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## Informality and Profitability: Evidence from a New Firm Survey in Ecuador<sup>♦</sup>

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## **Informality and Profitability: Evidence from a New Firm Survey in Ecuador**

### **Abstract**

This paper estimates the impact of informality on profits using a new survey administered to 1,200 firms with less than 50 employees in four cities in Ecuador. The paper proposes a novel definition of informality which explicitly recognizes that most firms comply with some regulations but not others. Accounting for firm selection and controlling for a large set of firm, owner, and location characteristics, the paper finds that more formal firms tend to be more profitable and have higher output per worker. This impact operates, *inter alia*, through improved access to credit and higher sales through issuance of tax receipts.

**Keywords:** Informality, profitability, firm survey, Latin America

**JEL classification:** O17, D22, L26

## **1. Introduction**

There are a large number of studies on the relationship between informality and firm productivity which, for the most part, find a negative relationship between the two. For example, Perry et al (2007), using data from the World Bank's Enterprise Survey Database, find a negative correlation between output per worker and various indicators of formality in Argentina, Bolivia, Mexico, Panama, and Peru. Although their analysis controls for a series of firm and location characteristics, it does not take into account the potential endogeneity of a firm's formal or informal status. In fact, in a study specific to Peru—a country for which Perry et al (2007) find the largest gap in productivity between formal and informal firms—World Bank (2008) finds no statistically significant effect of formality on firm profitability once selection controls are added to the equation. On the other hand, country-specific studies in Bolivia (McKenzie and Sakho, 2010; World Bank, 2009) and Mexico (Fajnzylber et al, 2009) do find a negative relationship between informality and firm profitability even after controlling for the potential endogeneity bias. World Bank (2010) reports similar findings for the relationship between informality and firm productivity in Turkey and Fajnzylber et al (2006) identify a negative impact of informality on firm revenues in Brazil.

This paper estimates a relationship between informality and firm profitability using a new survey of more than 1,200 small urban manufacturing and service firms conducted in Ecuador in May-June 2011. The richness of the survey allows for a variety of controls for firm, owner, and geographic characteristics, as well as for identifying determinants of informality which attempt to address the endogeneity problem. The paper finds that informality is negatively associated with profitability and productivity for otherwise comparable firms, and this finding is robust to different measures of informality and profitability. The paper also provides some evidence on the determinants of this relationship, such as the ability to avoid fines, issue receipts, and obtain improved access to credit for more formal firms.

The remainder of the paper is structured as follows: Section 2 briefly describes the data while Section 3 presents the methodological approach. Section 4 develops a new definition of informality as a continuum of compliance, with most firms following some regulations but not others. Section 5 presents the estimation results while Section 6 discusses the channels through which formality affects profitability. Section 7 offers concluding remarks.

## **2. Data**

The data used in this paper come from a new survey of firms with 1-50 employees designed specifically for this study. The survey, the Ecuador Micro-Enterprise Survey (EMES), focused on the eight most important sectors of urban economic activity: textiles, apparel, shoes, and leather manufacturing; other manufacturing; grocery retailing; street food vendors; hotels and restaurants; ground transport; auto repair; and construction. The survey respondents were the individuals ultimately responsible for the operations of the company or business and the participating firms were chosen through random geographic sampling by census tract in Quito, Guayaquil, Machala, and Tulcán.<sup>1</sup> Firm size was defined according to the number of persons employed in the business (both part-time and full-time), and sector of economic activity was defined as the activity that is the main source of income for the business. Due to the difficulties of identifying and interviewing larger firms in the much smaller Machala and Tulcán, only firms with up to 10 employees were sampled in these cities. The survey was complemented by 24 focus groups and 10 interviews with entrepreneurs as well as workers in all four cities to allow

for a greater variety of answers and a more in-depth discussion of reasons behind the observed behavior.

The sampling framework of the EMES was based on the 2004 national survey of urban micro-enterprises but the results also correspond closely to the recently completed economic census. The survey design was based on a 2004 survey sponsored by USAID under the project “Proyecto SALTO” (USAID, 2005), which collected information on close to 18,000 micro-entrepreneurs in low- and middle-income urban areas of Ecuador. Using this structure, the EMES sample was designed in such a way that sufficient observations to permit statistical analysis and hypothesis testing would be available along any of the three dimensions of firm size, sector, and city.<sup>2</sup>

The EMES contains 65 questions covering various aspects of firm performance: basic characteristics of businesses and their owners/managers, information about customers, sales, costs, and profits, and details on the firms/owners knowledge of and compliance with relevant regulations. Table 1 presents summary statistics on key variables of interest, while the questionnaire and (anonymous) survey data are available from the authors upon request.

[Table 1 here]

### 3. Methodology

In this paper, we focus on modeling profitability rather than productivity because the former is the main determinant of firm survival. From the firm owner’s perspective, decisions are normally made based on their impact on (expected) profitability rather than productivity, which most small firm owners do not observe directly. Moreover, while profitability and productivity are obviously linked, more productive firms are not necessarily more profitable, and vice versa. Katayama et al (2009; p. 406) note that “success ultimately depends upon profits rather than efficiency or product quality,” a view echoed by Foster et al (2008; p. 395) who show that “selection [for survival] is on profitability, not productivity ... productivity is only one of several possible idiosyncratic factors that determine profits.” Finally, measuring productivity without detailed information on quantities and prices at the firm level is fraught with difficulties while profits present a direct and robust alternative.

We use profits as reported by the entrepreneurs themselves; the exact question posed to firm owners asked about profit earned after paying all costs including inputs or raw materials, utilities, and employee salaries (excluding the value of the owner’s labor). This approach follows the critique of revenue-based productivity measures by Katayama et al (2009) and the arguments of De Mel et al (2008) for using profits measured through a direct question.<sup>3</sup> In particular, De Mel et al (2008) find that direct reports of profits tend to be less noisy and at least as reliable as asking firms for revenue and expenditure details; moreover, even if the true level of profits is likely to be understated, the ranking across firms is likely to be reasonable. In the case of EMES, self-reported profitability matched well with the difference between firm revenues and major expenditure categories such as salaries, raw materials, and electricity: the correlation between the two measures was 87 percent for monthly data and 97 percent for annual data (Figure 1).<sup>4</sup>

[Figure 1 here]

