

WHY DO MICROENTERPRISES REMAIN INFORMAL?

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ABSTRACT

Small, unregistered, survivalist enterprises employ most workers in Sub-Saharan Africa. This study uses a micro and small enterprise (MSE) survey from Zambia to look at things that affect registration decisions. The results suggest that visibility plays a large role in registration decisions. More visible firms—larger, urban MSEs with fixed business locations are more likely to register. The quality of public services might also affect registration decisions. MSEs are more likely to be registered when access to infrastructure is better and when the firm manager is better educated.

I. Introduction

As in most countries in Sub-Saharan Africa, informality is common in Zambia—estimates suggest that the informal sector accounts for about half of output (Schneider, 2005). Although, in part, this is because registered medium-sized and large enterprises hide output from the authorities, tens of thousands of small survivalist enterprises also contribute to the sector's large size. Few of these micro and small enterprises (MSEs) register with the authorities or pay taxes. They do, however, employ about 88 percent of workers (Clarke and others, 2010).

Given the effect that a large informal sector has on government's ability to raise revenue and regulate effectively, it is important to ask why so many MSEs remain informal. One important benefit of being informal is that informal firms avoid the costs associated with paying taxes and complying with labor, customs, and other regulations (Schneider and Enste, 2000). Remaining informal might also reduce bribe demands. Johnson and others (2000, p. 496) argue that remaining out-of-sight protects against 'predatory behavior by government officials seeking bribes from anyone with officially registered economic behavior'.¹

Although informal MSEs avoid taxes, regulation and corruption, being informal can create problems. One of these is that MSEs can only remain informal for as long as they can remain out-of-sight. Because large productive firms find this harder, unregistered firms cannot become too large or too successful.²

This is not the only cost of being informal. Firms that are not registered with the authorities find it hard to enter formal supply chains. La Porta and Shleifer (2011) note that one of the main reasons that MSE owners in Mauritius, Madagascar and Kenya gave for becoming formal was that it meant that they could issue invoices and so could sell goods and services to large firms that pay the VAT.

¹ Clarke (2011) finds that registered firms in Zambia pay more in bribes than similar unregistered enterprises. The cross-country macroeconomic evidence is consistent with this (Buehn and Schneider, forthcoming; Dreher and Schneider, 2010; Friedman and others, 2000; May and others, 2002).

² La Porta and Shleifer (2011) noted that during field interviews several firms in Mauritius, Madagascar and Kenya that had recently registered said they did so because they were becoming too large to continue operating in the informal sector. Gelb and others (2009) find that larger firms are more likely to be registered in six of seven countries in Sub-Saharan Africa. Zambia was not included in either study.

Remaining unregistered and out-of-sight also makes it more difficult for firms to gain access to government services. Getting a fixed location and getting utility service at that location makes the firm more visible and therefore it will be more difficult to remain informal. This is especially the case when the firm needs to have direct contact with the local authorities to get utility connections. For example, firms in Lusaka that are not close enough to power lines need to get an excavation permit from the Lusaka City Council to get a connection from ZESCO, the national state-owned power company (World Bank, 2011).

This paper looks at things that are associated with MSE registration in Zambia. In contrast to most earlier work that uses macroeconomic data or that look at tax evasion by larger, registered firms, it uses firm-level data from a representative survey of 4,800 registered and unregistered MSEs in the country.³ Given how common unregistered MSEs are in Zambia, it seems appropriate to focus on these enterprises rather than on tax evasion by larger enterprises.

The empirical analysis looks at several things that might affect registration decisions. First, it looks at the role that visibility plays in registration decision by looking at how size and location affect registration. Second, it looks at whether stronger performance encourages registration. Third, it looks at how the quality and availability of local government services affect registration decisions. Finally, it looks at whether there are spillovers between firms in terms of registration decisions—are firms more likely to register when other firms in the same region are registered?

II. Data

The data used in this paper comes from the Zambia Business Survey. The survey covered 4,801 micro and small enterprises (MSEs) with 50 or fewer employees in urban and rural areas. The sample was selected through rigorous area sampling, with the 2000 population census used as the sampling frame.⁴ Because the sample frame is not based upon official lists from the government both registered and unregistered firms were included in the sample.

³ Schneider and Enste (2000) summarize the macroeconomic literature. Johnson and others (2000) and Dabla-Norris and others (2008) use microeconomic data but focus on tax evasion by large enterprises.

⁴ Clarke and others (2010) describe the survey in more detail.

The firms in the survey are small. Including the owners, the average firm had less than five workers (see Table 2). About one-third of the firms had no employees other than the owner and only about 10 percent of firms had over 10 employees. About four-fifths of the sample were in rural areas. The entrepreneurs were, on average, about 43 years old and most had either only a primary (47 percent) or secondary education (45 percent). Few firms used any public infrastructure—about 6 percent got electricity from the grid, about 5 percent had piped water from public sources and less than 1 percent had a fixed-line phone. Most were either farms (about 70 percent) or traders (about 22 percent).

