



# On the effect of the costs of operating formally: New experimental evidence<sup>☆</sup>



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## ABSTRACT

This paper analyzes the impact of the elimination of the initial fixed costs of business registration on the decision of informal firms to operate formally in Bogotá, Colombia. The Chamber of Commerce of Bogotá (CCB) conducts workshops for prospective formal-sector entrants and arranges personalized meetings for them with CCB agents. The CCB's decision to significantly reduce the transaction costs of registration and the entry into force of Act No. 1429 of 2010, which eliminated the costs of the initial procedure for registering as a formal enterprise and provided tax exemptions during the first years after formalization, provided us with an ideal natural experiment for studying how the elimination of the initial fixed costs of formalization would influence firms' decision to operate formally or not. We obtained two important results. First, while a workshop treatment had no effect on firms' formalization decisions, meetings at the firm with CCB agents raised the likelihood that a business would begin to operate formally by 5.5 percentage points for all the firms that were invited, at random, to participate in this segment of the intervention and by 32 percentage points for the firms that accepted the invitation. Second, the effect on the treated firms did not persist over time. In fact, after a year of formal operation, the effect disappeared. These results indicate that substantial reductions in the fixed costs of operating formally are not an effective means of influencing formalization choices, since such reductions had no lasting effect on formalization decisions.

## 1. Introduction

Informality is widespread in most developing countries. Policymakers are concerned about this problem because it entails an inefficient allocation of resources, inasmuch as formal and informal firms compete in the same market but have different marginal costs (Hsieh and Klenow, 2009). Galiani and Weinschelbaum (2012) develop a general equilibrium model in which both firms and workers choose whether to operate formally or informally. On that basis, they conduct an extensive static comparative analysis. Since the work of De Soto (1989), a great deal of emphasis has been placed on the burden represented by fixed formal-sector entry costs. Another major barrier to formality is thought to be the high taxes levied on profits and labor. While there are several studies that evaluate the costs and benefits of operating formally, there are only a few studies that provide experimental evidence regarding the impact of fixed costs on firms' decisions whether to operate formally or not.

This paper analyzes the impact of the elimination of initial fixed

business registration costs on informal firms' decisions whether to operate formally or not in Colombia. In order to enter the formal sector of the Colombian economy, firms must register with the tax agency (*Dirección de Impuestos y Aduanas Nacionales* (DIAN)) and obtain a taxpayer identification number and card (*Registro Único Tributario* (RUT)), as well as obtain a license (*matrícula mercantil*) from the local chamber of commerce. Fees are charged for these procedures. Firms also need to renew their licenses every year, which increases the fixed costs of operating in the formal sector of the economy. In addition, in general, firms have to pay payroll taxes, value added taxes and income taxes.

In this paper we evaluate two interventions which were led by ECON ESTUDIO (EE), a research institute in Colombia ([www.econestudio.com](http://www.econestudio.com)), working in cooperation with the Chamber of Commerce of Bogotá (CCB). These initiatives were designed to eliminate the initial fixed costs for firms that wished to operate formally. EE, together with the CCB, organized workshops (the first intervention) and arranged personal meetings (the second

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intervention) to inform entrepreneurs about registration procedures and the advantages of operating formally. In both treatments, firms that were interested in starting the process of formalization were subsequently assisted by CCB agents in completing all the necessary paperwork. In addition to the assistance of the CCB agents, the Formalization and Job Creation Act No. 1429 of December 2010 establishes that the registration process is to be cost-free for small businesses (the population of our study) that are registering for the first time.<sup>1</sup> This initiative thus provided us with an ideal natural experiment for studying how the elimination of the initial fixed costs of formalization would influence firms' decisions to operate formally or not, thanks to the combination of the experiments (workshops and meetings), which eliminated all the transaction costs of registration, and Act No. 1429, which eliminated the costs of initial registration for firms created between 2011 and 2014. What is more, Act No. 1429 also establishes that, in the short run, firms are to be exempted from all taxes, thus giving them a clean slate for the start-up of their formal-sector operations. This intervention was expected not only to induce firms that were on the verge of entering the formal sector to actually do so, but also to give other firms the opportunity to experiment with formality at no cost for a year. This latter aspect also added a special feature to our experiment, since it enabled us to analyze the sustainability of the project-induced decision to operate formally once the firms had to renew their licenses (the fee for which, in the first year after registration, was cut by 50% under Act No. 1429). The importance of Act No. 1429 is that it establishes the business environment in which the firms in our experiment operate.

Thus, we were able to take advantage of this natural experiment to study the effect of the virtual elimination of formalization costs on firms' formalization decisions in a context in which no tax liabilities would be incurred for at least two years. In addition, we were also able to test whether the effects of this intervention would be sustainable once firms had had the opportunity to learn about the advantages or disadvantages of operating formally and had to opt to remain in the formal sector by paying a small fee (which would still be 50% less than it would otherwise have been).

EE conducted a randomized control trial to evaluate these programs' impact on the decision of a sample of informal firms in southern Bogotá as to whether to formalize or not. Bogotá, the capital city of Colombia, has a large concentration of small businesses. Because no frame of reference was available that could be used to identify which firms should be included in the baseline sample, we started with one neighborhood, Restrepo, in the center of the locality of Antonio Nariño, which had not come within the scope of the CCB interventions. In October 2010, a group of research assistants went door-to-door to screen firms, asking their owners or managers some basic questions that helped them to identify informal firms that could be included in the baseline sample. The objective was to pinpoint those firms which had not taken any steps to begin the formalization process. In order to obtain a large sample, the survey area was expanded by adding the areas located in concentric circles surrounding Restrepo, thus maintaining this neighborhood in the center of the circle; we also made sure that the additional survey areas were ones in which the CCB programs had not yet been implemented.

By matching our baseline sample data with the CCB's official records, we were able to obtain exact information on which firms actually formalized after the interventions were conducted. Furthermore, this data also showed which of the firms that did decide to formalize as a result of the intervention remained in the formal sector when the time came for them to renew their business licenses.

<sup>1</sup> This law defines small businesses as firms with fewer than 50 employees and total assets amounting to the equivalent of less than 5000 minimum legal monthly wages (MLMW). One MLMW was equivalent to Col\$ 515,000 in 2011 (US\$ 265 using the exchange rate as of December 31, 2011). All firms included in our sample fit this definition.

We have two important results to report. First, while the workshop treatment had no effect on firms' decisions regarding formalization, the CCB agents' visits raised the likelihood of formal operation by 5.5 percentage points for all the firms that were randomly invited to participate (the intention-to-treat parameter) and by 32 percentage points for those firms that had been invited and then accepted the invitation (the local average treatment effect). Second, and very interestingly, the effect of the treatment did not persist over time. After a year of formal operation, both effects disappeared. What is more, this was not the result of businesses in the control group entering the formal sector in order to "catch up" with the others but instead reflects the decisions of formalized firms not to renew their licenses. This is a very interesting result, since it suggests that some firms that experiment with formality do not find that it is advantageous for them to continue operating as formal-sector enterprises even when they do not have to pay taxes and only have to pay 50% of the license renewal fee.

These results show that a substantial reduction in the fixed costs of operating formally (i.e., the costs of acquiring information about formalization plus the costs of formalizing a firm) does not play a key role in a firm's decision whether or not to formalize, since that reduction had no enduring effect on the decision to operate in the formal sector. A considerable number of the firms in the study chose to become formal when it was cost-free but, later, when they would be called upon to pay a relatively small fee, they decided to return to the informal sector.