We model profitability as a function of observable firm, owner, and location/sector characteristics. Similar to other studies, profits of firm  $i$  depend on a set of owner characteristics  $X_i$  such as age, gender, education, and entrepreneurial ability; firm characteristics  $Z_i$  such as weekly hours spent on the business by the owner, access to formal sources of financing, whether

the location is owned or rented, and the number of employees; and location and sector dummies  $S_i$ :

$$\ln(\pi_i) = \alpha + \beta X_i + \gamma Z_i + \theta S_i + \varepsilon_i \quad (1)$$

The extent of a firm's compliance with regulatory requirements depends on whether the benefits of complying outweigh the costs. The focus group discussions reveal that, despite the wide variation in defining what constitutes "formality" or a "formal firm," all entrepreneurs are aware of at least some of the basic regulatory requirements. In other words, all firm owners are aware of the fact that following certain rules will bring their firm closer to formality, even if they may not know exactly what the rules are or which exact steps are required for compliance. Therefore, the decision of whether or not the entrepreneur may take some or all of these steps is a function of the benefits of complying with regulatory requirements weighed against the costs of doing so, in terms of money, time, and (acquiring) information. Following McKenzie and Sakho (2010), the condition under which the firm owner will formalize is as follows:

$$\sum_{t=1}^T \delta^t E(\pi_{s_2,t} - \pi_{s_1,t}) + \xi_F > C_{money} + C_{time} + C_{information} \quad (2)$$

where  $E(\pi_{s,t})$  is the expected profit in period  $t$  from choosing a state  $s_i \in [F \dots s_2 \dots s_1 \dots I]$  which lies on the continuum between fully formal and fully informal, with  $s_I$  being a less formal state than  $s_2$ . The summation over all time periods  $t$  gives us the net present value of the entire profit stream discounted in each period by  $\delta$ ;  $\xi$  represents the non-monetary value of complying with the regulatory requirements; and the  $C$  elements correspond to the monetary, time, and information costs of compliance.<sup>5</sup> It is important to note that condition (2) is not limited to the "exit" dimension of informality but also captures firms which are "excluded" from operating formally: those for whom the expected benefits of formalizing are positive but who are not able to bear the up-front costs  $C$  due to low productivity, lack of scale, etc.

In order to identify the impact of formality on profitability, we focus on otherwise comparable firms on different sides of the formality spectrum. If there were no up-front costs of formalizing and no penalties for non-compliance, then firms would select into a state  $s_i \in [F \dots I]$  based on the net present value of their profit stream.<sup>6</sup> Therefore, in the presence of unobserved firm heterogeneity, we could not distinguish whether differences in profits between more and less formal firms arise due to this heterogeneity or to differences in the formality status; in other words, more and less formal firms may simply not be comparable. However, if there are firms who would like to be more formal, i.e. for whom  $E(\pi_{s_2} - \pi_{s_1}) > 0$ , but are unable to overcome the fixed cost, then the differences between these firms and other similar firms who do operate more formally can be attributed to a "formality premium." Similarly, there may also be firms who would prefer to operate less formally but who formalize due to enforcement; in this case, identification arises from the likelihood of being detected and fined. Therefore, our strategy is to evaluate the impact of formality on profitability by modifying equation (1) to include an estimate of the coefficient  $\phi$ :

$$\ln(\pi_i) = \alpha + \beta X_i + \gamma Z_i + \theta S_i + \phi \widehat{F}_i + \varepsilon_i \quad (3)$$

where  $\widehat{F}_i$  is a measure of formality and identification comes from the between-firm variance in time and information costs of formalizing and in the likelihood of detection by the authorities.

#### 4. Defining informality

The multiple dimensions and hidden nature of informal activity pose substantial challenges to defining informality, with commonly used definitions focusing on "productivity" and/or

“legalistic” views. The “productivity” view focuses on the type of firm and its legal status. It includes small-scale production units with no legal separation from their owners (i.e., firms not legally registered as businesses), such as family-based businesses in which one or more family members participate, and micro-enterprises. The “social protection” or “legalistic” view focuses on employment, recognizing that formally registered firms may establish informal working contracts with employees, thus avoiding social security, severance, and other mandatory payments. This second view allows for informal behavior to take place both in informal and formal production units and could be broadened to a general lack of compliance with regulations, not necessarily only those related to labor relations.

This paper proposes a novel take on this latter view of informality, recognizing that economic actors tend to have a multi-faceted relationship with the state, complying with some regulations but not others, rather than operating in a dichotomous world of zero or full compliance. The definition includes both exclusion (inability to comply, a la de Soto, 1989) and exit (rational decision not to comply, a la Hirschman, 1970) dimensions of informal behavior and covers all businesses (and their workers) which operate in officially recognized sectors of economic activity, but excludes activities which would always be illegal (e.g., contraband).

In practical terms, the EMES survey captures seven distinct but related dimensions of informality, starting with mandatory compliances and expanding to other aspects. These include four behaviors which are legally required of all firms: three dichotomous variables that take a value of 1 if a firm has a tax identification number (RUC), a municipal license, and requests receipts on all its purchases, and a continuous variable which measures the percentage of the firm’s employees registered with the Ecuadorian Institute of Social Security (IESS). The survey also records the percentage of firm’s employees with written contracts; although this is not a legal requirement as verbal contracts are recognized on an equal basis, the use of written contracts is more indicative of firms which comply with a broader set of regulations, offer more worker protections, and in particular is highly correlated with affiliating employees to IESS.<sup>7</sup> Furthermore, the EMES considers two additional dimensions which are not mandatory for most firms but which reflect having reached a higher stage of development: being incorporated through a public notary and registered in the official registry (*registro mercantil*).

The survey results show that focusing on any one dimension of informality – particularly commonly used definitions such as registration with tax or municipal authorities – can give a rather skewed view of overall regulatory compliance. More than 80 percent of EMES firms operate somewhere on the “informality continuum,” complying with some rules but not others (Figure 1, left panel). There is a relatively high level of compliance with tax-related regulations (over 70 percent of firms report to have a RUC and to request receipts systematically) and, to a lesser extent, with municipal licenses (54 percent). Among those firms who are required to be incorporated by a public notary or appear in the official firm registry, compliance is also relatively high: 77 percent comply with incorporation and 63 percent with registration rules. On the other hand, labor compliance is notably lower: 73 percent of firms have no employees registered with social security while 14 percent register all of their workers.<sup>8</sup> Similarly, an average firm provides written contracts to just 13 percent of its employees.

