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TAX EVASION, INFORMALITY AND THE BUSINESS ENVIRONMENT IN UGANDA

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ABSTRACT

Uganda has recorded impressive economic growth rates over the last two decades. How-ever despite the sustained period of growth, the tax effort measured by the tax-to-GDP ratio has stagnated between 10-13 percent of GDP over the same period. Non-empirical evidence has identified the pervasiveness of the informal sector, tax evasion, narrow tax base, and tax breaks variously given out by the government as some of the factors that might explain the inelastic tax system in Uganda. While the informal sector has implications for tax effort, there is limited research on the microeconomic level determinants of informality and tax evasion in Uganda.

This paper provides some empirical evidence on how a poor business environment causes tax evasion. In particular, the paper examines specific components of the business environ-ment that include the efficiency of the legal systems, bureaucratic bribery and the provision of public capital such as adequate provision of electricity and transport infrastructure which is complementary to firm performance and how they relate to tax evasion. I construct an instrument for bureaucratic bribery as the interaction between a firm's ability to pay and corruption as a business constraint. I compute an individual firm's ability to pay bribes as the total cost of labour, including wages, salaries, bonuses and social payments adjusted for the level of annual sales. I use instrumental variable OLS and Tobit estimation procedures separately and find that the extent of tax evasion is determined by the quality and efficiency of the legal systems, bureaucratic bribery and inadequate provision of public capital. In addi-tion I find that the business environment has implications for tax evasion. These results sug-gest that ameliorating the business environment, strengthening the legal system, adequate provision of public capital such as transport and electricity infrastructure as well as reigning in on bureaucratic bribery will reduce tax evasion and ultimately lead to increasing Govern-ment revenue collections.

Key words: Tax evasion, informality, business environment, Uganda

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1. INTRODUCTION

The tendency of firms to operate informally and evade taxes is widespread in many developing countries. Schneider (2006) estimated the size of Uganda's informal economy at 45.4 percent of gross national income in 2003. More recent studies such as Schneider et al (2010) and Buehn & Schneider (2012) estimated the size of Uganda's shadow economy to be 45.8 percent and 40.3 percent of gross national income, respectively. At the same time Governments, especially in the developing world, are increasingly finding difficulties in mobilising domestic revenue due to an inelastic tax system characterised by a narrow tax base and widespread informality in the business sector. For these reasons, issues of tax evasion, informality, and widening of the tax base have now received renewed attention in policy debates.

Uganda has recorded impressive economic growth rates over the last two decades. However despite the sustained period of growth, the tax collected as measured by the tax-to-GDP ratio has stagnated between 10-13 percent of GDP over the same period (AfDb 2010; Matovu 2011). Non-empirical evidence has identified the pervasiveness of the informal sector and narrow tax base (AfDB 2010; Matovu 2010; Ssenoga et al 2009), and the effect of the tax breaks variously given out by the government (Gauthiera and Reinikka 2006; Tax Justice Network-Africa & Action Aid International (2012) as some of the factors that might explain the inelastic tax system in Uganda. Moreover, Uganda's tax compliance attitude estimated at 32 percent is lower than that of its regional neighbours, Kenya (54 percent)

and Tanzania (46 percent), as shown by Ali et al (2013).

Consequently, Uganda has continued to struggle with inadequate funds to finance its budget. Recent events where the donors who contributed as much as 25% of the national budget decided to withhold some of their support due to allegations of corruption in various government departments have left the Ugandan economy affected, with major implications on service delivery and business growth (Mawejje 2012). In turn, the Uganda Revenue Authority (URA), Uganda's autonomous body responsible for tax revenue collections, has had its tax collection targets elevated to close the financing deficit. However, the biggest challenge has been ensuring tax compliance, especially considering the size of the informal sector in the country.

While the informal sector has implications for tax effort, there is limited research on the microeconomic level determinants of informality and tax evasion in Uganda.

Central to the studies of the drivers of informality and tax evasion is the role of the environment in which businesses operate. A conducive business environment has been shown to enhance business performance. Inshengoma and Kappel (2011) examined the trends of some factors in the Uganda business environment between 1994 and 2010 and concluded that the business climate has deteriorated. The central question to this study is whether the various constraints in the business environment are some of the drivers of tax evasion. In other words, does an adverse business environment encourage Ugandan firms to operate

informally and evade taxes?

This paper follows the work of de Soto (1989), Loayza (1996) and Dabla-Norris et al (2008) who modelled informality as the failure by economic agents to fully comply with Government determined regulations and taxes. According to this framework, informality arises from excessive regulation, taxation and bureaucratic red tape by a Government that lacks the capacity to fully enforce compliance (Loayza 1996).

Using a 2006 World Bank dataset of a cross-section of Ugandan firms, I make a contribution to the empirical literature about the drivers of informality and tax evasion. In particular, I investigate if firm managers' perceptions about the business environment influence their decisions to operate informally and avoid taxes. I model a firm's decision to operate informally as a profit maximisation problem that depends on Government's provision of a conducive business environment and efficient legal systems that ensure enforceability of set regulations.

I show that inadequate Government provision of public capital, bureaucratic bribery, an inefficient legal environment and an adverse business environment are all associated with increasing informality and tax evasion. In addition, I show that firm, managerial as well as industry specific characteristics are important correlates of informality and tax evasion.

The rest of the paper is organised as follows: section two discusses the nature of the business environment in Uganda and informality. The literature survey and analytical framework are discussed in section three

while data and estimation strategy are presented in section four. Section five presents the findings and lastly the conclusions are presented in section 6.

2. THE BUSINESS ENVIRONMENT AND INFORMALITY IN UGANDA

2.1 The nature of the business environment in Uganda

According to Ishengoma and Kappel (2011) Uganda's business environment has been deteriorating over time. In addition, Uganda is still classified as a factor driven economy, implying that the key pillars for competitiveness are still the basic requirements such as adequacy of infrastructure, institutions, macroeconomic environment, health and primary education (World Bank 2013). According to the World Bank (2013), Uganda's competitiveness is largely driven by labour market efficiencies, developments in the macroeconomic environment and financial markets. Uganda's competitiveness ranking deteriorated to 123 in 2013 from 108 in 2009. This is largely due to insufficient progress made in addressing the education and skills challenges coupled with a poor work ethic, institutional weaknesses, infrastructural bottlenecks, lack of innovation and inadequacy of technology readiness.

The most pressing constraints to business development in Uganda are legal, regulatory and infrastructural challenges in addition to challenges in identifying, attracting and retaining an appropriately skilled labour force (PSFU 2012). Other challenges include non-

tariff barriers to trade, the tax burden and constrained credit market access (Mawejje 2012).

The World Bank (2013) highlights the regulatory burden of doing business in 183 economies. It aims at investigating the regulations that enhance business activity and those that constrain it. It looks at the impact of regulation on businesses at ten stages of a typical business's life cycle: starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a business. Uganda currently ranks 123rd out of the 183 economies measured by the Doing Business 2013 report on the overall ease of doing business. This ranking is worse that 2012 when the country was ranked 121st and 2011 when the country ranked 118th. The current ranking indicates that the business environment in Uganda has been deteriorating. The deterioration of the Uganda business environment has been occasioned by the persistence of constraints as detailed in table 1) below:

2.2   The extent of informality in Uganda

Uganda's Business Sector is dominated by Micro, Small and Medium Scale Enterprises (MSMEs) which comprise about 1,100,000 enterprises and employ approximately 2.5 Million people - equivalent to 90% of total non- farm private sector workers (PSFU 2012). Majority of these businesses operate in the informal sector. The Uganda informal sector is not only large but it is expanding too. For example Schneider's (2006) estimates shows that the informal sector in Uganda, as a percentage of GDP, increased from 43.1 in 2000 to 45.4 in 2003. A study by Muwonge et al (2007) estimates that 87 percent of all business establishments in Uganda; 80 percent of Uganda's economic total active labour force and 88 percent of women workers are all categorised within the informal sector. More recent estimations by Schneider et al (2010) and Buehn & Schneider (2012) indicate that the size of the informal sector or "the shadow economy" expressed as a percentage of gross national income is large and stands at 45.8 percent and 40.3 percent respectively. This evidence points to the ubiquitous nature of informality in Uganda.

