PERUVIAN ECONOMIC ASSOCIATION

Nudging microentrepreneurs under fire:
Experimental evidence from favelas in Rio de Janeiro

Anna-Katharina Lenz

Martin Valdivia

Nudging microentrepreneurs under fire: Experimental evidence from favelas in Rio de Janeiro

Anna-Katharina Lenz

Miami University, Ohio, United States

Martin Valdivia[*]

Grupo de Análisis para el Desarrollo (GRADE)

Abstract

Do behavioral biases and the distortions generated by the presence of organized crime limit microentrepreneurs' adoption of growth-oriented business practices? We explore this question in a field experiment with informal microentrepreneurs in which we provide informational visits and text messages about the advantages and convenience of a formalization program. All microentrepreneurs operated in Complexo Maré, a Favela in Rio de Janeiro, Brazil, where an important contextual factor was the presence of organized crime groups. After a recent state intervention, violence had increased in the intervened territories. Our average results suggest that while informative in-person visits do increase the knowledge about the formalization program and even the interest in formalizing, complementing the intervention with reminding messages is needed to increase business formalization. That is, treatment groups that received either information sessions or text messages show no effect, while those receiving both treatments show an increase in formalization by 8.5 percentage points. We also find, however, that these effects of the nudging intervention can be cancelled out by the distortions imposed by organized crime, in particular, by the mobility restrictions they often use to control their territories. We interpret these results as evidence in support of the importance of behavioral interventions such as reminder messages, to overcome limited attention and procrastination biases by microentrepreneurs, but also as an indication of the impacts that organized crime may have on adopting good business practices.

June, 2023

1 Introduction

Millions of people around the world are self-employed, either as independent workers or managers of small firms (La Porta & Shleifer, 2014; Ulyssea, 2020; World Bank, 2013). Many people view such enterprises as a potential source of economic growth that could be unleashed if only regulatory constraints were managed to avoid blocking individual entrepreneurship (De Soto et al., 1990). However, experiences over the last decades have raised questions about this optimistic view. Almost no growth transition has emerged among these self-employed firms, with most of them closing after a few months/years or remaining small in size; many continue to operate in the informal sector, where they avoid paying taxes and seldom comply with government safety and labor regulations (Schoar, 2010). Though many governments have endeavored to facilitate a transition to formality among these firms by reducing red tape and program-related costs and/or by increasing perceived benefits of formalization (Benhassine et al., 2018; Ulyssea, 2020), the effects of these efforts have for the most part been negligible (Bruhn & McKenzie, 2014).

We address this conundrum by looking at the extent to which behavioral biases related to limited attention, self-control and cognitive capacities and the presence of organized crime groups in the areas where they work may influence decisions and actions of entrepreneurs and may consequently impede program take-up. The importance of these factors has been analyzed in other areas relevant for economic development and social welfare such as saving behavior or changes in health care plan (Datta & Mullainathan, 2014). However, little in the way of research has examined the question of how behavioral biases may impede the adoption of good business practices by microentrepreneurs, especially under the severe constraints they tend to face in developing countries (Kremer et al., 2019), where they may interact with organized crime (Blattman et al., 2021).

This article provides experimental evidence on the importance of behavioral biases on formalization of microbusinesses working under severe restrictions, such as tight time constraints and exposure to gang-related violence. To do so, we conducted an experiment in which we offered a random sample of informal microentrepreneurs informational visits and/or weekly SMS text message reminders over a period of 10 weeks about the advantages and convenience of participating in a state-subsidized and state-facilitated formalization program: the Individual Microentrepreneur program (abbreviated as MEI, the acronym for Micro Empreendedor Individual, its name in Portuguese). The experimental setting was designed to take advantage of the fact that microentrepreneurs are not aware of the

benefits of the MEI program (De Andrade et al., 2016). Our experiment focused on microentrepreneurs in Complexo Maré, Rio de Janeiro's largest favela complex, which is home to approximately 140,000 residents in 16 communities and is controlled by three distinct organized crime groups, including drug-trafficking gangs and militia (Silva, 2017). To objectively confirm whether microentrepreneurs in our sample did indeed register into the formalization program, we use a business survey from Complexo Maré and administrative data from the private, non-profit organization, the Brazilian Service of Support for Micro and Small Enterprises (SEBRAE), and the credit bureau firm, Serasa Experian. Our results provide important empirical evidence both about the influence of behavioral biases on the decision to formalize businesses and about the economic role of drug-related violence that often affects the lives of residents and businesses operating in large urban areas of developing countries. Our findings suggest that informative visits increased entrepreneurs' knowledge about the MEI program and their interest in formalization; nevertheless, program take-up increased only for one group: those entrepreneurs who received both the two-pronged outreach methods of the in-person visit and reminder messages. While the extent to which businesses decided to formalize did not change among those who received either the in-person visit or text messages alone, formalization increased by 8.5 percentage points among those who receive both. The differentiated effects in favor of those receiving both forms of communication are even more robust when one considers compliance with payment schedules that are part of the requirements. As a result of the in-person informative visit and text message reminders, compliance with formalization tax payments increased by 6.4 percentage points, which means that the majority of those who registered with MEI as a result of both treatments had a good understanding of the requirements, which was a major concern of SEBRAE, our implementation partner.. We interpret these results as evidence of the existence of behavioral biases, such as limited attention and procrastination in explaining low rates of formalization by microentrepreneurs, even when their own cost-benefit analysis supports a move into the formal economy.

Importantly, our results also shed new light on the role of organized crime on microentrepreneurs' decision making. Complexo Maré has historically been affected by fights between organized crime groups – especially between two gangs, Comando Vermelho and Terceiro Comando Puro (TCP) – that control several of its neighborhoods. In the years prior to our intervention, police and military interventions against organized crime groups increased as part of a strategy implemented to control violence in Rio, which exacerbated

collisions between the state military and the gangs. At the time of our experiment – which took place between April 2016 and November 2018, Comando Vermelho and TCP were vying for territory. In that context, an unintended consequence of our requirement that final registration with MEI had to be done in person at the SEBRAE office complicated the formalization process for those residing in TCP-controlled neighborhoods, as the office was located in a territory controlled by Comando Vermelho. Among the microentrepreneurs operating in TCP-controlled neighborhoods, no treatment (in-person visits, text message, or both) had any effect on registration through the MEI program; by contrast, in Comando Vermelho-dominated areas (which incorporated the experiment's registration office), registration of microentrepreneurs who received full treatments of a visit and texts increased by 17.2 percentage points – twice as much as the overall average treatment effect of 8.5 percentage points. We interpret these results as evidence of the importance of organized crime groups' control of and their effects on mobility and behaviors of the favela's residents. This interpretation and related findings are consistent with the view that restrictions often imposed by ruling criminal groups on residents of the neighborhoods that they control limit the ability of citizens to move in and out of neighborhoods controlled by a rival group. Importantly, these results show that the effects of otherwise effective behavioral nudges can be canceled out by the types of social distortions generated by drug-related violence.

Our article contributes to several strands of the economic literature. First, as it focuses on a formalization intervention, it contributes to the wide literature that analyzes the causes of informality, the effects of informality on development, and the effectiveness of formalization policies (La Porta & Shleifer, 2014; Ulyssea, 2020). Our results open a new avenue for explaining the decision to formalize through a behavioral lens, thus adding to the previously established explanations of reducing costs of formalization or increasing benefits of being formal (Ulyssea, 2020). Our results are consistent with the idea that improving the benefits – not just reducing costs – is important part of microentrepreneurs' decision about whether to formalize their firms (Rocha et al., 2018). The program we analyze includes not only easy registration but also increased benefits through access to social protection for the microentrepreneur and one extra worker. While our findings show that the use of appropriate information channels to raise awareness about formalization benefits is important in spurring formalization, our findings also demonstrate that reminders are crucial to help overcome the limited attention and procrastination issues that affect microentrepreneurs (Ericson, 2017; Kremer et al., 2019). Considering

4

that the formalization decision is equivalent to adopting a costly business practice that will have impacts long into the future, our results open a new angle to better understand the low impacts that business training programs have had on formalization (McKenzie et al., 2021), and to support a research agenda to examine firm decisions with a behavioral lens as proposed by Kremer et al. (2019). Finally, our study also contributes to the line of literature that studies the functioning of drug-related organized crime and its effects on economic development (Acemoglu et al., 2019; Melnikov et al., 2020; Monteiro & Rocha, 2017). Our analysis suggests that a key mechanism is the restriction of individual mobility across territories of competing criminal groups, which is consistent with the key finding by Melnikov et al. (2020), who analyzes the effects of organized crime in El Salvador. It also complements the literature that studies the logic and impacts of state crackdowns to fight the territorial control of organized crime in urban areas; such efforts often further spur conflict between competing crime organizations (Blattman et al., 2021; Dell, 2015).

This paper is organized in seven sections, including this introduction. Section 2 discusses the conceptual framework that connects the literature of behavioral economics with that of entrepreneurship and formalization in developing economies. This framework underpins the theory of change behind the experiment design presented here. The third section presents information on the formalization program for which the intervention was designed. Section 4 provides background on organized crime groups in Complexo Maré and explains why an interaction with organized crimes likely affected the microentrepreneurs' behavior and interaction with the program. Section 5 presents the experimental design and its implementation. Section 6 presents the empirical methodology. Section 6 discusses the key results and the robustness analysis. Section 7 concludes by discussing the implications for research agendas and policy design.

2 Behavioral biases, entrepreneurship and formalization in developing economies

Entrepreneurship is particularly challenging in developing countries. Excessive state regulations limit the growth of entrepreneurial firms (De Soto et al., 1990), and the failure of the state to provide key public goods, such as justice and security, often exposes entrepreneurs to tense interactions with organized crime groups, especially in larger cities (Blattman et al., 2021). Earlier studies have considered microbusinesses in developing economies as an expression of entrepreneurship and an important source of sustained

economic growth that only needed to be freed from the legal constraints that limit the exchange value of their assets (De Soto et al., 1990). However, more recent evidence increasingly shows that becoming a microbusiness owner is in many cases the result of entry barriers to the formal labor markets, rather than a choice (Dencker et al., 2021; Maloney, 2004). Thus, such firms tend to have low productivity and seldom get onto an important growth path (González-Uribe & Reyes, 2021; Schoar, 2010). With low productivity and growth potential, many small firms may have little incentive to formalize, as they would have little chance to benefit from the increased access to public services and business opportunities. Thus, it is not surprising to find that the impacts of programs that facilitate and reduce the costs of formalization have been small if any (Bruhn & McKenzie, 2014), and/or vanished with time (Galiani et al., 2017).

We argue there are other factors at play that explain why small firms do not adopt good business practices that can help them get onto a sustainable growth path and that, in turn, would eventually make it relevant for them to join the formal sector. First, decisions and actions by entrepreneurs in developing economies are made under severe time constraints that exacerbate their behavioral biases. Second, entrepreneurs have to operate under the restrictions set by drug-related violence that affect the way individuals around their neighborhoods conduct their lives and operate their businesses. Let us first discuss the potential behavioral biases. We know that factors such as present bias, loss aversion, limited attention and memory can generate some behaviors that systematically deviate from the predictions of standard economic models. Present bias, for instance, can help explain underinvestment in preventive health care, weather insurance and retirement savings; such underinvestment patterns can be even more pronounced among the poor as they deal with multiple, severe scarcities (Banerjee & Mullainathan, 2010). Accordingly, the literature on behavioral economics is increasingly raising the importance of psychological factors to explain the behavior of small firms away from profit-maximizing behavior (Kremer et al., 2019), in particular with respect to the adoption of recommended business practices. While large firms build a system so that important decisions are not taken by an isolated individual, microentrepreneurs often make all key decisions in their firms. As a result, they likely face special pressures to manage their time because they have little help with key tasks, such as defining and implementing strategies to expand their sales, controlling production costs, guaranteeing quality, presenting business plans to obtain loans at a reasonable cost, and managing their human resources. They may hire workers, but these employees typically do not

participate in strategic decisions, except in some documented cases involving family members (Ilias, 2006). Thus, these small firms do not have the controls large firms set to see to it that their decisions are less likely to be affected by the subjectivity of one person alone. Furthermore, microentrepreneurs in developing countries make many decisions and take actions under excruciating circumstances of high risk, lacking both capital and trusted personnel to whom they can delegate key decisions or actions. Thus, it will be understandable if microentrepreneurs have little time to obtain, process, and act on new relevant information, especially if such decision-making and actions imply significant effort today, despite their obvious benefits in the long run.

In this paper, we argue that a complementary explanation for the low take-up of formalization programs is that the operators of small firms and microenterprises – even those of the transformational type for whom it may seem beneficial to jump into formalization – face behavioral biases associated with limited memory and self-control that limit their capacity to make and act on decisions that are beneficial to them. There is increasing evidence that such behavioral biases help explain the failure of microentrepreneurs in developing countries to adopt recommended business practices. Beaman et al. (2014) and Hanna et al. (2014) provide experimental evidence that limited attention can be an important reason why microentrepreneurs in Kenya and Indonesia failed to adopt high return management practices, technologies, and good investment behavior. Bloom et al. (2013) also argue that textile firm owners in India did not implement profitable business practices that they knew about because they lacked management time; the authors also find evidence of procrastination as a factor. A key point is that these firms operate in developing economies where competitive pressures are limited by protective policies and credit restrictions, which help these microentrepreneurs avoid being weeded out of the market by competitors.