[Figure 1 here]

Focus group results further support this multi-faceted view of informality and provide some insights into the reasons behind variations in compliance by type of regulation. Entrepreneurs believe there are different “levels of formality,” depending on the perceived importance of regulations and the firm’s ability to comply (based on monetary costs, time, and the burden of

acquiring necessary information). Participants claimed that the most important requirements are the RUC and the municipal license; in Quito and Guayaquil incorporation via a public notary and license from the fire marshal were also considered fundamental components of formality. Labor formality (contracts, affiliation, minimum wage, etc.) however, was not considered as important. Furthermore, some entrepreneurs relate formality to productivity, guilds and other aspects that are not legal requirements, highlighting the general lack of information and confusion about the subject.

As might be expected, compliance varies systematically across size, with below average compliance rates among micro firms and above average rates for small and medium firms (e.g., 72 percent of medium firms have a municipal license, against 46 percent of micro firms). While the variance is not as large in the case of RUC and tax receipts, it is striking in the case of labor regulations: over half of employees at medium firms have either a written contract or are affiliated to IESS, but only 2.4 percent of employees in micro firms have a written contract and 11.1 percent are affiliated with social security. These differences in compliance across types of regulation and sizes of firms are likely driven by a combination of varying compliance costs (higher for labor and social security regulations), likelihood of being inspected (lower for labor/social security), and perceptions that some rules are more important for formality than others.

Regardless of which aspect of formality one chooses, profits of firms which comply with regulations are substantially larger than profits of firms which do not comply (Figure 1, right panel). The relative differences are larger for higher-order measures of formality such as incorporation and official registry, but even in the case of taxpayer identification number and municipal license, formal firm earn 2-3 times the profits of informal firms. Of course, these differences could be attributed to a number of influences including firm size as well as other factors which determine firm performance; in order to isolate the impact of formality on firm profits, the following section follows the methodological approach of section 3 to identify this effect.

## **5. The impact of formality on firm profits**

We begin by estimating equation (3) without explicitly addressing the potential endogeneity of formality. We model firm profits as a function of owner and firm characteristics: the latter include density of firms in the parish, average distance of firms in the parish from the municipal office and the nearest tax office, the incidence of inspections in the parish, and size, sector, and city dummies.<sup>9</sup> Owner characteristics include gender, age, education, family business history, ownership of the place of business, hours worked in the business, membership in a guild, and entrepreneurial ability. The latter was measured by asking entrepreneurs to assess the difficulty of successfully achieving a series of common business objectives on a four-point scale, from very easy to difficult (Figure 2). Interestingly, the achievement of each one of these objectives was rated as “difficult” or “somewhat difficult” by at least 50 percent of the respondents, indicating the magnitude of challenges faced by the entrepreneurs in the performance of these typical tasks (or perhaps their lack of confidence in their abilities). For estimation purposes, entrepreneur answers to these questions were aggregated into an index by extracting the first principal factor of the combination of the ability variables.

[Figure 2 here]

The results are shown in column 1 of Table 2. The coefficient estimates on most variables are as expected: firms earn higher profits when the owner spends more time working in the firm,

when the owner is more educated and more entrepreneurial, when the owner takes advantage of networking and other opportunities offered by guild membership, and when firms own their place of business rather than renting it. Neither owner age nor gender significantly affects firm profits; this is because these variables do not offer additional explanatory power in the presence of controls for sector of activity and owner's education.<sup>10</sup> Larger firms earn greater profits even when controlling for other determinants of profitability; moreover, profits are highest in restaurants and hotels and lowest for street food vendors. Among locations, Quito turns out to be the most profitable city.

[Table 2 here]

The regulatory requirements of operating formally—having a RUC, issuing and requesting receipts, affiliating employees with IESS, and having a municipal license—are jointly significant and increase the predictive power of the model by more than two percentage points. Firms with a RUC earn 21.5 percent higher monthly profits than unregistered firms, while a 1 percent increase in the share of workers with social security affiliation is associated with 0.4 percent higher profits. Neither having a municipal license nor using receipts has a significant impact on profits, although coefficient estimates are positive in both instances. In the case of receipts, this result is explained by the RUC being a necessary condition for issuing tax receipts; in fact, if the RUC variable is removed from the estimation equation, the receipts variable becomes statistically significant with a semi-elasticity of 13.7 percent.<sup>11</sup> Broadening the definition of formality to all seven aspects of formality discussed in the previous section does not qualitatively change any of the results; in addition to other aspects of formality, we find that issuing written contracts to employees and inclusion in the commercial registry have a further significant impact on profits with an elasticity of 0.5 and a semi-elasticity of 0.3, respectively (column 2 of Table 2).

Columns 3 and 4 of Table 2 aggregate the narrow (four legal requirements) and wide (all seven aspects) definitions of formality into a single index  $F_i$  by extracting the first principal factor of the combination of these variables. The results show that higher values of the formality index are positively and highly significantly associated with increased profitability.<sup>12</sup> The estimated magnitude of the  $\phi$  coefficient suggests that a one standard deviation increase in the value of the formality index raises enterprise profits by 22-36 percent (US\$187-306 at the sample mean), depending on whether the narrow or the wide definition of formality is used.

Even though our specification includes a rich set of firm and entrepreneur controls, including controls for usually unobserved entrepreneurial ability, it still is possible that there are unobservable differences across entrepreneurs (and/or firms) which determine both formal status and profitability. In order to address the potential endogeneity bias introduced by these unobserved characteristics, we estimate equation (3) with an instrumental variables model and report the results in columns 5-6 of Table 2. In these results, identification comes from the variation in time and information costs of formalizing, with self-reported distance to the municipal office and the nearest tax office used as instruments for the extent of formality.<sup>13</sup> Because the estimated equation includes explicit controls for the parish-level averages of these variables—which capture distance to markets and major clients—the firm-level variables determine a firm's formality status without having a direct impact on its profitability.