Table 1: Constraints to Business Development in Uganda

Constraints	Years				
	2008/9	**2009/10**	**2010/11**	**2011/12**	**2012/13**
Corruption	17.0	17.8	21.9	20.2	18.4
Access to financing	22.9	19.3	15.3	17.6	16.7
Inadequate Infrastructure	11.4	13.0	13.0	10.3	12.8
Tax Rates	9.9	8.6	8.9	11.0	9.6
Poor work ethic in labour force	9.6	7.2	7.1	5.4	4.2
Government Bureaucracy	8.6	7.1	6.7	7.3	4.2
Inflation	4.6	7.3	6.3	13.3	16.3
Inadequately educated work force	3.4	3.7	5.0	2.8	3.3
Tax Regulations	4.3	3.9	4.4	2.5	1.1
Crime and theft	0.9	3.0	3.1	1.3	2.6

Source: Global Competitiveness Report (2013): The World Bank

3. LITERATURE AND ANALYTICAL FRAMEWORK

3.1 Literature review

Faced with growing development financing needs, reducing donor aid and an inelastic tax system many countries in the developing world started to think of ways of collecting more domestic revenue. The major bottlenecks were the large un-taxed informal sector and corruption in tax administration. The first steps towards improving tax systems were to institute reforms in tax administration. In the case of Uganda, the creation of the semi-autonomous tax body, the Uganda Revenue Authority (URA) was the first step towards instituting tax reforms aimed at increasing tax yield (Fjeldstad 2005).

At the same time, in a bid to understand the sheer size of the informal sector, many scholars set out to estimate the size of the informal or underground economy. This was intended to understand tax evasion and initiate debate on how the informal sector can be taxed to reduce revenue losses (see for example, Chipeta 2002; Schneider 2002; Schneider et al 2010; Buehn & Schneider 2012). While such studies helped to understand the extent of tax evasion in the economy, they cannot explain the reasons behind the firms' decisions to operate informally. This led to the popularity of firm level research into the determinants of informality. The importance of a good business climate for firm performance has been well researched in the literature. Reinikka and Svensson (2002) provided early insights into the implications of inadequately supplied public goods (such as transport infrastructure and electricity provision) that forms

part of the business environment in which firms operate. They show that firms significantly reduce investments in productive capacity when faced with poor provision of complementary public capital. Subsequent research has shown investment climate has implications for firm level productivity (Dollar et al 2002; Ingram et al 2007) and growth (Dollar et al 2003).

Dabla-Norris and Gradstein (2008) developed a general equilibrium model where the strength of the legal and regulatory system serves to hinder operations in the informal economy. They show that the quality of the legal and regulatory environment is the most important determinant of the level of activities in the informal sector, even more important than the prevailing tax policy and financial constraints.

By constructing a hostility business environment index, Sebigunda (2013) explored the link between the business climate and firm efficiency in the Democratic Republic of Congo. They paradoxically show that business environment hostility significantly improves the efficiency of firms in the context of a war setting. This finding is consistent with the finding in the same paper that corruption improves firm efficiency in a post conflict setting.

The literature identifies corruption and bribery of government officials, as one of the important determinants of firm performance and growth. The motives for corruption and bribery have now received much attention in the literature, with inconclusive evidence on the implications for firm performance. Employing Ugandan firm level data, Fisman and Svensson (2007) were able to show that corruption, captured as the propensity to

pay bribes is negatively associated with firm growth. However, this finding is contrasted by Kasuga (2013) who shows that paying bribes and corruption generally reduces the bureaucratic red tape and improves productivity. This implies that firms pay bribes to circumvent the adverse business environment.

Intuitively, if the business environment is ameliorated, firms would invest more into productive capital. Therefore, it can easily be seen that corruption would reduce firm productivity to the extent that it crowds out productive investments. Indeed Dabla-Norris and Gradstein (2008) show that corruption has a large effect on the tendency to operate informally for both small and large firms.

Benjamin and Mbaye (2010) used firm-level data from 900 formal and informal businesses in three Western African countries of Benin, Burkina Faso and Senegal. They show that the emergence of the informal sector is aided by a lack of robust enforcement mechanisms. In addition they document significant productivity differences between the informal and formal sectors.

Ali et al (2013) examined the correlates of tax-compliance tendencies between four African countries of Kenya, Tanzania, Uganda and South Africa. Using binary logit models they showed that tax compliance tendencies are influenced by the strength of the legal system that is deterrent enough to make evasion unattractive. Moreover, compliance is also influenced by the citizen's level of satisfaction with public service provision by the state. In addition ethnic sectarianism and the availability of information regarding taxation are all shown to be important

determinants of tax compliance behaviour.

3.2 Analytical Framework

The analytical framework used in this paper is adopted from Dabla-Norris et al (2008) and is in the realm of a profit-maximising firm that uses labour, private capital and public capital in its production function as expressed below

$$y_i = a_i f(L, K, G) \qquad \qquad 1)$$

Such that $f' > 0$ and $f'' < 0$

Where L is the amount of labour employed, K is the private capital investment, G is public capital, and a_i is the firm's productivity from other sources. Labour earns a wage *w* and private investment earns a return *r.*

Firms expect Government to invest in the provision of a conducive business environment or public capital that is complementary to private capital. Such public capital may be in the form of provision of adequate supply of electricity or quality transport infrastructure and is expected to reduce the cost of doing business and thus enable private firms to thrive.

I assume that governments can only provide the public good by imposing a taxation rate t on the firm's output and labour. The total amount that Governments collect is equal to T such that for efficient provision of complimentary public capital G must equal to T or $G = T$. For simplicity, I assume that governments do not run deficits and therefore G cannot exceed T. In reality however, Governments borrow and run deficits. Firms observe government's commitment to provide public good in period i and make a decision to operate formally or informally or

evade tax in the next period $i+1$.

Specifically, firms choose to operate formally in period $i+1$ if their perceptions of government's commitment to providing complementary capital are positive. Otherwise, firms will operate informally or will be unwilling to reveal their actual output. In this case, real output will be hidden so as to avoid a proportion of the taxes. Employees in the informal sector earn a wage w that is not taxed. Employees in the formal sector on the other hand earn a wage w_f and pay a tax t_f such that their net wage is $w_f - t_f$. This implies that employees choose to engage in formal employment if , that is if it makes economic sense to do so.

Likewise, firms engage in the formal sector if they expect government to provide public complementary capital to at least a minimum level g_f , otherwise firms operate informally or avoid paying taxes. However, operating formally is also costly since it involves a cost τ that is associated with meeting government regulatory requirements. If firms perceive the regulatory requirements as unnecessarily high, they will choose to operate informally.

Firms that operate in the formal sector earn a profit $\pi_f = af(L,K,G) - wL - rK - \tau - C$, while those that operate in the informal sector earn a profit equivalent to $\pi_{nf} = af(L,K,G) - wL - rK - C$. The costs of meeting the regulatory requirements that may include filing tax returns can be a significant factor in ensuring that firms choose to operate in the informal sector as shown by Djankov et al (2002).

Until now, I have assumed that there are no risks or penalties to operating informally. In reality, if firms hide output or under declare their tax obligations they face a probability, p , of being caught and punished (Galian and Weinschelbaum, 2012; Dabla-Norris et al, 2008). For simplicity, I assume that if caught, firms are fined their full profits and workers do not receive their wages. It, therefore, follows that the profits for firms operating in the informal sector can be expressed as:

$$\pi_{nf}(notcaught) = af(L,K,G) - wL - rK - C$$
, with probability $1-p$ 2)
$$\pi_{nf}(caught) = 0, \text{ with probability } p \quad 3)$$

Expressions 2) and 3) above imply that expected profits for a firm operating informally are given as:

$$\pi_{nf} = [af(L,K,G) - wL - rK - C](1-p) \quad 4)$$

In reality however, firms may only partially operate informally and hide only a fraction of their output and labour demand. For many developing countries, especially in Sub Saharan Africa, it has been shown that many firms operate two or more books of accounts for tax evasion purposes (Benjamin and Mbaye 2012). If this is true, then the analytical framework and basic model will be extended, following Dabla-Norris et al (2008), to reflect situations where firms operate only partly informally.

