchmarks-report.pdf

sender's account. This percentage differs among the treatment groups. The message that emphasizes that registration is free has the highest blocking rate, followed by the message that states "let's grow the economy", and then the message that emphasizes that registration is easy. The neutral message has the lowest blocking rate. When we compare actual registration status among treatment groups, we find that the neutral message has higher registration rate than the patriotic message.

Pooling the results together, the click rate, the block rate, and the registration rate consistently indicate that overselling online registration does not work in this context. Also simple patriotic messages may have a backfiring effect on people's willingness to participate. Overall we learnt that online registration could be an attractive option for very small businesses. However, the way to disseminate information about online registration needs to be better designed, as well as the registration portal. During information campaigns, neutral and informational messages is better than messages that try to sell the registration, especially the ones that try to appeal to people's morale.

This paper contributes to the experimental literature on how to bring the informal economy into the formal economy. Similar experiments have been run in Sri Lanka (De Mel, McKenzie and Woodruff 2013), Bangladesh (De Giorgi and Rahman 2013), Brazil (de Andrade, Bruhn and McKenzie 2016), Columbia (Galiani, Melendez and Ahumada 2017), Malawi (Campos, Goldstein and McKenzie 2018), and Benin (Benhassine, et al. 2018). Interventions include provision of registration information and assistance, cash incentive, businesses services such as accounting and banking upon registration, and enforcement through government inspection. The effect of these interventions on formal registration ranges from zero to 85 percentage points. Full assistance (going through the whole registration process from filling forms to picking up certificates/licenses from the government on behalf of the business) and high cash incentive seem to be the ones that result in the

highest registration rate. Lower cost interventions such as providing information on a brochure with contact details of a helpline seems to have zero to low impact on registration.

Our experiment differs from the previous ones in two ways. First, our sample is much larger. We assign 50,000 businesses into treatment and control groups, while the largest sample in previous experiments is around 8,000. Therefore our study may have better external validity. Second, our intervention is much less costly and therefore much easier to scale up. All previous experiments involve long physical visits of the businesses to provide assistance. A few experiments also involve cash incentives for registration. Our experiment only requires bulk sending of WhatsApp or Text Messages which can be implemented fairly quickly by just one research assistant. Sending social media messages is free, while each text message costs $0.02. The 3.5% click rate of our messages shows that informal businesses have an interest to register with the government when provided with the option of registering online. It also shows that low cost and large scale interventions with phone messages have the potential of obtaining updated information from informal businesses.

The paper also contributes to the literature on behavioural insights and government service provision. This literature has shown that making procedures easy and attractive can significantly increase service uptake (Service, et al. 2014). How to make the services attractive, however, needs to be understood more. We show that making registration easy (simple online registration) does seem to interest informal businesses. We also provide evidence on what does not work to make the service more attractive in the context of business registration. We show that stating that the registration is easy or free in the message lowers uptake, and appealing to people's patriotic feelings in the message lowers uptake even more. Therefore governments should be careful when phrasing their messages when incentivising citizens to take up government services or follow regulations.

The rest of the paper is structured as the following: Section 2 introduces the background of the informal sector and business registration in Indonesia. Section 3 introduces the trial design. Section 4 discusses the trial results. Section 5 concludes.

2. Informal sector and business registration in Indonesia

2.1 Informal sector in Indonesia

It is hard to know the real size of the informal sector in Indonesia. From World Bank Enterprises Surveys, we know that 67% of small firms (5-20 employees) are not registered with the government in 2009 (Rothenberg, et al. 2016), and we can expect this percentage to be higher for micro businesses.[4] Since majority of firms in Indonesia are micro and small firms (Hsieh and Olken 2014), the percentage of all firms not registered with the government would be very high. From labour force surveys, we know that 30% of working age population in Indonesia are self-employed or unpaid family workers and not working in the agriculture sector in 2016 (Dong and Manning 2017). Self-employed and unpaid family workers are used as proxy for informal workers in the development literature.

---

[4] There are two main ways of classifying businesses by size in Indonesia. Most surveys conducted by the Central Bureau of Statistics use the number of employees to classify businesses. Micro business is one with 1-4 employees, small business is one with 5-19 employees, medium business is one with 20-99 employees, and large business is one with larger than 100 employees. The Indonesian government for legality and tax purposes tend to use asset value and annul turnover to classify business. A micro enterprise is one with less than 50 million IDR (about USD 5,000) asset value, or less than 300 million IDR (about USD 30,000) annual turnover. A small enterprise is one with between 50 million and 500 million IDR (about USD 5,000-USD50,000) asset value, or between 300 million and 2.5 billion IDR (about USD 30,000 to USD USD 250,000) annual turnover.

Rothenberg, et al. (2016) shows that within the manufacturing sector, informal enterprises have lower productivity, pay lower wage, and have owners of lower education levels compared with formal enterprises. We know relatively little about the characteristics of informal businesses not in manufacturing such as small restaurants, small traders, etc.. These businesses constitute the majority of micro and small businesses in Indonesia.