Distance to government offices is a relevant instrument for formality because the monetary costs of registration in Ecuador are relatively low while the time and information costs are substantial. There is no cost to obtain a RUC and a municipal license in Quito costs US\$10, although affiliating workers is more expensive with employer's mandatory contribution to IESS set at 11.15 percent of the base wage.<sup>14</sup> Entrepreneurs without a RUC rate lack of information or

lengthy process as the second and third most important reasons for not registering, with monetary costs a distant 11<sup>th</sup> out of 12 possible reasons.<sup>15</sup>

Although we use self-reported distance rather than measuring it with GPS coordinates (GPS equipment was not available at the time of the survey), a robustness check which verified travel time to the nearest tax and municipal registration offices for 40 randomly selected firms using Google maps reveals that, while the correlation between self-reported and actual travel time is relatively high ( $\rho=0.48$ ), the correlation between entrepreneurial ability and the absolute difference between reported and actual travel time is low ( $\rho=0.19$ ) and of the wrong sign (i.e., larger deviations were associated with more able entrepreneurs). This gives us a fair amount of confidence that more skilled (and therefore profitable) business owners do not have better information on distance to government offices, suggesting that self-reported distances can indeed be valid instruments.<sup>16</sup>

The IV estimates show that the impact of formality on profitability is even stronger than suggested by OLS. Estimates in column 6 imply that a one standard deviation increase in the value of the formality index raises enterprise profits by 64 percent (US\$548 at the sample mean). Further robustness checks which estimate equation (3) using only RUC or municipal license as measures of formality – as has been the practice in earlier literature—show that profits of registered firms are 80-83 percent above those of otherwise comparable firms which did not register (see columns 3 and 4 of the Appendix Table). These effects are somewhat lower than earlier literature: e.g., McKenzie and Sakho (2010) estimate an average 230 percent difference in profits between firms with and without a tax identification number.

The IV estimates also reveal that several variables, such as education and guild membership, affect profitability mainly through their impact on formality. For example, unlike OLS estimates, only the highest level of education has a significant impact on profits. However, results from the first stage of analysis reveal that each level of education, beginning with complete secondary, is a statistically significant determinant of formality and the probability of formalizing rises with higher levels of education. Therefore, it appears that education affects profits mostly indirectly, through its effect on increasing the likelihood of formalizing. Similarly, guild membership does not significantly affect profits once its impact on formality—i.e., firms who are members of a guild are significantly more likely to be formal—is taken into account.

Formality is also positively associated with higher labor productivity. Column 7 of Table 2 provides the final robustness check on the results presented so far by regressing the log of revenue per worker—a crude measure of labor productivity—on the same set of independent variables as in the previous profitability regressions. Although the explanatory power of this model is much lower than the model of profitability, the significant positive relationship between formality and firm performance (in this case measured by output per worker) remains robust.

## **6. Why does formality matter?**

There are a number of potential reasons why formality has a positive impact on firm profits. The literature highlights several possible channels, including improved access to credit (Straub, 2005); ability to attract more customers by issuing receipts and lowering the costs of corruption (McKenzie and Sakho, 2010); ability to attract/retain qualified workers, opportunities to participate in government SME support programs, and access to contract enforcement mechanisms (Perry et al, 2007). In this section, we consider the role of some of these channels in enhancing firm profitability in Ecuador using the EMES data as well as the outcomes of the focus group discussions.

According to firm owners, the main benefit of formalizing is to “follow the rules.” As shown in Figure 3, more than 40 percent of respondents mention “following the rules” (*estar en regla*) as the main motivation for complying with regulatory requirements.<sup>17</sup> Similar sentiments were also expressed during focus group discussions, especially with owners of larger businesses (more than 10 employees) who indicated that they could not imagine operating their firms without having taken some steps towards formality. More generally, firm owners of all sizes felt that in order to grow and compete successfully for larger contracts, “having everything in order” and “following the rules” is a necessity.

[Figure 3 here]

The next most commonly mentioned benefit of formality is to avoid costly fines. This reason was named by 24 to 34 percent of respondents (Figure 3), and was also brought up during the focus group discussions. However, the EMES data on the likelihood and amounts of fines does not provide much evidence to support this motivation. Among the 141 firms (out of total 1,221 surveyed), more formal firms are actually more likely to have paid a fine in the last year, although this could be because more formal firms are also more visible and therefore more likely to be visited by authorities. For those who did pay a fine, there is no relationship between formality and the amount of fine paid, either in absolute value or as a share of revenues or profits.

The third most mentioned benefit is the ability to issue tax receipts to customers. This reason was cited by more than 20 percent of firms with a tax identification number (RUC); in addition, almost 8 percent of firms with a municipal license indicated that having a RUC—which allows to issue receipts for tax purposes—was the main benefit of obtaining the license. The ability to issue receipts can attract new customers or facilitate additional sales to existing customers, in either case increasing firm revenue. Regression results, using the same set of independent variables as in Table 2, confirm that more formal firms tend to have higher sales (columns 1-2 of Table 3), therefore lending support to the above hypothesis. In addition, more formal firms are significantly more likely to sell their products to larger clients (firms with more than 10 employees) and the government (including states and municipalities).<sup>18</sup>

[Table 3 here]

There are also additional spillover benefits of having a tax identification number. In addition to issuing receipts, a related but less commonly mentioned benefit of having a RUC is the ability to take advantage of the VAT credit on purchased inputs (Figure 3). Focus group participants also mentioned that a further advantage of operating with a RUC is an improvement in their accounting practices; in other words, issuing receipts and keeping track of input purchases encourages better overall book-keeping which has a positive impact on firm performance. Finally—and this point applies more broadly to other dimensions of formality—focus group participants mentioned that after having taken the steps to formalize they no longer have to hide from authorities and can advertise their business openly. This could be an additional explanation for the positive impact of formality on sales shown in Table 3.

Formality is also positively associated with better access to formal sources of financing at start-up. Columns 3-4 of Table 3 show that, controlling for other factors, more formal firms are more likely to have received some portion of their initial capital from formal sources, which are defined as private and public banks and micro-finance organizations.<sup>19</sup> The EMES data on access to credit shows that formal sources of financing tend to offer credit on better terms, which in turn positively affects the profitability of firms who are able to access these sources. Clearly, these results fall short of establishing causality between formality and access to finance, because we do

not observe the formality status of firms at start-up.<sup>20</sup> However, as shown in Figure 4, firms who complied with regulatory requirements from the start do have a higher likelihood of having benefitted from formal sources of financing; on the other hand, due to a relatively small number of firms who actually obtained credit from formal sources, the standard errors are too large for the differences to be statistically significant. Therefore, the evidence on a positive link between formality and improved access to credit in Table 3 and Figure 4 is suggestive, but not conclusive. [Figure 4 here]

Last but not least, formality helps firms attract more capable workers. More experienced and more educated workers are less likely to work informally (i.e., without social security coverage); moreover, even after controlling for worker characteristics, formal jobs in Ecuador carry a positive wage premium which suggests that these jobs and firms who offer them are able to attract more productive workers. This is also confirmed by the fact that firms with formal labor have 30-70 percent higher productivity than firms with informal labor (World Bank, 2014).