There is a large body of literature on the impacts of different types of programs on informality. Bruhn (2011) and Kaplan, Piedra and Seira (2011) use different panel datasets to analyze the effect of a Mexican program implemented in 2002 which reduced the time required to register as a business from 30 to 2 days. Bruhn (2011) uses data from the Mexican National Employment Survey and finds that the program raised the registration rate of eligible firms by 5% but that this increase was a reflection of the creation of new firms rather than the formalization of existing informal enterprises. She also finds that formal employment in eligible industries increased by 2.8%. Kaplan et al. (2011) use data from the Mexican Social Security Institute and also find that the program increased the number of formal firms. They do not find significant effects in terms of the formal employment rate. Monteiro and Assunção (2012) and Fajnzylber, Maloney and Montes-Rojas (2011) analyze a simplification program in Brazil which reduced both the costs of registration and business taxes. The first of these studies relies on a difference-in-differences strategy applied to ineligible firms as a control group for eligible ones. It shows that the program increased formalization by 13 percentage points in the case of retail firms but had no impact on other sectors. Furthermore, these researchers find that the effect is stronger for mid-sized firms. Fajnzylber et al. (2011) rely instead on a regression discontinuity design and find that the program did have an effect on formalization: a 7.5% increase in the number of firms registered as formal legal entities, a 6.3% increase in the registration of micro-enterprises and a 7.2% increase in registration with the tax authorities. In addition, they find that the program had an effect on other outcomes, since the intervention raised the revenues, employment figures and profits of the formalized firms. However, these authors have not been able to disentangle the various components of the program in order to determine which of those components was responsible for the documented effects. McKenzie and Sakho (2010) rely on an instrumental variables (IV) approach, using the distance to the registration office as an instrument for gauging registration costs in Bolivia. They find that firms with from 2 to 5 employees that register as businesses increase their profits, but that the profits of smaller or bigger firms that register as businesses actually decrease. Their results thus show that, in the presence of high formalization costs, while some firms would stand to gain in net terms if they were to register as businesses with the tax authorities, others would lose from doing so. In the latter case,

operating informally would be a rational choice. Finally, Bruhn and McKenzie (2014) summarize the literature on entry regulation and formalization of microenterprises in developing countries. According to these authors, the majority of microenterprises in most developing countries remain informal despite more than a decade of reforms aimed at making it easier and cheaper for them to formalize.

In terms of experimental evidence, there have been a number of attempts to induce firms to operate formally by providing them with information and lowering the costs of registering (see Jaramillo, 2009; Alcázar et al., 2010; de Mel et al., 2008, 2013; De Giorgi and Rahman, 2013; Campos, Goldstein, and McKenzie, 2015; De Andrade et al., 2016).

Mullainathan and Schnabl (2010) analyze the impact of licensing procedures on entrepreneurial activity by studying a reform of the municipal licensing system in Lima, Peru. This reform reduced the cost and time involved in registering for a municipal business license. They evaluate the project using a before and after analysis. Their results show that this had a large positive impact, as the number of newly licensed firms increased from 1758 to 8517. However, they also find that, in the second year after the reform, this number decreased to 3500. Their results thus tally with ours, since these authors also find that many firms did not end up renewing their licenses for a second year.

Among these experimental studies, the closest to ours is the empirical work of De Mel et al. (2008, 2013), which evaluates the influence of different interventions on a firm's decision to formalize. One of the approaches that they tested consisted of giving information to potential entrants about the registration process and about the possibility of obtaining reimbursement for direct registration costs. They find that this intervention had no effect on the decisions made by the informal Sri Lankan firms covered in their study as to whether to operate formally or not. In contrast, other treatments, in which actual payments were made, in addition to the provision of information and the reimbursement of registration costs, had a significant effect on the firms' decisions regarding formalization. Therefore, our study corroborates the findings of De Mel et al. (2013), since it suggests that firms remain informal, not because burdensome entry costs deter them from operating formally, but because they perceive the benefits of formality to be modest at best. In general, we may not presume that an estimated causal relationship is universally true in the sense that it holds under all conditions with all types of people and in any circumstance. In that sense, all causal statements are inevitably contingent. Thus it is undoubtedly useful to learn as much as possible about these contingencies and, where possible, identify the relationships that hold more consistently than others. In relation to the question of external validity, there is the idea of causal generalization, which is concerned with specifying the range of application of a causal mechanism that has been identified with at least one instance of a treatment and outcome and at least one sample of persons and settings. In practice, in one sense, all causal generalization is about interpolation and extrapolation, but, ultimately, the external validity of causal estimates is established by replication in new datasets (Angrist, 2003; Cruces and Galiani, 2007).

The results presented in this paper make a very important contribution to the existing experimental literature on the costs of formalization. The natural experiment which we use is unique in that it not only entails the virtual elimination of formalization costs but also provides firms with the opportunity to experiment with formality at no cost for an entire year while, at the same time, not incurring any tax liabilities for two years. This aspect enabled us to analyze the dynamic and sustainability of the project-induced decision to operate formally once the time came for the firms to renew their licenses (the fee for which, in the first year after registration, was cut by 50% under Act No. 1429). In this sense, this paper is, to the best of our knowledge, the first experimental study to report that firms, after having experimented with operating formally, do not find that it is advantageous for them to

continue operating as formal-sector enterprises.

The rest of this paper is organized as follows. Section 2 describes the process involved in registering as a formal-sector enterprise in Colombia. Section 3 describes the intervention and Section 4, the experimental design. In Section 5, we present our findings. Finally, Section 6 briefly concludes.

## 2. Establishing a formal-sector business in Colombia

There are two types of registration procedures required of any firm that wishes to operate formally in Colombia. The first is registration with the tax authorities of Colombia (*Dirección de Impuestos y Aduanas Nacionales* (DIAN)), which issue a taxpayer identification number. The second involves obtaining a license (*matrícula mercantil*) from the local chamber of commerce in the district where the firm is located.

First of all, a firm must record its name, its legal status (natural person or legal entity) and its industrial classification category as per the International Standard Industrial Classification (ISIC) nomenclature. This process is cost-free and takes just one day. The steps required to obtain the taxpayer identification number depend on the legal status of the firm but, since our sample is made up entirely of small firms whose legal status is that of a natural person, we will focus on the procedure to be followed by that type of business.

The applicant must submit an online form and the business owner's identity number to the corresponding chamber of commerce, which, working in conjunction with the DIAN, then issues a taxpayer identification number and a business license to the applicant. Under the terms of Act No. 1429, this procedure was cost-free during the period 2011–2014 for firms registering for the first time.

Once a business has received its taxpayer identification number, it is registered with the DIAN. However, this does not necessarily mean that it will be liable for business taxes. Small firms, such as those included in our sample, generally have to pay income taxes, but, under Act No. 1429, small firms are exempted from paying income taxes for the first two years after registration regardless of their income level. Additionally, under the legally mandated Simplified Regime, the small firms included in our experiment did not have to pay value added taxes.

A firm's business license is like a person's ID number. It is evidence that the firm exists and is authorized to engage in legal transactions with other firms and with the State. It is illegal to operate as a business without having a license. A business license is necessary in order to obtain contracts from the government, which is a large buyer of both goods and services. It is also necessary in order to have access to a business portfolio in the banking sector.

Every year, firms must renew their business licenses before March 31st by paying a fee to the local chamber of commerce; the amount of that fee depends on the value of their assets. Under Act No. 1429, between 2011 and 2014, firms renewing their licenses for the first time would have to pay just 50% of the usual fee; the second time around, they would have to pay 75% of the fee, and it was only after the third year that they would have to pay the full amount. In 2013, the renewal cost ranged from US\$ 17 for firms whose asset value was less than US\$ 650 to US\$ 844 for firms with assets valued at more than US\$ 284 million.<sup>2</sup> The taxpayer identification card must be renewed only when a firm has changed its line of business or activity, and the renewal is free of charge. However, to operate formally, a firm needs both the taxpayer identification and the license.

Additionally, in order to operate formally, a firm must pay labor taxes. However, here again, under Act No. 1429, for the first two years, firms are exempt from paying these payroll taxes. These provisions created an ideal experimental environment for our study on the effect

<sup>2</sup> The Colombian peso amounts were converted into dollars using the average exchange rate for March 2013.

that the elimination of fixed costs has on firms' decisions to operate formally or not, since, in the short run, firms were exempted from paying taxes.<sup>3</sup> In addition, given the unusual system put in place for the renewal of business licenses, although firms did not have to incur any of the administrative fixed costs of registration if they renewed their licenses, they did need to choose to remain in the formal sector one year after their initial decision to enter that sector.

### 3. Interventions

The CCB designed two programs to promote the formalization of small informal firms in Bogotá. Both interventions had been conducted previously by the CCB in other outlying districts of the city. ECON ESTUDIO partnered with the CCB to design a system for evaluating these types of initiatives based on a randomized control trial for the two interventions, which focused on: (1) giving precise information about the costs and benefits of formalization and the procedure involved in obtaining a business license; and (2) reducing the non-monetary costs of the registration process. In addition, as mentioned earlier, Act No. 1429 reduced the initial registration costs by establishing that the registration process would be free of charge for small firms that were registering for the first time and by exempting such firms from paying taxes for the first two years.