The Indonesian government has always taken a stance of support and assistance towards micro and small businesses which are predominately informal, perhaps because a large percentage of the population depend on these businesses for livelihood. Various programs are provided by the government to assist with operation and growth of micro and small businesses. The biggest of such programs is KUR (Kredit Usaha Rakyat, people's business credit), a subsidised loan program for small and micro businesses. Business income tax rate for micro and small businesses is also much lower at 0.5% of annual turnover. Registration and licensing of micro and small businesses are by law required but rarely enforced. The main tension between the government and the informal sector comes from the location of the businesses, as many informal venders operate in illegal locations such as sidewalks, parking lots, and streets.

2.2 Registration of businesses in Indonesia

Business registration in Indonesia is complicated and opaque. According to the 2018 World Bank Doing Business Survey, Indonesia ranks 106th in the world for the category "registering properly". To have formal company registration, all businesses first need to obtain clearance of the company's name from Ministry of Law and Human Rights, which costs about USD200. Then they need to obtain the Deed of Establishment form the Ministry of Law and Human Rights that recognizes the business as a legal entity. Then they can proceed to get the business registration number and a tax file number, as well as social security registration numbers. Rothenberg, et al. (2016) shows that in the capital city Jakarta,

this process from clearance of company name to registering with social security consists of 10 procedures with different ministries that would take at least 50 days. Then the business can go on to obtain operating licences for their particular industry and location such as food safety license. Different cities require different permits and licenses. Furthermore, clear information on what registrations, permits and licenses are required for different types of industries and businesses is lacking.

As a result of the complicated registration process, a business can have some registrations without completing the whole registration process. Because of the lack of information on what is required to achieve "full registration", different businesses will interpret the question "are you registered with the government" very differently. As Rothenberg, et al. (2016) explained, registration in Indonesia is more of a continuous variable than a binary variable.

The Indonesian government has made several attempts to simply the registration process. From 2001, district governments started one-stop-shop programs (PTSPs) that are supposed to consolidate main business licencing across different departments. In theory, a business owner needs to visit just one location in order to obtain the main licenses. By 2013, most districts in Indonesia have a one-stop-shop program. There is no data on the actual implementation of the one-stop-shop program across districts, however, and as a result we do not know whether these programs actually simplified the registration process (Rothenberg, et al. 2016). From 2018, the Indonesian central government launched the online single submission (OSS) platform. Once a business has cleared the company name and obtained a Deed of Establishment, it can obtain other major licenses, including the business registration number, tax file number, and social security number, from this platform. The requirement of obtaining the clearance of company name and Deed of establishment before using the platform, however, may still act as a major hurdle for micro and small businesses.

3. Trial design

3.1. Trial background

Facing the problem of lack of information on business registration and lack of data on the informal sector, University of Indonesia, supported Ministry of Cooperatives and SMEs (small and medium enterprises), created an information and registration portal for MSMEs (micro, small and medium enterprises) called ukmindonesia.id. The information portal has complete and accurate information about registration process and operating licenses for different industries in 69 major cities of Indonesia. It also allows businesses to register through the website to obtain a Certificate of Registration of Micro, Small and Medium Enterprise from the Ministry of Cooperatives and SMEs. The certificate is valid for one year and demonstrates that the Ministry of Cooperatives and SMEs has verified and registered the business. The only official document needed for registration is the business owner's national identity card (NIK). The registration process takes 15 minutes and involves the applicant filling basic information about the business and uploading a picture of his/her identity card. The registered business will have access to information and programs offered by the government and non-governmental organizations. These programs include assistance with market access, assistance with capital access and assistance with licences and permits.

The website was launched in 2017 as a registration information centre for MSMEs. In 2019 the registration portal was launched with support from Ministry of Cooperatives and SMEs. The main goal of the registration portal from the University of Indonesia and the government's view is to create a live and up-to-date database of MSMEs in Indonesia. The Indonesian public, however, still have low awareness of the website and the registration portal. Until December 2020, the portal have received 6,000 registrations.

3.2. Sample

The sample for this trial was selected from the administrative records of the Ministry of Cooperatives and SMEs. We were provided with a list of around 190,000 businesses that have obtained a Micro and Small Business Certificate (IUMK) from the local government. To obtain the IUMK, the business needs to visit the local government and provide a cover letter from their neighbourhood leader about the location of the business. The IUMK is a sign of legality for micro and small businesses, and is expected to provide legal certainty for micro and small businesses. Therefore, the businesses that have obtained an IUMK are already interested in formal registration and obtaining formal legal status. The new certificate offered from the new registration portal is issued by the central government, and therefore a business may have an incentive to obtain the new certificate if it thinks that the central government certificate has more authority and provides more recognition from the government and legal certainty.