## 7. Conclusions

In order to understand the links between formality and firm profitability, this paper relies on a new survey of micro and small firms in the urban areas of Ecuador collected specifically for the purposes of this study. Unlike earlier literature on the subject which has focused on registration with tax or municipal authorities, this paper proposes a novel definition of formality which recognizes that many firms operate somewhere along the informality continuum, complying with some regulations but not others. In the case of Ecuador, just 9 percent of firms exhibited none of the four requisite behaviors (tax registration, municipal license, issuing receipts for all transactions, and enrolling workers in social security) and only 10 percent of firms were in compliance with all four. The remainder followed some regulations but not others, with significant variation in compliance rates by firm size and type of regulation. In most cases, lack of compliance was due not to high monetary costs of registration but rather to perceived heavy time and information burdens, as well as some confusion about what it means to be “formal” and belief that most businesses were just too small to need to comply.

The econometric analysis in the paper establishes a positive link between formality and profitability. Controlling for a large set of firm, owner, and location characteristics, the paper finds that firms which comply with a larger number of regulatory requirements tend to have higher profits, and this relationship remains robust in the presence of explicit controls for the fact that firms may choose to exit formality or could be excluded from formalizing. In particular, having a tax identification number, affiliating workers with Social Security, and issuing written contracts to employees are all associated with significantly higher firm profits.

The positive relationship between formality and profitability is driven by a number of channels. The two most important ones include better access to formal sources of finance (which offer capital at more attractive rates) and the ability to generate more sales and grow the customer base by issuing tax receipts. Other benefits of formalization mentioned by firm owners include avoiding fines, being able to openly advertise the business, deducting VAT on input purchases, and a general improvement in book-keeping practices due to the need to keep records for tax purposes.

The results of this paper cover a number of sectors and several cities in Ecuador. Although profitability in any one sector or geographic location could be buttressed by several factors that have nothing to do with productivity (e.g., low price elasticities, localized demand shocks, etc.), the range of the paper’s results on profitability suggests that more formal firms could very well

be more productive than less formal firms. This conclusion is also supported by the regression results on revenue per worker, even though this measure is only a very crude approximation to productivity at the firm level. This, in turn, suggests that public policies aimed at encouraging formalization—through lowering information costs, simplifying procedures, and stepping up enforcement—could have important economy-wide benefits in terms of increasing aggregate productivity.

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<sup>1</sup> The universe of firms that the EMES survey represents—namely, firms with 50 employees or less operating in manufacturing and service sectors in Quito, Guayaquil, Machala, and Tulcán—represent 28 percent of the total number of economic establishments in Ecuador according to the Economic Census (INEC, 2010).

<sup>2</sup> The 2010 economic census (Censo Económico) was not available at the time of the EMES sample design; moreover, there are several methodological differences such as the fact that Censo Económico only surveyed businesses with a fixed place of establishment and did not cover most street vendors, construction workers, or taxi drivers. However, the correspondence between the EMES results and those of the economic census—for the same cities and firm sizes—is quite high for a number of characteristics, such as having a tax identification number (RUC) and the gender of the firm’s owner.

<sup>3</sup> Katayama et al (2009) argue that most firm-level productivity measures (i.e., output per a specific unit of input) have little to do with measuring technical efficiency or the likelihood of firm survival, unless data on physical quantities are available and the firms are relatively homogeneous in their input and output characteristics. The authors show that commonly-used revenue-based proxies to productivity indices (e.g., firm revenue deflated by an appropriate price index less the cost of inputs) are contaminated by variation in factor prices and demand elasticities and are therefore likely to give rise to spurious results regarding firm efficiency or performance.

<sup>4</sup> In the majority of cases the reported profits are higher than revenue less expenses on the above categories, as expected, with most observations below the 45 degree line. Additionally, there is a strong positive relationship between firms with higher reported profits and firms with greater output per worker.

<sup>5</sup> These are the up-front costs of formalizing; any recurring costs from operating formally (renewing licenses, remaining up-to-date on changes in tax law, etc.) are part of the expected future profit stream in state *F*.

<sup>6</sup> This assumes there are no quantitative restrictions on the number of firms which are allowed to operate formally.

<sup>7</sup> According to the Article 11(a) of the Ecuador Labor Code, employment contracts can be “explicit or implicit, and, first and foremost, written or verbal.” Furthermore, Article 12 specifies that “a contract is considered explicit when an employer and a worker agree on the conditions, whether in words or in writing.”

<sup>8</sup> Note that this result is not driven by a large number of firms with no (paid) employees. 94 percent of the firms in the survey have at least one paid employee, with 84 percent of firms having at least one full time paid employee.

<sup>9</sup> The EMES covers firms in 58 parishes of Ecuador; an average parish has a population of 59,000 people and contains 21 sampled firms.

<sup>10</sup> The signs on the gender and age coefficients and their lack of statistical significance are similar to results obtained from similar studies in Bolivia (McKenzie and Sakho, 2010) and Peru (World Bank, 2008).

<sup>11</sup> Note that having a RUC is not a sufficient condition for issuing receipts, as 32 percent of firms with a RUC provide tax receipts to half of their customers or less while another 30 percent do not provide tax receipts at all. This illustrates that tax registration and issuing receipts cover somewhat different aspects of formality.

<sup>12</sup> The results are robust to using an alternative index of formality computed by taking a simple average of the component variables.

<sup>13</sup> First stage results are reported in column (1) of the Appendix Table. The distance to the municipal office and the nearest tax (SRI) office was reported by the respondents themselves in hours and minutes of travel time, which is more comparable across the four surveyed cities (or even within cities) than geographic distance. In cases when respondents did not know the location of the nearest office or the travel time to reach it, they were assigned the maximum reported travel distance for their particular city. However, the results do not change substantially if instead firms who reported not knowing the location or the distance are dropped from the sample (see column (2) of the Appendix Table).

<sup>14</sup> The annual fee to renew the municipal license is set at 1-2 percent of the value of the firm’s assets, with the maximum renewal fee capped at US\$25,000.

