Informality and Profitability

Evidence from a New Firm Survey in Ecuador

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Abstract

This paper estimates the impact of informality on firm profits using a new firm-level survey designed specifically for this study. The survey was administered to about 1,200 firms with 50 employees or less in Ecuador's two largest cities, Quito and Guayaquil, plus two main centers of economic activity near the northern and southern borders. The paper's results confirm that the extent of firms' compliance with a set of regulatory requirements is linked to the perceived costs and benefits of informality, such as the probability of detection

by the authorities and the likelihood of being fined. Nonetheless, taking into account the non-random placement of firms along the formality-informality spectrum 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 more formal firms' ability to obtain improved access to credit and achieve higher sales by issuing receipts to clients.

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1. Introduction

There a large number of studies on the relationship between informality and firm productivity and, for the most part, the literature finds 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 has a significant negative impact on 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 presents a profile of the surveyed firms, focusing on those characteristics which are particularly relevant to the paper's analysis; Section 3 develops a simple model of profitability and formality and discusses estimation issues; Section 4 presents the estimation results; Section 5 discusses the channels through which formality affects profitability; and Section 6 offers some concluding remarks.

2. What are the main characteristics of surveyed firms and their owners?

2.1 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 "individual 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.¹ Firm size was defined

¹ 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).

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.²

2.2 Owner characteristics

A large majority of entrepreneurs value the independence and flexibility of having their own business. The survey asked entrepreneurs to establish a ranking among seven different reasons for having their own business rather than being a wage employee. Figure 1 displays the percentage of firms that cite each of the reasons among the top three in their ranking. Consistent with other evidence from Latin America (see Perry et al., 2007), over 70 percent of firm owners cite the advantage of being one’s “own boss” as a top reason. Only around 30 percent of entrepreneurs mention the lack of wage employment, and only around 20 percent go into business mainly to avoid paying mandatory social security contributions (IESS). Similar sentiments were expressed in the focus groups, with an additional reason of the business being a source of employment opportunities for family members, and an endowment that can be left to children.

Figure 1: Entrepreneurs’ reasons for having their own business

² The recently completed 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.

However, entrepreneurs seem to struggle to perform basic managerial tasks that would enable their businesses to thrive. Following McKenzie and Sakho (2010), the survey asks 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). This perception was also prevalent among focus group participants, who in general felt that it takes much effort to make a business grow, or even stay afloat.

Figure 2: Self-assessed entrepreneurial ability

Source: EMES

Small firm owners are also less likely to have achieved a high level of education, although their average educational attainment is similar to the population average. On average, firm owners have about 10 years of education, very similar to the average years of education for adult employed men (10.2 years) and women (10.7 years) in the four cities reported in the June 2011 round of the Ecuadorian household survey ENEMDU. However, while 22 percent of employed adults have complete tertiary education and 38 percent have at least some tertiary education, just 7 percent of firm owners in our sample report having completed tertiary education. This suggests that the distribution of skills among firm owners is much narrower than in the overall population.

2.3 Firm performance

Survival rates among surveyed firms are consistent with the rest of Latin America but are higher than OECD averages. It is well documented that the firm selection process tends to be intense and many firms do not survive for long; however, those that survive tend to grow fast and generate enough employment to partly offset the loss from firms exiting the market. However, more than 80 percent of firms interviewed for EMES have operated for more than two years, which is on the higher end of estimates by Bartelsman et al. (2004), who report that 61 to 87 percent of firms that enter the market in a given year still operate after two years in a sample of 14 countries (Figure 3:A). The median age for EMES firms is 10 years and the mean is 12 years, which is consistent with evidence on formal urban firms with 1-50 employees in Ecuador (10 and 15 years, respectively) and in all of Latin America (14 and 19 years, respectively) from

the 2010 round of Enterprise Surveys. However, these survival rates are high when compared with OECD averages, which could be explained in part by a low level of competition.³