Firms were randomly assigned to the target groups for the two interventions or to a control group. One of the interventions consisted of workshops run by CCB instructors. The CCB invites informal-sector entrepreneurs to these workshops so that it can provide them with information about the advantages and disadvantages of operating formally. It also provides information about the registration process. Workshops of this type had never been offered before in the area of Bogotá where the firms in our sample are located, and the CCB agreed not to hold any additional workshops there until after our study was completed. The workshops that took place during our study were held at the local CCB office in Restrepo, which was close to the firms included in our sample.

The workshops included: (1) a description of what formality in Colombia entails; (2) a discussion of the advantages of operating in the formal sector, including the possibility of doing more and better business with other formal-sector firms, of attending free training courses and of receiving assistance from the CCB to improve the way in which the business was being managed; (3) instructions about how to navigate the registration process; and (4) examples of successful firms that had started out in the informal sector but then moved into the formal sector of the economy.

The workshops lasted two hours and then allowed for additional time to provide more information about the registration process to interested entrepreneurs. The person in charge of providing this information to the entrepreneurs then contacted them by telephone in order to arrange a meeting at the CCB to start off the registration procedure. This follow-up support began at the time that the entrepreneur expressed interest in registration after the workshop and ended when the firm obtained its business license.

A personalized letter, signed by the CCB, inviting the selected entrepreneurs to the workshop was mailed to them, and this was followed up by a telephone call in order to confirm their attendance at the workshop and their contact information. The calls were made in two stages: the first in October and November 2011, and the second in January and February 2012.

The second intervention consisted of personalized visits to interested business owners by CCB agents who gave them the same information that was imparted at the workshop and assisted them

with the registration process if they wished to have that type of support. As is also true of the workshops, this kind of program is a regular activity of the CCB. The firms included in our sample had never received these kinds of visits, however, and an arrangement had been made with the CCB not to make such visits again until the experiment was over. The CCB-trained agents visited entrepreneurs after having phoned them and, if they agreed, setting a date and time for the visit. The CCB does not send agents to visit entrepreneurs unless they agree to meet with a CCB agent during the initial phone call. After the first visit, which is for information purposes only, CCB agents return only to the firms whose owners agree to register.

Throughout the rest of this discussion, all the firms that were assigned to the first or the second treatment will be designated as Intention-to-Treat Group No. 1 or No. 2 (ITT1 and ITT2, respectively). Similarly, all the firms that agreed to participate in the first or second treatment will be designated as T1 or T2, respectively.

### 4. Experimental design

#### 4.1. Experimental sample

EE conducted a randomized control trial to evaluate the impact of the CCB's interventions. The study took place in the south of Bogotá, the capital city of Colombia, which has a large concentration of small businesses. Because no frame of reference was available that could be used to identify which firms should be included in the baseline sample, we started with one neighborhood, Restrepo, in the center of the locality of Antonio Nariño. Restrepo is a low- to middle-income neighborhood in which there are many small businesses and retailers. The most common set-up in this neighborhood is a family business housed in the lower level of a residential unit. We chose this area as the starting point for our research on informal businesses for two reasons, one practical and one associated with our research design. The practical reason was to save time during data collection. Bogotá is a large city (a population of 8 million) with chaotic traffic. The fact that the candidate businesses to be surveyed were located in very close proximity to each other in this neighborhood eased the work of the surveyors, who covered the area block by block.<sup>4</sup> The second reason was that, at the time, the Chamber of Commerce of Bogotá had not yet started a formalization campaign in this neighborhood. In other parts of the city, it had been reaching out to particular businesses in order to motivate them to formalize, but we were able to secure a commitment from the Chamber of Commerce that it would not launch such a campaign in this neighborhood until our research project was over. The directors of the Chamber agreed to leave Restrepo "untouched" for the time being so that they could learn more about the impact of their activities from our research.

In October 2010, a group of research assistants went door-to-door to screen firms by asking entrepreneurs some basic questions that would help them to identify informal-sector businesses that could be included in the baseline sample. The objective was to identify firms that had not taken any steps to initiate the formalization process. In order to obtain a large sample, the number of businesses surveyed was expanded by including areas in concentric circles surrounding Restrepo, while keeping that neighborhood in the center of the circle. More firms than we expected said that they were operating formally: from a sample of 7871, only 2099 admitted that they did not have any type of registration or said that they had not completed the second stage of the formalization procedure (i.e., they did not have a current business license). Our initial baseline sample was thus made up of these 2099 firms. The baseline survey was collected in October 2010.

<sup>3</sup> Under the terms of Act No. 1429, during the first two years, firms are exempted from paying both labor and income taxes. Thereafter, they benefit from a graduated scale of reductions. Firms do not have to pay the total amount of the corresponding taxes until six years after their initial registration.

<sup>4</sup> Given that the information component is a key aspect of our experiment, there was a possibility of spillovers to the control group. However, this does not seem to have been the case, given the low percentage of registration in the control group (2.5%).

However, when we cross-checked our baseline records with the official records of the CCB, we realized that some entrepreneurs who had said that they did not have a current business license actually did have one. These firms were removed from the sample, leaving a total of 1927 informal-sector firms that did not have a business license and had fewer than 10 employees (thus fitting the definition of microenterprises set out in the Microenterprise and Small and Medium-Sized Enterprises Act of Colombia). These businesses are sited in seven localities in south and central Bogotá, and 30% of them are located in the Restrepo neighborhood of Antonio Nariño.

#### 4.2. Business characteristics

The firms included in the baseline sample have the following characteristics: 59.3% of them have only one employee, 25.4% have two employees and just 6.8% have four or more employees. Most of them (71.7%) have been operating for less than 10 years; 63.5% of the firms are retail firms, 14.1% are hotels and restaurants, 12.8% are manufacturing industries and the rest (9.7%) provide other types of services. Most of them are located in shops (71%) or in other fixed locations (20.6%); 7.4% of them are located in the entrepreneur's house and the rest are located in a factory or office. The premises of 65% of the firms are quite small (less than 10 m<sup>2</sup>); 96.7% of the firms do not have branches, 2.4% are a branch of another business and 0.8% are the main branch. In 25.2% of all cases, the entrepreneur owns the property where the business is located.

In all, 96% of the firms have total assets amounting to less than Col \$ 85.5 million at 2011 prices (US\$ 442,000)<sup>5</sup> and 2.5% have assets of more than Col\$ 257.5 million at 2011 prices (US\$ 1,350,000).<sup>6</sup> In terms of sales, 13% report monthly sales amounting to less than the equivalent of one minimum legal monthly wage (MLMW),<sup>7</sup> 29.2% report sales of between one and three MLMW, and 34.4% report sales of between three and nine MLMW. Most firms report profits per month of less than two MLMW (79.7%); 9.7% report monthly profits of between two and three MLMW, and only 10.4% report profits of more than three MLMW. A total of 65.5% do not keep any type of accounting records; 29% have a log book in which they register their operations; and 3% state they that use some other type of accounting system. Only 2.3% say that they keep formal accounting records. A full 76% of the firms do not give any type of receipt to their clients; 7.3% give a receipt; and only 16.7% bill clients after the transaction is completed.

Some of these statistics can be compared with the results from a 2010 nationwide survey of micro-establishments (firms with fewer than 10 employees) conducted by the National Statistics Department (*Departamento Administrativo Nacional de Estadística* (DANE)) of Colombia. Table 1 shows the results, which indicate that the firms in our baseline sample are smaller, in terms of both income and number of employees, than the firms in the DANE sample. This difference is to be expected, since the firms covered in the DANE survey include both informal and formal businesses, while the firms in our baseline sample are all informal-sector businesses and, as attested to by the economic literature, informal businesses tend to be smaller than formal enterprises (La Porta and Shleifer, 2008). The distribution of the types of economic activities is similar, although services are under-represented in our sample relative to the DANE sample. This may be attributable to the fact that we restricted our sample to firms in Bogotá, whereas the DANE survey covered the entire country.

<sup>5</sup> This was equivalent to 166.7 minimum legal monthly wages (MLMW) at 2011 prices converted to dollars using the exchange rate as of December 31, 2011.

<sup>6</sup> This amount was equivalent to 500 minimum legal monthly wages (MLMW) at 2011 prices converted to dollars using the exchange rate as of December 31, 2011.

<sup>7</sup> A minimum legal monthly wage was equivalent to Col\$ 515,000 in 2011 (US\$ 265 using the exchange rate for December 31, 2011).