<sup>15</sup> Similar responses were given by entrepreneurs without a municipal license, with “my business is too small” as the top reason for not registering in both cases.

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<sup>16</sup> As a further robustness check, we also estimate a specification where the firm's formality state is instrumented with parish-level average distances to limit a potential bias where less formal firms would tend to report distances less accurately. The relationship between formality and profitability remains positive, but the result is not statistically significant at conventional confidence levels ( $p=0.187$ ) because the parish-level variables do not capture well each firm's individual circumstances. Alternatively, the formality coefficient is positive and significant at the 10 percent level if we also add firm-level incidence of inspections to the two parish-level instruments – but this solution is not entirely satisfactory as more profitable firms could make more likely targets for inspectors.

<sup>17</sup> These questions were only asked of those business owners who have a RUC or a municipal license. Those who are not in compliance with these requirements were instead asked their reasons for not having done so.

<sup>18</sup> This result is a simple two-tailed test of the means of the formality index for groups which sell to large clients and the government, respectively, and groups which do not. However, the latter represent an overwhelming majority of the EMES sample (8 and 3 percent of the total, respectively). Therefore, although the differences are significant at the 1 percent level, these results are only indicative and should be interpreted with caution.

<sup>19</sup> Public banks include Banco Nacional de Fomento and Corporación Financiera Nacional. The micro-finance category also includes financing received through Credito de Desarrollo Humano (CDH).

<sup>20</sup> Knowing whether a firm received a loan from a formal source in the last year does not resolve the issue because, for example, more formal firms could have a lower demand for loans due to their higher profitability which could allow them to use retained earnings instead of credit.

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## 9. Tables

**Table 1: Summary statistics**

	Mean	St. Dev.	Min.	Max.	Obs.
<b>Monthly profits (US\$)</b>	860	2,938	0	68,500	1,177
<b>Formality index (broad)</b>	0	0.869	-1.016	2.858	1,221
<i>Formality index (narrow)</i>	0	0.774	-1.346	1.037	1,221
Has a tax identification number	0.701	0.458	0	1	1,221
Requests receipts	0.798	0.402	0	1	1,221
Workers affiliated with Social Security	0.205	0.368	0	1	1,221
Has a municipal license	0.536	0.499	0	1	1,221
<i>Issues written contracts to employees</i>	0.131	0.323	0	1	1,221
<i>Listed in the commercial registry</i>	0.083	0.276	0	1	1,221
<i>Established via a notarial instrument</i>	0.097	0.297	0	1	1,221
<b>Location characteristics</b>					
Number of firms in the parish	65	48	1	146	
Average (parish-level) distance from tax office	26	10.3	5	76.7	
Average (parish-level) distance from municipal office	17.5	7.2	5	82.5	
Average (parish-level) incidence of inspections	0.631	0.169	0	1	
<b>Firm/owner characteristics</b>					
Member of guild or union	0.246	0.431	0	1	1,221
Parents had a business	0.284	0.451	0	1	1,221
Hours worked in this business/week	58.7	21.6	2	112	1,221
Owns place of business	0.36	0.48	0	1	1,221
Age	43.8	12.7	18	99	1,220
Gender (male = 1)	0.623	0.485	0	1	1,221
Index of entrepreneurial ability	0	0.809	-1.644	2.784	1,221
Distance to nearest tax office (minutes)	37.8	35.1	1	120	1,221
Distance to municipal office (minutes)	59.1	60.4	1	190	1,221
Firm had an inspection during the past year	0.631	0.483	0	1	1,221
<b>Owner education</b>					
Incomplete primary					56
Incomplete secondary					591
Complete secondary					291
Incomplete tertiary					197
Complete tertiary					83
<b>Firm size</b>					
1-5 employees					845
6-10 employees					251
11-50 employees					125

Note: indices (formality and entrepreneurial ability) are calculated as the first principal factor of the combination of component variables.

**Table 2: Impact of formality on monthly profits and output per worker**

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) 2SLS	(6) 2SLS	(7) 2SLS <sup>‡</sup>
<i>Formality index (broad)</i>				0.351***		0.568***	0.383**
<b>Formality index (narrow)</b>			0.255***		0.393***		
Has a tax identification number	0.195***	0.187**					
Requests receipts	0.111	0.099					
Workers affiliated with Social Security	0.421***	0.192*					
Has a municipal license	0.089	0.043					
<i>Issues written contracts to employees</i>		0.513***					
<i>Listed in the commercial registry</i>		0.309**					
<i>Established via a notarial instrument</i>		0.104					
<b>Location characteristics</b>							
Number of firms in the parish	0.001	0.001	0.000	0.001	0.001	0.001	0.000
Average (parish-level) distance from tax office <sup>†</sup>	-0.278**	-0.257*	-0.284**	-0.254*	-0.296**	-0.248*	-0.153
Average (parish-level) distance from municipal office <sup>†</sup>	0.079	0.119	0.099	0.122	0.119	0.161	0.325**
Average (parish-level) incidence of inspections <sup>†</sup>	-0.451*	-0.447*	-0.447*	-0.451**	-0.516**	-0.531**	-0.120
<b>Firm/owner characteristics</b>							
Member of guild or union	0.146*	0.097	0.171**	0.102	0.123	0.003	0.024
Parents had a business	0.024	0.021	0.016	0.023	0.020	0.031	0.007
Hours worked in this business/week (log)	0.208***	0.215***	0.199***	0.205***	0.197***	0.206***	0.163***
Owns place of business	0.135**	0.105	0.155**	0.115*	0.153**	0.088	-0.027
Age	-0.005**	-0.004	-0.005*	-0.005*	-0.005**	-0.005**	-0.003
Gender (male = 1)	0.043	0.036	0.038	0.037	0.037	0.036	0.103
Index of entrepreneurial ability	0.065*	0.066*	0.061*	0.061*	0.063*	0.063*	0.051
<b>Owner education</b>							
Incomplete primary	-0.136	-0.174	-0.153	-0.169	-0.145	-0.171	0.030
Complete secondary	0.100	0.106	0.118	0.108	0.090	0.068	0.088
Incomplete tertiary	0.220**	0.188**	0.259***	0.201**	0.218**	0.118	0.125
Complete tertiary	0.472***	0.403***	0.526***	0.426***	0.466***	0.295*	0.383**

**Firm size**

6-10 employees	0.739***	0.695***	0.773***	0.726***	0.721***	0.637***	-0.008
11-50 employees	1.556***	1.378***	1.619***	1.438***	1.554***	1.252***	-0.016
Observations	1,112	1,112	1,112	1,112	1,112	1,112	1,113
R <sup>2</sup>	0.434	0.449	0.428	0.446	0.424	0.433	0.192

**Identifying variables**

Distance to nearest tax office					-0.133***	-0.090***	-0.090***
Distance to municipal office					-0.203***	-0.147***	-0.147***
First stage F statistic					80.880	34.350	34.560
First stage partial R <sup>2</sup>					0.143	0.062	0.063
Over-identifying restrictions: Prob > $\chi^2$					0.759	0.654	0.099

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Note: Dependent variable is log of monthly profits. Distances are in logarithms. Confidence intervals calculated with robust standard errors. City and sector dummy variables are included in all specifications, but are not shown.