Ericson (2017) analyzes theoretically the interaction between present-bias and limited memory to better explain the effect of commitment devices, deadlines, and reminders when individuals are trying to complete a valuable task that entails immediate costs and delayed benefits. We contribute to this research, by arguing that the formalization process, even after simplifying procedures and offering tax exemptions or subsidies, does entail non-monetary, immediate costs, which small- and micro-firm entrepreneurs must assume in exchange for the promise of benefits in the long run. In accordance with Ericson (2017), present-biased microentrepreneurs, who find formalization beneficial in the long run, through access to better financial products or new clients from the

7

formal economy, will tend to procrastinate the formalization decision after attending an informative session, but later forget about the option as a result of limited prospective memory. Although life experiences may make this microentrepreneur sophisticated enough to recognize own procrastination tendencies and limited memory, increasing evidence suggests that many remain somewhat naïve about such behavioral biases, and thus may fail to take steps to help themselves commit by establishing deadlines or setting up reminders, for instance, with the help of calendars or smartphones. Ericson's model shows that present bias can help explain the failure to set up inexpensive reminders by the microentrepreneurs themselves. Present-biased microentrepreneurs may procrastinate on setting up a reminding mechanism, which may result in them being more forgetful about tasks (such as undertaking the formalization process) that involve costs today and benefits later (Ericson, 2017).

The situation Is particularly demanding for microentrepreneurs working in poor, urban areas of large cities, where the state often fails to provide key public goods such as security and protection of property rights. In many places, this void is filled partially or imperfectly by organized criminal groups, such as drug-related gangs (Blattman et al., 2021; Melnikov et al., 2020). Recent evidence increasingly shows the negative effects of criminal group on socio-economic development, especially in Latin America. Blattman et al. (2021) analyze the case of gangs in Medellin, where gangs are very active in collecting taxes from residents and businesses in exchange for policing and "justice" services. They find that, although criminal rule may have started as a result of the absence of the state, state efforts to increase governance may lead gangs to react by trying to increase their own rule to address the threat to the sustainability of their illegal activities and the potential loss of civilian loyalty to them. Thus, an equilibrium gang rule may be threatened when the state attempts to recover governance of specific neighbourhoods, or when the ruling drug-related gang is challenged by a competing gang or the state. Often times, such crises lead to abusing local residents, and especially business owners, as violence escalates and members of criminal groups start charging extra fees for allowing business operations, as has been documented in Brazil (Magaloni et al., 2020). This situation, albeit in different forms and shapes, is relevant in large urban areas of Brazil, Colombia, El Salvador, Mexico, and several other countries in Latin America. More specifically, Melnikov et al. (2020) uses a spatial regression discontinuity design to show that gangs in San Salvador constrain socioeconomic development by restricting people's access to employment at large firms, leading to less income and worse dwelling conditions. The authors argue that a key

mechanism through which criminal rule negatively affects socioeconomic development is by restricting mobility, especially across the territories each gang controls, and thus constraining individuals' access to employment opportunities.

Under such circumstances, we can hypothesize that small firms operating in neighborhoods ruled by organized crime groups, as it is the case in Complexo Maré, are negatively affected both by the mobility restrictions that affect their costumers and workers, and by violent clashes between competing gangs. Microentrepreneurs in this context may also be more affected by psychological factors that distort their decision processes, including the adoption of recommended business practices and the decision to join the formal sector.

3   The formalization program

Our study tests the importance of behavioral constraints under conditions of drug-related street violence on the take-up of the formalization program MEI among microentrepreneurs in Favela Complexo Maré. This section details the specificities of the MEI formalization program.

The MEI formalization program aims to increase formalization by facilitating the process, reducing the costs of formalization, and giving access to social security. Efforts to reduce the tax burden of micro and small enterprises in Brazil date back at least to 1996, with the creation of the federal tax simplification program SIMPLES, which reduced the overall tax burden while consolidating several taxes and social contribution into one payment. In 2009, Brazil introduced the MEI program to reduce both registration costs and the tax burden for firms with up to one employee.[1] With an MEI registry, firms can issue receipts, which are usually required when providing goods and services to other formal firms. The features that make this program especially beneficial for microentrepreneurs in comparison to many other formalization efforts are related to accessing social security benefits. Through the program, the registered business can hire one employee for whom the state will subsidize the employer's share of social security contributions. The biggest benefit from formalizing through the MEI program is in creating eligibility for the microentrepreneur to receive a salary equal to the minimum wage up on retirement. Microentrepreneurs who formalize their operations through the

---

[1]Rocha et al. (2018) describe the staggered implementation of different incentives of the MEI program and evaluate the impact of each step on the reduction of informality.

MEI program are eligible to receive a monthly retirement equal to the minimum wage from the retirement age onward (currently 60 years of age for women and 65 years for men) after a minimum of 15 years of contributions. This makes retirement through MEI a highly-subsidized plan because 15 years of contribution are nominally equivalent to only nine months of retirement benefits. Further benefits include disability pension and sick leave —to which the holder is entitled after one year of contributions— as well as maternity leave for women after 24 months of contributions. In the event of the entrepreneur's death, the family is entitled to a life insurance payment each month, as long as one child is under 21 years of age. In any event, since its launch in 2009, the number of MEIs has been growing steadily. By the end of November 2016 (the year of our baseline survey), 6,487,621 microenterprises were registered in the country through the program. Importantly, formalization rates continue to be low, especially in poorer regions of the metropolitan areas, where relatively few businesses participate (Rocha et al., 2018).

As of the time of this study, microentrepreneurs were able to complete the registration process alone online with a few personal identification documents. Our intervention, however, downplayed the possibility of online registration and actively encouraged entrepreneurs to visit the Brazilian Micro and Small Business Support Service (henceforth, SEBRAE) office to process the registration together with a SEBRAE consultant. This decision was agreed upon with SEBRAE, our partner for this study, out of SEBRAE's concern that many entrepreneurs who registered online were not fully aware of the requirement to comply with the monthly tax and social security payments.[2] Indeed SEBRAE's reports from the field indicated that, in some cases, intermediaries were interested in facilitating the registration of the entrepreneur in the MEI program, but that these intermediaries often did so without full disclosure of the liabilities that come with formalization. As one example SEBRAE noted the case of a bank employee who had helped a microentrepreneur to register to offer her a loan, which in turn led to the accumulation of debts with the state that were unknown to the entrepreneur who had not understood the terms of the MEI program. Thus, SEBRAE officials encourage in-person visits to their offices so they can reinforce the information about compliance aspects and processes to the microentrepreneur. SEBRAE has had an office in Complexo Maré since its military occupation in early 2014 and continued its work after the 15 months of military occupation even though the intended Police Pacification Units that

---

[2]SEBRAE offers entrepreneurs in poor urban areas business management courses and technical assistance via phone, internet, and directly through their local offices. SEBRAE operated offices in most of the pacified favelas (low-income communities) in Rio de Janeiro prior to the COVID-19 crisis.

followed military occupation of other favelas never came into place (Barnes, 2022). In total, SEBRAE had helped approximately 400 microentrepreneurs to formalize through the formalization program prior to the advent of our study.

4 Organized crime groups in Maré

In this section, we provide background on organized crime groups and violence in Complexo Maré, and we discuss the ways in which such presence affected our intervention. As previously mentioned, SEBRAE indicated in early coordination discussions that previous experience caused them to worry that light informative sessions might result in spurious registrations, in the sense that registered microentrepreneurs do not pay the corresponding taxes that allow them to remain registered and receive social security benefits associated with their MEI registration. With those concerns in mind, the research team agreed to emphasize during the informative session the importance of completing the registration with MEI with an in-person visit to the local SEBRAE office. In TCP-controlled neighborhoods, such requirements implied microentrepreneurs had to cross the border to register with MEI at SEBRAE, which is located in Comando Vermelho neighborhoods. In this section, we explain how organized crime groups traditionally manage their territories and how that interacts with the requirement for entrepreneurs from TCP-controlled neighborhoods to visit Comando Vermelho neighborhoods.

As is the case in many marginalized areas in South America, Rio de Janeiro's favelas tend to have a heavy presence of organized crime groups (Barnes, 2022; Magaloni et al., 2020). Complexo Maré is one of the largest and oldest favelas in Rio de Janeiro, and it has a long history with organized crime groups affecting the lives of local residents and business owners (Magaloni et al., 2020; Monteiro & Rocha, 2017; Silva, 2015). Complexo Maré has historically been divided between two old and large rival groups: Comando Vermelho, in the central neighborhoods, and Terceiro Comando Puro, in the southern neighborhoods (see map in Figure 3). Comando Vermelho is one of the oldest and largest drug-trafficking gangs in Brazil. In the eighties, with the proliferation of the commercialization of cocaine, it consolidated power by establishing contacts with criminal groups dedicated to international trafficking of such drugs, for which the control of favelas' territories in Rio de Janeiro became crucial (de Souza e Silva et al., 2008; Monteiro & Rocha, 2017). The Comando Vermelho controlled the Parque Maré and the Nova Holanda neighborhoods in which the SEBRAE offices were located during the time of our experiment (April 2016-November 2018).

Terceiro Comando Puro (TCP) emerged from a split of the old Terceiro Comando (TC), which in turn emerged in the late eighties as a reaction to the monopoly that Comando Vermelho had developed in drug trafficking (Barnes, 2022; Misse, 2011). Terceiro Comando began disputing the control of Comando Vermelho territories in open battles using heavy weaponry, but internal conflicts in the nineties led to a split of the group into two drug-trafficking organizations, TCP and Amigos dos Amigos. In 2009, TCP invaded the territories controlled by Amigos dos Amigos and expelled it from Complexo Maré. This conquest of new territories by TCP also rekindled its rivalry with the Comando Vermelho.

As a consequence of this history, violent conflicts between these competing drug-trafficking gangs have occurred for three decades. In addition, since the 2000s, militias have proliferated as groups mostly formed by paramilitaries that recovered control of neighborhoods from organized crime groups, liberating them from drug trafficking and associated violence for a security fee (de Souza e Silva et al., 2008). In Complexo Maré, two neighborhoods in the extreme north are controlled by militia groups, and there is no violent dispute between them and their southern neighbor, Comando Vermelho (see map in Figure 3).

Although drug-related organized crime groups differ from one another, they have one thing in common: an interest in controlling and defending a territory where they can engage in illicit activities, including drug dealing (Blattman et al., 2021). However, the way these groups govern their territory is heterogeneous and depends on several factors related to their relationship with state actors and the community, and also with the extent of control they have over their territories (Magaloni et al., 2020). In the absence of the state, organized crime groups often provide key public services such as security and justice to their residents in exchange for the freedom and exclusivity to deal drugs and conduct other illegal activities. To maintain social order in their territories, each criminal organization implements its own informal rules. Gang members can arbitrate disputes between residents, enforce community rules, and punish property crime in exchange for a security fee, a "tax" paid by residents and businesses. Depending on the severity of the infraction and the specific individuals involved, gang punishments can include beatings, expulsion, or even death (Barnes, 2022). For the legitimacy of their control, these groups may also support some of the poorest families, through the distribution of small amounts of money or food baskets, and might organize community parties. Such strategies are more commonly used when gang members have closer familial and social ties with the rest of the community.

Equilibrium between rule by the state and rule by a crime group is affected when two rival gangs fight for the control of a territory, or when the state decides to fight openly against the ruling group. Under such circumstances, organized crime groups are likely to move from helping to prevent violence towards generating violence, with victims including not only gang members, but also innocent civilians. These issues were particularly relevant for Complexo Maré during the period of our study, as the state undertook its largest campaign to date to recover control of favela territories in anticipation of international attention due to two major sporting events: the 2014 World Cup and the 2016 Olympics – a period that transitioned into the time of our study start in 2016. The general state strategy was based on the intervention of neighborhoods with pacifying police units that enlisted young officers trained in principles of human rights and community-based policing. Though these police officers relied heavily on the individual leadership style of their commanders, they all tended to try to involve the local population in public security and conflict resolution[3]. The intervention started with a pre-announced arrival in the territory by special operation units that were to govern the neighborhood during a transitional stabilization period of several months until police officers were permanently assigned to the neighborhood.