Firms the EMES sample also show surprisingly low employment growth rates since inception. Average annual employment growth in micro firms is only 5 percent (equivalent to one employee every four years for a 5-employee firm). Firms that started with more than 10 employees have added few workers and many have actually downsized, while firms which began with 11-50 workers have contracted by 2.4 percent per year. An important caveat is that the survey does not observe firms of more than 50 employees (14.7 percent of firms in these cities, according to the Economic Census), and also that for many firms downsizing brings efficiency gains that allow them to stay afloat, so negative growth in employment does not necessarily imply productivity loss.⁴ Still, it is worrisome that employment growth is so low as it reflects the difficulties of these firms to expand the scale of their operations.

Figure 3: Firm survival, age and growth

Source: EMES

The revenue generation capacity of sampled firms is also limited, with an average of US\$55,000 per year in gross sales. The median firm, however, generates only US\$12,000 per year, and 50 percent of firms generate between US\$5,800 and US\$34,000 in sales per year. In general, firms appear to have a limited ability to generate sufficient income to cover the basic needs of firm owners and their families or,

³ Although it is not possible to compute exact survival rates with a cross-section of firms, looking at the age distribution provides a rough idea of the extent of “churning” among firms; if the age composition is biased towards young firms it is likely that survival rates are low, and vice-versa if the distribution is biased towards older firms. In the case of Ecuador, the fact that only about 20 percent of firms is less than 2 years old suggests that the survival rate is higher than in OECD countries, where it is estimated that between 20-40 percent of entering firms fail within the first two years, so that—assuming that there is no firm entry in a 2-year period—at most 80 percent of firms would be older than 2 years. Since it is not realistic to assume zero entry for two years, it must be the case that at any given time the age distribution shows less than 80 percent of firms being two years and older. In Ecuador more than 80 percent of firms are older than two, which means that the survival rate is probably much higher than the average for the OECD. In turn, this is consistent with low rates of firm exit, which typically occur when there are high exit costs. See López-García and Puente (2006).

⁴ When comparing this low employment generation with the Enterprise Survey data for Ecuador—which includes firms of all sizes—the results are not particularly different. Firms which had 50 employees or less in 2007 have on average added less than one new employee per year, virtually the same rate as all of Latin America (LAC Enterprise Surveys, 2010).

sometimes, even to keep them above the poverty line: consider that the basic consumption basket for a family of four in 2011 cost US\$6,400 per year, and the poverty line for a family of four was around US\$3,300.

2.4 Access to finance

By and large, access to credit for firms in the EMES sample is low. Only 22 percent of firms borrowed funds at their inception, and only 31 percent of them obtained a loan in the last year. This is substantially lower than the share of formal urban firms of all sizes who currently access credit in Ecuador (49 percent) and formal firms with 50 employees or less in all of Latin America (42 percent; LAC Enterprise Survey 2010). Female entrepreneurs tend to be more successful in obtaining loans, and smaller firms are also more likely to obtain a loan either at the start or in the last year, compared to their larger counterparts. This is likely explained by the fact that most of the credit –and thus the liability—is given to the entrepreneur, not to the firm (this was confirmed by focus group participants), which increases the risk and difficulty for larger firms to obtain loans (that are typically also larger). As a result, larger firms are more likely to use their own earnings to finance their operations, although retained earnings alone are not likely to be sufficient to consistently finance business expansion.

Figure 4: Uses of credit

Source: EMES

For credit obtained in the past year, loan sizes tend to be small and maturities short. The median loan is about 20 percent of annual sales, which is a small amount even for a micro firm (if median annual sales are US\$12,000, the median loan is US\$2,400). Consequently, firms use credit mainly for short-term cash flows (e.g., purchase inventory), except in transport and auto repair shops where most of the credit is used to purchase machinery and vehicles (Figure 4). As for duration, most loans are repaid within 1 ½ years, which is significantly shorter than in OECD countries and points to markets characterized by with high information asymmetries and low borrower bargaining power (Kirschenmann and Norden, 2012).⁵

⁵ The median loan maturity for firms of less than 50 employees in OECD is close to five years (See Hernández-Cánovas and Koëter-Kant, 2011).