† Location (parish-level) variables are calculated as excluded means.

‡ Dependent variable: log of monthly revenue per worker.

**Table 3: Impact of formality on sales and access to finance**

	(1)	(2)	(3)	(4)
	ln(Sales)		P(Formal finance)	
Formality index (broad)		0.712***		0.512**
Formality index (narrow)	0.491***		0.366**	
Observations	1,110	1,110	1,112	1,112
R <sup>2</sup>	0.580	0.560		
Number of firms with access to finance			265	265
Wald $\chi^2$			150.2***	158.2***
<b>Identifying variables</b>				
Distance to nearest tax office	-0.139***	-0.087***	-0.124***	-0.075**
Distance to municipal office	-0.201***	-0.144***	-0.184***	-0.131***

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Note: All specifications are estimated with a full set of control variables listed in Table 1. Confidence intervals calculated with robust standard errors.

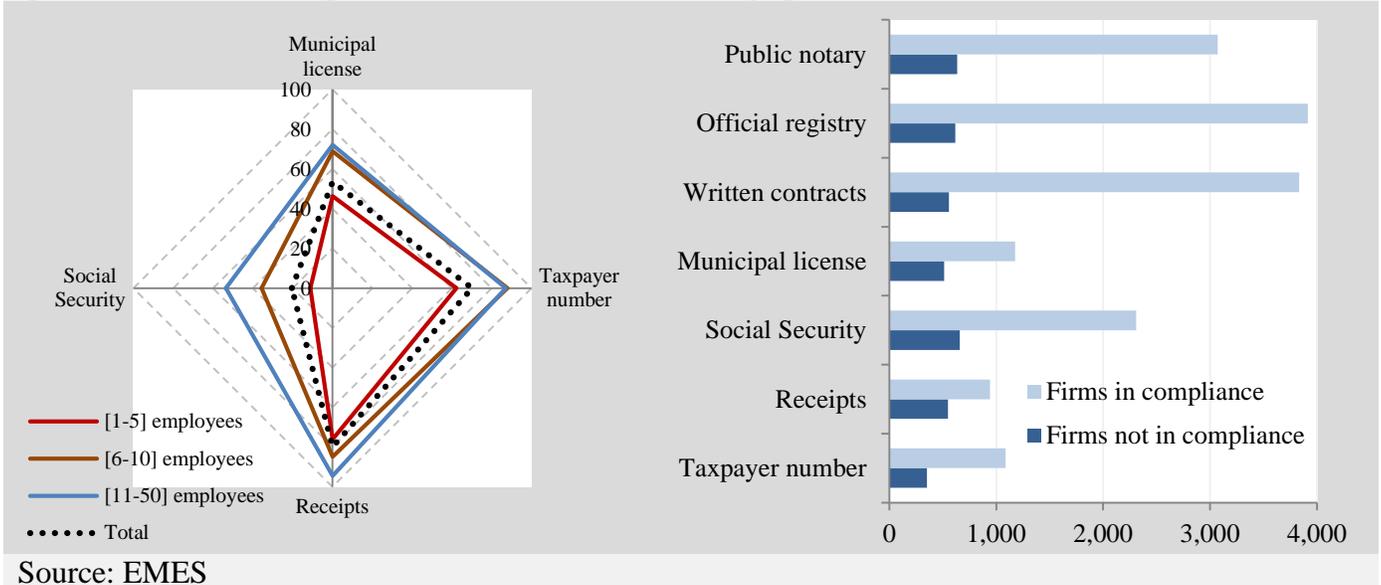
Log of sales is estimated using 2SLS, while the probability of access to formal sources of finance is estimated with IV probit.

## 10. Figures

**Figure 1: Formality profile of firms by type of regulation**

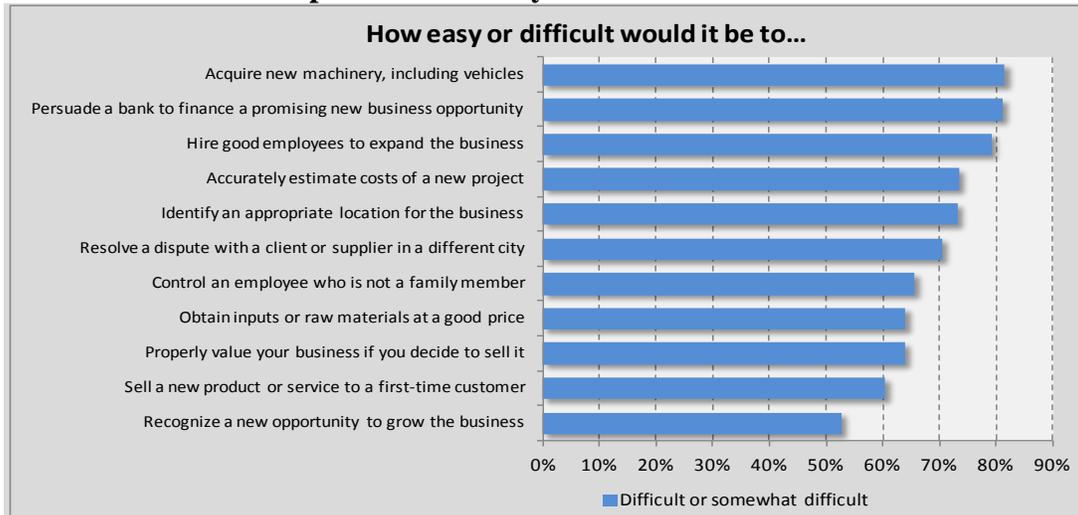
(percent of firms in compliance)