Firm Registration

MSEs participating in the survey were asked three questions about registration: (i) whether they were registered with the Patents and Company Registrar (PACRO); (ii) whether they had an operating, trade or other business license with any local government institution; and (iii) whether they had a taxpayer identification number (TPIN) from the Zambia Revenue Authority (ZRA). Throughout the paper, these questions are used to identify ‘registered’ or ‘formal’ enterprises. MSEs that have done any of these things are considered to be registered.

Most companies in Zambia are required to register with PACRO. Sole proprietorships that are operating under a trade name are required to register as a business name under Section 3 of the Registration of Business Act Cap 389, while limited liability companies are required to register as companies under the Companies Act Cap 388.⁵ Because sole proprietorships can operate under the personal name of their owner, however, some firms operate legally without registering with PACRO.

Firms also have to get operating or trading licenses from municipal or local governments. Requirements and license fees depend upon sector of operations, size of the firm, and locality and some firms need to pay multiple fees and obtain multiple licenses.⁶

⁵ Patents and Companies Registration Office (2009a; 2009b)

⁶ In some sectors, firms need multiple licenses (Economics Association of Zambia, 2009). Foreign Investment Advisory Service (2004) noted that some businesses needed as many as 54 separate licenses from national, regional and local departments to operate.

Finally, businesses need a TPIN from the Zambia Revenue Authority. This applies to companies registered with PACRO under the Registration of Businesses Act and the Companies Act and to individuals operating businesses that are not registered as firms (Zambia Revenue Authority, 2009). After getting a TPIN, most (over 99 percent) are too small to have to register for either the value-added tax or the income tax, both of which apply only to firms with turnover of more than K200 million (about \$53,000 in 2008). They are, however, required to pay a presumptive three percent tax on turnover (Zambia Revenue Authority, 2004).

Few MSEs are registered with any agency—only about one in 19 (see Table 1). MSEs were most likely to report that they had an operating or trading license from a local or municipal government (about 1 in 20). Fewer reported that they were registered with PACRO (about 1 in 30) or had a TPIN from the Zambia Revenue Authority (about 1 in 50). In contrast, almost all medium-sized and large enterprises surveyed in a separate large business survey reported that they were registered with all three agencies.

Characteristics of registered and unregistered MSEs

Registered MSEs are slightly larger than unregistered MSEs (see Table 2), are more likely to be in urban areas and far are more likely to operate out of a formal business premise as opposed to the owner's home, farm, or an informal location. Owners of registered firms were better educated and slightly younger. Agricultural MSEs made up a smaller share of registered MSEs, while other sectors made up correspondingly larger shares.

Consistent with previous analyses of informal firms in Sub-Saharan Africa, registered firms are far more productive than unregistered firm (Gelb and others, 2009; La Porta and Shleifer, 2011). The average registered firm produces almost four times as much output per worker as the average unregistered firm—about 17.2 million Kwacha (\$4,600 in 2008) per worker) compared with about 3.3 million Kwacha (\$900) per worker.

III. Econometric Analysis

To see what factors are associated with registration, we regress a dummy variable indicating that the MSE is registered with at least one government agency (i.e., registered with

PACRO, has a TPIN, or has an operating or trading license from local government) on the control variables described below. The model is:

$$\text{Propensity to register}_i = \beta_1 + \beta_2 FC_i + \gamma_1 Infr_i + \gamma_2 FP_i + \gamma_3 Other Registration_{-i} + \epsilon_i$$

Firm i will register if its propensity to register is high enough. That is:

$$\text{Registration}_i = \begin{cases} 0 & \text{if } -\infty < \text{Propensity}_i \leq 0 \\ 1 & \text{if } 0 < \text{Propensity}_i \leq \infty \end{cases}$$

The independent variables are: FC_i , characteristics of the MSE and owner; FP_i , a measure of MSE performance; $Infr_i$, a measure of access to public infrastructure; and *Other Registration*, a measure of registration rates for similar MSEs (excluding the MSE itself). The error term, ϵ_i , is assumed to be distributed normally and so the model is estimated as a Probit model.

The MSE characteristics are firm age, firm size (log of number of employees and log of number of employees squared), a dummy variable indicating that the MSE is located in an urban area, a dummy variable indicating that the firm has a formal business premise and a series of sector dummies. Firm age is included to control for the possibility that older MSEs might be more likely to be register if firms only register once they become well established. Firm size and location are included to control for how visible the MSE is likely to be to government officials. In general, it will be harder for large MSEs, MSEs with fixed business locations, and MSEs in urban areas to remain out-of-sight and so we would expect that these MSEs would be more likely to register. Sector dummies are included to control for the visibility of MSEs and differences in registration requirements and enforcement across sectors. The models also include controls for characteristics of the entrepreneur: age and educational attainment. Previous studies have found that educational attainment is associated with decisions to start a microenterprise and the decision to formalize (Gelb and others, 2009; La Porta and Shleifer, 2011).