While most firms pay reasonable rates, a few pay extremely high interest. For the large majority interest rates vary from less than 5 percent per year and to 50 percent per year, and the distribution of firms along this range is quite uniform. However around 8 percent of firms pay over 50 percent interest and about 4 percent pay over 100 percent. These rates are always charged by informal lenders (*prestamistas*), who typically charge daily interest rates. Not surprisingly, there is a negative relationship between firm size and the interest rate, although among the approximately 10 percent of firms in the EMES sample which pay interest rates in excess of 100 percent, the largest share corresponds to firms with 11-50 employees.

2.5 Informality

The EMES survey captures seven distinct but related dimensions of informality. These include four sets of mandatory regulations: 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.⁶ 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*).

Figure 5: Formality profile of firms

In addition to analyzing the performance of firms along each of these dimensions individually, the paper also combines them in an index which captures the level of firm compliance along the entire spectrum of formality. We construct two indices: a “narrow” index which only includes the four mandatory

⁶ According to the Article 11(a) of the Ecuadorian 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.”

regulations (Figure 5, left panel) and the broader index using all seven variables. To compute the index we use alternatively the first principal factor of the informality variables and a simple average (both normalized to take values between 0 and 100), with results being very similar across the two.

More than 80 percent of micro and small businesses in Ecuador operate somewhere on the “informality continuum,” complying with some rules but not others. 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 regulation compliance is notably lower. On average, firms affiliate only 20.5 percent of their employees with social security, and the rate of compliance is substantially lower for smaller firms. Moreover, most firms (over 70 percent) affiliate zero employees and a smaller percentage (less than 20 percent) affiliate all their employees with virtually no firms in between (Figure 6). Likewise, an average firm provides written contracts to just 13.1 percent of its employees.

Figure 6: Distribution of firms by percent of employees affiliated with IESS

As expected, the level of compliance varies systematically across size, with micro firms below average and small and medium firms above. For instance, 72 percent of medium firms have a municipal license, against 46.2 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.⁷

2.6 Profitability

In order to assess the impact of informality on firm performance, this paper uses firm profits as reported by the entrepreneurs themselves. The definition of profits includes the value of the owner’s labor, but

⁷ Many workers in focus groups reported having “*contratos de palabra*” or oral agreements. However, in most cases oral agreements put the burden of proof on the employee, making litigation procedures more difficult, lengthy and costly for workers.

excludes all other costs borne by the firm such as inputs or raw materials, utilities, and salaries paid to employees. The use of self-reported profitability as the main variable of interest 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.⁸ 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.

Figure 7: Self-reported profits vs. calculated profits and labor productivity

Source: Authors' calculations with EMES data.

Following the suggestions of De Mel et al (2008), the EMES did not contain very detailed questions on the structure of firms' costs. However, we did ask firms about their revenues as well as their expenditures on salaries, inputs or raw materials, and electricity.⁹ The correlation between reported profits and the difference between revenues and expenditure on all of the above categories is very high: 87 percent for monthly data and 97 percent for annual data. Moreover, in the majority of cases the reported profits are higher than revenue less expenses on the above categories, as expected (see the left panel of Figure 7, where most observations lie below the 45 degree line). Additionally, there is a significant positive relationship between firms with higher reported profits and firms with greater output per worker (right panel of Figure 7). These results, therefore, give us additional confidence in using self-reported profits as a measure of profitability and firm performance.

The distribution of profits among the sampled firms is quite wide, ranging from zero to over US\$10,000 a month. The distribution of profits is approximately log-normal with half of the firms reporting profits of

⁸ 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.

⁹ For each of these questions, the respondents were asked to provide numbers for the last month, the last full year (2010), and expected outturn for the current year (2011). The length of recall period did not seem to affect the responses very much: for profits and revenues, respectively, their annualized values (12*the monthly outturn of May/June) were quite close to the values reported for 2010 and the values expected for 2011 (around 80 percent for profits and 90 percent for revenues).