The data provided by the Ministry of Cooperative and SMEs contain basic information about the businesses including the owner's age, gender, identification number, phone number, the business's location, industry, legal status, whether it is micro or small business, and the value of capital of the business. The Ministry has indicated, however, that the database is highly out of date and needs to be updated. Therefore, they hope that by informing businesses in their existing database about the new registration portal, businesses will register and update their information online.

3.3. Interventions

The interventions for this trial consists of WhatsApp or text messages. Four different messages were tested. The messages are listed below with their translations:

Treatment 1 (neutral message):

Original message: Tahukah UMKM bisa daftar usahanya ke KemenKopUKM RI scr online? Daftar utk dpt sertifikat resmi & akses program2. Klik: bit.ly/ukmindonesia1

Translation: Did you know that MSMEs can register their business with the Republic of Indonesia's Ministry of Cooperatives and SMEs online? Register to get an official certificate and access programs. Click: bit.ly/ukmindonesia1

Treatment 2 (``it's free!''):

Original message: Tahukah UMKM bisa daftar usahanya ke KemenKopUKM RI scr online dgn GRATIS? Daftar utk dpt sertifikat resmi & akses program2. Klik: bit.ly/ukmindonesia2

Translation: Did you know that MSMEs can register their business with the Republic of Indonesia's Ministry of Cooperatives and SMEs online for FREE? Register to get an official certificate and access programs. Click: bit.ly/ukmindonesia2

Treatment 3 (patriotic):

Original message: Tahukah UMKM bisa daftar usahanya ke KemenKopUKM RI scr online? Daftar utk dpt sertifikat resmi & akses program2. MARI TUMBUHKAN EKONOMI. Klik: bit.ly/ukmindonesia3

Translation: Did you know that MSMEs can register their business with the Republic of Indonesia's Ministry of Cooperatives and SMEs online? Register to get an official certificate and access programs. LET'S GROW THE ECONOMY. Click: bit.ly/ukmindonesia3

Treatment 4 (easy):

Original message: Tahukah UMKM bisa daftar usahanya ke KemenKopUKM RI scr online dgn MUDAH? Daftar utk dpt sertifikat resmi & akses program2. Klik: bit.ly/ukmindonesia4

Translation: Did you know that MSMEs can register their business with the Republic of Indonesia's Ministry of Cooperatives and SMEs online EASILY? Register to get an official certificate and access programs. Click: bit.ly/ukmindonesia4

Each treatment group received the same message three times. We initially sent WhatsApp messages to all treatment group members to determine whether or not they were using WhatsApp. Treatment group members who were not using WhatsApp received text messages. WhatsApp messages came from a sender named ``UKMIndonesia'', which is the

recognized name of the registration portal created by University of Indonesia (ukmindonesia.id). The text message came from a sender named ``UKMIndo'' because the number of characters of the sender name is limited for text messages. We differentiated the unique link for each treatment group in order to track the click numbers per group. Once they click the link, they will be directed to an initial registration page to register or log in with an email address or using google account or facebook account. Then they will be directed to the registration portal where they can complete the registration online.

3.4. Randomization

As part of the agreement with the UKM Centre, the sample for our trial should be around 50,000. From the original database of around 190,000 businesses, we first drop businesses in provinces that have internet penetration rate below 65%, to limit to locations where the capacity to register online is reasonably high. This process leaves us with around 120,000 businesses. Then we randomized the 120,000 businesses into six groups, with five groups of sizes around 11,000, and one group of size around 65,000. The five groups of sizes around 11,000 will be used for treatment groups and the control group. Stratified randomization is done at the individual (business) level. We stratified along gender of business owner, age of business owner (quartiles), location of business (island groups: Java-Bali, Sumatra, Kalimantan, Sulawesi, Eastern Indonesia), sector of business (accommodation and food service, trade and repair, other sectors, sector unknown), size of business (small or micro) and value of capital of business (sextiles).