The regressions also include three additional variables. The first is a measure of firm performance. Better performing MSE might be more likely to register because they are more visible or because they are more likely to be able to afford to do so. Because few microenterprises keep detailed financial records--only about 30 percent reported keeping up-to-date financial records and only about 8 percent reported keeping audited accounts—we focus on

a simple measure of performance, sales per worker. This is available for most MSEs in the sample and does not depend on the firm keeping detailed records. Since the regressions include sector dummies, this can be interpreted as sales per worker relative to MSEs in the same sector.

Although firm performance might affect registration, the reverse is also true. Registering might make it easier for the firm to advertise, bid on government contracts, get access to public services, and enter formal supply chains. All of these could result in improved performance. We deal with the possibility that performance could be endogenous by calculating a ‘leave-one-out’ average for MSEs in the same sector and region and using it as an instrument for the MSE’s own performance.⁷ If there are spillovers between MSEs in the same region or other factors affect the performance of all MSEs in the same sector and region, this could be an appropriate instrument.

The second variable, infr_i , is included to control for the availability of public infrastructure—power, fixed-line telephones, and public water. We focus on these measures because access to these services requires a fixed location, which makes the MSE more visible. In contrast, getting a cell phone does not. The variable is an index variable indicating whether the MSE gets electricity from the public grid, gets water from a public or municipal source, and has a fixed-line telephone. The index is increased by one for each type of public infrastructure the MSE has access to. In the robustness checks, we split the index into its components.

Infrastructure use is also potentially endogenous. Better performing MSEs might be more likely to use public infrastructure and to register. We deal with this by substituting the leave-one-out average of other MSEs’ use in place of the MSEs’ own use. This allows us to focus on access rather than use. Access by other MSEs shows that infrastructure is available in the district. Moreover, the cost of connecting is lower when infrastructure is already in place (e.g., when the power company does not need to erect new poles).

The third additional variable is the registration rate for other MSEs in the same sector and region (i.e., a leave-one-out average of other MSEs’ registration decisions). There are three

⁷ The variable is a ‘leave-one-out’ average--average performance of enterprises in the same sector and region excluding the enterprise itself. Leave-one-out averages are preferable to simple averages because they exclude the firm’s own decision. Use of averages and leave-one-out averages is common in firm-level studies. See, for example, Aterido and others (2011); Clarke (2009); Dollar and others (2005); Fisman and Svensson (2007); and Svensson (2003).

reasons to include this. The first is that other MSEs' decisions regarding registration might affect the costs and benefits of registration (i.e., there might be spillovers). In regions and sectors where few MSEs bears the costs of registration, it might be difficult for registered MSEs to compete. Second, registration might be higher in regions where formal supply chains are better developed. Third, the variable is a useful control for other omitted factors at the local level that affect formalization decisions at the firm-level. For example, we have little information on how registration costs, taxes and regulation vary across regions. Since these policies might affect registration rates, this should control for that possibility.

Empirical Results

Results from the base model are in Table 3. The base model includes the firm and entrepreneur characteristics described above. The additional variables (i.e., firm performance, infrastructure use, and other MSEs' registration decisions) are added in later models.

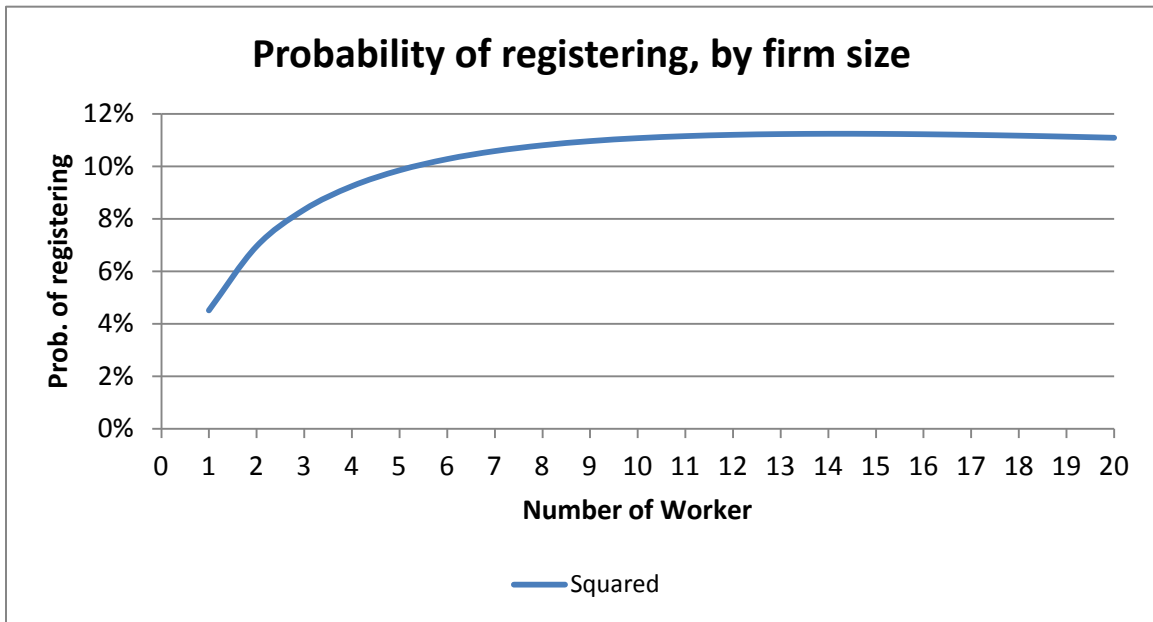
Firm Visibility. The coefficients on the natural log of the number of workers and the squared term of the same variable are both statistically significant. The positive coefficient on the linear term and the negative term on the squared term suggest an upside-down u-shaped relationship. The coefficients suggest that MSEs with between 12 and 15 workers are the most likely to register in the models where sales per worker is omitted (see Figure 1). The probability of registration appears to increase rapidly between 1 and 5 workers, before flattening (see Figure 1).⁸ Between 12 to 15 workers is, however, towards the high end of the observed sample—only about 7 percent of the MSEs in the sample have more than 10 workers. This suggests that the probability of registration is increasing across most—if not all—of the observed distribution.⁹