The strategy started in 2008, with the southern favelas, proximate to the most elegant neighborhoods of Ipanema, Leblon and Copacabana and gradually moved northeast (see Figure 2). The first intervention to affect Complex Maré was the operation that sought to take control of Complexo do Alemão in 2012. This operation involved the largest number of troops and the greatest investment of resources because the area operated as the Comando Vermelho's headquarters. As the police took over governance of the area, a significant number of Comando Vermelho gang members migrated toward Complexo Maré, which had already begun to experience increased violence and higher extortion charges as competition for resources increased. In 2014, the army occupied Complexo Maré with 2,500 troops in mobile patrol units and stationary checkpoints in strategic locations, with special consideration given to the borders of Comando Vermelho and TCP territories (Barnes, 2022). Although initially effective to cut drug dealing and violence in their territories, the intervention ended a year later without the installation of the follow-up pacifying police units, as the state lost interest in the initial strategy. Thus, publicly visible drug dealing and conflict within Comando Vermelho and TCP returned

---

[3]The strategy worked as it significantly reduced violence and killings in the first years (2008-2013), but the numbers went back to the levels witness prior to the use of special policy forces. For more detail about the results, see Magaloni et al. (2020)

to Complexo Maré, with periodic militarized interventions during the period of our study, from 2016 to 2017 (see Figure 1). In 2017, according to data from the local non-government organization Redes da Maré , there were at least 41 violent conflicts between Comando Vermelho and TCP. In the same year, not one conflict had been reported to have occurred between the militia and the drug cartel. Such historical background and data show how different local sub-government structures of illicit organizations define within-favela life and work (Magaloni et al., 2020; Monteiro & Rocha, 2017). The violence and the rivalry in between Comando Vermelho and TCP influence the perception of safety of people with direct consequences on their mobility within Complexo Maré, both because the conflict between the two gangs, but also because that conflict prompted frequent militarized state interventions.

Recent studies have analyzed the impacts of these state interventions in Rio favelas. Magaloni et al. (2020) report that residents under the rule of TCP did not venture into the territory controlled by Comando Vermelho, and that they fear invasions from Comando Vermelho members because the resulting shootouts terrorize everyone. Evidence of the costs of mobility restrictions are not unique to Complexo Maré or other favelas of Rio de Janeiro. For example, Melnikov et al. (2020) report that mobility restrictions associated with organized crime groups' control of certain territories in San Salvador. Mobility restrictions in San Salvador were implemented by putting a system of checkpoints in place to control the circulation of residents across neighborhoods under the control of different organizations. Such restrictions affected job-searching activities of residents, who often cannot work outside of the given territory and are thus forced to take low-paying jobs in small firms operating in the territory of the ruling crime group.

Another consequence of the state intervention in Complexo Maré was the closing of several regular activities when there was high risk of armed confrontations. Monteiro and Rocha (2017) reported, for example, that schools were regularly locked down when there was high risk of armed confrontation, which happened frequently during the times of state military interventions in Rio favelas. Another consequence of the violence that directly connects with our study, is that the SEBRAE office, located in Nova Holanda, a Comando Vermelho-controlled territory, was closed three times during our intervention period. In sum, during the course of our study we expected microentrepreneurs in TCP-controlled areas to have the hardest time registering with the formalization program because the office that they were asked to visit was located in a Comando Vermelho-controlled territory. We anticipated that the gangs' rivalry would likely negatively influence the willingness

of people living in TCP areas to cross the border into Comando Vermelho territory to complete registration with formalization program. Although few people actively mentioned being afraid of crossing the borders, we expected that fear-based mobility restrictions would be present in the minds of people and that this would influence their behavior. In addition, the increased levels of violence and disturbance in all neighborhoods of Complexo Maré might have distracted entrepreneurs from throughout the favela from taking important decisions such as registering with the MEI program. Therefore, with increased turmoil in the region, we would expect an even a greater need for behavioral nudges in Complexo Maré, to facilitate attention and action toward the decision to join the MEI program. Furthermore, we would expect lower levels of responses to both the information and the nudges by business owners in TCP-controlled territories because going to a destination in another gang's territory to participate in the program would expose them to violence by requiring them to cross the border into a territory controlled by a rival gang.[4]

5 Experiment design and implementation

We designed an intervention to test the impacts of informative visits and SMS text messages to microentrepreneurs operating in Favela Complexo Maré. We based our work on the implementation of the MEI program, which was designed to foster entrepreneurship, to increase tax registration and compliance by existing microentrepreneurs, and to increase contributions to the social security system (Rocha et al., 2018).

Since 2014, SEBRAE had established fixed or moving offices in 31 favelas in Rio de Janeiro, in an attempt to promote local entrepreneurship and economic development. We coordinated with SEBRAE to implement and evaluate variants of informative interventions to promote formalization through the MEI program using an experimental design. As of 2013, Complexo Maré had about 3,000 informal microentrepreneurs with fixed establishments (REDES, 2014), making the pursue to increase formalization an important goal for SEBRAE. Those in the first treatment group (T1) received an in-person visit to inform the microentrepreneur about the benefits of the MEI program, including the benefits for the business, the extra benefits of social security, and the availability

---

[4]Although this study's sample also included territories dominated by militias, our final sample only included 35 eligible microentrepreneurs in the two neighborhoods controlled by militias. Thus, we exclude this sub-sample in the analysis of sub-sections. We hypothesize that microentrepreneurs in militia-dominated territories would be the least affected by the violence that was exacerbated by the conflict between the two drug-trafficking organized crime groups and the police interventions.

of institutional facilitators, such as SEBRAE, that help in the formalization process. Additionally, the first treatment group received 10 weekly text messages containing information about the MEI program and SEBRAE, which then worked as reminders of the information already provided in the informative visits. Those in the second treatment group (T2) received the information about the MEI program and SEBRAE only through the 10 weekly text messages. Those in the third treatment group (T3) received only the in-person visit, but no text messages. Microentrepreneurs were randomly assigned to each of these treatment arms, or to the control group, which received neither information nor text messages. The unit of randomization in this field experiment is the individual microentrepreneur, stratified at the level of the neighborhood.

5.1 The treatment arms

In-Person information session

All entrepreneurs in treatment groups T1 and T3 received in-person informative visits. The information sessions were developed through a collaborative effort by SEBRAE and the Brazilian School of Public and Business Administration (FGV-EBAPE). They included one-to-one visits to the entrepreneurs´ business. These visits lasted 15 to 20 minutes on average and continued for a maximum duration of 45 minutes. All counselors were recent female university graduates that had participated in previous research studies in Complexo Maré. None had previous experience as information facilitators of adults, but they were trained by SEBRAE specifically for this intervention. The counselors introduced themselves as researchers affiliated with Redes da Maré, a local NGO that conducts extensive social and development work in the area and that has gained legitimacy through its work. Such identification was considered key to avoid the prospect that microentrepreneurs might identify the counselors as municipal law enforcers, but also to increase the safety of the counselors.

The information sessions included detailed information about the benefits of the MEI program. They started by asking whether the entrepreneur had already heard about the MEI program and knew what it stands for. The counselors then gave an overview of how formalization can provide easier access to production factors and promote microbusiness growth, for example by making it possible to issue bills and to hire an employee with state-subsidized labor costs. It also included a detailed explanation of the program's social security coverage and necessary contributions for its eligibility. Special focus was put on the retirement benefits provided after the necessary amount of contribution years

and the economic advantage due to the government subsidies. In front of the participants, the counselors calculated that the contributions made over 15 year pay off less than one year after retirement. The (relatively easy) formalization procedure was explained in detail, and the counselors pointed out and explained the necessary documentation for the take-up of the program. They also highlighted the obligation to pay the business industry tax together with the social security contribution on a monthly basis and to hand in a statement about the yearly income at the end of each calendar year. They were also informed about the documents needed to assure a quick process. Microentrepreneurs were advised to visit the SEBRAE office in Complexo Maré to receive free registration help, although online registration was already available and that they also received materials with the same information during the initial visit. That decision was based on early coordination discussions between the research and SEBRAE teams, in which SEBRAE indicated that previous experience led to their concern that light informative sessions may lead to spurious registrations, in the sense that those registered microentrepreneurs do not pay the corresponding taxes that allows them to remain registered and have access to the social security benefits attached to registration with MEI. Those concerns led to an agreement with the research team to emphasize during the informative session the need to close the registration with the MEI program with an in-person visit to the local SEBRAE office. During the informative session, microentrepreneurs also received a pencil holder with the MEI logo printed on it. The counselors were instructed to provide full information about the possibility of registering online if the microentrepreneur expressed interest in such an option.

Text message reminders

We sent out text messages to all entrepreneurs in treatment groups T1 and T2 for a period of 10 weeks, starting the week after their participation in the baseline survey, which occurred at the time of the informative visit for those in T1. The content of the text messages was intended to remind entrepreneurs from T1 about the just-received information counseling, but the content of the messages was objective enough to also be used for T2 as a simple information content message. The only difference between the text messages sent to treatment group 1 and those sent to treatment group 2 was that we referred to the person who delivered the information counseling for those entrepreneurs of treatment group 1. Importantly, there was no information content sent by text message that went beyond the information given in the in-person informative visits. The text message content is described in Table A1 of the appendix. We received correct cellphone

numbers of approximately 75% of entrepreneurs assigned to the message condition during the baseline survey. In our analysis we consider all entrepreneurs who were assigned to receive messages, thus applying an intention-to-treat analysis.

5.2   The implementation

The initial plan was to use the 2012-13 entrepreneurial census of Complexo Maré as a sampling frame to establish the eligible population in each neighborhood, but we soon learned that the data were already seriously outdated due to the high mortality rate that characterizes micro-informal businesses. Thus, we decided to organize an on-the-spot randomization, with the help of the software Qualtrics.

Counselors visited all microentrepreneurs that were conducting visible business activities (i.e., small shop owners, street vendors, motorboys, etc.) in Complexo Maré to conduct the baseline survey. Exceptions were made for businesses that were clearly perceived as not eligible for the MEI program or were already formalized (i.e., those businesses with more than three employees, brand chain members, businesses recognized as already formalized in the 2012 census). The counselors arrived at the microentrepreneurs' businesses without prior notice, and they briefly explained that they were updating the 2012-13 census data. They said they aimed to promote local development and asked the microentrepreneurs to participate. Receptivity to census participation was positive. Overall, fewer than 2% of people denied participation.

The on-the-spot randomization made use of the Randomizer in Qualtrics Survey Software, which allows one to randomly generate survey blocks. During the baseline survey, the software generated a random treatment number between one and four to indicate which treatment the entrepreneur would receive (represented by one through three) or whether the entrepreneur would be a member of the control group (number four). This was programed as an automatic message (e.g. "Treatment 1 → This person receives the information session") after the enumerator indicated the name of the entrepreneur and shop and address in the questionnaire. The early information about the treatment group allowed the counselor to shape the conversation during part of the baseline survey toward the information delivery about the MEI program. Due to this "cold" approach, we did not ask microentrepreneurs if they wanted to obtain information about the MEI program. On the upside, all entrepreneurs assigned to receive the information counseling were treated. On the downside, we expected that less-interested microentrepreneurs would show little interest in engaging with the counselor about this topic. Although

the counselors were trained to push the information and the conversation about the topic, they were also instructed not to intimidate the business owner in any way. Our approach indeed led to variance in the duration of the information sessions, with 7% of participants receiving information counseling of less than 10 minutes in duration, and 7% receiving an information session that lasted more than 30 minutes. The baseline survey started on April 29, 2016, and the follow-up data collection ended in July 2017, comprising a total of 14 months of field work. The timeline of the randomized field experiment and each of the steps are depicted in Figure 1.

During the intervention and afterwards (during the observation period), events occurred that likely affected the impacts of the intervention. First, the SEBRAE office had to move its office twice, with the first change being done on May 24 and the last change being done on June 28. As our intervention directed people to formalize the business at the SEBRAE office, this was a serious complication; as a result, all consulting materials that had been used during the first weeks of the experiment contained the wrong address. Although all locations were a short walking distance from each other and in Comando Vermelho territory, we tried to minimize the negative bias of this event by sending an additional text message about both address changes to all entrepreneurs who had received the information counseling, which included treatment group 3. Second, there was a spike in armed territorial conflicts between the Comando Vermelho and TCP. Crossing from a a TCP-controlled area into a Comando Vermelho-controlled area, in which the office is located, is perceived as risky in times of such conflicts. Both events negatively affected the possibility of visiting the SEBRAE office in Complexo Maré.

The other complication was a spike in armed territorial conflicts between drug cartels in Maré. Maré is traditionally dominated by two distinct drug cartels – Comando Vermelho and Terceiro Comando Puro – and the Militia. The SEBRAE office is located in an area controlled by Comando Vermelho. With Terceiro Comando Puro being the biggest rival of Comando Vermelho, the territory transition is particularly in times of conflict perceived as risky.

The group size for the 3 treatment groups and the control group was initially set at 450 people per group. This was based on a statistical-power calculation that allowed a power of 0.8 to identify interaction effects of the magnitude displayed in Table 1. As the expected proportions of take-up were much lower than 0.5, we considered these proportions to estimate the relevant variances instead of the usual conservative value of 0.5, which would

likely have overestimated the necessary sample size. Because many businesses shut down, our actual group sizes turned out to be smaller than originally planned (Table 2).