#### 4.3. Self-reported reasons for operating informally

Firm owners were asked what they knew about the registration process and what they believed to be the costs and benefits of obtaining a taxpayer identification number and business license. A total of 48% of the owners said that they knew about business licenses, and 54.4% said that they knew about taxpayer identification numbers. Those who admitted knowing about taxpayer identification numbers and business licenses were then asked why they did not have them. Regarding the identification numbers, 32.8% said that they were “useless”; 27% said that they “could not afford one because their business is too small or young”; and, 17.2% felt that they “do not have enough time to obtain one”. As for business licenses, 21% responded that they were “useless” and another 21% said that “it would mean that you would have to pay taxes”; 18% felt that they “could not afford one because my business is too small or young”; another 11.5% answered that they already had one (which was false, according to the data obtained from the CCB).

With respect to the potential benefits of operating formally, the most frequent answers were “avoiding penalties” (41.6%), “improving the image of the firm” (33.5%), “having greater growth opportunities” (23.5%), “having more marketing opportunities” (20.1%), “having access to financial markets” (19%) and “gaining access to inputs” (15%). Only 10% of the entrepreneurs answered that operating formally does not have any benefits.

#### 4.4. Experimental group balance

The sample of 1927 firms was randomly divided into three groups. The first one, with 362 firms (19% of the sample), was the control group and did not receive any treatment. The second group, made up of 1017 firms (53% of the total), was designated Group ITT1. The third group, composed of 548 firms (28% of the total), was designated Group ITT2.

Table 2 shows the balance between each treatment group and the control group. For almost all the variables, we do not reject the null hypothesis of no mean differences among groups. There are only two exceptions, where just two variables are unbalanced (out of 59) at the 10% significance level. This provides evidence that the control group and Group ITT1, on the one hand, and the control group and Group ITT2, on the other hand, were statistically equivalent before the treatment.

### 5. Empirical results

#### 5.1. Take-up

Not every firm assigned to a treatment group accepted the invitation to join it.<sup>8</sup> Possible reasons for this include the following: some firms may have closed down or moved between the time that the baseline survey was conducted and the time that the invitations were issued; they may have changed their telephone number; there may have been an error in the number recorded during the survey; or they may have never received the letter of invitation that was sent because there was a change in the numbering system for street addresses in Bogotá during the first half of 2011.

Of the 1017 firms assigned to Group ITT1, 119 did not receive the invitation and 762 received the invitation but did not accept the treatment. Therefore, from that group, only 136 firms actually received Treatment One (T1). Similarly, of the 548 firms assigned to Group ITT2, 281 could not be contacted in order to arrange a meeting with a CCB agent and 172 were contacted but did not agree to a meeting. Thus, only 95 firms actually received Treatment Two (T2).

Table 3 presents the relationship between assignment to treatment

<sup>8</sup> On the other hand, there was perfect compliance in the control group.

**Table 1**  
Comparison between firms surveyed by dane and firms in the study sample.

Sector of economic activity	% of businesses		Average number of workers		Income (in thousands)		Any type of accounting	
	DANE	Sample	DANE	Sample	DANE	Sample	DANE	Sample
<b>Trade</b>	57.7	63.5	1.8	1.5	4.580	3.459	40.8	69.1
<b>Services</b>	32.8	23.7	2.3	1.8	4.090	3.101	34.8	57.1
<b>Industry</b>	9.5	12.8	2.5	1.6	4.140	4.025	47.9	63.4
<b>Total</b>	100	100	2.0	1.7	4.380	3.444	39.4	65.5

and actual take-up, which can be described as:

$$Firmtake - up_i = \alpha + \gamma ITT(k)_i + \beta X_i + \epsilon_i \tag{1}$$

where the dependent variable is a dummy that takes the value of 1 if firm *i* takes up the treatment that it has been assigned to; *ITT(k)<sub>i</sub>* is a dummy that takes the value of 1 if firm *i* belongs to Group ITT1 or Group ITT2 (see columns 1, 2 and 3 in Table 4) or either of them (columns 4, 5 and 6 in Table 4); and *X<sub>i</sub>* is a set of control variables measured at baseline. Some specifications include as regressors the age of the business and an interaction between the age of the business and the corresponding intention-to-treat variable. All the specifications are presented with and without variables that control for the characteristics of the firm (locality, area and business sector, number of employees and average education level of the staff).

The likelihood of receiving the treatment can be gauged on the basis of a firm's assignment to either treatment (ITT) or to Treatment One (ITT1) or Treatment Two (ITT2). Specifically, being assigned to either treatment raises the likelihood of take-up by 14 percentage points. Being assigned to Treatment One increases the likelihood of take-up by 15 percentage points, while being assigned to Treatment Two increases the likelihood of take-up by 16 percentage points. Thus, the effects of assignment to Group ITT1 and Group ITT2 on the likelihood of take-up are quite similar.

In regard to the age of the business, columns 3 and 6 show that older firms are more likely to take up treatment, while the interaction between a firm's age and the intention-to-treat dummy is significant only for Group ITT1.<sup>9</sup>

In addition, Table 4 shows the mean difference between firms that took up Treatment One or Treatment Two and firms that did not take up any treatment. As is shown, firms that took up the treatments differ in some respects from the ones that did not. Those differences are related to their age, their visibility, their staff, the payroll taxes that they pay, the sector of activity and other factors.

### 5.2. Intention-to-treat effects

The next step was to analyze the official records of the CCB to determine which of the firms in our sample became formal after the treatments. We found that some of the firms in each group did so: 9 firms from the control group started to operate formally; of the firms in Group ITT1, 17 firms that were never contacted or that rejected the treatment and 12 firms that received the treatment started to operate formally; and, finally, of the firms in Group ITT2, 17 firms that were never contacted or rejected the treatment and 27 firms that received the treatment formalized.

Table 5 shows the impact of being assigned to treatment on the decision regarding formalization, which can be described as follows:

$$Firmisformalinyear_t = \alpha + \gamma ITT(k)_i + \beta X_i + \epsilon_i \tag{2}$$

Columns 1 to 6 present the results of the model in which the

<sup>9</sup>Other specifications, including nonlinear terms for the firms' age, have been considered, but the additional terms were not statistically significant.

dependent variable is a dummy that takes a value of 1 if a firm operates formally in 2012; columns 7 to 12 provide the same information in the event that a firm operates formally in 2013. Both dependent variables were obtained from the CCB records. As in Table 4, the independent variables are assignment to any treatment (ITT), on the one hand (columns 1, 2, 3, 7, 8 and 9), and assignment to Treatment One (ITT1) or Treatment Two (ITT2), on the other hand (columns 4, 5, 6, 10, 11 and 12). Again, some specifications include independent variables for the age of the business and an interaction between the age of the business and the intention-to-treat variable. All specifications are presented with and without a set of variables that control for the characteristics of the firms.

Being assigned to any treatment raises the likelihood of formalization in 2012 by 2.1 or 2.9 percentage points, depending on the specification. However, when we evaluate the impact of each treatment separately, we find that assignment to Treatment One has no effect on the likelihood of formalization. On the other hand, assignment to Treatment Two has an effect of 5.5 or 6 percentage points for the year 2012, depending on the specification. Yet, one year later, in 2013, neither of the treatments had any effect on the decision to formalize.

All the specifications provide evidence that the age of the business is not significant in terms of the decision to formalize or not, regardless of which intention-to-treat group the firm was in.

Although some firms from every group have formalized, more of the firms from Group ITT2 formalized after the treatment. However, in order to ascertain whether the firms from that group formalized because of the treatment, it is important to determine whether the formal firms from that group actually received Treatment Two. Table 6 shows that more firms from Group T2 formalized after the treatment and, specifically, that 4.9% of the firms that were assigned to Group ITT2 formalized after the treatment. This percentage is higher than the percentage of firms from other groups that formalized (2.9% for Group ITT1; 1.1% for Group T1; 2.5% for the control group).

### 5.3. The effects of receiving treatment

Table 7 shows the impact that receiving any of the treatments has on the decision to operate formally or not. We rely on an instrumental variables (IV) identification strategy in which we instrument the treatment variable with the assignment to treatment (ITT). This IV strategy provides evidence about the causal relationship between the treatment and the formalization decision.<sup>10</sup> Specifically, we estimate the following system:

$$T(k)_i = \alpha + \delta ITT(k)_i + \theta X_i + \nu_i \tag{3}$$

<sup>10</sup>The outcome variable is a limited dependent variable (LDV). The problem of causal inference with LDVs is not fundamentally different from the problem of causal inference with continuous outcomes. If there are no covariates or the covariates are sparse and discrete, linear models (and associated estimation techniques like 2SLS) are no less appropriate for LDVs than for other types of dependent variables. This is certainly the case in an RCT where controls are only included to improve efficiency, but their omission would not bias the estimates of the parameters of interest.