The coefficient on the dummy variable indicating that the MSE is located in an urban area is positive and statistically significant. The point estimate suggests that MSEs in urban areas are about fifty percent more likely to be registered as similar MSEs in rural areas (about 6.3 percent for rural MSEs compared with about 9.5 percent for urban MSEs).

⁸ Marginal effects are average probabilities assuming all firms in the sample take on that attribute. The margin command in STATA is used for the calculations.

⁹ Including a cubic term does not affect results in terms of size or statistical significance of the coefficients.

Figure 1: Average probability of registering, by firm size



Note: Average probabilities are calculated by assuming that all firms in the sample have that number of workers and calculating the probability that each firm will register using the coefficients from column 6 of Table 3.

Finally, the model includes a dummy variable indicating that the MSE operates out of fixed, formal premises (e.g., office, business complex, factory, shop or formal market). This is in contrast to businesses that operate out of the owner’s home, farm, another informal premise (e.g., informal market-place, street or footpath, or vehicle) or that have no fixed location. The coefficient is statistically significant and positive indicating that MSEs that operate out of a formal business premise are more likely to be registered than MSEs that are not. The point estimates of the coefficients suggest that MSEs operating out of formal business premises are about three times as likely to be registered as MSEs operating out of other premises (about 16.7 percent compared with about 5.6 percent). These results are all consistent with the idea that MSEs that are more visible are more likely to register.

Other Firm and Entrepreneur Characteristics. In addition to the variables associated with visibility, the model includes several other variables related to characteristics of the MSE and the MSE owner: age of the MSE, age of the owner, and the owner’s education.

Consistent with Gelb and others (2009), MSEs are more likely to be registered when their owners are better educated. Because the missing group is managers with a primary education or less, the positive coefficients indicate that owners with secondary, vocational, and university

education are more likely to be registered than MSEs where the owner has a primary education or less. Moreover, the likelihood of education increases with educational attainment. That is, the null hypotheses that registration is equally likely for MSEs with owners with a secondary education and owners with a vocational education and equally likely for MSEs with owners with a vocational education and owners with a tertiary education are both rejected at a 10 percent significance level or higher. The coefficients suggest that the average probability of registration is about 4 percent for MSEs owned by someone with a primary education or less, about 8 percent for MSEs owned by someone with a secondary education, about 15 percent for MSEs owned by someone with a vocational education, and about 20 percent for MSEs owned by someone with a tertiary education.

Older MSEs are more likely to be registered than younger MSEs. This could be because MSEs are more likely to register after they have been operating for a few years or because registered MSEs are more likely to survive. The point estimate of the coefficient, however, suggests that age has only a very minor impact on registration rates. An MSE that is eleven years old (75th percentile in terms of age) is only about 1 percentage points more likely to be registered than a similar MSE that is three years old (25th percentile). In contrast, the coefficient on age of entrepreneur is statistically insignificant.

Firm Performance. Several studies have noted that informal MSEs tend to be less productive than registered MSEs (Gelb and others, 2009; La Porta and Shleifer, 2011). We therefore add sales per worker to the base regression. Since we include sector dummies, this could be thought of as sales per worker relative to MSEs in the same sector. Including this does not have a large impact on the base results in terms of the size or statistical significance.