Half of the microentrepreneurs who were assigned to the information session and half of the microentrepreneurs who were not assigned to the information session received text messages two times a week for 10 weeks. The messages informed and reminded them about the free SEBRAE service to help with formalization through their local office in Complexo Maré and addressed some of the MEI program benefits. We monitored the content of the information session, the length of each session, and the randomization and delivery of the text messages.

6   Empirical methodology

6.1   Data

This study uses four key data sources: (1) the baseline survey conducted at the moment of the intervention, (2) SEBRAE data on individual client business support services, (3) Serasa Experian credit bureau data, (4) the follow-up survey conducted 7 to 12 months after the intervention. The baseline survey captures general socio-demographic data about 790 microentrepreneurs in Complexo Maré, business data, and some entrepreneurial measures, such as motives for opening a business. Less than 2% of our sample rejected participation. Table A2 shows that the sample is fairly well balanced with respect to key variables such as microentrepreneurs' age and gender, age of the business, business profits, entrepreneurship and distance to SEBRAE's office[5]. Table A2 also shows that the average age of the entrepreneur in our sample was 43. In the sample, 48% of the participants are female. Participating businesses had been operating for 5 years on average and were making an average monthly profit of USD 363. We define an indicator of entrepreneurship based on the microentrepreneur's report of the main reason for starting the business, classifying the answers as necessity vs entrepreneurial reasons[6]. We find that 60% of the microentrepreneurs in our sample have a high level of entrepreneurial spirit; there are no differences across treatment arms. The average distance from the business to the SEBRAE

---

[5]We calculated the distance to SEBRAE's office based on the last office address from June 28 2016 that persisted until the end of our observation period.

[6]We defined a microentrepreneur as having a higher entrepreneurial spirit if she reported having started the business because she valued working independently, wanted to implement her business idea, or believed that founding it would be the best way to strengthen her professional profile. We considered that an entrepreneur created a business out of necessity if their motivations related to a lack of options for finding a job that met her salary expectations or her sectoral expertise.

office was 1.6 kilometers with no significant differences by treatment arm. This was crucial for our analysis because visiting the office was key for finalizing the formalization process.

For the follow-up survey, we were able to re-interview 701 of the 790 microentrepreneurs. Thus, we faced an attrition rate of 10%, although Table 2 indicates such attrition is not different across treatment arms. The follow-up survey allows us to register the change in knowledge and perceptions about formalization, the MEI program and SEBRAE. Thus, in addition to seeing whether entrepreneurs completed the formalization process, we can observe changes in their understanding of the MEI program – its potential benefits for the business itself, the advantages for individuals through participation in social security – and knowledge about the existence and location of the SEBRAE office in Complexo Maré. We can also examine whether treated microentrepreneurs considered more formalizing their business and actually formalized their business more than those entrepreneurs who did not receive information. A full description of our dependent variables is presented in Table A3.

The SEBRAE data on individual client business support services contains each service delivered to an entrepreneur through SEBRAE consultants or SEBRAE projects. The services included individual counseling, technical help to formalize, workshops, seminars, and business training. We are able to identify whether the entrepreneur went to the SEBRAE office after our intervention and whether the entrepreneur formalized with the help of a SEBRAE consultant. We consider the search for SEBRAE services as one of the outcomes of interest. We combined the survey reports with administrative records from Serasa Experian for the formalization variable. We asked the individuals about their formalization status at baseline so that our sample consisted of those that had not been formalized prior to the intervention. In the follow-up interviews, we asked if they had changed their status, and, if so, we asked for their number in the National Registry of Legal Entities (CNPJ). 701 microentrepreneurs participated in the follow-up interview out of which 81 indicated to have formalized. Of these 81 entrepreneurs, 18 provided us with a valid CNPJ number, and 53 provided a valid number under a different registry, the Registry of Physical Persons (CPF). Using the Serasa Experian database, we verified the validity of the self-reported formalization status, which also included information about the date of formalization and payment compliance. It was discovered then that six entrepreneurs had already been formalized at baseline, despite reporting to be informal during the baseline survey; as a result, they were excluded from the analysis. The database also revealed seven microentrepreneurs who falsely reported that they had formalized at endline. We

corrected their status accordingly.

Our next step was to verify the status of those who reported still running informal businesses in the follow-up survey. This was accomplished by using the Register of Physical Persons (CPF) number and the birth date provided. As part of our baseline or endline survey, we received 397 self-reported CPF numbers. The CNPJ numbers (indicating business registration) of 39 microentrepreneurs were found among them, and their status was adjusted to formal accordingly. However, 30 of these 39 entrepreneurs formalized in the months following the follow-up survey, which means only nine entrepreneurs gave us inaccurate information about their informal business status when interviewed during the follow-up survey. We interpret this information as validation that informal entrepreneurs self-reported their informal business status mostly accurately. This is crucial, as we continued to use all self-reported data on entrepreneurs who did not indicate a CPF or CNPJ number during neither the baseline nor the endline survey. Importantly, despite not being able to locate 89 entrepreneurs during the endline survey, we obtained informal/formal status information for 27 of them, through the Serasa Experian database based on their self-reported CPF numbers during the baseline survey. Accordingly, our final database includes the information on formalization status for 728 microentrepreneurs.

6.2 Statistical methods

For the estimation of impacts, we use the treatment-control differences based on the random assignment, obtaining intention-to-treat estimates. The comparison between treatment group T1 (both in-person visits and text messages) and the control group allows us to estimate the effects of in-person informational visits. The comparison of group T2 (text messages only) and the control group allows us to estimate the effects of text messages as an alternative mechanism to transmit information. The comparison of T3 (in-person visits only) with T1 (both in-person visits and text messages) gives us the marginal contribution of the text messages as reminders of the information provided during the in-person visits. The comparison of T1 (both in-person visits and text messages) with T2 (text messages) presents the relative effectiveness of the informative sessions. Formally, the preferred specification is a linear probability model for the intention-to-treat effects, which we estimate through the following ordinary least-squares (OLS) regression:

$$Y_{ij} = \alpha + \beta_1 T1_{ij} + \beta_2 T2_{ij} + \beta_3 T3_{ij} + \gamma X_{ij} + \delta_j + \epsilon_{ij} \tag{1}$$

where Y_{ij} denotes an outcome variable for a business owner i in neighborhood j, $T1_i$ is a dummy variable that takes the value of one if the business owner i was assigned to both treatments, the in-person visits and text messages. $T2_i$ is a dummy variable that takes the value of one if the business owner i was assigned to receive only the text messages. $T3_i$ is the dummy variable that takes the value of one if the business owner i was assigned to only the informational in-person visit. X_{ij} denotes a vector of characteristics of microentrepreneur i, including age, education, and business tenure. δ_j denotes the neighborhood fixed effect. ϵ_{ij} is the random error term that is assumed to be correlated within each neighborhood but uncorrelated across them. Thus, β_3 is the effect of the informational in-person visit, while β_2 is the effect of informational text messages. In turn, $(\beta_1 - \beta_2)$ represents the marginal contribution of the nudge in the form of a text message for those who had previously received the informational in-person visit; $(\beta_1 - \beta_3)$ represents the marginal contribution of the informational in-person visit when combined with the sequence of text messages.

We also estimate the effects as differentiated by the impact of organized crime groups in the neighborhood, by introducing interaction terms to the equation (1). For that specification, we also added a control variable for the level of profits at baseline, considering there were some imbalances across treatment groups (see Table B1).[7]

7   Results

Table 3 reports the average intention-to-treat effects of the three treatment arms on knowledge and perception about the formalization program and whether the person went to the SEBRAE office. It shows effects that emerge about 7 to 12 months after the baseline survey, and the extent to which microentrepreneurs contacted SEBRAE and formalized through the MEI program up to 24 months after end of treatments. The column Control presents the average of the dependent variable for the control group (as all indicators are dummy variables [1= yes, 0 = no], it can be interpreted as the proportion of participants whose dependent variable equals one). In turn, columns (1) to (3) present our estimates of the causal effects for each treatment group when regressing the expression in equation (1) – that is, with covariates and neighborhood fixed effects.

---

[7]Table B1 also shows differences in the distance to the SEBRAE office. Firms operating in Comando Vermelho-controlled neighborhoods were closer to the SEBRAE office. We did not include such control because we had information indicating only the distance from a central point in each neighborhood to the SEBRAE office, rather than from each firm's location. Thus, the distance is perfectly correlated with the neighborhood fixed effect, δ_j.

The last three columns report the p-values associated to the pairwise comparison tests across treatment arms. The estimated effects in Table 3 show that all intervention arms increased the microentrepreneurs' knowledge about the existence and location of SEBRAE, but not so much about the MEI program. We first observe that only 19% of microentrepreneurs in the control group knew about SEBRAE's existence, and only 9.6% knew its local address; all interventions increased such knowledge. The effects were smallest for those who received only the messages (T2), a 16 percentage points increase in knowledge about SEBRAE's existence and 14 percentage points in knowledge of its local address, and largest for those fully-intervened (T1, IS+M), 38 percentage points and 31 percentage points, respectively. We next examine whether in-person and/or text messages changed entrepreneurs' understanding about the benefits of formalization through MEI. Our findings show that 22% of those in the control group knew the full set of benefits; by contrast, the proportion of those who knew about all benefits in the fully treated group (T1) increased 10 percentage points[8]. Our findings also show that in-person visits not only increased knowledge about SEBRAE's services and the MEI program, but also interest in formalization, though the effects are much stronger for those who received the complementary treatment of the reminder messages (increase of 16 percentage points) in comparison to those who only received the in-person informative visits (12 percentage points). At the same time, the only-messaging treatment (T2) did not increase this variable of interest, suggesting that the treatment was too weak to transmit the required information.

We then examine how the treatment arms affected entrepreneurs' decision to formalize under the MEI program. The bottom panel of Table 3 shows our estimates of the intention-to-treat effects of the three treatment arms on contact with SEBRAE and on two key measures of formalization. The likelihood of contacting SEBRAE increased among all treated entrepreneurs with respect to the control group. Only 1.3% of entrepreneurs in the control group contacted SEBRAE during the period versus 12.1% in the fully treated group (T1). Even the message-only treatment arm (T2) had a positive significant effect, albeit much smaller (an increase of 3.4 percentage points). Second, 24 months after the treatment, we find a positive effect on registering as MEI only for our fully treated group in which we combine the informational in-person visits and text message reminders over a

---

[8]We consider an answer to represent full knowledge about the MEI program if the entrepreneur mentioned the social security component plus at least one business benefit. Though the proportion of those with full knowledge of formalization's benefits in the group that received in-person visits only also increased by 6.7 percentage points, the effect is not statistically significant.

10-week period. While 11% of participants in the control group formalized with the MEI program, the combined treatment increased this rate by 8.5 percentage points; though this is not statistically significant according to the usual standards (p-value=0.172), it is nevertheless striking to observe that the effects of the other treatment arms are estimated to be very close to zero and not statistically significant. The average effect for those that received only an informative visit is 0.1 percentage points, so that the marginal effect of the reminding messages is 7 percentage points (p-value=0.251). We interpret this positive effect as evidence of the importance of behavioral biases to explain the lack of adoption of business practices, even after they identify such practices as being beneficial for their businesses. The reminder messages they received after the information visit may have helped the microentrepreneurs comply with their goal to formalize under MEI, despite everyday pressures. We consider this estimate as a lower bound even though it is not statistically significant at standard confidence levels, because of the high registration rate for the control group (10.6%), which can arguably be explained by the treatment spilling over to neighbors.

Finally, we look at a more stringent outcome that can arguably be connected to a better-informed decision by microentrepreneurs. We first argue that focusing only on the mere registration with the MEI program may be misleading if the promoters provide incomplete information or if the microentrepreneur is led to register by agents with a vested interest in registering the microentrepreneur. As indicated in Section 3, this may be the case for bank agents who need the microentrepreneur to operate a formally registered business to be eligible for a bank loan. Thus, in such a situation, it is possible that the microentrepreneur registers with the MEI program without complete information about the responsibilities, including the monthly tax payments. Thus, it is relevant to observe whether the observed increased registration comes with payment compliance. The last variable in Table 3 shows the intention-to-treat effect of tax payment compliance as a formalization outcome variable, showing that the effect of full treatment (T1) for such a measure of formalization is slightly smaller but statistically significant. That is, 18 months after the treatment, we observe that those in the fully treated group (T1) are more likely not only to register but also to comply with corresponding tax payments. Also notice that such variable implies a much lower take up for the control group (2.5%), compared to the 11% observed for the simple registration variable. This result is consistent with the concern raised by SEBRAE that incomplete information may lead to spurious registrations by microentrepreneurs, in that many of those microentrepreneurs in the control group who

register with MEI fail to comply with the tax payments. In contrast, a greater fraction of those who registered with MEI and received the full treatment paid their taxes. Again, we observe no effect for the other two treatments: the message-only and informative in-person visit-only treatment arms. We take these results not only as evidence that messaging made a key difference in formalization, but also as further evidence that the microentrepreneur received and understood proper information about the compliance issues, which in turn likely leads to more sustainable effects.[9]

7.1 Heterogeneous treatment effects

This section discusses the evolution of the treatment effects over time and its sensitivity to key factors that could have played a role in facilitating access to SEBRAE offices and registration with MEI. Regarding the timing of the treatment effects, we use the fact that the data from Serasa Experian allows us to see not only whether the microentrepreneur got formalized, but also the exact date that she registered into MEI. Looking first at the date of the response, Figure 4 shows the cumulative hazard rates for each of the treatment arms, suggesting several interesting patterns. First, we observe most of the action for those in the treatment arms with counseling visits (T1+T3) occurs in the first 10 weeks which is the period up to which messages were sent. Actually, we see that rates of registration with MEI appear similar between the in-person informative visits only microentrepreneurs and the fully treated for the first four weeks, with the difference between these two groups showing up between weeks 4 and 10. And the other interesting thing is that registration by microentrepreneurs in the control group continues to grow significantly up to around week 20, getting very close to registration rates by the message-only and the counseling-only microentrepreneurs, and we cannot rule out the presence of spillovers as more of the treated in the corresponding neighborhoods get formalized. In that regard, the interesting thing is that the extra push obtained by the fully treated from weeks 4 to 10 helps to sustain the difference with the control group and provides extra evidence that the additional text messaging was key to increase formalization rates.