**Table 2**  
Mean comparison between firms assigned to treatment one and treatment two and firms assigned to the control group.

Variable	Number of firms assigned to Treatment One	Number of firms assigned to Treatment Two	Number of firms assigned to control group	Average for firms assigned to Treatment One	Average for firms assigned to Treatment Two	Average for firms assigned to control group	Difference (Treatment One)	P-value (Treatment One)	Difference	P-value
Age of the business (in years)	1003	538	355	8.89	8.61	9.17	0.28	0.68	0.56	0.46
Visibility	1017	548	362	91.90	90.70	90.30	-1.60	0.35	-0.40	0.86
Staff (last month)	1017	548	362	1.09	1.09	1.10	0.01	0.67	0.01	0.84
Unpaid workers	1017	548	362	0.04	0.03	0.06	0.01	0.45	0.03	0.11
Employees	1017	548	362	0.56	0.62	0.55	-0.01	0.87	-0.07	0.36
Total staff	1017	548	362	1.69	1.74	1.71	0.01	0.87	-0.04	0.66
Pays payroll taxes	983	524	349	1.70	2.10	2.30	0.60	0.51	0.20	0.85
funds	971	513	346	0.90	0.80	1.40	0.50	0.42	0.60	0.35
ICBF	988	527	349	4.60	5.70	5.20	0.60	0.65	-0.50	0.73
Pensions	985	527	349	3.10	4.20	3.40	0.30	0.79	-0.80	0.58
ARFs	989	528	349	16.40	18.60	17.80	1.40	0.55	-0.80	0.77
Health	971	512	346	1.00	0.80	1.40	0.40	0.53	0.60	0.35
SENA	1017	548	362	22.90	20.80	19.90	-3.00	0.24	-0.90	0.74
Requested a loan in the last year	1017	548	362	45.90	50.20	50.30	4.40	0.15	0.10	0.98
Knows what the <i>matricula mercantil</i> business license is	751	402	269	56.10	52.00	53.50	-2.60	0.48	1.50	0.70
Knows what the taxpayer ID number (RUT) is	900	495	316	44.20	43.16	41.54	-2.66	0.31	-1.61	0.57
Probability that the firm agrees to obtain a business license	721	382	264	51.91	50.66	52.65	0.74	0.80	1.99	0.54
Probability that the firm agrees to obtain a tax ID number	1017	548	362	7562.05	7.128	6955.28	-606.77	0.48	-172.46	0.86
Total expenditure in the six-month period (USD)	1017	548	362	41.60	40.90	39.50	-2.10	0.49	-1.40	0.68
Firms surveyed in the follow-up exercise	1017	548	362	0.64	0.64	0.67	0.03	0.38	0.02	0.47
Area of the premises	1017	548	362	0.31	0.29	0.27	-0.03	0.22	-0.02	0.45
Less than 10 m <sup>2</sup>	1017	548	362	0.04	0.05	0.06	0.02	0.19	0.01	0.40
Between 10 and 50 m <sup>2</sup>	1017	548	362	0.01	0.01	0.00	-0.01	0.11	-0.01	0.10
Between 51 and 100 m <sup>2</sup>	1017	548	362	0.03	0.05	0.04	0.01	0.25	-0.01	0.83
More than 100 m <sup>2</sup>	1017	548	362	0.04	0.06	0.05	0.01	0.39	-0.01	0.18
Sector of activity	1017	548	362	0.13	0.13	0.13	0.00	0.85	0.00	0.99
Manufacturing	1017	548	362	0.64	0.61	0.66	0.02	0.60	0.05	0.13
Commerce	1017	548	362	0.15	0.14	0.11	-0.04	0.10	-0.03	0.18
Hotels and restaurants	1017	548	362	0.02	0.01	0.01	-0.01	0.30	0.00	0.69
Real estate services	1017	548	362	0.03	0.05	0.04	0.01	0.25	-0.01	0.83
Transportation and communications	1017	548	362	0.04	0.06	0.05	0.01	0.39	-0.01	0.18
Other services	1017	548	362	0.20	0.18	0.20	0.00	0.95	0.02	0.56
Socioeconomic stratum of the business	1017	548	362	0.80	0.81	0.80	0.00	0.98	-0.01	0.81
Strata 1 and 2	1017	548	362	0.96	0.97	0.98	0.02	0.08	0.01	0.28
Strata 3 and 4	1017	548	362	0.03	0.02	0.02	-0.01	0.19	0.00	0.70
Branches	1017	548	362	0.01	0.01	0.00	-0.01	0.24	-0.01	0.17
Businesses without branches	1017	548	362	0.03	0.02	0.02	-0.01	0.19	0.00	0.70
One of the branches of the business	1017	548	362	0.01	0.01	0.00	-0.01	0.24	-0.01	0.17
The main branch of the business	1017	548	362	0.96	0.96	0.96	0.00	0.89	0.00	0.81
Asset value	1017	548	362	0.00	0.01	0.01	0.00	0.48	0.00	0.54
Less than US\$ 47,739	1017	548	362	0.00	0.01	0.01	0.00	0.48	0.00	0.54
Between US\$ 47,739 and US\$ 71,607	1017	548	362	0.00	0.01	0.01	0.00	0.48	0.00	0.54

(continued on next page)

Table 2 (continued)

Variable	Number of firms assigned to Treatment One	Number of firms assigned to Treatment Two	Number of firms assigned to control group	Average for firms assigned to Treatment One	Average for firms assigned to Treatment Two	Average for firms assigned to control group	Difference (Treatment One)	P-value (Treatment One)	Difference	P-value
Profits (monthly average in last six months)	More than US\$ 71,607	1017	362	0.03	0.03	0.03	-0.01	0.72	0.00	0.98
	Less than US\$ 142	1017	362	0.22	0.24	0.22	0.00	0.97	-0.02	0.45
	Between US\$ 142 and US\$ 286	1017	362	0.27	0.27	0.29	0.02	0.50	0.02	0.53
	Between US\$ 286 and US\$ 572	1017	362	0.27	0.24	0.26	-0.01	0.80	0.02	0.56
	Between US\$ 572 and US\$ 859	1017	362	0.09	0.09	0.09	0.00	0.98	0.00	0.89
Income from sales (monthly average in last six months)	More than US\$ 859	1017	362	0.11	0.10	0.09	-0.02	0.27	-0.01	0.64
	Less than US\$ 286	1017	362	0.13	0.14	0.13	0.00	0.95	-0.01	0.62
	Between US\$ 286 and US\$ 859	1017	362	0.37	0.36	0.38	0.02	0.58	0.03	0.39
	Between US\$ 856 and US\$ 2577	1017	362	0.34	0.35	0.35	0.01	0.84	0.00	0.92
	Between \$2577 and \$7733 USD	1017	362	0.13	0.12	0.11	-0.02	0.44	-0.01	0.68
Investment (in last six months)	More than US\$ 7733	1017	362	0.04	0.04	0.03	-0.01	0.48	-0.01	0.38
	Less than US\$ 286	1017	362	0.12	0.13	0.11	-0.01	0.60	-0.02	0.37
	Between US\$ 286 and US\$ 859	1017	362	0.15	0.16	0.17	0.02	0.53	0.01	0.64
	Between US\$ 856 and US\$ 2577	1017	362	0.13	0.14	0.11	-0.02	0.36	-0.03	0.13
	Between US\$ 2577 and US\$ 7733	1017	362	0.07	0.07	0.07	0.01	0.65	0.00	0.95
Staff's level of education (as of the last month)	More than US\$ 7733	1017	362	0.03	0.02	0.03	0.00	0.98	0.00	0.91
	Staff with primary education	1017	362	0.52	0.55	0.49	-0.02	0.62	-0.06	0.29
	Staff with secondary education	1017	362	0.95	0.95	1.00	0.05	0.47	0.05	0.51
	Staff with technical education	1017	362	0.14	0.17	0.14	0.00	0.95	-0.03	0.40
	Staff with undergraduate university education	1017	362	0.07	0.04	0.04	-0.02	0.15	0.00	0.89
Staff with graduate university education	Staff with graduate university education	1017	362	0.00	0.01	0.01	0.00	0.78	0.00	0.85
	Staff with other level of education	1017	362	0.02	0.03	0.03	0.01	0.43	0.00	0.86

Note: ICBF: Instituto Colombiano de Bienestar Familiar (Colombia Family Welfare Institute); ARP: Administradora de Riesgos Profesionales (Occupational Risk Administrator) (this is a generic term; there are a number of different occupational insurance providers, which are collectively known as ARPs); SENA: Servicio Nacional de Aprendizaje (National Learning System).