3.5. Outcomes

Three main outcomes are analysed in this paper. The first one is whether the business has registered through the online portal. This outcome is directly obtained from the portal. If the phone number of the business or the owner's national identification number from the
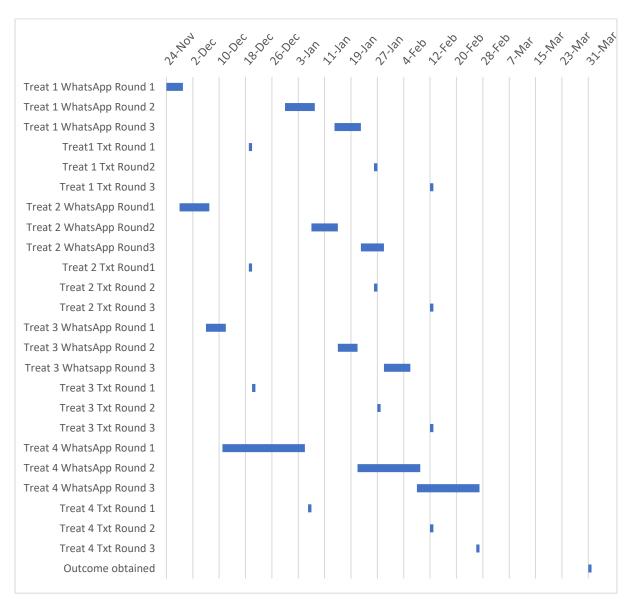
online registration matches with the one in our sample, we define the outcome of registration as 1, and 0 otherwise. The second outcome is number of clicks of the link provided in the messaged divided by the number of businesses in each treatment group. This ratio can only be observed at the treatment group level, since we cannot identify who has clicked the link, but only the number of clicks for each link (different links are provided for different treatment groups). The third outcome is whether a business has blocked our account after receiving the first round of messages. Since only WhatsApp account can be blocked and text message cannot be blocked, we only observe this outcome for businesses that have a WhatsApp account and receive WhatsApp messages.

3.6. Timing

De-identified data were used to carry out initial randomization in November, 2019 after we received ethics clearance from ANU human ethics committee. The trial was registered with the American Economics Association RCT registry in November, 2019.[5] The interventions were carried out between November 2019 and February, 2020. De-identified outcomes data were obtained at end of March, 2020. The timing of the interventions is illustrated in the timeline in Graph 1 below. The messages are sent between November 24th, 2019 and February 26th, 2020. The outcome variables are obtained on March 31st, 2020. So the number of clicks and the number of registrations for all treatment groups and control group are accumulated from the start of the website to March 31, 2020. The gap between the first and second round of messages is larger than planned at around 36 days, due to technical issues. The gap between the second and third rounds of messages is around 14 days as planned.

---

[5] Trial registration link: https://doi.org/10.1257/rct.5007-1.0

Graph 1: Trial Timeline

3.7. Empirical strategy

For the outcome registration status, we estimate the following equation to obtain the average treatment effect of each treatment:

$$Y_i = \alpha_0^j + \alpha_1^j T_i^j + X_i \alpha_2^j + \varepsilon_i^j \qquad (1)$$

$$T_i^j = 1 \; if \; i \; is \; in \; treatment \; group \; j$$

$$T_i^j = 0 \; if \; i \; is \; in \; control \; group$$

$$j = 1,2,3,4$$

α_1^js are the parameters of interest, X_i is a vector of control variables including business owner's age and gender, province of the business location, industry of the business, whether the business is categorized as small or micro business, and the value of capital of the business. ε_i^js are the model error terms. We estimate the equation without controls to obtain the unconditional treatment effects as well.

We also compare the registration status and whether the WhatsApp account was blocked between treatment groups, we estimate the following equations:

$$Y_i = \beta_0^{12} + \beta_1^{12}T_i^{12} + X_i\beta_2^{12} + \eta_i^{12} \qquad (2)$$

$$Y_i = \beta_0^{13} + \beta_1^{13}T_i^{13} + X_i\beta_2^{13} + \eta_i^{13} \qquad (3)$$

$$Y_i = \beta_0^{14} + \beta_1^{14}T_i^{14} + X_i\beta_2^{14} + \eta_i^{14} \qquad (4)$$

$$Y_i = \beta_0^{23} + \beta_1^{23}T_i^{23} + X_i\beta_2^{23} + \eta_i^{23} \qquad (5)$$

$$Y_i = \beta_0^{24} + \beta_1^{24}T_i^{24} + X_i\beta_2^{24} + \eta_i^{24} \qquad (6)$$

$$Y_i = \beta_0^{34} + \beta_1^{34}T_i^{34} + X_i\beta_2^{34} + \eta_i^{34} \qquad (7)$$

$$T_i^{jk} = 1 \ if \ i \ is \ in \ treament \ group \ k$$

$$T_i^{jk} = 0 \ if \ i \ is \ in \ treatment \ group \ j$$

We also estimate the equations without controls.

To compare the click rate between treatment groups, we calculate means and standard errors for each group and do manual comparison between means.

4. Results

4.1 Summary statistics

Table 1 summarizes the characteristics of the businesses in our sample. We show the characteristics of the full sample and of the sample we used for our trial. Although not random, a sample of this size can add to our knowledge about the basic characteristics of micro and small businesses in Indonesia, which is lacking. According to the full sample, the

mean age of business owners is 44. About half of businesses are owned by women. In terms of location, 36 percent of businesses are on the island of Java-Bali, and the rest are fairly equally distributed across other major island groups. The industry distribution shows that 49 percent of businesses are not sure about which industry they are in. For the ones that do report an industry group, the majority of businesses are in trade and repair, followed by accommodation and food. Manufacturing and agriculture constitute small percentages at 3-4 percent of all businesses. In terms of size, 90 percent of businesses are classified as Micro Enterprises, and 10 percent are classified as Small Enterprises.[6] The mean of value of capital across businesses is USD 1,760, which is low. The trial sample have similar characteristics on average as the full sample except that more businesses are located on Kalimantan and Sulawesi instead of on Java-Bali.