US\$300/month or less, but with a long right tail stretching into monthly profits that number in the thousands (Figure 8). The average monthly profit reported by the surveyed firms is US\$860, which amounts to 30 percent of total monthly revenue. This figure lines up reasonably well with the average reported annual (2010) profit of US\$12,396 which works out to just over US\$1,000 per month. It is also consistent with the entrepreneurs' expected profits for the entire 2011 (approximately US\$1,090), a somewhat curious result given the general lack of optimism about enterprise growth prospects expressed by entrepreneurs during the focus group sessions (most entrepreneurs complained about growing costs, higher taxes, and increased levels of competition).

Figure 8: Distribution of monthly profits

Source: Authors' calculations with EMES data.

3. How do we model firm profitability?

The emphasis of this paper is 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) note that "success ultimately depends upon profits rather than efficiency or product quality," a view echoed by Foster et al (2008) who show that "selection [for survival] is on profitability, not productivity ... productivity is only one of several possible idiosyncratic factors that determine profits." Finally, as mentioned in the previous section, 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 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 the first principal factor of entrepreneurial ability components in Figure 2; 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 there are certain steps they must take before their firm becomes formal, even if they may not know exactly what those steps may be. 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), we can formally represent the condition under which the firm owner will formalize as follows:

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

where $E(\pi_{s,t})$ is the expected profit in period t from choosing a state s which lies on the continuum between fully formal and fully informal, i.e., $s \in [F \dots I]$; the summation over all time periods t gives us the net present value of the entire profit stream discounted in each period by δ ; ξ represents the non-monetary value of complying with the regulatory requirements (corresponding to the "estar en regla" motivation mentioned in survey responses and focus group interviews); and the C elements correspond to the monetary, time, and information costs of compliance.¹⁰ It is important to note that condition (0.2) 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 $s \in [F \dots I]$ based on the net present value of their profit stream.¹¹ 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, formal and informal firms may simply not be comparable. However, if there are firms who would like to be formal, i.e. for whom $E(\pi_F) > E(\pi_I)$, but are unable to overcome the initial fixed cost, then the differences between these firms and other similar firms who do operate formally can be attributed to a "formality premium." Similarly, there may also be firms who would prefer to operate as informal 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 φ :

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

where $\hat{F}_i$ is an index 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.

¹⁰ 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 .

¹¹ This assumes there are no quantitative restrictions on the number of firms which are allowed to operate formally.

4. Does formality matter for profitability?

The set of independent variables in equation (3.1)—gender, age, education, entrepreneurial ability, and family business history of the owner, hours worked in the business, membership in a guild, ownership of the place of business, 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—explain more than 41 percent of the variation in the log of monthly profits (column 1 of Table 1). 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 explained by the fact that they do not offer additional explanatory power in the presence of controls for sector of activity and owner's education.¹² 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.

The addition of four variables which reflect the regulatory requirements of operating formally—having a RUC, issuing and requesting receipts, affiliating employees with IESS, and having a municipal license—to the estimated equation increases the predictive power of the model by more than two percentage points (column 2 of Table 1). 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 inter-dependency between having a RUC and issuing receipts: a firm must have a tax identification number before it is able to give 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. Broadening the definition of formality to seven aspects previously discussed does not qualitatively change any of the results; in addition, 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 3 of Table 1).

Columns 4 and 5 of Table 1 aggregate the narrow and wide definitions of formality, respectively, into a single variable F_i by extracting the first principal factor of the combination of these variables.¹³ The results show that higher values of the formality index are positively and highly significantly associated with increased profitability.¹⁴ The estimated magnitude of the ϕ coefficient suggests that a one standard deviation increase in the value of the formality index raises enterprise profits by 22-36 percent, depending on whether the narrow or the wide definition of formality is used.¹⁵

The positive relationship between formality and profitability remains robust to our attempts to control for endogeneity by using instrumental variables. Columns 6-9 of Table 1 show the results of estimating

¹² 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).