**Table 3**  
Relationship between assignment to treatment and actual take-up.

Dependent variable: Dummy = 1 if treated	(1)	(2)	(3)	(4)	(5)	(6)
ITT	0.148*** (0.00897)	0.146*** (0.00950)	0.157*** (0.0122)			
ITT 1				0.130*** (0.0111)	0.156*** (0.0141)	0.155*** (0.0147)
ITT 2				0.177*** (0.0166)	0.162*** (0.0205)	0.161*** (0.0204)
Age of the business		-0.000267 (0.000645)	0.000698** (0.000335)	-0.000246 (0.000641)		0.000727** (0.000339)
ITT*Age of the business			-0.00122 (0.000782)			
ITT 1*Age of the business					-0.00280*** (0.000759)	-0.00286*** (0.000816)
ITT 2*Age of the business					0.00172 (0.00158)	0.00193 (0.00156)
Constant	0.0000 (0.0000)	-0.0379 (0.0388)	-0.0468 (0.0383)	-0.0403 (0.0387)	0.0000 (0.0000)	-0.0533 (0.0384)
Observations	1927	1881	1881	1881	1896	1881
R-squared	0.032	0.057	0.057	0.061	0.040	0.066
F statistic	270.72	13.91	13.22	13.27	66.75	12.10
Locality dummies		x	x	x		x
Area of the business dummies		x	x	x		x
Sector dummies		x	x	x		x
Number of staff		x	x	x		x
Average education of staff		x	x	x		x

Robust standard errors in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.1.

$$Firmisformality_{i,t} = \alpha + \gamma T(k)_i + \beta X_i + \varepsilon_i \quad (4)$$

where regressions (3) and (4) are the first and second stages of the 2SLS estimator of the local average treatment effect. As in Table 5, we present different specifications for the different dependent variables (2012 or 2013).

The results indicate that receiving any treatment (TT) raises the likelihood of formalization during the next year by 14 or 20 percentage points, depending on the specification. However, this effect is derived entirely from the second treatment. If we evaluate each treatment separately, we find that the workshop (Treatment One) had no effect on the formalization decision. In contrast, receiving visits from CCB agents (Treatment Two) raised the likelihood of formalization by 30, 32 or 37 percentage points, depending on the specification. Once again, there was no effect exerted by either of the treatments in the following year (2013) and, for all the specifications, the age of the business was not significant in terms of the likelihood of formalization.

These tables yield two important results. First, the workshops were ineffective in raising the likelihood of formalization. In contrast, the CCB agents' visits increased the likelihood of formalization. There are several possible explanations for this differential result. One possibility is that Treatment Two is more effective than the workshops. Alternatively, it could be that the firms that decided to take up Treatment Two are different from the ones that received Treatment One. Also, obviously, the real reason could be a combination of these two possibilities. However, we do not have sufficient experimental variability to determine which of these options is an accurate explana-

tion of why Treatment Two increased the likelihood of formalization while Treatment One did not. Table 8 shows the results of a comparison of the groups that self-select into receiving Treatment One and Treatment Two that may be useful in determining whether there were any significant differences between the groups before treatment.

As Table 8 shows, firms that received Treatment Two have been in business for a longer period of time, have higher asset values, profits and investments, and belong to higher socioeconomic strata.<sup>11</sup> Thus, firms with these characteristics seem to have been more predisposed to take up Treatment Two. This result could explain why Treatment Two had an effect on firms' formalization decisions while Treatment One did not. However, we cannot rule out the possibility that differences in the treatments themselves are what made one treatment more effective than the other.

Another important result is that Treatment Two influenced the decision regarding formalization only in the first year after treatment; the following year, when newly formalized firms had to renew their licenses, the treatment had no effect on the formalization outcome variable. In other words, firms that were persuaded to formalize after the treatment were operating informally again in 2013. This result

<sup>11</sup> In Colombia, socioeconomic strata correspond to area classifications on a scale from 1 to 6 (where 1 represents the lowest-income area and 6 the highest). Based on this classification, the lower strata (1 and 2) receive subsidies for public services, while the higher strata (5 and 6) have to pay taxes to fund those subsidies.

**Table 4**  
Mean comparison between firms that take up any treatment and firms that do not.

Variable	Firms that take up treatment (1 or 2)		Firms that do not take up treatment (1 or 2)		Means difference	P Value	
	Number of firms	Mean	Number of firms	Mean			
Age of the business (in years)	1334	0.66	231	0.528	0.132	0***	
Visibility	1334	0.288	231	0.377	-0.089	0.007***	
Staff (last month)							
	Owners	1334	0.037	231	0.078	-0.041	0.004***
	Unpaid workers	1334	0.007	231	0.009	-0.002	0.748
	Employees	1334	0.461	231	0.55	-0.089	0.013**
	Total staff	991	0.531	162	0.642	-0.111	0.008***
Pays payroll taxes							
	Family social service funds	1334	0.379	231	0.61	-0.231	0***
	ICBF	1315	8.964	226	7.776	1.188	0.127
	Pensions	1334	0.006	231	0	0.006	0.514
	ARPs	1334	0.022	231	0.022	0	0.994
	Health	1334	0.542	231	0.455	0.087	0.131
	SENA	1334	0.909	231	1.156	-0.247	0.002***
Requested a loan in the last year		1334	0.143	231	0.203	-0.06	0.087*
Knows what the <i>matricula mercantil</i> business license is		1334	0.054	231	0.082	-0.028	0.116
Knows what the taxpayer ID number (RUT) is		1334	0.196	231	0.156	0.04	0.154
Probability that the firm agrees to obtain a business license		1334	0.8	231	0.84	-0.04	0.156
Probability that the firm agrees to obtain a tax ID number		1334	7355.062	231	7727.07	-372.008	0.703
Total expenditure in the six-month period (USD)		1281	0.017	226	0.027	-0.01	0.336
Firms surveyed in the follow-up exercise		1260	0.008	224	0.013	-0.005	0.42
Area of the premises							
	Less than 10 m <sup>2</sup>	1288	0.048	227	0.057	-0.009	0.559
	Between 10 and 50 m <sup>2</sup>	1285	0.034	227	0.04	-0.006	0.683
	Between 51 and 100 m <sup>2</sup>	1290	0.162	227	0.225	-0.063	0.021**
	More than 100 m <sup>2</sup>	1259	0.009	224	0.013	-0.004	0.507
Sector of activity							
	Manufacturing	1334	1.078	231	1.156	-0.078	0.014**
	Commerce	1334	0.029	231	0.091	-0.062	0***
	Hotels and restaurants	1334	0.568	231	0.671	-0.103	0.226
	Real estate services	1334	1.675	231	1.918	-0.243	0.005***
	Transportation and communications	1334	0.203	231	0.329	-0.126	0***
	Other services	1186	42.734	209	50.048	-7.314	0.015**
Socioeconomic stratum of the business							
	Strata 1 and 2	946	50.195	157	59.204	-9.009	0.009***
	Strata 3 and 4	1334	0.96	231	0.957	0.003	0.842
Branches							
	Businesses without branches	1334	0.005	231	0.004	0.001	0.857
	One of the branches of the business	1334	0.031	231	0.022	0.009	0.419
	The main branch of the business	1334	0.229	231	0.19	0.039	0.19
Asset value							
	Less than US\$ 47,739	1334	0.274	231	0.273	0.001	0.959
	Between US\$ 47,739 and US\$ 71,607	1334	0.256	231	0.273	-0.017	0.584
	More than US\$ 71,607	1334	0.09	231	0.108	-0.018	0.377
Profits (monthly average in last six months)							
	Less than US\$ 142	1334	0.098	231	0.126	-0.028	0.206
	Between US\$ 142 and US\$ 286	1334	0.139	231	0.082	0.057	0.019**
	Between US\$ 286 and US\$ 572	1334	0.37	231	0.325	0.045	0.183
	Between US\$ 572 and US\$ 859	1334	0.325	231	0.45	-0.125	0***
	More than US\$ 859	1334	0.127	231	0.121	0.006	0.793
Income from sales (monthly average in last six months)							
	Less than US\$ 286	1334	0.039	231	0.022	0.017	0.194
	Between US\$ 286 and US\$ 859	1334	0.125	231	0.139	-0.014	0.574
	Between US\$ 856 and US\$ 2577	1334	0.157	231	0.147	0.01	0.713
	Between \$2577 and \$7733 USD	1334	0.124	231	0.177	-0.053	0.026**
	More than US\$ 7733	1334	0.07	231	0.052	0.018	0.301
Investment (in last six months)							
	Less than US\$ 286	1334	0.025	231	0.022	0.003	0.778
	Between US\$ 286 and US\$ 859	1334	0.12	231	0.169	-0.049	0.039**
	Between US\$ 856 and US\$ 2577	1334	0.65	231	0.515	0.135	0***
	Between US\$ 2577 and US\$ 7733	1334	0.138	231	0.199	-0.061	0.015**
	More than US\$ 7733	1334	0.011	231	0.03	-0.019	0.023**
Staff's level of education (as of the last month)							
	Staff with primary education	1334	0.04	231	0.039	0.001	0.956
	Staff with secondary education	1334	0.041	231	0.048	-0.007	0.656
	Staff with technical education	1334	0.966	231	0.957	0.009	0.506