We can confirm such patterns with the help of Table 4 that reports the formalization rate of the control microentrepreneurs and the effects of each of the treatment arms across time. The first estimate reported is the formalization rate four weeks after the in-person informative visit, which shows that microentrepreneurs who received such visits

---

[9]Table 4 in Appendix A includes the full regression for an extra measure of payment compliance 12 months after the treatment. Estimated effects are quite similar to the one included in Table 3.

increased the formalization rate by 8.1 percentage points (T1) and 5.1 percentage points (T3); this is higher than the rate of the control group (1.4 percentage points), with the higher effect corresponding to the full treatment arm. Ten weeks from the visit, the number of microentrepreneurs that register with MEI grow to 11.1 percentage points for the fully treated microentrepreneurs (T1), while registration rates remain constant for the informational visit-only microentrepreneurs (4.9 percentage points), and at this stage the difference is almost statistically significant (p-value=0.131). Afterwards, only microentrepreneurs who received the full treatment of in-person visits and additional text message reminders (T1) presented positive and significant effects on formalizing their businesses. The effect disappears for microentrepreneurs who only receive informational visits as formalization rates increase in the control group, reaching 6.3% 40 weeks after the baseline and 10.6% about two years later.

Next, we look at the effect of the timing of the intervention and the distance to the SEBRAE office. In Section 3.2, we mentioned that one key negative event likely affected the impact of our treatments on formalization: the change of address of the SEBRAE office in Complexo Maré. That variable appears important because SEBRAE was a key facilitator not only for the microentrepreneur to obtain more information about the MEI program, but also for the registration of microentrepreneurs with MEI. Thus, we first expect the treatment effects to be higher for those entrepreneurs whose initial in-person visit took place after the final change of address by the SEBRAE office because, unlike those who received the in-person informative visit prior to the address change, they had received no conflicting information about SEBRAE's address, and, therefore, were unlikely to be confused about where to go to complete the registration process. Also, considering that the distance from the location of the business and SEBRAE's office was not negligible, we also expect higher effects for those microentrepreneurs located in neighborhoods closer to SEBRAE's office. The estimated coefficients are reported in Table A5. The first panel differentiates by the timing of the informative visit, showing that while the treatment effects on contacting SEBRAE are all significant regardless of the timing of the visit, there were indeed slightly larger effects among those who were visited after the change of address; however, such differences are not statistically significant. The timing of the visit does appear to have been very relevant for the formalization itself; we find no positive effects for those who were visited earlier, and thus faced the prospect of finding a different SEBRAE office to finalize their formalization. We can hypothesize that such inconvenience may have discouraged microentrepreneurs, especially those that did not receive reminders

afterwards. When looking at the effects for those visited late, it is interesting to note that all treatment arms increased the formalization rate, although it is larger for those fully treated (T1).

A similar pattern is observed when we differentiate by the distance between the microentrepreneur's working place and the location of SEBRAE's office (Table A5). Though we do not have the specific geographical location of the microentrepreneur's business, and thus must establish its rough location by the neighborhood in which they operate, our results using this measure of distance show that all treatment arms increase the likelihood of treated microentrepreneurs contacting SEBRAE. This effect is larger for those neighborhoods closer to the ones in which the SEBRAE office was located, though the difference fails to be statistically significant[10]. Looking at the formalization variable, we see that only the full treatment (T1) has a positive and significant effect, and only in neighborhoods closer than 1 kilometer to those where the SEBRAE office was located. For such a sub-group, the treatment effect is 17.4 percentage points - significantly larger effect compared to the 2.2 percentage point increase among those entrepreneurs of the same treatment group located in neighborhoods that were farther away. In light of this, we interpret these results on proximity to the SEBRAE office as evidence that the intention-to-treat effects for the fully treated would have been almost twice as large had the intervention not faced disruptions from the change of address, or if it had offered registration options that would have made the distance less important. Further, we note that such larger effects would increase the relevance of limited prospective memory among microentrepreneurs of Complexo Maré.

Most of the microentrepreneurs in our sample do not have clear growth plans for their businesses, as they started their business out of necessity, and they are thus less likely to respond positively to the business incentives offered by the MEI program. In that sense, it would be important to see if there are specific characteristics that make entrepreneurs more responsive because such information could be considered very useful for the cost-effectiveness of informational treatments like the one evaluated here. We present in Table A6 the estimates of the intention-to-treat effects of the different interventions differentiated by a number of socio-economic characteristics. We observe that the effects on formalization for those in the T1 group who attended in-person meetings and received

---

[10]Figure 3 identifies 16 neighborhoods across Complexo Maré, and shows that the first SEBRAE office was located in Parque Maré, and then they moved to the neighboring Nova Holanda. Both neighborhoods are placed in the middle of the Complexo Maré area.

follow-up text messages do not seem to differ by the age or gender of the microentrepreneur, or by the tenure or profit-based size of the business. We do find, however, that the treatment arm (T1) did have a greater effect on formalization of those with high entrepreneurial spirit (13.8 percentage points) than those with low entrepreneurial spirit (0.0 percentage points). This indicates, arguable, that the MEI program's business-related benefits are more important to those with higher entrepreneurial spirit. Also interesting is the finding that information visits alone (T3) had positive and significant effects on reaching out to SEBRAE of microentrepreneurs in the retail sector (13.0 percentage points), compared to those in services and manufacturing (5.2 percentage points). One explanation may be that to purchase from wholesalers and from more prestigious brands, businesses typically require a business taxation number for purchase, which makes the business-related advantages of the MEI program for retailers more pronounced and, therefore, visiting SEBRAE for the purpose of getting more information about the MEI program more attractive.

7.2 Drug cartel violence in favelas of Rio de Janeiro and formalization under the MEI program

In Section 4, we described how organized criminal gangs operate as a key feature of life in Rio de Janeiro's favelas. Indeed, the presence and dominance of drug-based organized crime groups clearly affects the way microentrepreneurs run their businesses. In Complexo Maré, we have three of these groups and they differ in the way they operate in their territories but also in the way they manage their rivalries. There are several factors that condition the way the presence of these gangs may affect the reaction of microentrepreneurs to the information about the prospect of formalizing through the MEI program. The first one is the location of SEBRAE's office in the territory controlled by Comando Vermelho. This location is a relevant factor considering that our treatment asked for microentrepreneurs to visit the SEBRAE office in person after our initial information session. The historical, bloody rivalry between the favela's two dominant gangs, the Comando Vermelho and the TCP, likely influenced the intervention's aims. All SEBRAE offices that participated in our experiments were in Comando Vermelho-dominated territories. Comando Vermelho actively creates barriers to mobility to secure its territory and protect its criminal activities. To these ends, gang members may stop and question people from TCP areas at times. Thus microentrepreneurs might have feared crossing territories, which in turn might have actively restricted the impact of the

intervention, particularly among those who worked in TCP-dominated areas. Moreover, during our intervention and observation period, a wave of police interventions to search for alleged criminals, drugs, and weaponry, targeted areas dominated by the Comando Vermelho to a greater degree than those dominated by the TCP. Consequently, the SEBRAE office stayed closed at times due to shootings. This might have increased the perceived risk of commuting by microentrepreneurs from TCP and militia areas.

Finally, the situation regarding crime was also affected by the installation of police units that were a key state strategy to try to recover territories occupied by drug gangs in the run-up to the 2014 World cup and the 2016 Olympic Games in Brazil. These police units were employed as a key part of a state strategy to recover territories occupied by drug gangs in anticipation of the 2014 Soccer World Cup and the 2016 Olympic Games in Brazil. Although the state did not establish such a police unit in Complexo Maré, their territories were indirectly affected because such units were used in neighboring favelas (especially Complexo do Alemão and Jacarazinho). In response, a high number of Comando Vermelho members from those favelas migrated to Complexo Maré, increasing tension and exacerbating conflict with TCP for control of territory.

In this context, it is clear that microentrepreneurs in TCP-controlled territories would have the hardest time registering with MEI, as the exacerbated conflict with Comando Vermelho would deter them from crossing the border into Comando Vermelho territory to complete registration with the MEI program. However, we would also expect that the change of leadership and gang members, due to the inflow of gang members from outside of Complexo Maré in the time of our study, the exacerbated conflict between Comando Vermelho and TCP, and the high number of police interventions in Comando Vermelho-dominated areas, would have strongly affected the behavior of microentrepreneurs. These increased levels of disturbance might have distracted them from key important decisions such as registering with the MEI program. Therefore, with increased turmoil we would also expect the need for nudges as a device to help capture microentrepreneurs' attention about making a decision about whether to join the MEI program, and to increase the likelihood that they take related actions to do so[11].

---

[11]Although this study's sample also included territories dominated by militias, our final sample only included 35 eligible microentrepreneurs in the two neighborhoods controlled by militias. Thus, we exclude this sub-sample in the analysis of sub-sections. We hypothesize that microentrepreneurs in militia-dominated territories would be the least affected by the violence exacerbated by the conflict between the two more directly drug-related organized crime groups.

Table 5 presents the intention-to-treat effects of each treatment arm delineated by which criminal gang ruled the corresponding territories in which the firms' operated. To discuss these impacts in context, we must first look at essential characteristics of these territories. Table B1 shows that businesses in Comando Vermelho-dominated regions are more profitable; they are also closer to the SEBRAE offices. As a result, we decided to include those variables as controls when estimating the effects by the ruling gang.[12] The estimates in Table 5 confirm that the treatment arms have no effect on the registration with the MEI program among microentrepreneurs operating in TCP-dominated neighborhoods. On the opposite side, the effect of the full treatment in Comando Vermelho-dominated neighborhoods is almost twice as high as the average treatment effect. The full-treatment effect on registration with MEI is 17.2 percentage points in Comando Vermelho-dominated neighborhoods and significant at the 0.1 level of confidence, while the average treatment effect is 8.5 percentage points and with a p-value of 0.131. Similarly, the full-treatment effect on registration and compliance is 8.3 percentage points among Comando Vermelho-dominated neighborhoods, while the average treatment effect for this variable is 6.4 percentage points. What does not change is the fact that the restricted treatment arms, information-only and messaging-only, have no significant effects in such areas. Effects on contacting SEBRAE are positive and significant regardless of which criminal organization dominates, but they are much larger in Comando Vermelho-dominated neighborhoods. Overall, we interpret these results as evidence that the location of the SEBRAE office and the expanded level of conflict between the two rival gangs limited the extent to which microentrepreneurs formalized their businesses in Complexo Maré. And that for the microentrepreneurs in TCP-dominated neighborhoods, support for online registration may be required for reminding messages to become effective. These results on the importance of mobility restrictions under gang rule are indeed consistent with those reported by Melnikov et al. (2020) in El Salvador.

8 Conclusions and discussion

Though many different policy measures have sought to incentivize microenterprises to formalize, most of these efforts have focused on either reducing the costs of formalization or increasing the benefits of the process with very limited results (Benhassine et al.,

---

[12]However, given that we only have distance from the center to the central point of the neighborhood in which the business operates, we only added a control for the level of monthly profits in the estimates reported in Table 5.

2018; Ulyssea, 2020). In this paper, we explore the potential influence of other factors, including behavioral biases, such as present bias and limited prospective memory, and behaviors that are reactions to the very real presence of crime and control of residents' mobility by organized crime groups. We examine whether these behaviors influence if microentrepreneurs follow through in adopting good business practices that are costly today but will be clearly beneficial tomorrow. To address our hypothesis that the low take-up of formalization programs can be partially explained by behavioral biases and by the context of neighborhoods facing the threat of violence, we conduct a field experiment in urban Brazil. In the experiment we provided information about the Individual Microentrepreneur program (MEI, for its initials in Portuguese), a program that makes formalization convenient (by reducing registration and taxation costs) and beneficial (by enrolling the microentrepreneur into a subsidized social security system) but has nevertheless had only small and transitory effects in boosting formalization of small businesses (Rocha et al., 2018). Our experiment randomly allocated either informative visits or SMS text messages or both (in which case the text messages worked as a reminder) to a sample of informal microentrepreneurs in Complexo Maré, a Rio de Janeiro favela where two gangs were vying for control of territory. We conducted the experiment in coordination with SEBRAE - the Brazilian Service to Support the Micro and Small Enterprises, which had offices in a neighborhood dominated by one of the two prevailing gangs.