Better performing MSEs are more likely to be registered than other MSEs—the coefficient on sales per worker is positive, large and statistically significant. The average probability that a MSE in the sample is registered would be about 5 percent if sales per worker were equal to the sales per worker of the MSE at the 25th percentile (400,000 Kwacha) but about 10 percent if sales per worker were equal to the sales per worker of the MSE at the 75th percentile (4.8 million Kwacha).

As noted above, firm performance could be endogenous—that is, registration might affect sales. We control for this by instrumenting the MSEs’ own sales using the leave-one-out average as an instrument (i.e., sales per worker by MSEs in the same district and sector). The instrument is highly significant (t-stat=28.50) in the first-stage regression. Once we instrument for sales per worker, its coefficient becomes statistically insignificant. This suggests that causality might be running in the opposite direction (e.g., from registration to performance). Because the variable is not statistically significant once we control for endogeneity, we omit it from the rest of the analysis.

Infrastructure Access. Access to infrastructure might encourage MSEs to become formal by either improving performance and allowing for expansion or by making the MSE more visible. Column 4 presents results with the infrastructure index added. For the most part, adding the infrastructure index does not affect results for variables in the base regression.

In the regression in column 4, the index variable represents the MSE’s own use of infrastructure. The coefficient is positive and statistically significant indicating that MSEs that use public infrastructure are more likely to be registered than MSEs that do not. Based upon the estimates of the coefficient, the average probability of registration would be about 6 percent if MSEs had no access to infrastructure. If MSEs had access to all three types, the average probability of registration would increase to about 36 percent.

We are, however, probably more interested in infrastructure access rather than use. That is, access might encourage formalization by making formalization more attractive—even before the firm gets connected to infrastructure. Moreover, using access reduces concern about endogeneity. For these reasons we substitute the ‘leave-one-out’ average for the firm’s own use of infrastructure (see column 5). The results are similar although the point estimate of the coefficient on infrastructure use becomes larger. The point estimates imply that the average probability of registration would be 6 percent if no infrastructure was available compared with 50 percent if all three were available to all MSEs.

Other MSEs’ registration. The final question is whether MSEs’ registration decisions are affected by the decisions of other MSEs in the same region. To test whether this is the case, we add the percent of other MSEs in the same region and sector that are registered to the regression.

The coefficient is positive and statistically significant indicating that MSEs are more likely to be registered when other MSEs in the same region and sector are registered. This could be because MSEs are more likely to register when they see similar MSEs are registered or could be because there are omitted variables (e.g., local government policies) that affect all MSEs' registration decisions. In the second case, this could be seen as a useful control for omitted policies related to local taxes or regulations. The difference is relatively large. Increasing registration rates in the same province from the 25th percentile (0 percent) to the 75th percentile (15 percent) would increase the likelihood that the average MSE would registered from about 6 percent to about 8 percent.

Robustness Checks

Registration with each agency separately. The measure of registration used in the main analysis above is coded "1" if the firm is registered with any national or local government agency. Not all types of registration are, however, equal. For example, as noted above, an entrepreneur can legally operate a sole proprietorship under the owner's name rather than a trade name without registering with PACRO. To see how robust the results are, we therefore break the index down into the three components that we used to construct it and use each dummy variable as the dependent variable separately.

The results are very similar for the three variables (see Table 4). The coefficients on the main independent variables are statistically significant in all three regressions suggesting that similar things affect all registration decisions. For example, firms are more likely to be registered with all three agencies when infrastructure access is higher, when the owner is better educated and when the firm is more visible (larger, in urban areas, and operates out of fixed business premises). The main differences are that the coefficient on the age of the firm is statistically significant only in the regression for registration with local authorities and that agricultural firms are less likely to be registered with the local authorities and PACRO, but not the tax authorities.

Other measures of infrastructure. As a second robustness check, we break up the index of infrastructure use into its three components: (i) whether the firm has water from public utilities; (ii) whether the firm receives power from the grid; and (iii) whether the firm has a

fixed-line telephone connection. It is possible that the different utilities affect registration decisions differently and breaking the index into three dummies allows us to control for this.

One reason to separate the three services is that they are provided differently. Fixed-line telephone service is provided by ZAMTEL, the national state-owned fixed-line telephone provider. Similarly, electricity is mostly provided by the national vertically-integrated state-owned power company, ZESCO, which dominates the sector.¹⁰ In contrast, at the time of the 2008 survey, water and sewerage services were provided by a number of agencies, with many providing only local service. Water providers include: local government owned commercial utilities, which were regional joint ventures and had been formed by merging local authorities; some local authorities; and some small private providers (National Water Supply and Sanitation Council, 2008). Because the local authorities were heavily involved in the water sector, the availability of local financial resources might affect the availability of piped water in each region. Because informality might affect local resources, this might be a concern even after we directly control for informality at the local level by including the variable representing other firms' registration rates.