Table 1: Summary statistics

		Full sample N=191341 Mean	Trial sample N=52519 Mean
Age		44	43
Female		0.51	0.53
Location	Java-Bali	0.36	0.19
	Sumatra	0.16	0.16
	Kalimantan	0.18	0.26
	Sulawesi	0.20	0.27
	Eastern Indonesia	0.10	0.13
Industry	Accommodation and food	0.12	0.10

---

[6] The Ministry of Cooperatives and SMEs uses asset value and annul turnover to classify business. A micro enterprise is one with less than 50 million IDR (about USD 5,000) asset value, or less than 300 million IDR (about USD 30,000) annual turnover. A small enterprise is one with between 50 million and 500 million IDR (about USD5000-USD50,000) asset value, or between 300 million and 2.5 billion IDR (about USD 30,000 to USD USD 250,000) annual turnover.

	Trade and repair	0.32	0.34		
	Manufacturing	0.04	0.03		
	Agriculture and fishing	0.03	0.03		
	Other	0.19	0.19		
	Do not know	0.30	0.30		
Classification	Micro	0.90	0.90		
	Small	0.10	0.10		
Capital (in USD)		1760	1800		

4.2 Balance

Table 2 shows the balance of characteristics after randomization. The numbers in the table are coefficients and standard errors from regressing treatment variable on the characteristics of the businesses. The treatment variables is equal to one if the business is in a treatment group, and equal to zero if the business is in the control group. Since the coefficients for all four regressions are close to zero and not significant, the randomization process balanced baseline characteristics well. We have also compared characteristics between treatment groups, all characteristics listed in Table 2 do not differ between treatment groups.

Table 2: Balance

		Dependent variable			
		Treat 1	Treat 2	Treat 3	Treat 4
Female		0.00	0.00	-0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)
Age		0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
Location	Java-Bali	-0.00	-0.00	-0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)
	Sumatra	-0.00	0.00	-0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)

	Kalimantan	-0.00	-0.00	-0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)
	Eastern Indonesia	0.00	-0.00	0.00	0.00
		(0.01)	(0.01)	(0.01)	(0.01)
Industry	Accommodation and food	-0.00	-0.00	0.00	-0.01
		(0.01)	(0.01)	(0.01)	(0.01)
	Manufacturing	0.00	0.01	0.02	-0.00
		(0.02)	(0.02)	(0.02)	(0.02)
	Agriculture	0.01	-0.00	-0.01	-0.00
		(0.02)	(0.02)	(0.02)	(0.02)
	Other	0.00	0.00	-0.00	0.00
		(0.01)	(0.01)	(0.01)	(0.01)
	Don't know	0.00	0.00	0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)
Classification	Small	-0.00	-0.00	0.00	0.00
		(0.01)	(0.01)	(0.01)	(0.01)
Capital		0.00	0.00	0.00	-0.00
		(0.00)	(0.00)	(0.00)	(0.00)
Constant		0.50***	0.49***	0.49***	0.50***
		(0.02)	(0.02)	(0.02)	(0.02)
N in Treatment		10671	10594	10476	10380
N in Control		10398	10398	10398	10398
Adjusted R-sq		-0.001	-0.001	-0.000	-0.001

4.3 Trial Results

Table 3 summarizes the outcomes. Around 35% of businesses in treatment groups have a WhatsApp account and were sent a WhatsApp message. After the first WhatsApp message, 1% - 5% of businesses blocked the sender's WhatsApp account, depending on the treatment group. The businesses without WhatsApp account were sent text messages. At the end of our trial period, 3%-4% of businesses clicked the link provided in the messages,

depending on the treatment group, and 0.06%-0.14% of businesses registered through the

online portal.

Table 3: Outcomes Summary

	Treat 1 Neutral	Treat 2 Free	Treat 3 Patriotic	Treat 4 Easy	Control	All treated
Sent by WhatsApp	3755	3510	3540	3930		14735
Sent by Text	6916	7084	6936	6450		27836
Total	10671	10594	10476	10380	10398	42121
% with WhatsApp	35.19%	33.13%	33.79%	37.86%		34.98%
Registered	15	8	6	14	8	43
Registration rate	0.14%	0.08%	0.06%	0.13%	0.08%	0.10%
Clicks of link	425	350	304	347		1426
Click rate	3.98%	3.30%	2.90%	3.34%		3.39%
WhatsApp Blocked	42	202	159	89		492
WhatsApp Block						3.34%
rate	1.12%	5.75%	4.49%	2.26%		

We can see from Table 3 that registration rate, click rate and WhatsApp block rate can

be different between treatment groups and control group. Table 4-5 show the regression

results from Equation (1)-(7), to estimate if the differences are statistically significant.