Let the firm's share of output that is reported for tax purposes be γ_i such that the level of informal activity is $1-\gamma_i$. Let the cost of regulation in the formal sector be denoted τ as before and is positively related to the fraction of output the firm declares for tax purposes or the level of formality, $\tau\gamma i$, and the probability of detecting informal activity in firm i is related to its share $p(1-\gamma i)$. Firm i's expected profits are then expressed as:

$$\pi_{nf} = \gamma_i \left[af(L,K,G) - wL - rK - \tau(\gamma i) \right]$$
$$+ (1 - \gamma i) \left[af(L,K,G) - wL - rK \right] \left[p(\gamma i) \right] \qquad 5)$$

Denoting the first expression of the right hand part of equation 5) above as a and the second part as b such that $\pi_{nf} = a + b$, then it is becomes clear that the decision to operate informally depends on whether $a > b$, that is π_{nf}, must strictly be non-negative. Each firm i chooses its desired level of informality $1 - \gamma_i$ after assessing the level of the strength of the legal environment that determines the probability that it will be caught or not.

Following the above analytical framework, I test the proposition that the efficiency of the legal environment is an important determinant of tax evasion. In addition, I test the proposition that firms that are constrained by the inadequate complementary public capital are more likely to operate with a higher level of tax evasion than firms for whom complementary public capital is not perceived as a major constraint. . In this study, I look at public capital in terms of efficient access to electricity and the general business environment. This preposition is akin to the observation of Etzion (2012) who indicated that when a government fails to deliver the complimentary public capital that it should, it loses the legitimacy and this in turn may diminish the firms' willingness to pay taxes. I extend the model to include bribery and both firm and industry level characteristics.

4. DATA AND ESTIMATION STRATEGY

4.1 The data

The study uses data from the 2006 World Bank Enterprise Surveys for Uganda. The data was collected in five districts namely; Kampala, Jinja, Mbale, Mbarara and Lira and involved 563 firms. The data contains information on Ugandan firms' perceptions of the quality of Government provision of public services, the strength of the legal framework, bureaucratic red tape, corruption and bribery as well as other constraints in doing business. Most importantly, the survey has information on the tendency to operate informally. Specifically the survey questionnaires have the following question that I use as a proxy for tax evasion: "What percentage of total annual sales would you estimate a typical establishment in your sector of activity reports for tax purposes?"

Of equal importance, the survey asked questions about the specific components of the business environment and on a scale of 1 -5 where 1 represents no obstacle and 5 represents very severe obstacle, the business managers were required to indicate whether the stated factors presented any obstacles to the operations of the establishment. The evaluated factors included: functioning of the courts; practices of competitors in the informal sector; corruption; macroeconomic instability; access to finance; inadequately educated workforce; tax administration; tax rates; transportation and electricity. The empirical analysis laid special emphasis on the effects of bribery, adequate provision of electricity and the functioning of the courts.

Table 2: Summary statistics of variables to be used in estimation

Variable names	N	Mean	Standard deviation	Min	Max
Firm evades some taxes (yes=1)	563	0.730	0.444	0	1
Percentage of sales hidden for tax purposes (log)	547	2.912	1.889	0	4.615
Number of electricity outages in month (log)	533	2.403	0.435	1.098	3.433
Monthly outages exceed mean level (yes=1)	563	0.515	0.500	0	1
Courts are fair and impartial	559	2.308	0.913	1	4
Courts are quick	562	2.076	0.861	1	4
Courts are affordable	562	2.341	0.866	1	4
Courts can enforce decisions	553	2.763	0.961	1	4
Firm age (logarithm)	554	2.379	0.637	0.693	4.382
Firm size (log number of employees)	563	2.696	1.001	1.099	8.294
Manufacturing (yes=1)	563	0.545	0.498	0	1
Retail and wholesale trade (yes=1)	563	0.216	0.412	1	1
Level of domestic ownership (log)	563	3.938	1.583	0	4.615
Presence of female owners	563	1.692	0. 618	1	2
Manager's education level in years	556	6.680	1.909	1	12
Manager's experience in years (log)	558	2.228	0.622	0.693	3.829
Percentage level of exports (log)	563	0.245	0.882	0	4.615
Exports - Dummy	563	0.080	0.271	0	1
Business location – Kampala	563	0.801	0.399	0	1
Business location – Jinja	563	0.053	0.225	0	1
Business location – Mbale	563	0.043	0.202	0	1
Business location – Mbarara	563	0.062	0.242	0	1
Shares of informal payments intotal sales (log)	488	0.911	1.093	0	3.892
General constraint – electricity	563	4.440	0.979	1	5
General constraint – transport	563	2.446	1.320	1	5
General constraint - tax rates	563	3.597	1.202	1	5
General constraint - tax administration	563	2.417	1.241	1	5
General constraint– courts	563	1.355	0.763	1	5
General constraint - skills	563	1.872	1.022	1	5
General constraint – finance	563	3.310	1.376	1	5
General constraint - macroeconomic factors	563	2.218	1.327	1	5
General constraint – corruption	563	2.266	1.356	1	5
General constraint - competition from informal businesses	563	2.827	1.411876	1	5

Source: Author calculations based on the 2006 World Bank Enterprise Surveys for Uganda

Table 2 contains descriptive statistics of the variables of interest to this paper. It includes a measure of tax evasion – the proportion of sales kept off the books for tax purposes; the constraints in doing business including measures for bureaucratic corruption and bribery; as well as various firm level characteristics. The data indicates that more than 73 percent of all firms are engaged in some degree of tax evasion. The average firm experiences about 11 power outages in a typical month.

In terms of the general business environment constraints that firms face, on average firms report that electricity availability and cost (37 percent), tax rates (16 percent), access to finance (12 percent), practices of competitors in the informal sector (7 percent) and transport infrastructure (5 percent) are the major obstacles. Other constraints are reported with varying degrees of intensity as shown in appendix 4.

4.2   The estimation strategy

To estimate the determinants of tax evasion and informality among Ugandan firms, I estimate equation 6 below:

$$Evasion_i = \beta_0 + \beta_1 courts_i + \beta_2 outage_i + \beta_3 bribery_i + \beta_4 V_i + \beta_5 W_i + \beta_6 Z_i + \varepsilon_i \quad 6)$$

Where *Evasion* is the level of tax evasion for a particular firm measured as percentage of sales not reported for tax purposes. Courts is a measure of efficiency of the legal system, categorised as "fair and impartial", "quick", "affordable", and "can enforce decisions". Each of these four categories is measured on a scale of 1-4 where 1 represents strongly disagree and 4 represents strongly agree. The variable outage is a measure of the extent of electricity availability in a typical month and is treated as a dummy variable

in which a firm reports yes if it experienced electricity outages in excess of the monthly average. Bribery is the extent to which a firm makes informal payments to "have things done" and is measured as a share of informal payments in total sales. *V* is a vector of firm level characteristics, *W* is a vector of industry level characteristics, and *Z* is a vector of general constraints that firms face. ε_i is the stochastic error term that is assumed to be independently and identically distributed with zero mean and constant variance.

The dependent variable is the proportion of sales not reported for tax purposes. Other independent variables of interest included in the base equation include the strength and efficiency of the legal system as captured by the functioning of the courts of law. The efficiency of the court system is captured by four variables that include the extent to which courts are fair, quick, affordable, and can enforce decisions. Government public capital provision is captured by a dummy variable that equals 1 if the number of outages experienced by a firm in a typical month exceeds the mean value of number of outages reported in a month and zero otherwise. Another important variable is bureaucratic bribery. This is included because bribes are in themselves taxes to the firm and therefore are likely to discourage official tax payments.

Other control variables are added to the base model separately and they include: the various firm characteristics that include firm age and size in terms of number of employees; firm manager/owner characteristics that include level of education and years of experience and the extent to which a business is owned by nationals (domestic ownership). The models include the square

terms of age and size to control for any non-linear relationships that may exist between informality, size and age.