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Table 4 (continued)

Variable	Firms that take up treatment (1 or 2)		Firms that do not take up treatment (1 or 2)		Means difference	P Value
	Number of firms	Mean	Number of firms	Mean		
Staff with undergraduate university education	1334	0.025	231	0.035	-0.01	0.385
Staff with university graduate education	1334	0.01	231	0.009	0.001	0.876
Staff with other level of education	1334	0.918	231	0.9	0.018	0.39

Note: ICBF: Instituto Colombiano de Bienestar Familiar (Colombia Family Welfare Institute); ARP: Administradora de Riesgos Profesionales (Occupational Risk Administrator) (this is a generic term; there are a number of different occupational insurance providers, which are collectively known as ARPs); SENA: Servicio Nacional de Aprendizaje (National Learning System).

\* Significance at the 0.10 level.

\*\* Significance at the 0.05 level.

\*\*\* Significance at the 0.01 level.

Table 5

The impact of assignment to treatment on formalization decisions.

Dependent variable: Dummy=1 if firm is formal	2012						2013					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ITT	0.0218** (0.00977)	0.0210** (0.0103)	0.0298** (0.0128)				0.00573 (0.00661)	0.00384 (0.00669)	0.0101 (0.00878)			
ITT 1				0.00365 (0.00971)	0.00343 (0.0103)	0.0130 (0.0127)				0.00277 (0.00684)	0.00207 (0.00702)	0.0116 (0.00936)
ITT 2				0.0554*** (0.0142)	0.0537*** (0.0145)	0.0603*** (0.0179)				0.0113 (0.00864)	0.00713 (0.00834)	0.00750 (0.0104)
Age of the business		-0.000199 (0.000381)	0.000560 (0.000887)		-0.000176 (0.000376)	0.000567 (0.000887)		0.000073 (0.000273)	0.000627 (0.000793)		0.000074 (0.000273)	0.000633 (0.000794)
ITT Age of the business			-0.000958 (0.000948)						-0.000700 (0.000828)			
ITT 1 Age of the business						-0.00105 (0.000927)						-0.00106 (0.000817)
ITT 2 Age of the business						-0.000712 (0.00125)						-0.000014 (0.000991)
Constant	0.0249*** (0.00819)	0.00288 (0.0274)	-0.00415 (0.0280)	0.0249*** (0.00819)	0.000224 (0.0271)	-0.00694 (0.0280)	0.0115** (0.00570)	0.00904 (0.0149)	0.00388 (0.0154)	0.0115** (0.00570)	0.00873 (0.0148)	0.00264 (0.0153)
Observations	1927	1881	1881	1927	1881	1881	1861	1817	1817	1861	1817	1817
R-squared	0.002	0.017	0.017	0.014	0.028	0.029	0.000	0.007	0.008	0.001	0.007	0.009
F statistic	4.97	2.79	2.64	9.11	2.54	2.36	0.75	1.43	1.34	0.92	1.35	1.21
Locality dummies		x	x		x	x		X	x		x	x
Area of the business dummies		x	x		x	x		X	x		x	x
Sector dummies		x	x		x	x		X	x		x	x
Number of workers		x	x		x	x		X	x		x	x
Average education of workers		x	x		x	x		X	x		x	x

Robust standard errors in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.1.

**Table 6**  
Percentage of formal firms, by group.

Group	Formal firms	Total
ITT1	29 (2.9%)	1017
T1	12 (1.1%)	
ITT2	44 (8%)	548
T2	27 (4.9%)	
CONTROL	9 (2.5%)	362

**Table 7**  
The impact of receiving treatment on formalization decisions.

Dependent variable: Dummy=1 if firm is formal	2012						2013					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.148** (0.0656)	0.144** (0.0696)	0.201** (0.0890)				0.0384 (0.0442)	0.0261 (0.0454)	0.0735 (0.0639)			
Treatment 1				0.0273 (0.0725)	0.0267 (0.0789)	0.119 (0.101)				0.0206 (0.0509)	0.0160 (0.0542)	0.112 (0.0841)
Treatment 2				0.320*** (0.0790)	0.302*** (0.0788)	0.373*** (0.107)				0.0633 (0.0485)	0.0393 (0.0460)	0.0447 (0.0625)
Age of the business		-0.000160 (0.000369)	0.000477 (0.000907)		-0.000444 (0.000369)	0.000424 (0.000906)		0.000079 (0.000269)	0.000622 (0.000821)		0.000054 (0.000254)	0.000617 (0.000818)
Treatment * Age of the business			-0.00704 (0.00858)						-0.00592 (0.00754)			
Treatment 1 * Age of the business						-0.0140 (0.0144)						-0.0151 (0.0135)
Treatment 2 * Age of the business						-0.00696 (0.00655)						-0.000419 (0.00502)
Constant	0.0249*** (0.00819)	0.00832 (0.0256)	0.00157 (0.0264)	0.0249*** (0.00819)	0.0122 (0.0248)	0.00272 (0.0260)	0.0115** (0.00570)	0.01000 (0.0148)	0.00347 (0.0164)	0.0115** (0.00570)	0.0103 (0.0150)	0.00143 (0.0171)
Observations	1927	1881	1881	1927	1881	1881	1861	1817	1817	1861	1817	1817
R-squared	0.053	0.064	0.054	0.074	0.085	0.070	0.007	0.011		0.006	0.011	
F statistic	5.06	1.58	1.54	10.06	2.26	2.08	0.75	1.28	0.88	0.92	1.22	0.95
Locality dummies		x	x		x	x		X	x		x	x
Area of the business dummies		x	x		x	x		X	x		x	x
Sector dummies		x	x		x	x		X	x		x	x
Number of workers		x	x		x	x		X	x		x	x
Average education of workers		x	x		x	x		X	x		x	x

Robust standard errors in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.1.

indicates that the types of treatments studied in this paper do not have a sustained effect. It is important to note that this result was not generated by decisions on the part of control-group firms to formalize a year after the treatment, thereby “catching up” with the outcome for the treatment group, but rather by the decision of formalized firms not to renew their legal certification (see Fig. 1).<sup>12</sup>

This result provides evidence that, at least in Colombia, the fixed costs of formalization are not what prevents firms from operating in the

formal sector of the economy. Even when firms are already operating formally, they sometimes decide to return to the informal sector. Thus, this choice must be based on other types of margins. This result backs up the results of De Mel et al. (2008, 2013), which indicate that firms remain informal, not because of burdensome entry regulations that deter them from operating formally, but rather because they perceive the benefits of operating formally as being quite modest at best. It is important to recall that, for those firms that registered for the first time after the experimental Act No. 1429 had exempted them from paying

taxes during the first two years and from paying the full fee for renewing their business licenses, the costs of remaining formal during 2013 were extremely low. This, in turn, suggests that firms perceive the benefits of formality as being so modest that, even when the costs of continuing to operate formally have been greatly reduced, they nonetheless prefer to return to the informal sector.

## 6. Conclusions

In most developing countries, policymakers are concerned about the extent of informal economic activity and its consequences. Although there are several factors that could affect the size of the informal sector in equilibrium (Galiani and Weinschelbaum, 2012),

<sup>12</sup> Note that, as providing information was one of the goals of the experiment, firms knew that they needed to renew their licenses. Their decision to operate informally again was therefore not based on a lack of information.