Table 4: Effect on Registration

Treatment vs. Control

	Treatment 1 vs. Control	Treatment 2 vs. Control	Treatment 3 vs. Control	Treatment 4 vs. Control
Unconditional	0.0006	-0.0000	-0.0002	0.0006
	(0.0005)	(0.0004)	(0.0004)	(0.0005)
Conditional	0.0006	-0.0000	-0.0002	0.0006
	(0.0005)	(0.0004)	(0.0004)	(0.0005)
N	21069	20992	20874	20778

Note: Conditional results are from regressions that control for age, gender, island group, industry group, classification, and capital. * p<0.1 ** p<0.05 *** P<0.01. Standard errors in brackets.

Table 4 shows the treatment effects on registration, comparing treatment groups with the control group (Equation (1)). We can see that none of the treatments had an effect on registration, compared with the control group. The coefficients are very small and also insignificant. The unconditional treatment effect estimates are identical to the conditional treatment effect estimates, showing the robustness of our randomization.

Table 5 shows the results when comparing between treatment groups. The estimates for the difference in registration status and in whether the WhatsApp account was blocked are from regressions according to Equation (2)-(7). The estimates for the difference in click rate are manually calculated comparing the means of the treatment groups.

When the outcome is registration, both Treatment 1 (neutral) and Treatment 4 (easy) have 0.08 percentage point higher registration rate than Treatment 3 (patriotic), significant at the 0.1 significance level. The difference is small in absolute terms, but big considering that the overall registration rate is around 0.1 percentage point. This difference is not picked up when comparing treatment groups with the control group, perhaps because Treatment 1 and 4 increases registration compared with control group, and treatment 3 decreases registration compared with the control group, but none of the difference is big enough to be statistically significant. When we compare Treatment 1/Treatment 4 with Treatment 3 though, the difference is big enough to be statistically significant at 0.1 significance level. The unconditional estimates are almost identical to the conditional estimates, again showing the robustness of the randomization.

In terms of click rate, Treatment 1 (neutral) has the highest click rate, followed by Treatment 2 (free) and 4 (easy), and Treatment 3 (patriotic) has the lowest click rate. The difference between Treatment 1 (neutral) and Treatment 2/4 (free or easy) is 0.68 percentage point, and the difference between Treatment 2/4 (free or easy) and Treatment 3 (patriotic) is 0.44 percentage point. These differences are significant at at least 0.05 significance level.

These differences are also large considering that average click rate across treatment groups is

3.39 percentage points.

Table 5: Effect on Outcomes

Comparing Treatments

	Treatment 2 vs. Treatment 1	Treatment 3 vs. Treatment 1	Treatment 4 vs. Treatment 1	Treatment 3 vs. Treatment 2	Treatment 4 vs. Treatment 2	Treatment 4 vs. Treatment 3
Registered Unconditional	-0.0007	-0.0008*	-0.0001	-0.0002	0.0006	0.0008*
	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
N	21265	21147	21051	21070	20974	20856
Registered Conditional	-0.0007	-0.0008*	-0.0001	-0.0002	0.0006	0.0008*
	(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
N	21265	21147	21051	21070	20974	20856
Registered Conditional+ Whatsapp	-0.0006	-0.0008*	-0.0001	-0.0002	0.0005	0.0007
	(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
N	21265	21147	21051	21070	20974	20856
Click rate	-0.0068***	-0.0108***	-0.0064***	-0.0040**	0.0004	0.0044**
	(0.0026)	(0.0025)	(0.0026)	(0.0024)	(0.0025)	(0.0024)
N	21265	21147	21051	21070	20974	20856
Blocked Unconditional	0.046***	0.034***	0.011***	-0.013**	-0.035***	-0.022***
	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)
N	7265	7295	7685	7050	7440	7470
Blocked Conditional	0.048***	0.033***	0.011***	-0.014***	-0.036***	-0.023***
	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)
N	7265	7295	7685	7050	7440	7470

Notes: Registered conditional controls for gender, age, island group, industry group, classification, capital. Registered conditional + WhatsApp controls for the same set of variables plus whether the business owner has WhatsApp account. Blocked conditional controls for same set of variables except WhatsApp, since blocked is only observable for recipients with WhatsApp. * p<0.1 ** p<0.05 *** P<0.01. Standard errors in brackets.

The result the click rate is lowest for the patriotic message is consistent with the

results on registration rate. These results show that in terms of making micro and small

businesses interested in online registration, a neutral message performs better than the ones that sell the registration portal by stating that it is either free or easy to use. Furthermore, messages that tries to appeal to people's patriotic feelings can backfire and make people less interested in online registration.