We first include the three dummy variables simultaneously indicating whether the firm itself has utility services (see Table 5). The coefficients on all three dummy variables are positive, but are statistically significant for only two of the variables: power and fixed-line telephone service. In each case, the dummy variables indicate a large difference in registration rates between firms with an without service. The average probability that a firm is registered would be 17 percent if all firms have power connection compared with 6 percent if they do not. Having a telephone connection has an even larger effect. The average probability that a firm is registered would be 27 percent if all firms had telephone connections compared with 7 percent if not.

¹⁰ Although there were other companies involved in the power sector in 2008, they were much smaller than Zesco. The main active companies were: the Copperbelt Energy Corporation (CEC) PLC, which provided power to 8 large mines in the Copperbelt Province; the Lunsemfwa Hydro Power Company, which generated power that it sold ZESCO and a manganese mine, and the Zengamina Power Company, which sold power in Northwest province to several schools, clinics, and hospitals and to 350 residents. The Northwestern Energy Corporation commenced sales in November 2008 (at the time of the survey). It started providing service to the Lumwana mine and residents in the township around the mine at that time. See Energy Regulation Board (2008) for details.

As discussed infrastructure use is potentially endogenous. Moreover, because we are interested in infrastructure access as much as infrastructure use, we substitute the ‘leave-one-out’ average in place of the firm’s infrastructure use. When all are included, the coefficients are statistically insignificant (see column 4). However, when included one at a time, the coefficient on electricity access becomes statistically significant at a ten-percent level. The coefficient on access to power is a little smaller than when the dummy variable is included directly suggesting a slightly more modest impact.

IV. Conclusions

When large parts of the economy are informal, as is the case in many countries in Sub-Saharan Africa, governments find that the narrow tax base makes it difficult for them to raise tax revenues. They also find that is difficult to use regulation to control externalities or advance social goals. Encouraging formalization would therefore be beneficial.

Tighter enforcement of tax laws and registration requirements—and heavier punishment for firms that fail to register—would be one way to encourage formalization. Tighter enforcement, however, is unlikely to solve informality in countries like Zambia. La Porta and Shleifer (2011) note that informal MSEs are so unproductive in many countries in Sub-Saharan Africa that registration would have improve productivity for most informal MSEs to be able to afford the added costs associated with formalization. Given the low productivity of informal and formal MSEs in Zambia, this is likely to be the case in Zambia as well.

The observation that firms remain informal to evade taxes and avoid burdensome regulations suggests that reducing the burden of taxes and regulation would raise registration rates. The results from this study, however, suggest other interventions that might also reduce informality. In particular, the results suggest that improving physical infrastructure and boosting the human capital of potential entrepreneurs might reduce informality in countries like Zambia. If access to infrastructure was improved firms would have a greater incentive to become formal. Similarly, improving education for entrepreneurs would allow them to run their businesses better and therefore might also allow them to formalize.

These policies are useful for other reasons. The same policies might also improve the performance of large enterprises in many countries in Sub-Saharan Africa. Studies that have

looked at the barriers to the performance of larger, formal enterprises have also found these are constraints for large enterprises. Dinh and others (2011), for example, notes that more managers of formal MSEs said that electricity was the biggest constraint that they faced than said the same about any of the other 14 constraints that were asked about in 16 of the 38 African countries with available data. In this respect, they are likely to benefit not just small, survivalist enterprises but large formal ones as well.

Finally, it is possible that there are positive feedback effects with respect to MSE registration. That is, MSEs appear to be more likely to be registered when the registration rates for similar MSEs in the same district are higher. This could suggest either a positive feedback with respect to registration—perhaps related to the development of formal supply chains—or could suggest that registration rates proxy for omitted variables—perhaps related to the quality of local services or regulations.

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VI. Tables

Table 1: Percent of MSMEs and large enterprises registered with each agency

	% of MSMEs	% of large enterprises
Registered with any agency	6%	100%
Registered with PACRO	3%	99%
Have operating license from local government	5%	98%
Have TPIN from Zambia Revenue Authority	2%	96%

Source: Author's calculations based upon data from the Zambia Business Survey MSME and large business surveys.

Note: All variables are weighted means.

Table 2: Summary statistics for registered and unregistered MSMEs

	All	Registered	Unregistered
Number of Workers	4.6	5.3	4.5
Age of firm in Years	11.1	7.7	11.3
Operates in formal business premises	10%	48%	8%
% in urban areas	19%	61%	16%
Age of owner in years	42.6	40.7	42.8
% of owners with secondary education	45%	53%	45%
% of owners with vocational education	4%	15%	3%
% of owners with university education	4%	18%	3%
% of firms in retail trade sector	22%	41%	21%
% of firms in manufacturing sector	3%	8%	2%
% of firms in agriculture	70%	30%	73%
% of firms in other (mining)	0%	1%	0%
Sales per worker (in Kwacha)	4,170,813	17,200,000	3,306,704
% with electricity from grid	6%	39%	4%
% with piped water from public sources	5%	28%	4%
% with fixed-line telephone	0%	7%	0%

Source: Author's calculations based upon data from the Zambia Business Survey MSME survey.