**Table 8**  
Mean comparison between firms that received treatment one and firms that received treatment two.

Variable		Number of firms that received Treatment One	Number of firms that received Treatment Two	Average for firms that received Treatment One	Average for firms that received Treatment Two	P-value
Age of the business (in years)		131	95	6,37	9,72	0,01
Visibility		136	95	89,00	91,60	0,52
Staff (last month)	Owners	136	95	1,15	1,17	0,74
	Unpaid workers	136	95	0,12	0,05	0,23
	Employees	136	95	0,59	0,79	0,20
	Total staff	136	95	1,85	2,01	0,34
Pays payroll taxes	Family social service funds	136	90	2,90	2,20	0,74
	ICBF	134	90	1,50	1,10	0,81
	Pensions	136	91	3,70	8,80	0,11
	ARPs	136	91	2,90	5,50	0,34
	Health	136	91	18,90	28,60	0,07
	SENA	134	90	1,50	1,10	0,81
Requested a loan in the last year		136	95	37,50	26,30	0,08
Knows what the <i>matricula mercantil</i> business license is		136	95	52,90	57,90	0,46
Knows what the taxpayer ID number (RUT) is		96	66	63,50	65,20	0,84
Probability that the firm agrees to obtain a business license		122	87	49,71	50,53	0,89
Probability that the firm agrees to obtain a tax ID number		94	63	55,73	64,38	0,19
Total expenditure in the six-month period (USD)		136	95	7113,55	8605,38	0,32
Firms surveyed in the follow-up exercise		136	95	58,80	64,20	0,41
Area of the premises	Less than 10 m <sup>2</sup>	136	95	0,54	0,52	0,76
	Between 10 and 50 m <sup>2</sup>	136	95	0,38	0,38	0,95
	Between 51 and 100 m <sup>2</sup>	136	95	0,07	0,08	0,77
	More than 100 m <sup>2</sup>	136	95	0,01	0,01	0,80
Sector of activity	Manufacturing	136	95	0,15	0,19	0,49
	Commerce	136	95	0,56	0,45	0,11
	Hotels and restaurants	136	95	0,15	0,26	0,04
	Real estate services	136	95	0,04	0,01	0,14
	Transportation and communications	136	95	0,05	0,04	0,74
	Other services	136	95	0,04	0,04	0,84
Socioeconomic stratum of the business	Strata 1 and 2	136	95	0,21	0,08	0,01
	Strata 3 and 4	136	95	0,79	0,91	0,02
Branches	Businesses without branches	136	95	0,94	0,98	0,17
	One of the branches of the business	136	95	0,04	0,02	0,35
	The main branch of the business	136	95	0,02	0,00	0,24
Asset value	Less than US\$ 47,739	136	95	0,99	0,92	0,01
	Between US\$ 47,739 and US\$ 71,607	136	95	0,00	0,01	0,23
	More than US\$ 71,607	136	95	0,01	0,04	0,08
Profits (monthly average in last six months)	Less than US\$ 142	136	95	0,18	0,20	0,76
	Between US\$ 142 and US\$ 286	136	95	0,29	0,24	0,39
	Between US\$ 286 and US\$ 572	136	95	0,32	0,20	0,04
	Between US\$ 572 and US\$ 859	136	95	0,05	0,19	0,00
	More than US\$ 859	136	95	0,13	0,13	0,98
Income from sales (monthly average in last six months)	Less than US\$ 286	136	95	0,08	0,08	0,93
	Between US\$ 286 and US\$ 859	136	95	0,34	0,31	0,60
	Between US\$ 856 and US\$ 2577	136	95	0,45	0,45	0,95
	Between \$2577 and \$7733 USD	136	95	0,11	0,14	0,55
	More than US\$ 7733	136	95	0,02	0,02	0,96
Investment (in last six months)	Less than US\$ 286	136	95	0,15	0,13	0,66
	Between US\$ 286 and US\$ 859	136	95	0,15	0,15	1,00
	Between US\$ 856 and US\$ 2577	136	95	0,20	0,15	0,32

(continued on next page)

Table 8 (continued)

Variable		Number of firms that received Treatment One	Number of firms that received Treatment Two	Average for firms that received Treatment One	Average for firms that received Treatment Two	P-value
	Between US\$ 2577 and US\$ 7733	136	95	0,05	0,05	0,97
	More than US\$ 7733	136	95	0,01	0,04	0,08
Staff's level of education (as of the last month)	Staff with primary school	136	95	0,46	0,44	0,84
	Staff with secondary school	136	95	1,12	1,21	0,55
	Staff with technical education	136	95	0,17	0,25	0,23
	Staff with undergraduate university education	136	95	0,08	0,08	0,94
	Staff with graduate university education	136	95	0,00	0,00	1,00
	Staff with other level of education	136	95	0,02	0,02	0,97

Note: ICBF: Instituto Colombiano de Bienestar Familiar (Colombia Family Welfare Institute); ARP: Administradora de Riesgos Profesionales (Occupational Risk Administrator) (this is a generic term; there are a number of different occupational insurance providers, which are collectively known as ARPs); SENA: Servicio Nacional de Aprendizaje (National Learning System).

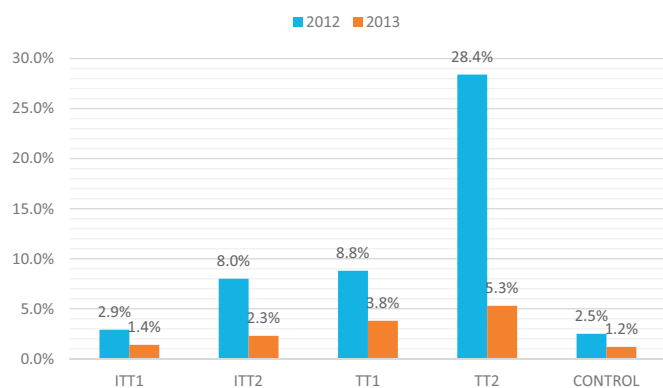


Fig. 1. Formal firms, by group, 2012–2013.

ever since the work of [Hernando \(1989\)](#), a great deal of emphasis has been placed on the burden represented by fixed formal-sector entry costs. While there is an ample body of literature on the evaluation of the costs and benefits of formality, there is much less experimental evidence regarding the impact of fixed costs on firms' decisions whether to operate formally or not.

This paper analyzes the impact of the elimination of the initial fixed costs of registration on informal firms' decisions whether to operate formally or not in Colombia. We rely on a randomized control trial (RCT) strategy for evaluating the effectiveness of two types of interventions which the CCB conducts (workshops and meetings with CCB agents). These two interventions reduce the fixed costs of registration by: (1) giving precise information about the costs and benefits of formalization and the procedure involved in obtaining a business license (*matricula mercantil*), and (2) reducing the non-monetary costs of the registration process. In addition, Act No. 1429 reduced initial registration costs by establishing that the registration process was to be cost-free for small businesses that were registering for the first time and by exempting such firms from paying taxes for the first two years. Thus, the CCB's elimination of all the transaction costs associated with registration as a formal-sector enterprise and the entry into force of Act No. 1429, which did away with initial registration fees for such firms, provided us with an ideal natural experiment for use in studying the effects of the elimination of initial fixed costs on firms' decisions as to whether to operate formally or to remain in the informal sector.

We have two important results to report. First, while the workshop

treatment had no effect on formalization decisions, meetings with CCB agents raised the likelihood that a business would begin to operate formally by 5.5 percentage points for the population of all the firms that were invited to participate at random (the intention-to-treat parameter) and by 32 percentage points for the firms that accepted the invitation (the local average treatment effect). Second, and very interestingly, the effect of the treatment did not persist over time. After a year of formal operation, both effects disappeared. What is more, this was not the result of decisions by firms in the control group to formalize and thus “catch up” with the others, but was instead a reflection of the fact that formalized firms decided not to renew their licenses. This is very interesting, since it suggests that some of the firms that experiment with formality do not find it sufficiently beneficial to remain in the formal sector even when they do not have to pay taxes and only have to pay 50% of the usual fee for renewing their licenses.

These results indicate that substantially reducing the fixed costs of operating formally (i.e., the costs of acquiring information about formalization plus the costs of formalizing a firm) does not play a key role in firms' formalization choices, since it has no lasting effect on their formalization decisions. Specifically, firms may choose to become formal when it is cost-free but, the following year, when they are faced with a small monetary cost, many of them decide to return to the informal sector. This result suggests that firms, after having had the opportunity to experiment with formality, do not find it optimal to continue to operate in the formal sector once they have to bear the related costs. This paper thus corroborates the results of [De Mel et al. \(2013\)](#), since it suggests that firms remain informal, not because burdensome entry costs deter them from operating formally, but rather because they perceive the benefits of formality to be modest at best.

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