Our results suggest that informative visits do increase the knowledge about the program and interest in formalization, but that reminder messages are needed to increase formalization registration. Treatment groups that received only one type of outreach – either informative sessions alone or text messages alone – showed no effect; by contrast, receiving both led to a 8.5 percentage point increase in formalization. Moreover, those who followed through with formalization in the wake of the dual-pronged outreach complied to a greater degree with the required payments, with a 6.4 percentage point increase in compliance 18-month after the intervention, indicating that microentrepreneurs were properly informed, and suggesting that the effects on the adoption of good business practice may be more sustainable.

Leveraging our experiment feature that asked microentrepreneurs to visit a physical office to complete the formalization procedures, we examined the extent to which behaviors were affected by the potential for violence among rival organized crime groups and related mobility fears and restrictions. We found a steep reduction in physical office visits

of SEBRAE by entrepreneurs residing in areas that implicated crossing different gang territories, which resuled in a significant decline in formalization rates. Specifically, the treatment arms had no effects on business formalization rates in neighborhoods controlled by the TCP, the rival gang to the Comando Vermelho, which dominated the neighborhood in which the office for our experiment was located. Meanwhile, in neighborhoods controlled by the Comando Vermelho, the effect of the full treatment (both in-person visits and follow-up text messages) was almost twice as high as the average treatment effect – 17.2 percentage points compared to 8.5 percentage points. We interpret these last results as evidence of the importance of the mobility restrictions often imposed upon residents by area gangs.

Our results support the importance of limited attention and procrastination in helping explain low rates of formalization by microentrepreneurs, in particular, and the limited adoption of growth-oriented business practices, more broadly. The findings are in line with those of the literature on behavioral economics such as Ericson (2017), Karlan et al. (2016), and Mullainathan (2002), but also with the research agenda raised by Kremer et al. (2019) to insert behavioral biases as another key factor explaining entrepreneurship in developing economies. At the same time, however, it is important to see that the effects of behavioral nudges can be canceled out by the types of social distortion generated by organized crime, in particular by the mobility restrictions that are often implemented by ruling gangs for residents of the neighborhoods they control to move in and out of the territories they control. This last result is consistent with those reported by Melnikov et al. (2020) for El Salvador, when analyzing the impact of the expansion of organized crime groups on the economic development of neighborhoods they control. From a policy perspective, we can think about the implications of this for the promotion of entrepreneurship in poor urban areas. Our work suggests that formalization efforts in particular, and efforts to promote good business practices in general, would benefit from institutional arrangements that help public policies incorporate behavioral perspectives and the role of organized crime in deterring local economic development.

References

Acemoglu, D., De Feo, G., & De Luca, G. D. (2019). Weak States: Causes and Consequences of the Sicilian Mafia. *The Review of Economic Studies*, *87*(2), 537–581.

Banerjee, A., & Mullainathan, S. (2010). *The shape of temptation: Implications for the economic lives of the poor* (tech. rep.). National Bureau of Economic Research.

Barnes, N. (2022). The logic of criminal territorial control: Military intervention in rio de janeiro. *Comparative Political Studies*, *55*(5), 789–831.

Beaman, L., Magruder, J., & Robinson, J. (2014). Minding small change among small firms in kenya. *Journal of Development Economics*, *108*, 69–86.

Benhassine, N., McKenzie, D., Pouliquen, V., & Santini, M. (2018). Does inducing informal firms to formalize make sense? experimental evidence from benin. *Journal of Public Economics*, *157*, 1–14.

Blattman, C., Duncan, G., Lessing, B., & Tobón, S. (2021). *Gang rule: Understanding and countering criminal governance* (tech. rep.). National Bureau of Economic Research.

Bloom, N., Eifert, B., Mahajan, A., McKenzie, D., & Roberts, J. (2013). Does management matter? evidence from india. *The Quarterly Journal of Economics*, *128*(1), 1–51.

Bruhn, M., & McKenzie, D. (2014). Entry regulation and the formalization of microenterprises in developing countries. *The World Bank Research Observer*, *29*(2), 186–201.

Datta, S., & Mullainathan, S. (2014). Behavioral design: A new approach to development policy. *Review of Income and Wealth*, *60*(1), 7–35.

De Andrade, G. H., Bruhn, M., & McKenzie, D. (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 Soto, H. d., Vargas Llosa, M., & Abbott, J. (1990). *The other path*. Perennial library, Harper; Row.

de Souza e Silva, J., Fernandes, F., & Braga, R. (2008). Grupos criminosos, armados com domínio de território: Reflexões sobre a territorialidade do crime na região metropolitana do rio de janeiro. *Segurança, tráfico e milícias no rio de janeiro* (pp. 16–24). Justiça Global.

Dell, M. (2015). Trafficking networks and the mexican drug war. *American Economic Review*, *105*(6), 1738–79.

Dencker, J. C., Bacq, S., Gruber, M., & Haas, M. (2021). Reconceptualizing necessity entrepreneurship: A contextualized framework of entrepreneurial processes under the condition of basic needs. *Academy of Management Review*, *46*(1), 60–79.

Ericson, K. M. (2017). On the interaction of memory and procrastination: Implications for reminders, deadlines, and empirical estimation. *Journal of the European Economic Association*, *15*(3), 692–719.

Galiani, S., Meléndez, M., & Ahumada, C. N. (2017). On the effect of the costs of operating formally: New experimental evidence. *Labour Economics*, *45*, 143–157.

González-Uribe, J., & Reyes, S. (2021). Identifying and boosting "gazelles": Evidence from business accelerators. *Journal of Financial Economics*, *139*(1), 260–287.

Hanna, R., Mullainathan, S., & Schwartzstein, J. (2014). Learning through noticing: Theory and evidence from a field experiment. *The Quarterly Journal of Economics*, *129*(3), 1311–1353.

Ilias, N. (2006). Families and firms: Agency costs and labor market imperfections in sialkot's surgical industry. *Journal of Development Economics*, *80*(2), 329–349.

Karlan, D., McConnell, M., Mullainathan, S., & Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. *Management Science*, *62*(12), 3393–3411.

Kremer, M., Rao, G., & Schilbach, F. (2019). Behavioral development economics. *Handbook of behavioral economics: Applications and foundations 1* (pp. 345–458). Elsevier.

La Porta, R., & Shleifer, A. (2014). Informality and development. *Journal of Economic Perspectives*, *28*(3), 109–26.

Magaloni, B., Franco-Vivanco, E., & Melo, V. (2020). Killing in the slums: Social order, criminal governance, and police violence in rio de janeiro. *American Political Science Review*, *114*(2), 552–572.

Maloney, W. F. (2004). Informality revisited. *World development*, *32*(7), 1159–1178.

McKenzie, D., Woodruff, C., Bjorvatn, K., Bruhn, M., Cai, J., Gonzalez-Uribe, J., Quinn, S., Sonobe, T., & Valdivia, M. (2021). Training entrepreneurs. *VoxDevLit*, *1*(2), 3.

Melnikov, N., Schmidt-Padilla, C., & Sviatschi, M. M. (2020). *Gangs, labor mobility and development* (tech. rep.). National Bureau of Economic Research.

Misse, M. (2011). Crime organizado e crime comum no rio de janeiro: Diferenças e afinidades. *Revista de sociologia e politica*, *19*, 13–25.

Monteiro, J., & Rocha, R. (2017). Drug battles and school achievement: Evidence from rio de janeiro's favelas. *The Review of Economics and Statistics*, *99*(2), 213–228.

Mullainathan, S. (2002). A memory-based model of bounded rationality. *The Quarterly Journal of Economics*, *117*(3), 735–774.

REDES. (2014). Censo de empreendimentos Maré. *Redes de Desenvolvimento da Maré, Observatório de Favelas, Rio de Janeiro*.

Rocha, R., Ulyssea, G., & Rachter, L. (2018). Do lower taxes reduce informality? evidence from brazil. *Journal of development economics*, *134*, 28–49.

Schoar, A. (2010). The divide between subsistence and transformational entrepreneurship. *Innovation policy and the economy*, *10*(1), 57–81.

Silva, E. S. (2015). Testemunhos da maré. *Rio de Janeiro: Morula*.

Silva, E. S. (2017). A ocupação da maré pelo exército brasileiro: Percepção de moradores sobre a ocupação das forças armadas na maré. *Rio de Janeiro: Redes da Maré*.

Ulyssea, G. (2020). Informality: Causes and consequences for development. *Annual Review of Economics*, *12*, 525–546.

World Bank, D. C., Washington. (2013). *Doing business 2013: Smarter regulations for small and medium-size enterprises*. World Bank Publications.
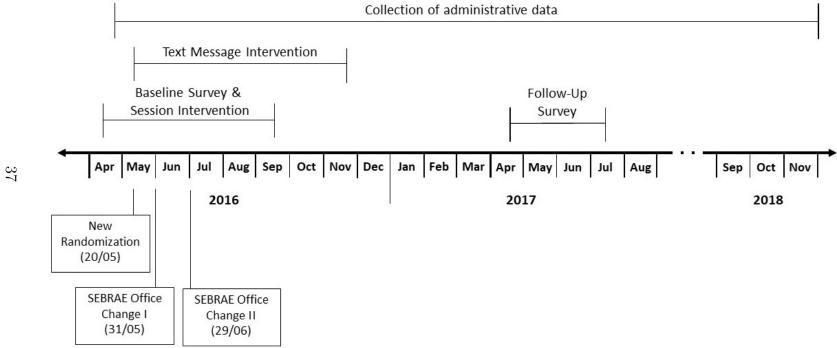
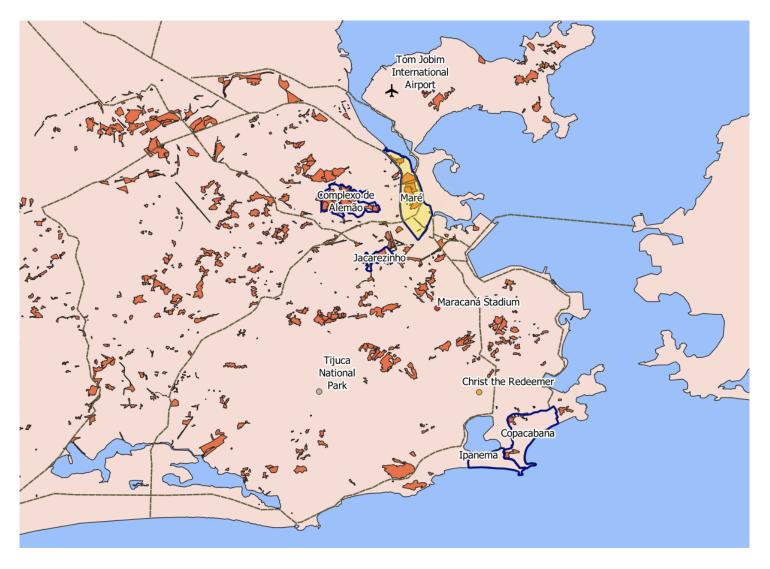Figure 1: Timeline of the field experiment
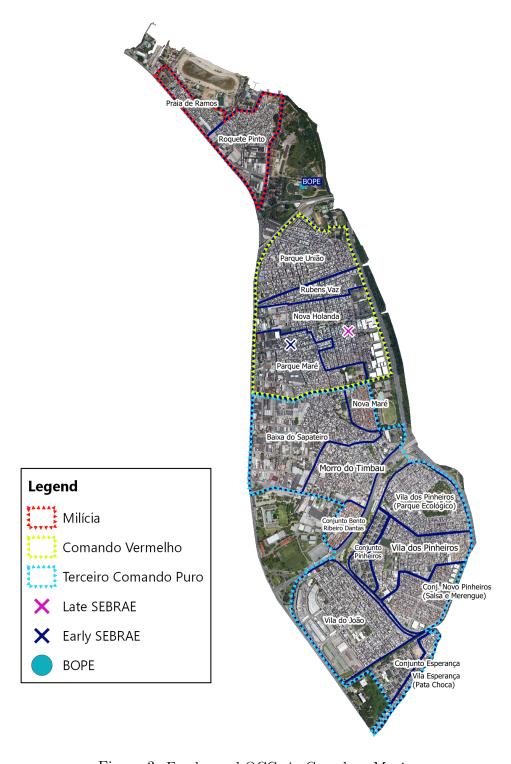
Figure 2: Complexo Maré in Rio de Janeiro
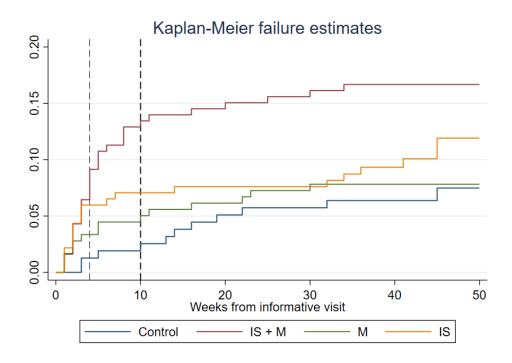
Figure 3: Favelas and OCGs in Complexo Maré

Figure 4: Timing of the response – or how many messages are needed?