I construct two dummy variables for manufacturing and retail sectors to control for industry effects and interpret these in relation to firms engaged in the rest of the sectors. In addition I control for geographical effects by constructing location dummy variables for Kampala, Jinja, Mbale and Mbarara and interpret them in relation to the one that was left out (Lira).

I employ two different methods of parameter estimation that include Ordinary Least Squares (OLS); and maximum likelihood Tobit methods. The OLS estimations assume a linear relationship between tax evasion and the independent variables. I include the Tobit methods because the adopted measure of tax evasion is censored at zero. Data shows that 28 percent of all the firms have a zero score for tax evasion. I believe this may cause bias in the OLS estimations, and this justifies my choice of the Tobit model. The OLS models are estimated with heteroskedasticity robust standard errors. The models are later re-estimated using instrumental variable methods because I have sufficient reason to suspect that one of our key independent variables, bribery, is endogenous.

5. RESULTS AND DISCUSSION

In this section I present the estimated results. I begin by presenting the results from the Ordinary Least Square estimations in table 3.

Model (1) represents the base equation. It includes measures of a quality legal envi-ronment that is measured by four variables that include the extent to which: i) courts are fair; ii) courts act quickly; iii) courts can enforce decisions, and iv) courts are affordable. I included a variable that controls for state public capital provision – a dummy variable for electricity outages. Whereas a variable that would represent the number of days reported each month that firms did not have electricity is a suitable indicator for electricity outages, it has a major limit that it would be bounded at 30 or 31 for firms that spent an entire month without electricity. This would lead to serious interpretation problems. To circumvent this problem, I constructed a dummy variable that equals one if electricity outages exceed the mean monthly value and zero otherwise. In addition, I include a variable that captures the extent of bureaucratic bribery. All regressions include location specific dummy variables (not shown in results).

Results from the base model (1) largely confirm the analytical framework. Two of the four variables that capture the quality and efficiency of the legal framework are significant with the expected signs. These variables are: i) the extent to which courts are quick in resolving disputes and ii) the extent to which courts are affordable. This shows that the efficiency of the legal system is highly correlated to tax evasion and informality. In addition, results indicate that firms choose to operate informally in response to deficient public capital provision and bureaucratic bribery. According to model 1) the biggest effect on tax evasion is due to bribery followed by the extent to which courts are perceived to be quick in resolving disputes.

Model (2) extends the base model by add-

ing two dummy variables for manufacturing and retail and wholesale trade. These dummies were constructed in relation to the rest of the businesses. Results from this model show that Ugandan firms that are retail in nature tend towards informality than their counterparts that are not. The coefficient for retail and wholesale trade is positive and significant implying that firms engaged in this trade tend to be more informal and evade more taxes.

Model (3) includes two more firm level variables that include age and size. Age is the number of years a firm has been in existence and size is the total number of employees. Results from this model suggest that while informality is positively associated with firm age, larger firms are less likely to operate informally.

Model (4) includes two variables that capture the firm manager's characteristics including education and years of experience. The model also includes a variable that captures the extent of domestic ownership. Results show that of three additional variables, only manager's level of experience matters for tax evasion and informality. Surprisingly more experience is associated with bigger levels of firm-level tax evasion.

Models (5) and (6) include some business environment constraints of relevance to Ugandan firms. These include transport, tax administration, skills, finance, macroeconomic, and competition constraints. The business environment constraints are measured on the scale 1–5 with 5 representing a very severe obstacle and 1 representing no obstacle. In addition, model (6) tests the existence of non-linear relationships between tax evasion, firm age and firm size.

Results show that transport constraints, inadequately skilled workforce, as well as constraints in the macroeconomic environment are positively associated with higher levels of informality and tax evasion. In addition, competition from the informal sectors and tax administration obstacles are negatively associated with tax evasion and informality. The existence of non-linear relationships in firm age and size was tested by the inclusion of their respective square terms in model (6). The square of age is not statistically significant but the square of firm size is significant, albeit weakly at the 10 percent level, indicating the possible existence of a non-linear relationship between firm size and tax evasion. The full results for all the models are expressed in table (3) below:

Since the values of the dependent variable – the proportion of annual sales not reported for tax purposes has many values that are zero (28 percent of all firms) then OLS estimates may be biased. For this reason therefore, models were re-estimated using the maximum likelihood Tobit procedures. This estimation strategy corrects for any biases caused by the concentration of variables at the lower limit. The results (table 4) are largely unchanged except that the coefficients on bribery and indeed most other variables are bigger implying that OLS coefficients were underestimated.

Table 3: The determinants of tax evasion – Ordinary Least Square estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Bribery	0.399***	0.377***	0.380***	0.401***	0.439***	0.442***
	(0.070)	(0.071)	(0.071)	(0.071)	(0.071)	(0.071)
Dummy - electricity outages in excess of monthly average	0.293*	0.296*	0.287*	0.244	0.398**	0.397**
	(0.179)	(0.178)	(0.177)	(0.181)	(0.174)	(0.174)
Courts are fair	-0.099	-0.102	-0.089	-0.088	-0.148	-0.151
	(0.098)	(0.097)	(0.098)	(0.098)	(-0.148)	(0.098)
Courts are quick	-0.345***	-0.338***	-0.354***	-0.362***	-0.342***	-0.319***
	(0.100)	(0.100)	(0.098)	(0.098)	(0.095)	(0.096)
Courts can enforce decisions	-0.126	-0.132	-0.167*	-0.153*	-0.142	-0.144*
	(0.089)	(0.087)	(0.087)	(0.089)	(0.089)	(0.089)
Courts are affordable	-0.282***	-0.282***	-0.278***	-0.254***	-0.262***	-0.256***
	(0.096)	(0.095)	(0.094)	(0.097)	(0.098)	(0.098)
Age in complete years			0.289**	0.134	0.136	0.551
			(0.121)	(0.149)	(0.149)	(0.479)
Number of employees (size)			-0.320***	-0.317***	-0.324	0.160
			(0.090)	(0.101)	(0.098)	(0.321)
Square - age						-0.100
						(0.102)
Square - number of employees						-0.070*
						(0.042)
Manufacturing (yes=1)		-0.330	-0.340*	-0.397*	-0.463**	-0.445**
		(0.210)	(0.208)	(0.214)	(0.214)	(0.217)
Retail and wholesale (yes=1)		0.375*	0.152	0.095	0.143	0.202
		(0.231)	(0.235)	(0.235)	(0.240)	(0.242)
Manager's education				-0.062	-0.062	-0.053
				(0.048)	(0.047)	(0.047)
Manager's experience				0.374*	0.324*	0.304*
				(0.202)	(0.198)	(0.204)
Domestic ownership				0.017	0.026	0.028
				(0.058)	(0.059)	(0.059)
Transport constraint					0.161**	0.183**
					(0.076)	(0.077)
Tax administration constraint					-0.192**	-0.188**
					(0.078)	(0.078)
Skills constraints					0.115	0.126*
					(0.076)	(0.076)
Finance constraints					-0.019	-0.031
					(0.064)	(0.065)
Macroeconomic constraints					0.224***	0.210***
					(0.076)	(0.077)
Corruption constraints					0.063	0.068
					(0.071)	(0.072)
Competition constraints					-0.159***	-0.147***
					(0.062)	(0.062)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	1.822***	2.010***	2.112***	1.881**	1.729**	0.557
	(0.479)	(0.491)	(0.567)	(0.777)	(0.802)	(0.997)
Observations	465	465	457	452	452	452
R-Squared	0.126	0.149	0.176	0.188	0.247	0.252

Notes: 1) The coefficients are tabulated heteroskedasticity robust standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *= significant at the 10% level, ** = significant at the 5% level, *** =significant at the 1% level

The maximum likelihood Tobit estimations (table 4) indicate that bribery has a large and highly statistically significant effect on tax evasion and informality. On average, a one percent change in the proportion of unofficial payments results in a 0.5 – 0.6 percentage increase in tax evasion. Just like in the OLS estimations, the legal environment plays a significant role in explaining tax evasion and informality. In particular, the extent to which courts are perceived to be quick and affordable has implications for tax evasion. This is consistent with our theoretical framework.