(average profits)



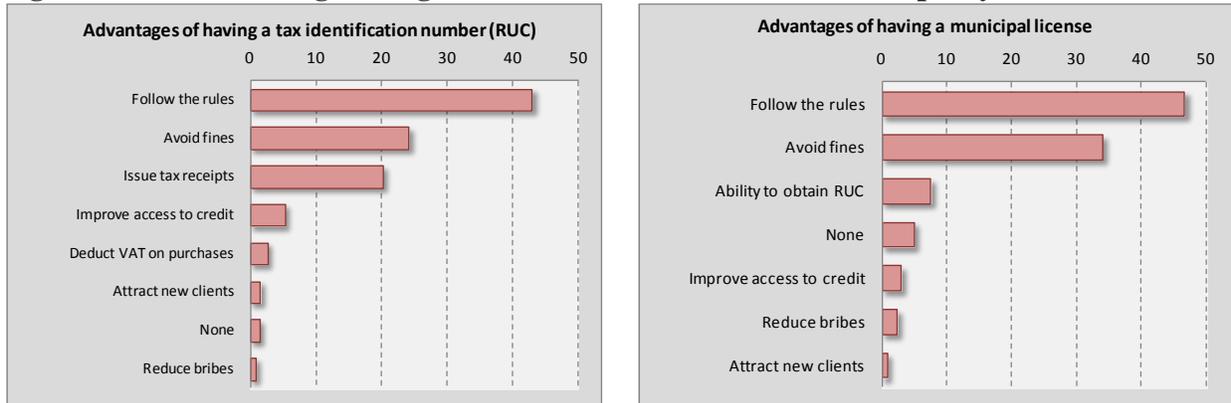
Source: EMES

**Figure 2: Self-assessed entrepreneurial ability**



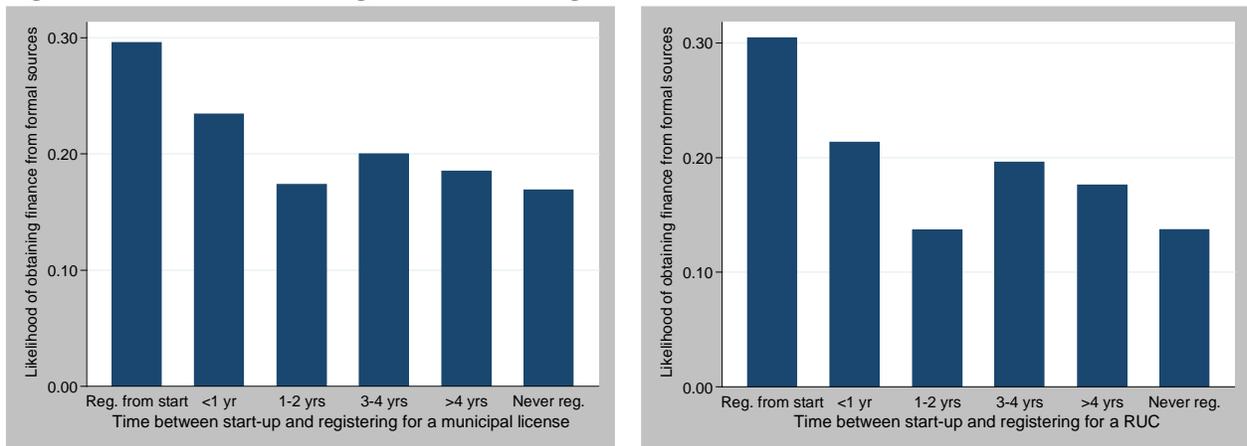
Source: EMES

**Figure 3: Benefits of registering with tax authorities and the municipality**



Source: Authors' calculations with EMES data.

**Figure 4: Formal financing and time of registration**



Source: Authors' calculations with EMES data.

## Appendix Table

	(1) 2SLS, 1st Stage (baseline)	(2) 2SLS, 2nd stage (no top code)‡	(3) RUC, 2nd stage	(4) Municipal license, 2nd stage
<b>Formality index (broad, 7 compliances)</b>				
Firm has a tax identification number		1.147*	0.604**	
Firm has a municipal license				0.586***
<b>Location characteristics</b>				
Number of firms in the parish	-0.000	-0.000	0.000	0.001
Average (parish-level) distance from tax office†	0.097	-0.190	-0.345**	-0.235*
Average (parish-level) distance from municipal office†	-0.076	0.203	0.122	0.118
Average (parish-level) incidence of inspections†	0.349**	-0.901*	-0.452*	-0.489**
<b>Firm/owner characteristics</b>				
Member of guild or union	0.403***	-0.256	0.164*	0.161*
Parents had a business	-0.058	0.057	0.025	-0.001
Hours worked in this business/week (log)	-0.021	0.189**	0.187***	0.197***
Owns place of business	0.131***	0.131	0.157**	0.177***
Age	0.002	-0.006*	-0.005*	-0.005**
Gender (male = 1)	-0.018	0.155*	0.045	0.023
Index of entrepreneurial ability	-0.009	0.011	0.060	0.062*
<b>Owner education</b>				
Incomplete primary	0.035	0.011	-0.137	-0.174
Complete secondary	0.157***	0.015	0.112	0.118
Incomplete tertiary	0.318***	-0.113	0.240**	0.276***
Complete tertiary	0.576***	-0.088	0.516***	0.539***
<b>Firm size</b>				
6-10 employees	0.401***	0.386	0.761***	0.774***
11-50 employees	0.900***	0.689	1.630***	1.625***
Observations	1,206	746	1,112	1,112
R <sup>2</sup>	0.455	0.252		
<b>Identifying variables</b>				
Distance to nearest tax office	-0.090***	-0.084*	-0.533***	-0.155**
Distance to municipal office	-0.147***	-0.059	-0.322***	-0.519***
First stage F statistic	34.35	3.43		
First stage partial R <sup>2</sup>	0.06	0.01		
Over-identifying restrictions: Prob > $\chi^2$	0.654	0.687		
$\rho$			-0.231	-0.256

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Note: Dependent variable is log of monthly profits. Distances are in logarithms. Confidence intervals calculated with robust standard errors. City and sector dummy variables are included in all specifications, but are not shown.

† Location (parish-level) variables are calculated as excluded means.

‡ Sample restricted only to firms who knew the location and distance to the nearest tax registration and municipal offices.