¹³ This amounts to estimating equation (3) by OLS, without explicitly addressing the identification issue.

¹⁴ The results in this paragraph are robust to using the alternative, equal-weighted index of formality.

¹⁵ The (principal factor) formality index is distributed with a zero mean and a standard deviation of 0.84-0.86 (for the narrow and wide definitions, respectively).

equation (3) with selection controls for formality. In columns 6, 7, and 9, identification comes from the variation in time and information costs of formalizing, proxied by the self-reported distance to the municipal office, the nearest tax office, and whether the firm has had an inspection in the past year.¹⁶ Because the profit equation (1) already controls for the parish-level averages of these variables—which should capture the distance to markets and major clients as well as the likelihood that a firm is located in an inspection-prone area—the firm-level variables should determine a firm’s formality status without having a direct impact on its profitability. However, because the instruments come from information reported by the firm itself, there is still a possibility that they are correlated with the unobservable determinants of profitability. In order to limit this possibility, column 8 of Table 1 shows the results of estimating a specification where parish-level average distances and whether or not a firm has had an inspection are used as instruments to limit a potential bias where less formal firms would tend to report distances less accurately. The results show that the relationship between formality and profitability remains robust, although the standard error of the formality coefficient is larger because the parish-level variables do not capture each firm’s individual circumstances as accurately. It should be mentioned, however, that none of the instruments are fully satisfactory because, unlike similar studies in Bolivia (World Bank, 2009) and Peru (World Bank, 2008), GPS equipment was not available to independently measure the distances to the municipal and tax offices.

The IV estimates 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 10 of Table 1 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.¹⁷

¹⁶ 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—i.e., the formality variable remains significant with a similar coefficient—if instead firms who reported not knowing the location or the distance are assigned the average distance to the municipal and SRI offices reported by other firms in the parish (see column 7 of Table 1).

¹⁷ Although Table 1 only shows the 2SLS results, the positive relationship between formality and output per worker also holds in OLS regressions.

Table 1: Impact of formality on monthly profits and output per worker

	OLS	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS	2SLS [†]
Formality index (broad)					0.351***		0.453***	0.356*	0.342*	0.334**
Formality index (narrow)				0.255***		0.332***				
Has a tax identification number		0.195***	0.187**							
Requests receipts		0.111	0.099							
Workers affiliated with Social Security		0.421***	0.192*							
Issues written contracts to employees		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 public notary</i>			0.104							
Location characteristics										
Number of firms in the parish	0.000	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000
Average (parish-level) distance from tax office [†]	-0.263*	-0.278**	-0.257*	-0.284**	-0.254*	-0.291**	-0.251*	-0.254*		-0.155
Average (parish-level) distance from municipal office [†]	0.060	0.079	0.119	0.099	0.122	0.110	0.140	0.123		0.319**
Average (parish-level) incidence of inspections [†]	-0.320	-0.451*	-0.447*	-0.447*	-0.451**	-0.485**	-0.489**	-0.452*	-0.339	-0.104
Firm/owner characteristics										
Member of guild or union	0.262***	0.146*	0.097	0.171**	0.102	0.144	0.056	0.100	0.113	0.047
Parents had a business	0.009	0.024	0.021	0.016	0.023	0.018	0.026	0.023	0.018	0.005
Hours worked in this business/week (log)	0.204***	0.208***	0.215***	0.199***	0.205***	0.198***	0.206***	0.205***	0.204***	0.163***
Owens place of business	0.158**	0.135**	0.105	0.155**	0.115*	0.154**	0.102	0.114*	0.111*	-0.021
Age	-0.003	-0.005**	-0.004	-0.005*	-0.005*	-0.005**	-0.005**	-0.005*	-0.004*	-0.003
Gender (male = 1)	0.039	0.043	0.036	0.038	0.037	0.037	0.037	0.037	0.035	0.103*
Index of entrepreneurial ability	0.058	0.065*	0.066*	0.061*	0.061*	0.062*	0.062*	0.061*	0.065*	0.051*
Owner education										
Incomplete primary	-0.166	-0.136	-0.174	-0.153	-0.169	-0.148	-0.170	-0.169	-0.186	0.032
Complete secondary	0.172**	0.100	0.106	0.118	0.108	0.102	0.089	0.107	0.113	0.096
Incomplete tertiary	0.334***	0.220**	0.188**	0.259***	0.201**	0.236**	0.162	0.199*	0.200*	0.142
Complete tertiary	0.638***	0.472***	0.403***	0.526***	0.426***	0.493***	0.365**	0.423**	0.453***	0.414***