Note: All variables are weighted means. Registered means registered with any agency

Table 3: Probability of registration by firm type for MSMEs.

Dependent Variable	Firm is registered					
	Probit	Probit ^d	IV Probit ^d	Probit ^e	Probit ^e	Probit
Estimation Method						
Observations	4403	3500	3469	4242	4242	4214
Firm Performance						
Sales per worker <i>[natural log]</i>		0.192*** (7.77)	0.058 (0.95)			
Infrastructure						
Firm uses public infrastructure <i>[index]</i>				0.454*** (8.77)		
Use of infrastructure by other firms ^a <i>[index, average]</i>					0.621*** (3.31)	0.386** (1.99)
Other firm's registration						
Registration for other firms in same region ^a <i>[dummy, average]</i>						1.663*** (6.12)
Firm Characteristics						
Number of workers <i>[natural log]</i>	0.497*** (5.60)	0.545*** (5.31)	0.414*** (3.60)	0.418*** (4.56)	0.507*** (5.58)	0.481*** (5.25)
Squared number of workers <i>[natural log]</i>	-0.093*** (-3.06)	-0.061* (-1.73)	-0.054 (-1.56)	-0.077** (-2.44)	-0.100*** (-3.17)	-0.09*** (-2.86)
Age of firm <i>[years, natural log]</i>	0.071** (2.01)	0.068* (1.66)	0.065 (1.61)	0.078** (2.15)	0.076** (2.12)	0.077** (2.13)
Firm operates in fixed business premises <i>[dummy]</i>	0.765*** (10.88)	0.750*** (9.22)	0.778*** (9.53)	0.688*** (9.41)	0.762*** (10.61)	0.737*** (10.13)
Firm is in urban area <i>[dummy]</i>	0.349*** (5.30)	0.301*** (3.92)	0.334*** (4.30)	0.287*** (4.18)	0.293*** (4.15)	0.273*** (3.82)
Entrepreneur Characteristics						
Age of entrepreneur <i>[dummy]</i>	0.100 (0.85)	0.205 (1.50)	0.213 (1.57)	0.120 (0.98)	0.108 (0.90)	0.119 (0.98)
Has secondary education ^b <i>[dummy]</i>	0.482*** (6.45)	0.444*** (5.05)	0.502*** (5.56)	0.437*** (5.66)	0.492*** (6.41)	0.497*** (6.41)
Has vocational education ^b <i>[dummy]</i>	0.860*** (6.56)	0.749*** (4.81)	0.868*** (5.41)	0.703*** (5.07)	0.842*** (6.31)	0.876*** (6.46)
Has university education ^b <i>[dummy]</i>	1.131*** (10.30)	0.857*** (6.42)	1.007*** (6.92)	0.874*** (7.38)	1.123*** (10.04)	1.122*** (9.88)
Sector^c						
Retail <i>[dummy]</i>	-0.276*** (-2.73)	-0.267** (-2.25)	-0.286** (-2.42)	-0.074 (-0.69)	-0.254** (-2.48)	-0.010 (-0.09)
Manufacturing <i>[dummy]</i>	-0.221 (-1.38)	-0.209 (-1.14)	-0.324* (-1.71)	-0.081 (-0.47)	-0.251 (-1.48)	-0.038 (-0.21)
Agriculture <i>[dummy]</i>	-0.794*** (-7.30)	-0.623*** (-4.85)	-0.708*** (-5.46)	-0.512*** (-4.40)	-0.720*** (-6.45)	-0.328** (-2.45)
Other <i>[dummy]</i>	0.132 (0.42)	0.215 (0.55)	0.348 (0.76)	0.130 (0.38)	0.177 (0.55)	0.249 (0.66)
Pseudo R-Squared	0.26	0.27	---	0.28	0.26	0.27

Source: Author's calculations based upon data from the Zambia Business Survey MSME survey.

***, **, * Statistically significant at a 1 percent, 5 percent, and 10 percent level.

^a 'Leave-one-out' averages (i.e., averages for firms in same region and sector omitting the firm itself. ^b Omitted category is primary education or less. ^c Omitted sector is other services. ^d Column 2 includes sales per worker directly in regression, while column 3 instruments with the leave one average for firms in same sector and district. ^e The fourth column includes the firm's own index, while the fifth replaces the firm's own index with the 'leave-one-out' average for firms in the same region and sector.

Table 4 : Probability of registration with separate agencies by firm type for MSMEs.