In addition, results show that tax evasion is correlated with inadequate supply of public capital. The coefficient of the dummy variable for electricity outages in excess of the monthly mean is large and statistically significant in all the models. This finding could point to the fact that firms that face electricity challenges will most likely invest in own electricity generation at the expense of productive investments and therefore do not have the incentive to pay taxes. Reinikka and Svensson (2002) provide a detailed discussion on the effects of inadequately supplied public capital in the context of Ugandan firms. In addition, the coefficient on transport as an obstacle to business operation is positive and significant indicating that firms that face the most severe transport bottlenecks are more likely to hide output and so evade taxes. This may be true if bad roads, for example, necessitate firms to replace motor vehicle parts more frequently and this eats into their profits and capital. Firm characteristics that include firm age and size are also associated with tax evasion. In particular, older firms are associated with increased tax evasion while bigger firms are associated with less tax evasion. An increase

of a firm's age by one percent increases tax evasion by between 0.15 – 0.30 percentage points. However, I failed to confirm the existence of a nonlinear relationship between tax evasion, firm age and the number of employees.

Results also reveal that tax evasion increases with manager's experience. The manager's level of education does not seem to matter for tax evasion. Firms in the retail and wholesale sectors tend to be associated with more tax evasion, while firms in the manufacturing sector tend to evade less taxes in relation to the rest of the sector. Firm characteristics including firm age and size are shown to be highly correlated with the tendency to evade taxes and to operate informally. In particular young firms learn to evade taxes as they grow older. Bigger firms that employ more people are less likely to operate informally and evade taxes.

Finally, various business constraints have implications for tax evasion and informality. In particular, firms tend to operate at a bigger level of informality when faced with tougher transport, macroeconomic, inadequately skilled manpower challenges.

Surprisingly, results show that firms operate more formally when faced with tax administration and competition challenges. I cannot find a plausible explanation to this finding, but I conclude that it could possibly be due to data challenges.

Table 4: The determinants of tax evasion – maximum likelihood Tobit estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Bribery	0.565***	0.525***	0.517***	0.544***	0.597***	0.595***
	(0.118)	(0.116)	(0.116)	(0.117)	(0.115)	(0.115)
Number of electricity in excess of monthly average (yes=1)	0.486*	0.488*	0.494*	0.430*	0.665**	0.662**
	(0.266)	(0.263)	(0.261)	(0.265)	(0.261)	(0.260)
Courts are fair	-0.147	-0.155	-0.132	-0.132	-0.220	-0.222
	(0.163)	(0.161)	(0.159)	(0.160)	(0.155)	(0.154)
Courts are quick	-0.481***	-0.470***	-0.498***	-0.506***	-0.479***	-0.445***
	(0.160)	(0.159)	(0.156)	(0.157)	(0.154)	(0.154)
Courts can enforce decisions	-0.171	-0.182	-0.230*	-0.213	-0.198	-0.200
	(0.140)	(0.138)	(0.137)	(0.139)	(-0.198)	(0.136)
Courts are affordable	-0.380**	-0.381**	-0.385**	-0.358**	-0.360**	-0.353**
	(0.156)	(0.153)	(0.152)	(0.155)	(0.151)	(0.151)
Age in complete years			0.382**	0.157***	0.157	0.706
			(0.176)	(0.207)	(0.201)	(0.631)
Number of employees (size)			-0.522***	-0.524	-0.523	0.305
			(0.141)	(0.150)	(0.146)	(0.590)
Square - age						-0.131
						(0.138)
Square - number of employees						-0.123
						(0.086)
Manufacturing (yes=1)		-0.556*	-0.545*	-0.634**	-0.726**	-0.708**
		(0.308)	(0.307)	(0.311)	(0.313)	(0.313)
Retail and wholesale (yes=1)		0.625*	0.252	0.152	0.221	0.304
		(0.364)	(0.369)	(0.375)	(0.369)	(0.370)
Manager's education				-0.094	-0.096	-0.085
				(0.072)	(0.070)	(0.070)
Manager's experience				0.565**	0.483*	0.450**
				(0.256)	(0.248)	(0.251)
Domestic ownership				0.019	0.031	0.033
				(0.081)	(0.081)	(0.081)
Transport constraint					0.223**	0.254**
					(0.103)	(0.104)
Tax administration constraint					-0.283**	-0.279**
					(0.114)	(0.114)
Skills constraints					0.191	0.206*
					(0.128)	(0.128)
Finance constraints					-0.027	-0.044
					(0.093)	(0.093)
Macroeconomic constraints					0.315***	0.298***
					(0.108)	(0.108)
Corruption constraints					0.121	0.129
					(0.107)	(0.107)
Competition constraints					-0.208**	-0.190**
					(0.095)	(0.095)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	1.266	1.600**	1.973**	1.714	1.320	-0.465
	(0.797)	(0.807)	(0.897)	(1.172)	(1.207)	(1.550)
Observations	465	465	457	452	452	452
Pseudo R-Squared	0.030	0.039	0.047	0.050	0.068	0.070

Notes: 1) The coefficients are tabulated standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *=significant at the 10% level, ** =significant at the 5% level, *** =significant at the 1% level

So far the estimation procedures have assumed that the explanatory variables are purely exogenous. However we have sufficient reasons to suspect that one of our key variables, bribery of government officials, is endogenous. First, it is within a firm's discretion to decide on how much to pay out in unofficial payments or bribes to public officials. Second, there may exist two way relationships between tax evasion and bribe payments. On the one hand, firms that evade taxes may pay bribes to officials so as to cover up or not get reported to the authorities. On the other hand, firms may evade taxes if officials ask for informal payments "to get things done quickly" and in this case the informal payment is perceived as a tax on the firm. If any of the two conditions above is correct, then results in tables 4) and 5) may be biased. Therefore OLS and Tobit estimates will not be valid and cannot infer on the direction of causality.

For these reasons I re-estimate the models in tables 3) and 4) using the instrumental variable methods controlling for the possible endogeneity bias due in bribery. The paucity of the data makes it difficult to identify meaningful instruments for bribery. However, I relied on earlier work by Kasuga (2013) and intuition to identify one plausible instrument – the interaction between a firm's 'ability to pay' and corruption as an obstacle in doing business. Ability to pay is constructed as the total cost of labour, including wages, salaries, bonuses and social payments adjusted for the level of annual sales. Adjusting for sales allows me to construct a variable that is comparable across both small and large firms.

Establishing a valid causal relationship between tax evasion and bribery requires that the constructed instrumental variable satisfies two conditions. The first is that the instrument must be correlated with bribery. The second condition is that the instrument should affect the tax evasion only via its effect on bribery. These two conditions mean that the instrument must be correlated with bribery but not correlated with tax evasion. It is easy to see from the first stage regressions (Appendices 1 and 2) that the first condition is satisfied. The second condition is harder to explain but I know that firms only pay bribes if and only if they have the ability to do so. Otherwise they do not. Whereas ability to pay bribes affects bribery, it may not explain tax evasion. Moreover, the other component of the instrument – corruption as a business constraint - was included in all the OLS and Tobit models in tables 3) and 4) and its effect on tax evasion was shown to be quantitatively small and statistically not significant. I am, therefore, comfortable with the choice of instrument. First, I present the OLS IV results in table 5 below:

Table 5: The determinants of tax evasion – IV OLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Bribery	1.395**	1.538**	1.467**	1.222**	1.163**	1.161**
	(0.640)	(0.700)	(0.723)	(0.610)	(0.546)	(0.554)
Number of electricity in excess of monthly average (yes=1)	0.019	0.070	0.085	0.040	0.192	0.193
	(0.298)	(0.303)	(0.316)	(0.278)	(0.256)	(0.257)
Courts are fair	-0.017	-0.002	-0.005	-0.025	-0.107	-0.112
	(0.140)	(0.141)	(0.137)	(0.123)	(0.121)	(0.120)
Courts are quick	-0.368***	-0.366***	-0.380***	0.384***	-0.341***	-0.316***
	(0.125)	(0.129)	(0.126)	(0.116)	(0.113)	(0.113)
Courts can enforce decisions	-0.038	-0.030	-0.049	-0.057	-0.064	-0.071
	(0.119)	(0.134)	(0.141)	(0.129)	(0.118)	(0.116)
Courts are affordable	-0.357***	-0.367***	-0.361***	-0.302***	-0.314***	-0.308***
	(0.128)	(0.138)	(0.138)	(0.122)	(0.118)	(0.118)
Age in complete years			0.300**	0.110	0.144	0.847*
			(0.154)	(0.168)	(0.146)	(0.494)
Number of employees (size)			-0.342***	-0.342***	-0.357***	0.020
			(0.110)	(0.113)	(0.103)	(0.384)
Square - age						-0.166
						(0.110)
Square - number of employees						-0.054
						(0.053)
Manufacturing (yes=1)		-0.244	-0.246	-0.337	-0.424*	-0.394*
		(0.247)	(0.241)	(0.232)	(0.228)	(0.228)
Retail and wholesale (yes=1)		0.211	0.058	0.003	0.089	0.148
		(0.325)	(0.307)	(0.287)	(0.276)	(0.276)
Manager's education				-0.083	-0.078	-0.066
				(0.055)	(0.051)	(0.050)
Manager's experience				0.460**	0.384**	0.343*
				(0.230)	(0.186)	(0.184)
Transport constraint					0.234***	0.259***
					(0.089)	(0.092)
Tax administration constraint					-0.239***	-0.232**
					(0.090)	(0.090)
Skills constraints					0.121	0.139
					(0.093)	(0.093)
Finance constraints					-0.027	-0.044
					(0.066)	(0.067)
Macroeconomic constraints					0.245***	0.230***
					(0.077)	(0.077)
Competition constraints					-0.210**	-0.191**
					(0.084)	(0.082)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	0.358	0.264	0.491	0.727	1.101	-0.155
	(1.113)	(1.207)	(1.312)	(1.243)	(1.053)	(1.302)
Observations	462	462	455	450	450	450
F-statistics (1st stage instrument)	12.274	13.162	12.192	13.952	13.113	12.729

Notes: 1) The coefficients are tabulated standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *=significant at the 10% level, ** =significant at the 5% level, ***

=significant at the 1% level, robust standard errors have been corrected for predicted values

Results from the instrumental variable OLS estimations indicate that the coefficients for bribery are all highly significant and larger that the ordinary OLS coefficients. This implies that the OLS underestimates the true coefficients. However, the coefficient of the dummy variable that captures electricity outages is not only quantitatively smaller but also statistically insignificant implying that the impact of electricity outages on tax evasion might have been over estimated in the earlier models.

The credibility of the court system, particularly the extent to which courts are perceived as "quick" and "affordable" reduces tax evasion. The coefficients for "quick" and "affordable" are positive and statistically different from zero implying that firms evade taxes if they perceive the legal system as weak and unable to quickly resolve disputes or are not affordable. This is because when the legal system is weak firms can bribe their way around and get away with it. Results further indicate that firm level characteristics are associated with tax evasion. In particular, bigger firms are less likely to evade tax while older firms are shown to be associated with higher tax evasion. I however fail to confirm the existence of non-linear relationships firm age, size and tax evasion. The coefficients for the squares terms for age and size are not statistically different from zero in table 4 model 6.

Firms in the manufacturing sector are shown to be less likely to evade tax in relation to firms engaged in the rest of the businesses. In addition, our results show that the manager's level of experience is associated with tax evasion. Manager's education level does not seem to matter for tax evasion.

Of equal importance to this study, I show that the business environment has implications for tax evasion. In particular, when the transport systems are bad and the macroeconomic environment is unfavourable, businesses react by evading taxes. The coefficients for tax administration and macroeconomic constraints are positive and statistically significant from the zero implying that tougher business environment conditions lead to more tax evasion.

Finally, the instrumental variable Tobit results in table 6) are similar to the OLS instrumental variable estimates in table 5. The only difference is that the IV-tobit model estimates are larger indicating that IV-OLS model coefficients are under estimated.

Table 6: The determinants of tax evasion – IV TOBIT estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Bribery	1.926**	2.112**	2.026**	1.826**	1.605**	1.570**
	(0.883)	(0.847)	(0.865)	(0.797)	(0.755)	(0.763)
Number of electricity in excess of monthly average (yes=1)	0.011	0.074	0.102	0.020	0.293	0.302
	(0.411)	(0.406)	(0.416)	(0.386)	(0.354)	(0.353)
Courts are fair	-0.006	-0.0113	-0.005	-0.004	-0.137	-0.144
	(0.191)	(0.196)	(0.191)	(0.183)	(0.167)	(0.165)
Courts are quick	-0.491***	-0.491***	-0.510***	-0.538***	-0.452***	-0.415***
	(0.173)	(0.179)	(0.174)	(0.168)	(0.156)	(0.155)
Courts can enforce decisions	-0.063	-0.056	-.0701	-0.076	-0.089	-0.100
	(0.165)	(0.169)	(0.176)	(0.167)	(0.162)	(0.159)
Courts are affordable	-0.471***	-0.480***	-0.478***	-0.403***	-0.420***	-0.411***
	(0.176)	(0.180)	(0.178)	(0.167)	(0.162)	(0.161)
Age in complete years			0.408**	0.150	0.187	1.184*
			(0.195)	(0.221)	(0.203)	(0.711)
Number of employees (size)			-0.486***	-0.571***	-0.507***	0.277
			(0.154)	(0.157)	(0.147)	(0.601)
Square - age						-0.240
						(0.159)
Square - number of employees						-0.123
						(0.087)
Manufacturing (yes=1)		-0.355	-0.343	-0.382	-0.586*	-0.557*
		(0.349)	(0.344)	(0.331)	(0.316)	(0.315)
Retail and wholesale (yes=1)		0.263	0.063	0.064	0.109	0.197
		(0.428)	(0.415)	(0.397)	(0.379)	(0.3778)
Manager's education				-0.113	-0.099	-0.084
				(0.077)	(0.071)	(0.070)
Manager's experience				0.628**	0.539**	0.502*
				(0.276)	(0.260)	(0.262)
Transport constraint					0.323***	0.367***
					(0.124)	(0.129)
Tax administration constraint					-0.330***	-0.311**
					(0.125)	(0.126)
Skills constraints					0.171	0.180
					(0.128)	(0.129)
Finance constraints					-0.051	-0.070
					(0.091)	(0.094)
Macroeconomic constraints					0.335***	0.314***
					(0.108)	(0.108)
Competition constraints					-0.275**	-0.242
					(0.116	(0.113)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	-0.732	-0.835	-0.491	0.041	0.307	-2.608
	(1.544)	(1.543)	(1.626)	(1.538)	(1.465)	(1.873)
Observations	462	462	462	450	450	543

Notes: 1) The coefficients are tabulated standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *=significant at the 10% level, ** =significant at the 5% level, *** =significant at the 1% level, robust standard errors have been corrected for predicted values

6. CONCLUSIONS AND POLICY RECOMMENDATION

Using a rich 2006 World Bank data set on a cross section of Ugandan firms, I examine the causes of tax evasion. In particular, I examine whether the quality of the legal environment, bureaucratic bribery, provision of public goods that are complimentary to private investments, and the business environment in general are associated with tax evasion. I employ both ordinary least square and maximum likelihood Tobit methods to estimate the effect of the business environment on tax evasion.

I address the potential endogeneity concerns associated with bribery by constructing an instrument as the interaction between the firm's ability to pay and corruption as an obstacle in doing business. Ability to pay is constructed as the total cost of labour, including wages, salaries, bonuses and social payments adjusted for the level of annual sales.

Results indicate that: the effectiveness of the court system, bureaucratic bribery, insufficient provision of complementary public capital such as electricity and transport infrastructure as well as an adverse business environment are associated with tax evasion. In addition, large firms are less likely to evade taxes. Moreover, tax evasion is much less concentrated in manufacturing firms as compared to firms in the retail and wholesale business sector.

Results have implications for policy and contribute to the growing strand of literature on the determinants of tax evasion and informality in Sub Saharan Africa. In particu-

lar, the government should consider taking decisive steps to deal with corruption and bureaucratic bribery, provide public capital such as transport infrastructure and electricity that are complementary to private capital and strengthen the legal environment. In addition, various interventions directed towards ameliorating the business environment, and reducing the cost of doing business will reduce tax evasion.