Firm size

6-10 employees	0.870***	0.739***	0.695***	0.773***	0.726***	0.744***	0.684***	0.724***	0.739***	0.010
11-50 employees	1.739***	1.556***	1.378***	1.619***	1.438***	1.582***	1.351***	1.434***	1.462***	0.026
Observations	1,112	1,112	1,112	1,112	1,112	1,112	1,112	1,112	1,112	1,113
R ²	0.412	0.434	0.449	0.428	0.446	0.427	0.443	0.446	0.444	0.194

Identifying variables

Distance to nearest tax office						-0.117***	-0.076***			-0.076***
Distance to municipal office						-0.186***	-0.133***			-0.133***
Firm had an inspection during the past year						0.349***	0.288***	0.331***	0.339***	0.288***
Average (parish-level) distance from tax office [†]								0.106		
Average (parish-level) distance from municipal office [†]								-0.178*		
First stage F statistic						81.480	38.210	18.730	18.290	36.460
First stage partial R ²						0.199	0.093	0.050	0.051	0.093
Over-identifying restrictions: Prob > χ^2						0.613	0.470	0.260	0.127	0.207

*** 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.

5. 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 9, more than 40 percent of respondents mention “following the rules” (*estar en regla*) as the main motivation for complying with regulatory requirements.¹⁸ 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 9: Benefits of registering with tax authorities and the municipality

Source: Authors' calculations with EMES data.

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 9), 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

¹⁸ 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.

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 1, confirm that more formal firms tend to have higher sales (columns 2-3 of Table 2), 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).¹⁹

Table 2: Impact of formality on sales and access to finance

	ln(Sales)		P(Formal finance)	
Formality index (broad)		0.735***		0.512**
Formality index (narrow)	0.526***		0.366**	
Observations	1,110	1,110	1,112	1,112
R ²	0.580	0.560		
Number of firms with access to finance			265	265
Wald χ^2			150.2***	158.2***
Identifying variables				
Distance to nearest tax office	-0.124***	-0.075**	-0.124***	-0.075**
Distance to municipal office	-0.184***	-0.131***	-0.184***	-0.131***
Firm had an inspection during the past year	0.343***	0.268***		

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

Note: All specifications are estimated with a full set of control variables listed in Table 3.1.

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.

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 9). 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 hid 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 2.

¹⁹ 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.

Last but not least, formality is positively associated with better access to formal sources of financing at start-up. Columns 3-4 of Table 2 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.²⁰ 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.²¹ However, as shown in Figure 10, 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 2 and Figure 10 is suggestive, but not conclusive.

Figure 10: Formal financing and time of registration

Source: Authors' calculations with EMES data.

6. 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. The paper finds that most entrepreneurs face substantial difficulties in performing daily business-related activities, access to credit is limited, and firm revenues and profits relatively low. Defining formality as compliance with a broad spectrum of legal and regulatory requirements, the paper finds that the vast majority of firms operate somewhere along the informality continuum, with compliance varying substantially by firm size and type of regulation.

²⁰ 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).

²¹ 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.

The empirical analysis in the paper establishes a positive link between formality and profitability for micro and small firms in the urban areas of Ecuador. 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 profitability 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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