	Registered with local authorities	Registered with PACRO	Registered with tax authorities
Observations	4214	4214	4214
Infrastructure			
Use of infrastructure by other firms in same region [index, average]	0.531** (2.55)	0.510** (2.28)	0.889*** (3.27)
Other firm's registration			
Registration rate for other firms in same region [dummy, average]	1.767*** (6.25)	0.681** (2.19)	1.232*** (3.51)
Firm Characteristics			
Number of workers [natural log]	0.552*** (5.43)	0.346*** (3.08)	0.355** (2.53)
Squared number of workers [natural log]	-0.115*** (-3.27)	-0.050 (-1.31)	-0.054 (-1.14)
Age of firm [years, natural log]	0.081** (2.05)	0.054 (1.21)	0.091 (1.63)
Firm operates in fixed business premises [dummy]	0.841*** (10.98)	0.322*** (3.52)	0.537*** (5.06)
Firm is in urban area [dummy]	0.225*** (2.90)	0.433*** (4.91)	0.206* (1.90)
Entrepreneur Characteristics			
Age of entrepreneur [dummy]	0.116 (0.86)	0.220 (1.45)	0.103 (0.55)
Has secondary education [dummy]	0.511*** (5.78)	0.406*** (4.03)	0.550*** (3.79)
Has vocational education [dummy]	0.958*** (6.65)	0.602*** (3.59)	0.986*** (5.01)
Has university education [dummy]	1.188*** (9.76)	1.069*** (8.12)	1.390*** (8.32)
Sector			
Retail [dummy]	0.040 (0.34)	-0.124 (-0.94)	-0.029 (-0.19)
Manufacturing [dummy]	0.023 (0.12)	-0.156 (-0.71)	0.001 (0.00)
Agriculture [dummy]	-0.373*** (-2.60)	-0.425*** (-2.69)	-0.208 (-1.07)
Other [dummy]	0.413 (1.09)	0.544 (1.40)	-0.017 (-0.03)
Pseudo R-Squared	0.32	0.23	0.30

Source: Author's calculations based upon data from the Zambia Business Survey MSME survey.

*** ** * Statistically significant at a 1 percent, 5 percent, and 10 percent level.

Note: See Table 4 for additional notes.

Table 5: Probability of registration with additional controls for infrastructure access and use.

Observations	Firm is registered			
	4214	4268	4214	4353
Infrastructure				
Firm uses electricity from grid [dummy]	0.740*** (7.90)	0.744*** (8.42)		
Firm uses water from public sources [dummy]	0.024 (0.23)			
Firm uses fixed-line telephone [dummy]	1.086*** (3.70)	1.089*** (3.72)		
% of firm in region using electricity from grid [dummy, average]			0.509 (0.81)	0.621* (1.72)
% of firm in region using from public sources [dummy, average]			0.084 (0.12)	
% of firm in region using fixed-line telephone [dummy, average]			1.374 (0.57)	
Other firm's registration				
Registration rate for other firms in same region [dummy, average]	1.672*** (6.11)	1.664*** (6.11)	1.658*** (6.06)	1.626*** (6.03)
Firm Characteristics				
Number of workers [natural log]	0.395*** (4.25)	0.394*** (4.25)	0.477*** (5.19)	0.478*** (5.31)
Squared number of workers [natural log]	-0.068** (-2.13)	-0.067** (-2.11)	-0.089*** (-2.81)	-0.088*** (-2.85)
Age of firm [years, natural log]	0.072* (1.93)	0.068* (1.84)	0.078** (2.15)	0.074** (2.06)
Firm operates in fixed business premises [dummy]	0.670*** (8.94)	0.684*** (9.17)	0.738*** (10.13)	0.756*** (10.53)
Firm is in urban area [dummy]	0.249*** (3.54)	0.244*** (3.49)	0.281*** (3.85)	0.272*** (3.90)
Entrepreneur Characteristics				
Age of entrepreneur [dummy]	0.149 (1.20)	0.153 (1.24)	0.114 (0.93)	0.103 (0.86)
Has secondary education [dummy]	0.434*** (5.53)	0.427*** (5.48)	0.497*** (6.40)	0.485*** (6.40)
Has vocational education [dummy]	0.704*** (4.93)	0.697*** (4.89)	0.875*** (6.45)	0.870*** (6.47)
Has university education [dummy]	0.792*** (6.46)	0.787*** (6.43)	1.122*** (9.88)	1.107*** (9.83)
Sector				
Retail [dummy]	0.153 (1.27)	0.147 (1.24)	-0.011 (-0.10)	-0.007 (-0.06)
Manufacturing [dummy]	0.062 (0.32)	0.102 (0.55)	-0.041 (-0.23)	0.012 (0.07)
Agriculture [dummy]	-0.100 (-0.71)	-0.111 (-0.79)	-0.330** (-2.46)	-0.340** (-2.55)
Other [dummy]	0.102 (0.26)	0.098 (0.25)	0.257 (0.68)	0.255 (0.68)
Pseudo R-Squared	0.31	0.31	0.27	0.27

Source: Author's calculations based upon data from the Zambia Business Survey MSME survey.

***, **, * Statistically significant at a 1 percent, 5 percent, and 10 percent level.

Note: See Table 4 for additional notes