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APPENDIX 1: FIRST STAGE REGRESSIONS – ORDINARY LEAST SQUARE (OLS) ESTIMATES

|	(1)	(2)	(3)	(4)	(5)	(6)
Number of electricity in excess of monthly average (yes=1)	0.328*** (0.108)	0.323*** (0.108)	0.342*** (0.108)	0.352*** (0.108)	0.308*** (0.108)	0.311*** (0.108)
Courts are fair	-0.085 (0.067)	-0.0863 (0.067)	-0.081 (0.067)	-0.080 (0.0667)	-0.074 (0.065)	0.068 (0.065)
Courts are quick	-0.014 (0.066)	-0.014 (0.065)	-0.017 (0.066)	-0.022 (0.067)	-0.004 (0.065)	-0.001 (0.065)
Courts can enforce decisions	-0.073 (0.057)	-0.075 (0.057)	-0.094 (0.058)	-0.105* (0.058)	-0.101 (0.057)	-0.102* (0.057)
Courts are affordable	0.065 (0.067)	0.066 (0.066)	0.071 (0.067)	0.049 (0.068)	0.061 (0.064)	0.066 (0.064)
Firm age in complete years			-0.034 (0.073)	0.029 (0.084)	0.005 (0.084)	-0.354 (0.261)
Number of employees (size)			0.024 (0.054)	0.028 (0.059)	0.042 (0.059)	0.130 (0.217)
Square - age						0.084 (0.057)
Square - number of employees						-0.014 (0.030)
Manufacturing (yes=1)		-0.077 (0.118)	-0.079 (0.121)	-0.050 (0.123)	-0.016 (0.131)	-0.030 (0.132)
Retail and wholesale (yes=1)		0.194 (0.153)	0.134 (0.156)	0.170 (0.1589)	0.158 (0.156)	0.155 (0.157)
Manager's education				0.028 (0.0308)	0.032 (0.029)	0.021 (0.029)
Manager's experience				-0.154 (0.097)	-0.116 (0.103)	-0.101 (0.104)
Domestic ownership					0.040 (0.033)	0.038 (0.032)
Transport constraint					-0.083* (0.043)	-0.093 (0.043)
Tax administration constraint					0.072 (0.046)	0.067 (0.046)
Skills constraints					0.018 (0.053)	0.011 (0.054)
Finance constraints					-0.011 (0.039)	0.005 (0.038)
Macroeconomic constraints					-0.039 (0.044)	-0.031 (0.045)
Competition constraints					0.316 (0.098)	0.076* (0.039)
Ability to pay * corruption as a business constraint (IV)	0.289*** (0.098)	0.314*** (0.099)	0.301*** (0.099)	0.329*** (0.099)	0.316*** (0.098)	0.306*** (0.098)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	1.169*** (0.289)	1.168*** (0.303)	1.221*** (0.357)	1.261*** (0.430)	0.841* (0.501)	1.249** (0.606
Observations	462	462	455	450	450	450
Pseudo R-Squared	0.087	0.092	0.089	0.096	0.107	0.107

Notes: 1) The coefficients are tabulated standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *=significant at the 10% level, ** =significant at the 5% level, *** =significant at the 1% level

APPENDIX 2: FIRST STAGE REGRESSIONS –TOBIT ESTIMATES

	(1)	(2)	(3)	(4)	(5)	(6)
Number of electricity in excess of monthly average (yes=1)	0.328*** (0.103)	0.323*** (0.103	0.342*** (0.103)	0.352*** (0.104)	0.311*** (0.105)	0.311*** (0.105)
Courts are fair	-0.085 (0.064)	-0.086 (0.064)	-0.080 (0.064)	-0.081 (0.064)	-0.071 (0.064)	-0.068 (0.063)
Courts are quick	-0.014 (0.063)	-0.013 (0.063)	-0.017 (0.062)	-0.022 (0.063)	-0.004 (0.063)	-0.001 (0.063)
Courts can enforce decisions	-0.073 (0.055)	-0.075 (0.054)	-0.094* (0.055)	-0.105* (0.055)	-0.107 (0.055)	-0.102* (0.055)
Courts are affordable	0.065 (0.061)	0.065 (0.061)	0.071 (0.071)	0.049 (0.062)	0.066 (0.062)	0.066 (0.062)
Firm age in complete years			-0.033 (0.071)	0.029 (0.082)	0.013 (0.082)	-0.354 (0.254)
Number of employees (size)			0.024 (0.054)	0.028 (0.057)	0.033 (0.057)	0.130 (0.211)
Square - age						0.084 (0.055)
Square - number of employees						-0.014 (0.029)
Manufacturing (yes=1)		-0.077 (0.121)	-0.079 (0.122)	-0.050 (0.123)	-0.013 (0.128)	-0.030 (0.128)
Retail and wholesale (yes=1)		0.194 (0.144)	0.134 (0.149)	0.170 (0.150)	0.161 (0.152)	0.155 (0.153)
Manager's education				0.028 (0.028)	0.026 (0.028)	0.021 (0.028)
Manager's experience				-0.154 (0.101)	-0.128 (-0.126)	-0.101 (0.101)
Transport constraint					-0.087** (0.042)	-0.094** (0.042)
Tax administration constraint					0.069 (0.045)	0.067 (0.045)
Skills constraints					0.0183 (0.052)	0.011 (0.052)
Finance constraints					-0.002 (0.037)	0.005 (0.037)
Macroeconomic constraints					-0.035 (0.043)	-0.031 (0.043)
Competition constraints					0.083** (0.038)	0.076** (0.038)
Ability to pay * corruption as a business constraint (Instrument)	0.289*** (0.094)	0.314*** (0.094)	0.301*** (0.094)	0.329*** (0.094)	0.311*** (0.095)	0.306*** (0.095)
Regional effects	YES	YES	YES	YES	YES	YES
Constant	1.169*** (0.319)	1.168 (0.326)	1.221 (0.360)	1.261 (0.427)	1.041** (0.460)	1.249*** (0.589)
Observations	462	462	455	450	450	450