If the registration rate and click rate shows to what extent messages can incentivize online registration, the block rate shows to what extent messages can put off recipients and prevent future interaction. Table 5 shows that Treatment 2 (free) has the highest block rate, followed by Treatment 3 (patriotic), and then Treatment 4 (easy). Treatment 1 (neutral) has the lowest block rate. The difference between Treatment 2 and Treatment 3 is 1.3 percentage point; the difference between Treatment 3 and Treatment 4 is 2.2 percentage point, and the different between Treatment 4 and Treatment 1 is 1.1 percentage point. These differences are significant at at least 0.05 significance level, and are large considering that the block rate across treatment groups is 3.34 percentage points. The unconditional estimates are almost identical to the conditional estimates, again showing the robustness of the randomization.

Comparing results on click rate with the results on block rate, it seems that different mechanisms could be at play when making people interested and when making people dubious. Specifically, the free message is more incentivising than the patriotic message, but also more off-putting than the patriotic message. Beyond this difference, it seems that the neutral message is the most incentivising and the least off-putting, followed by the message that emphasizes that registration is easy.

One caveat when looking at the results is that the percent of businesses that have a WhatsApp account differ between treatment groups. The differences are statistically significant at at least 0.05 significance level for most pair-wise comparisons between treatment groups, except that it is not significant even at 0.10 significance level comparing Treatment 2 and Treatment 3. Whether having a WhatsApp account is a baseline variable

that is not observed at baseline, and only observed when trying to send WhatsApp messages. Therefore it is not possible to try to balance this variable at time of randomization. As Deaton and Cartwright (2018) points out, unbalance in variables can occur when conducting RCTs with even very large sample size. This does not necessarily mean, however, that the treatment effects will be biased.

To assess the extent to which the imbalance in WhatsApp account ownership is a confounding factor, I compare estimates without and with controlling for whether the owner has WhatsApp when the outcome variable is registration status. We can see in Table 5 that the unconditional estimates of coefficient and standard errors are identical with conditional estimates when WhatsApp status is not controlled for. When WhatsApp status is added, the point estimates change slightly but stay close to unconditional estimates. The standard errors remain the same. This shows that whether having WhatsApp is not a big confounding factor when the outcome is registration. The results on block rate shows that restricting to people with WhatsApp account, the estimates are very similar when having no controls and when having full controls of baseline characteristics. This is evidence that when restricting to businesses with WhatsApp account, unobserved characteristics between treatment groups are less likely to be confounding factors when the outcome is block rate (Oster 2019). From these evidence, the fact that WhatsApp account owning status may not be balanced across treatment groups is potentially a small concern for the validity of the results in this paper.

5. Discussion and conclusion

This paper showed the background, design and results of a randomized controlled trial conducted to informs micro and small businesses about a free and easy to use online registration portal for business registration. We find that in the context of Indonesia, a country with a large informal sector and complicated business registration process, simple

online registration can be attractive to micro and small businesses. Sending three rounds of very short WhatsApp or text messages resulted in 3.4% of recipients clicking the registration link in the messages. Only 0.1% of recipients registered through the portal, however, indicating that the registration portal is not easy enough to use. We also find that different phrasing of messages resulted in different click rates and different registration rates. More specifically, a neutral message that simply informs people about the availability of the registration portal performed the best, followed by message that emphasizes that registration is free or easy. Message that appeals to people's patriotic feelings by adding "let's grow the economy" performed the worst. We also find that difference in phrasing resulted in difference in the rate that recipients blocked the WhatsApp sender's account after receiving the first message. In this case, the neutral message still had the lowest block rate. The message that emphasizes that registration is free had the highest block rate, however, indicating mechanisms that incentivize registration can be different from mechanisms that put off the businesses.

Our study adds to the discussion on formalization of the informal sector in developing countries. Compared with existing studies that use bigger and more expensive interventions, we show that first of all, online registration can be attractive to micro and small businesses. We also show that low cost information campaigns using social media and text messages can generate substantial interest. How to turn the interest into actual registration, however, still needs to be tested. A randomized controlled trial that varies the design of the registration portal would shed light on this question.

The messaging can also be improved to increase initial interest. For example, instead of sending the message from a not well known organization, messages can be sent directly by the Ministry of Cooperatives and SMEs. This would potentially increase the credibility of the sender. More or less details can be given in the message, and intervals between messages can

be shortened to increase the intensity of the messaging. A message that more clearly explains the benefits of this particular registration with the Ministry of Cooperatives and SMEs can also potentially increase interest.

Our study uses a non-random sample of micro and small businesses. In particular, these are businesses that have registered with the local government and obtained a Certificate of Micro and Small business, which is similar to the ones offered by the our registration portal. The only difference is that our certificate is distributed by the central government, namely, the Ministry of Cooperatives and Small and Medium Enterprises. The treatment effects from this sample can be higher than the average over the population of micro and small businesses if businesses that have obtained local registration are more interested in registration than average. The treatment effects from this sample can also be lower than the average over the population if businesses that have already obtained a similar certificate are less likely to get a new one. Nevertheless, the fact that these businesses already have some extent of local registration should be taken into account when interpreting the results from this study.