Table 1: Two-by-Two Between-Subject Factorial Design with Expected Effects

	No message	Message
No info	0.025	0.05
Info	0.11	0.225

Table 2: Attrition by treatment arm

	Obs.	Control	IS+M (1)	M (2)	IS (3)
Follow-up	790/701	0.1006	0.0202	0.0387	−0.0119
		(0.0240)	(0.0320)	(0.0330)	(0.0320)
Info about Formalization	790/728	0.0782	−0.0106	0.0163	−0.0043
		(0.0200)	(0.0280)	(0.0280)	(0.280)

Note: * Significant at 10%, ** Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table 3: ITT effects - Knowledge, perception and take up of MEI

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(1)-(3)	(2)-(3)
Knowledge and perception								
Knowledge about SEBRAE	694	0.191 (0.026)	0.381*** (0.048)	0.163*** (0.044)	0.321*** (0.037)	0.001	0.337	0.000
Knowledge about SEBRAE address	694	0.096 (0.022)	0.312*** (0.043)	0.139*** (0.035)	0.205*** (0.039)	0.004	0.056	0.100
MEI as Formalization program	607	0.551 (0.033)	0.011 (0.053)	−0.075 (0.049)	0.062 (0.054)	0.105	0.129	0.061
Full knowledge about MEI benefits	694	0.217 (0.033)	0.102** (0.036)	0.011 (0.053)	0.067 (0.053)	0.032	0.311	0.149
Considers Formalization to be positive	535	0.072 (0.013)	−0.029* (0.017)	−0.020 (0.032)	−0.046** (0.020)	0.701	0.519	0.460
Thought about formalizing	537	0.392 (0.031)	0.156** (0.055)	0.025 (0.046)	0.122* (0.058)	0.077	0.503	0.137
Take up								
Contact with SEBRAE	720	0.013 (0.015)	0.108** (0.043)	0.034** (0.012)	0.061*** (0.016)	0.062	0.284	0.227
Registration as MEI (24m)	721	0.106 (0.026)	0.085 (0.059)	−0.016 (0.024)	0.013 (0.037)	0.033	0.251	0.360
Registration + Payment Compliance (18 m)	721	0.025 (0.011)	0.064** (0.022)	0.003 (0.020)	0.012 (0.016)	0.010	0.061	0.729

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in columns (1) - (3). * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table 4: ITT effects - Timing of take up of MEI

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(1)-(3)	(2)-(3)
Formalization								
4 weeks	721	0.014	0.081***	0.019	0.051***	0.011	0.203	0.011
		(0.010)	(0.024)	(0.012)	(0.013)			
10 weeks	721	0.025	0.111**	0.025	0.049*	0.012	0.131	0.292
		(0.018)	(0.037)	(0.022)	(0.025)			
20 weeks	721	0.049	0.105*	0.013	0.028	0.023	0.146	0.586
		(0.025)	(0.053)	(0.022)	(0.036)			
30 weeks	721	0.056	0.108*	0.023	0.022	0.034	0.101	0.968
		(0.023)	(0.051)	(0.021)	(0.033)			
40 weeks	721	0.063	0.106*	0.017	0.031	0.042	0.199	0.648
		(0.025)	(0.057)	(0.024)	(0.035)			
Total period (24m)	721	0.106	0.085	−0.016	0.013	0.033	0.251	0.360
		(0.026)	(0.059)	(0.024)	(0.037)			

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in columns (1) - (3). * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table 5: ITT effects - Take up of MEI by ruling OCG

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(2)-(3)	(1)-(3)
Contact with SEBRAE								
ATE	718	0.012	0.109**	0.032**	0.061***	0.059	0.267	0.196
		(0.019)	(0.043)	(0.011)	(0.016)			
Comando Vermelho	718	0.016	0.182**	0.035**	0.066***	0.029	0.161	0.130
		(0.030)	(0.073)	(0.016)	(0.012)			
Terceiro Comando Puro	718	0.011	0.048*	0.032**	0.043**	0.525	0.633	0.807
		(0.025)	(0.023)	(0.014)	(0.016)			
Registration as MEI (24m)								
ATE	719	0.103	0.085	−0.020	0.012	0.027	0.228	0.322
		(0.026)	(0.057)	(0.022)	(0.036)			
Comando Vermelho	719	0.079	0.172*	0.022	0.067	0.086	0.476	0.448
		(0.042)	(0.093)	(0.019)	(0.046)			
Terceiro Comando Puro	719	0.129	−0.005	−0.049	−0.034	0.224	0.633	0.110
		(0.034)	(0.049)	(0.032)	(0.043)			
Registration + Payment Compliance (18m)								
ATE	719	0.025	0.064**	0.002	0.012	0.008	0.052	0.702
		(0.016)	(0.022)	(0.020)	(0.016)			
Comando Vermelho	719	0.016	0.083**	0.019	0.024	0.002	0.892	0.218
		(0.026)	(0.032)	(0.022)	(0.019)			
Terceiro Comando Puro	719	0.032	0.032	−0.001	−0.006	0.168	0.887	0.167
		(0.022)	(0.023)	(0.029)	(0.020)			

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in columns (1) - (3). * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis. Estimates for Milícia have been excluded due to concerns with sample size.

Appendix A

Table A1: Types of messages

Receivers of information session (T1)	Not receivers of information session (T2)
Hello, (MICROENTREPRENEUR'S NAME) Do you remember the (NAME OF INTERVIEWER)'s visit? She discussed the advantages and benefits offered by MEI when formalizing the business with you. Now it's your turn to pay a visit to SEBRAE, at Rua Flavia Farnese, 45 (inside the Parque Maré Residents Association) and get in touch with Carol, who meets every Tuesday and Wednesday from 9am to 6pm. It's fast, convenient and free of charge! Take advantage of this unique opportunity!	Hello, (MICROENTREPRENEUR'S NAME) SEBRAE has an office in Maré to assist you and help you with your formalization for free! Look for Carol at Rua Flavia Farnese, 45 (inside the Parque Maré Residents Association). She is available every Tuesday and Wednesday from 9:00 am to 6:00 pm. It's fast, convenient and free of charge! Take advantage of this unique opportunity!
(MICROENTREPRENEUR'S NAME), Do you remember the visit of (NAME OF INTERVIEWER)? Free of charge, you have the opportunity to formalize your own business and receive all the benefits offered by MEI. Will you miss this chance? Go to Rua Flavia Farnese, 45 (Enter Teixeira Ribeiro, second on the right) inside the Residents' Association. Look for Carol, who is there on Tuesdays and Wednesdays, from 9am to 3pm, with full availability to help you!	"(MICROENTREPRENEUR'S NAME) Free of charge, you have the opportunity to formalize your own business and receive all the benefits offered by MEI. Will you miss this chance? Go to Rua Flavia Farnese, 45 (Enter Teixeira Ribeiro, second on the right) inside the Residents' Association. Look for Carol, who is available on Tuesdays and Wednesdays, from 9:00 am to 3:00 pm, with full availability to help you!
(MICROENTREPRENEUR'S NAME), Carol from SEBRAE is open TODAY from 9am to 3pm at R. Flavia Farnese, 45, enter Teixeira Ribeiro, second on the right, inside Assoc. of Residents. Free! Take your CPF, RG, voter title, proof of residence and do your formalization now! The service is free and made for you!	(MICROENTREPRENEUR'S NAME), Carol from SEBRAE is open TODAY from 9am to 3pm at R. Flavia Farnese, 45, enter Teixeira Ribeiro, second on the right, inside Assoc. of Residents. Free! Take your CPF, RG, voter title, proof of residence and do your formalization now! The service is free and made for you!
(MICROENTREPRENEUR'S NAME), Carol from SEBRAE is attending TODAY and TOMORROW from 9am to 3pm, R. Sargento Silva Nunes, 1012, within REDES DA MARE.	(MICROENTREPRENEUR'S NAME), Carol from SEBRAE is attending TODAY and TOMORROW from 9am to 3pm, R. Sargento Silva Nunes, 1012, within REDES DA MARE.
(MICROENTREPRENEUR'S NAME), did the (NAME OF INTERVIEWER) clear all doubts about the formalization? It's now time to secure your rights, look for Carol from SEBRAE!	(MICROENTREPRENEUR'S NAME), do you have any questions about how to formalize your business? Do not waste time! Look for Carol at SEBRAE, from 9 am to 3 pm, R Sargento Silva Nunes, 1012, inside Redes da Maré!
Hello, (MICROENTREPRENEUR'S NAME) Do you remember the (NAME OF INTERVIEWER)'s visit? At no cost, you have the opportunity to formalize your business. Look for Carol at SEBRAE, from 9 am to 3 pm, R Sargento Silva Nunes, 1012, inside Redes da Maré!	(MICROENTREPRENEUR'S NAME), now the residents of Maré have the opportunity to formalize their own business! Look for Carol at SEBRAE, from 9 am to 3 pm, R Sargento Silva Nunes, 1012, inside Redes da Maré!
(MICROENTREPRENEUR'S NAME), according to the information that (NAME OF INTERVIEWER) gave you, it is easy and fast to guarantee your rights through business formalization! Look for Carol at SEBRAE, from 9 am to 3 pm, R Sargento Silva Nunes, 1012, inside Redes da Maré!	(MICROENTREPRENEUR'S NAME), guaranteeing your rights with formalization is much easier and faster than you can imagine! Look for Carol at SEBRAE, from 9 am to 3 pm, R Sargento Silva Nunes, 1012, inside Redes da Maré!

Table A2: Balance at baseline

	Obs	Control mean	Treatment differences			P-values		
			IS+M (1)	M (2)	IS (3)	(1)-(2)	(1)-(3)	(2)-(3)
Age (years)	695	42.931	−0.236	−2.849	−1.904*	0.066	0.101	0.457
		(0.779)	(1.414)	(1.622)	(1.048)			
Gender (Female = 1)	695	0.478	0.016	−0.036	0.065	0.395	0.279	0.077
		(0.024)	(0.042)	(0.047)	(0.043)			
Entrepreneurial spirit (High = 1)	695	0.597	0.019	0.054	0.125*	0.400	0.011	0.081
		(0.044)	(0.065)	(0.063)	(0.063)			
Business tenure (months)	695	61.717	−2.850	−4.072	−6.934	0.871	0.620	0.511
		(4.094)	(10.030)	(5.150)	(5.367)			
Monthly profits (USD)	695	363.347	−0.132	21.685	5.462	0.573	0.886	0.564
		(36.534)	(46.220)	(32.903)	(19.886)			
Distance to SEBRAE office (Kms)	695	1.593	0.147	0.085	−0.008	0.522	0.150	0.381
		(0.281)	(0.124)	(0.103)	(0.035)			
Illiterate	695	0.025	0.003	0.016	−0.003	0.124	0.551	0.095
		(0.012)	(0.019)	(0.018)	(0.019)			
Primary Education	695	0.547	−0.036	−0.053	−0.004	0.760	0.517	0.287
		(0.058)	(0.064)	(0.048)	(0.052)			
High School	695	0.396	0.009	0.034	0.011	0.685	0.974	0.559
		(0.050)	(0.076)	(0.034)	(0.040)			
Higher Education	695	0.031	0.019	0.003	−0.004	0.174	0.365	0.755
		(0.014)	(0.019)	(0.019)	(0.020)			

Note: * Significant at 10%, ** Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table A3: Description of key dependent variables

Dependent Variable	Description
Formalization process Variables	
Association of MEI as a Formalization program	is a dummy variable that takes the value 1 if the entrepreneur correctly associates the MEI program with a Formalization program for microentrepreneurs, and 0 otherwise;
Full knowledge about MEI benefits	is a dummy variable that takes the value 1 if the entrepreneur remembers the social security as a benefit plus at least on business related benefit (such as hiring one employee with reduced labor cost or accessing better credit options), and 0 otherwise;
Knowledge about SEBRAE	is a dummy variable that takes the value 1 if the entrepreneur indicates that a SEBRAE office exist in Maré, and 0 otherwise;
Knowledge about SEBRAE address	is a dummy variable that takes the value 1 if the entrepreneur correctly indicates the SEBRAE address in Maré, and 0 otherwise;
Considers Formalization to be positive	is a dummy variable that takes the value 1 if the entrepreneur indicates that formalization would be a good thing, and 0 otherwise;
Thought about formalizing	is a dummy variable that takes the value 1 if the entrepreneur indicates to have thought about formalizing in the last 12 months, and 0 otherwise;
Formalization outcome Variables	
Formalization	Is a dummy variable that takes the value 1 if the entrepreneur formalized after baseline, and 0 otherwise;
Contact with SEBRAE	Is a dummy variable that takes the value 1 if the entrepreneur appeared at the SEBRAE office after baseline, and 0 otherwise;