One underlying constraint to the effectiveness of online registration is the technical/digital capacity of micro and small business owners. We can see that 35% of business in our trial sample have a WhatsApp account, indicating that they own a smartphone, have internet connection and know how to use simple smart phone applications. Navigating through a website and registration portal, however, requires more technical skills and better internet connection than using WhatsApp. Jurriens and Tapsell (2017) has shown that among Indonesians that have access to internet and have a smart phone, majority of them only have access to very slow internet which limit internet use to mostly social media. Therefore there is potentially an upper limit to which online registration of micro and small businesses can be effective. It would be very useful, though, to assess the extent of this limit

empirically.

Voluntary online registration of businesses is an attractive option for both the government and for businesses. The Online Single Submission (OSS) system launched by the Indonesian government shows that this is the direction the government is thinking already. How to make the system work for micro and small businesses that have lower incentive to register in the first place and also have low digital capacity will be an important area of research. Removing pre-requisites for registration, such as obtaining legal documents beforehand, would increase interest of micro and small businesses. We have shown that targeted information campaigns that include the registration link can lead to businesses accessing the registration system. We have also shown that phrasing of the messages is important, and neutral informational messages seem to perform the best. Many more tests need to be done, however, to find the most cost-effective way of encouraging online registration.

References

Benhassine, Najy, David McKenzie, Victor Pouliquen, and Massimiliano Santini. 2018. "Does inducing informal firms to formalize make sense? Experimental evidence from Benin." *Journal of Public Economics* 157: 1-14.

Bruhn , Miriam, and David McKenzie. 2018. "Entry Regulation and the Formalization of Microenterprises in Developing Countries." *PEDL Policy Insight Series*, December.

Bruhn, Miriam, and David McKenzie. 2014. "Entry Regulation and the Formalization of Microenterprises in Developing Countries." *The World Bank Research Observer* 29: 186–201.

Campos, Francisco, Markus Goldstein, and David McKenzie. 2018. "How Should the Government Bring Small Firms into the Formal System?" *Policy Research Working Paper 8601*, October.

de Andrade, Gustavo Henrique, Miriam Bruhn, and David McKenzie. 2016. "A Helping Hand or the Long Arm of the Law? Experimental Evidence on What Governments Can Do to Formalize Firms." *The World Bank Economic Review* 30 (1): 24–54.

De Giorgi, Giacomo, and Aminur Rahman. 2013. "SME's registration: Evidence from an RCT in Bangladesh." *Economics Letters* 120: 573-578.

De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2013. "The Demand for, and Consequences of, Formalization among Informal Firms in Sri Lanka." *American Economic Journal: Applied Economics* 5 (2): 122–150.

Deaton, Angus, and Nancy Cartwright. 2018. "Understanding and misunderstanding randomized controlled trials." *Soc Sci Med* 210: 2–21.

Dong, Sarah, and Chris Manning. 2017. "Labour-Market Developments at a Time of Heightened Uncertainty." *Bulletin of Indonesian Economic Studies* 53 (1): 1-25.

Galiani, Sebastian, Marcela Melendez, and Camila Navajas Ahumada. 2017. "On the effect of the costs of operating formally: New experimental evidence." *Labour Economics* 45: 143-157.

Hsieh, Chang-Tai, and Benjamin A. Olken. 2014. "The Missing "Missing Middle"." *Journal of Economic Perspectives* 28 (3): 89–108.

Jurriens, Edwin, and Ross Tapsell, editors. 2017. *Digital Indonesia: Connectivity and Divergence.* Singapore: ISEAS – Yusof Ishak Institute.

La Porta, Rafael, and Andrei Shleifer. 2008. "The Unofficial Economy and Economic Development." *Brookings Papers on Economic Activity*, Fall: 275-352.

La Porta, Rafeal, and Andrei Shleifer. 2014. "Informality and Development." *Journal of Economic Perspectives* 28 (3): 109–126.

Oster, Emily. 2019. "Unobservable Selection and Coefficient Stability: Theory and Evidence." *Journal of Business & Economic Statistics* 37 (2): 187-204.

Rothenberg, Alexander D., Arya Gaduh, Nicholas E. Burger, Charina Chazali, Indarsari Tjandraningsih, Rini Radikun, Cole Sutera, and Sarah Weilant. 2016. "Rethinking Indonesia's Informal Sector." *World Development* 80: 96-113.

Service, Owain, Michael Hallsworth, David Halpern, Felicity Algate, Rory Gallagher, Sam Nguyen, Simon Ruda, et al. 2014. *EAST Four simple ways to apply behavioural insights.* London: The Behavioural Insights Team.