Table A4: ITT effects - Payment compliance

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(1)-(3)	(2)-(3)
Formalization	721	0.103 (0.026)	0.085 (0.059)	–0.016 (0.024)	0.013 (0.037)	0.033	0.251	0.360
At least 2/3 of payments								
12 months	721	0.033 (0.018)	0.059** (0.025)	–0.002 (0.022)	0.027* (0.013)	0.006	0.250	0.281
18 months	721	0.025 (0.016)	0.064** (0.022)	0.003 (0.020)	0.012 (0.016)	0.010	0.061	0.729

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in columns (1) - (3). * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table A5: ITT effects of take up of MEI - The role of organizational adjustment and drug cartels' conflict

Dependent variables	Panel A: Contact with SEBRAE				Panel B: Formalization			
	Obs.	M+IS	M	IS	Obs.	M+IS	M	IS
Full Sample	720	0.108**	0.034**	0.061***	721	0.085	−0.016	0.013
		(0.043)	(0.012)	(0.016)		(0.059)	(0.024)	(0.037)
By timing of informative visit								
Early (April-June)	720	0.095*	0.034*	0.035*	721	0.008	−0.077*	−0.065
		(0.045)	(0.017)	(0.018)		(0.053)	(0.041)	(0.055)
Late (July-September)	720	0.125**	0.038**	0.094***	721	0.183**	0.064*	0.117**
		(0.047)	(0.017)	(0.017)		(0.076)	(0.032)	(0.032)
P-value (Early vs. Late)		0.377	0.883	0.122		0.051	0.025	0.027
By distance to SEBRAE office								
Less than 1KM	720	0.183**	0.038*	0.064***	721	0.174*	0.026	0.065
		(0.075)	(0.018)	(0.013)		(0.096)	(0.020)	(0.047)
More than 1KM	720	0.053**	0.031**	0.060**	721	0.022	−0.043	−0.019
		(0.022)	(0.014)	(0.014)		(0.051)	(0.033)	(0.033)
P-value (Less vs. More)		0.133	0.787	0.915		0.201	0.107	0.213

Note: Regressions include covariates and community fixed effects. Each stratifier is included as a separate variable and also interacted with the treatment variable. Standard errors between parentheses. * Significant at 10%, **Significant at 5%, *** Significant at 1%.

Table A6: ITT effects of take up of MEI by key social-demographic variables

	Panel A: Contact with SEBRAE				Panel B: Formalization		
	Obs.	M+IS	M	IS	Obs.	M+IS	M	IS
Full Sample	720	0.108**	0.034**	0.061***	721	0.085	−0.016	0.013
		(0.043)	(0.012)	(0.016)		(0.059)	(0.024)	(0.037)
By Age of Microentrepeneur								
Less than 40 years	720	0.071*	0.012	0.060**	721	0.056	−0.094***	−0.012
		(0.037)	(0.027)	(0.023)		(0.074)	(0.028)	(0.052)
More than 40 years	720	0.135*	0.051	0.059***	721	0.104	0.050	0.028
		(0.073)	(0.030)	(0.030)		(0.076)	(0.040)	(0.040)
P-value (Less vs. More)		0.457	0.471	0.961		0.614	0.008	0.608
By Gender								
Male	720	0.108**	0.042*	0.057	721	0.081	0.003	0.008
		(0.050)	(0.020)	(0.035)		(0.059)	(0.045)	(0.063)
Female	720	0.109**	0.025	0.064**	721	0.089	−0.038	0.018
		(0.044)	(0.019)	(0.019)		(0.072)	(0.034)	(0.034)
P-value (Male vs. Female)		0.969	0.603	0.895		0.884	0.530	0.864
By Entrepreneurial Spirit								
Low	720	0.045	0.023	0.040	721	0.001	−0.069*	0.005
		(0.026)	(0.020)	(0.029)		(0.059)	(0.034)	(0.063)
High	720	0.148**	0.039*	0.065***	721	0.138**	0.012	0.015
		(0.056)	(0.019)	(0.019)		(0.063)	(0.025)	(0.025)
P-value (High vs. Low)		0.027	0.641	0.450		0.009	0.034	0.831
By Age of Business								
Less than 2 years	720	0.135**	0.055***	0.081**	721	0.098	0.021	0.011
		(0.061)	(0.016)	(0.031)		(0.072)	(0.034)	(0.060)
More than 2 years	720	0.088**	0.018	0.046***	721	0.075	−0.043	0.017
		(0.039)	(0.016)	(0.016)		(0.059)	(0.039)	(0.039)
P-value (Less vs. More)		0.378	0.136	0.292		0.694	0.268	0.938
By Firm Size (Profits)								
Less than R$ 1000	720	0.086**	0.046*	0.021	721	0.062	−0.001	−0.026
		(0.030)	(0.022)	(0.026)		(0.046)	(0.037)	(0.022)
More than R$ 1000	720	0.139*	0.023	0.100**	721	0.117	−0.035	0.049
		(0.077)	(0.024)	(0.024)		(0.087)	(0.048)	(0.048)
P-value (Less vs. More $)		0.473	0.564	0.264		0.447	0.621	0.286
By Category of Business								
Retail	720	0.127***	0.043*	0.090***	721	0.130***	0.023	0.046
		(0.039)	(0.022)	(0.018)		(0.044)	(0.042)	(0.037)
Services or Manufacturer	720	0.095*	0.029	0.037	721	0.052	−0.043	−0.008
		(0.050)	(0.020)	(0.020)		(0.079)	(0.028)	(0.028)
P-value(R vs. S or M)		0.309	0.664	0.085		0.232	0.222	0.400

Note: Regressions include covariates and community fixed effects. Each stratifier is included as a separate variable and also interacted with the treatment variable. * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Appendix B

Table B1: Socioeconomic characteristics by ruling OCG

	Obs	Milícia (1)	CV (2)	TCP (3)	P-values (1)-(2)	(1)-(3)	(2)-(3)
Age (years)	695	41.914 (1.934)	40.558 (0.895)	42.420 (0.754)	0.509	0.803	0.040
Gender (Female = 1)	695	0.314 (0.084)	0.518 (0.030)	0.487 (0.026)	0.023	0.050	0.429
Entrepreneurial spirit (High = 1)	695	0.686 (0.081)	0.657 (0.030)	0.640 (0.026)	0.738	0.587	0.652
Business tenure (months)	695	54.086 (8.626)	56.354 (3.167)	59.767 (2.668)	0.804	0.528	0.398
Monthly profits (USD)	695	387.109 (51.176)	433.258 (19.018)	323.772 (16.023)	0.396	0.236	0.000
Distance to SEBRAE office (Kms)	695	2.400 (0.104)	0.783 (0.049)	2.198 (0.042)	0.000	0.064	0.000
Illiterate	695	0.000 (0.028)	0.036 (0.010)	0.026 (0.009)	0.225	0.381	0.423
Primary Education	695	0.429 (0.084)	0.489 (0.031)	0.557 (0.026)	0.500	0.145	0.085
High School	695	0.571 (0.083)	0.449 (0.031)	0.368 (0.026)	0.164	0.019	0.037
Higher Education	695	0.000 (0.031)	0.026 (0.011)	0.047 (0.009)	0.445	0.156	0.152
Observations		35	274	386			

Note: Standard errors in parenthesis.

Table B2: ITT effects - Take up of MEI by Ruling OCG

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(2)-(3)	(1)-(3)
Contact with SEBRAE								
ATE	718	0.012	0.108**	0.034**	0.062***	0.061	0.286	0.207
		(0.019)	(0.043)	(0.012)	(0.017)			
Comando Vermelho	718	0.016	0.183**	0.038*	0.066***	0.031	0.188	0.136
		(0.030)	(0.076)	(0.018)	(0.013)			
Terceiro Comando Puro	718	0.011	0.047*	0.033**	0.044**	0.544	0.645	0.875
		(0.025)	(0.023)	(0.014)	(0.017)			
Milícia	718	0.000	0.143***	0.068*	0.374	0.000	0.440	0.557
		(0.099)	(0.034)	(0.034)	(0.354)			
Registration as MEI (24m)								
ATE	719	0.103	0.084	−0.017	0.014	0.033	0.254	0.338
		(0.026)	(0.059)	(0.024)	(0.037)			
Comando Vermelho	719	0.079	0.174*	0.026	0.069	0.100	0.504	0.456
		(0.042)	(0.097)	(0.021)	(0.047)			
Terceiro Comando Puro	719	0.129	−0.006	−0.046	−0.032	0.244	0.663	0.219
		(0.034)	(0.051)	(0.036)	(0.044)			
Milícia	719	−0.000	0.321***	0.057**	0.167	0.000	0.594	0.509
		(0.135)	(0.043)	(0.025)	(0.189)			
Registration + Payment Compliance (18m)								
ATE	719	0.025	0.064**	0.003	0.012	0.010	0.061	0.713
		(0.016)	(0.022)	(0.020)	(0.017)			
Comando Vermelho	719	0.016	0.084**	0.020	0.024	0.002	0.905	0.222
		(0.026)	(0.032)	(0.021)	(0.019)			
Terceiro Comando Puro	719	0.032	0.032	−0.001	−0.005	0.182	0.883	0.187
		(0.022)	(0.023)	(0.030)	(0.021)			
Milícia	719	−0.000	0.250**	−0.005	0.191	0.022	0.273	0.830

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in columns (1) - (3). * Significant at 10%, **Significant at 5%, *** Significant at 1%. Standard errors in parenthesis.

Table B3: Timing of take up of MEI for OCG

	Obs.	Control mean	IS+M (1)	M (2)	IS (3)	P-value (1)-(2)	(1)-(3)	(2)-(3)
Comando Vermelho								
4 weeks	722	0.016	0.116***	0.054***	0.063***	0.078	0.159	0.397
		(0.028)	(0.035)	(0.010)	(0.014)			
10 weeks	722	0.016	0.177**	0.075***	0.090***	0.039	0.304	0.718
		(0.032)	(0.063)	(0.021)	(0.030)			
20 weeks	722	0.016	0.201**	0.073**	0.102**	0.063	0.381	0.602
		(0.035)	(0.085)	(0.025)	(0.039)			
30 weeks	722	0.032	0.184*	0.074**	0.087***	0.144	0.389	0.769
		(0.037)	(0.094)	(0.025)	(0.027)			
40 weeks	722	0.032	0.195*	0.075**	0.101**	0.153	0.476	0.636
		(0.038)	(0.103)	(0.027)	(0.036)			
Total period (24m)	722	0.079	0.174*	0.026	0.066	0.100	0.445	0.541
		(0.042)	(0.096)	(0.021)	(0.047)			
Terceiro Comando Puro								
4 weeks	722	0.011	0.045*	0.002	0.036**	0.058	0.683	0.022
		(0.023)	(0.023)	(0.003)	(0.013)			
10 weeks	722	0.032	0.049**	0.001	0.015	0.197	0.310	0.517
		(0.026)	(0.017)	(0.024)	(0.020)			
20 weeks	722	0.074	0.018	−0.019	−0.030	0.238	0.181	0.636
		(0.029)	(0.036)	(0.016)	(0.029)			
30 weeks	722	0.074	0.031	−0.008	−0.031	0.211	0.084	0.414
		(0.030)	(0.037)	(0.024)	(0.029)			
40 weeks	722	0.085	0.018	−0.020	−0.025	0.224	0.128	0.856
		(0.031)	(0.040)	(0.028)	(0.029)			
Total period (24m)	722	0.128	−0.005	−0.045	−0.031	0.246	0.222	0.660
		(0.034)	(0.051)	(0.036)	(0.044)			
Milicia								
4 weeks	722	0.000	0.181	−0.010	0.191	0.240	0.978	0.271
		(0.090)	(0.153)	(0.007)	(0.178)			
10 weeks	722	−0.000	0.247**	−0.009	0.182	0.033	0.823	0.303
		(0.105)	(0.100)	(0.016)	(0.187)			
20 weeks	722	0.000	0.253**	−0.007	0.181	0.029	0.800	0.292
		(0.113)	(0.105)	(0.018)	(0.176)			
30 weeks	722	−0.000	0.329***	0.066**	0.174	0.000	0.502	0.603
		(0.118)	(0.046)	(0.027)	(0.184)			
40 weeks	722	0.000	0.328***	0.067**	0.171	0.000	0.505	0.620
		(0.122)	(0.046)	(0.025)	(0.190)			
Total period (24m)	722	−0.000	0.321***	0.056**	0.167	0.000	0.508	0.593
		(0.135)	(0.042)	(0.026)	(0.188)			

Note: All coefficients of column (1)-(3) are controlled by covariates and community FE. Control means are estimated at the mean values of the same controls used in colums (1) - (3). * Significant at 10