Notes: 1) The coefficients are tabulated standard errors are in parentheses 2) Regional fixed effects have been accounted for using 4 dummy variables and they are highly significant 3) Significance levels: *=significant at the 10% level, ** =significant at the 5% level, *** =significant at the 1% level
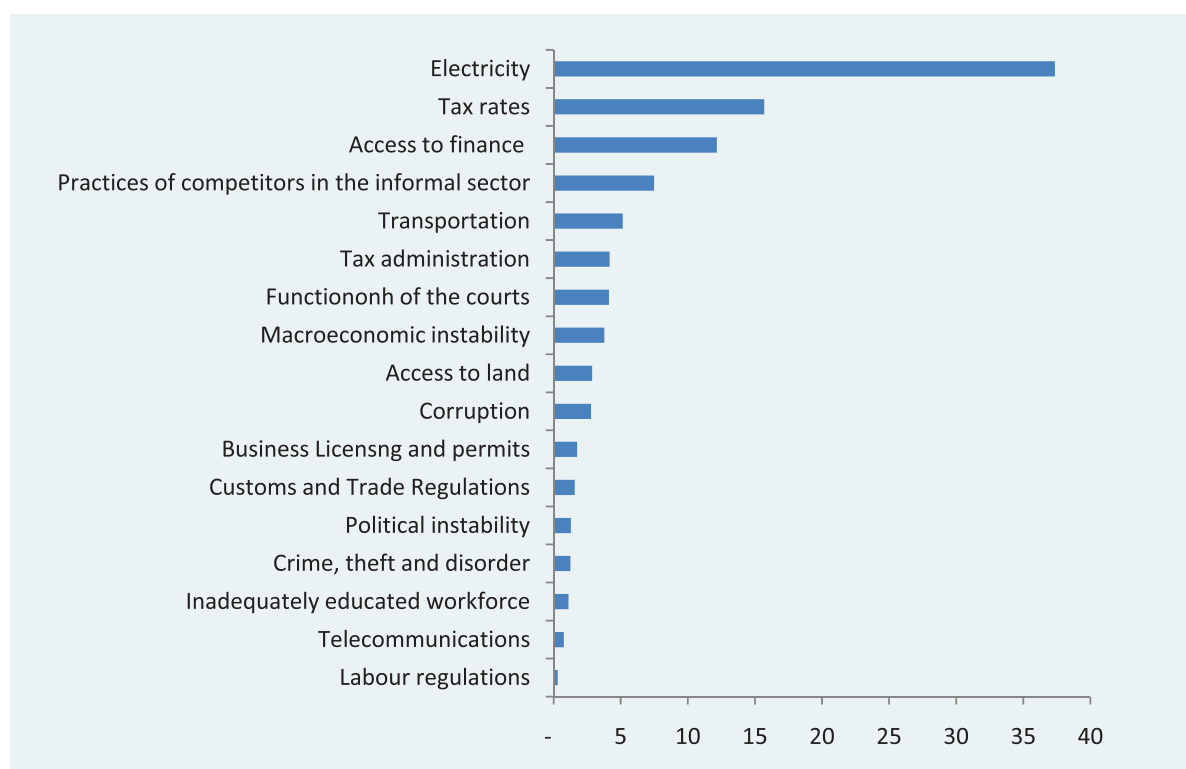
APPENDIX 3: SCATTER PLOT – LOG OF INFORMAL SALES AND LOG OF BRIBERY
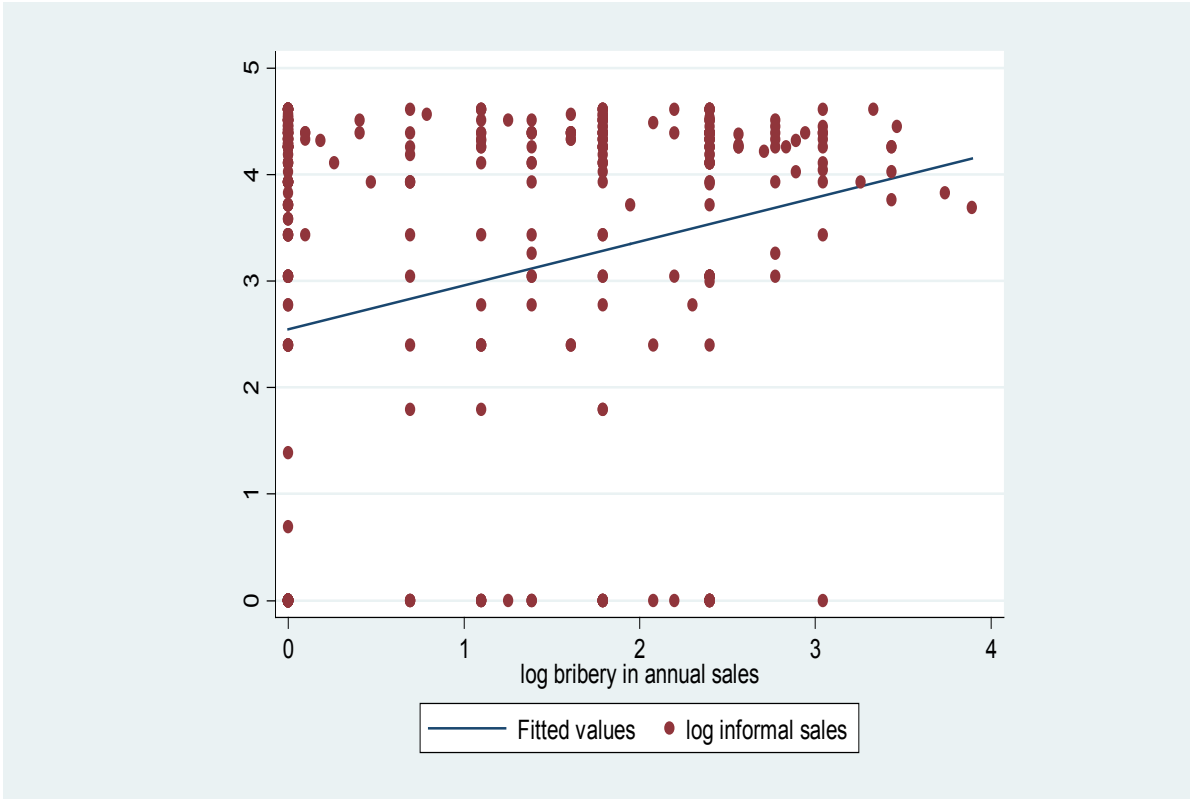
APPENDIX 4: SCATTER PLOT – LOG OF INFORMAL SALES AND LOG NUMBER OF ELECTRICITY OUTAGES IN A MONTH
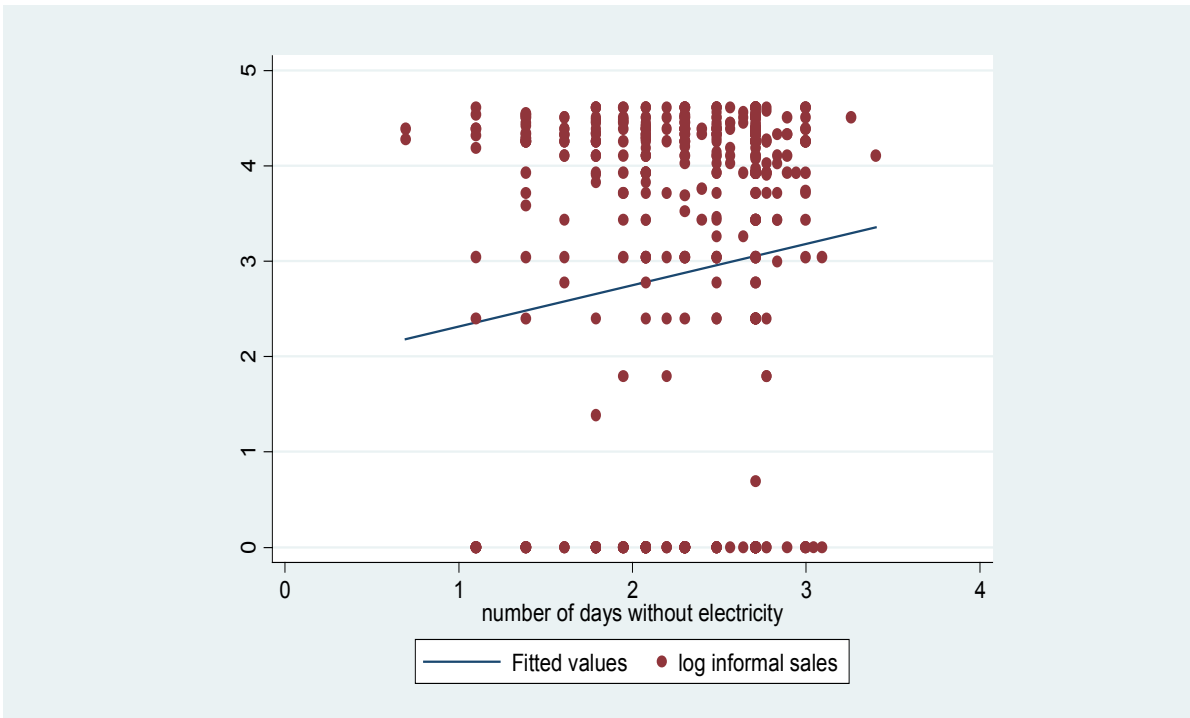
APPENDIX 5: THE BIGGEST OBSTACLES IN DOING BUSINESS

Source: Author computations from the World Bank enterprise survey data

APPENDIX 6: DESCRIPTION OF DATA VARIABLES

Variable names	Definition
Evasion	Log of (1+the proportion of sales kept off the books for tax purposes)
Outage	Log of the number of days a firm experienced electricity outages in a typical month
Dummy - Outage	Dummy variable = 1 if number of outages exceed mean monthly value (10)
Courts - fair	The extent to which courts are perceived to be fair, impartial and uncorrupted on a scale $1-4$ where 1 represents strongly disagree and 4 strongly agree
Courts - quick	The extent to which courts are perceived to be quick in resolving disputes on a scale $1-4$ where 1 represents strongly disagree and 4 strongly agree
Courts - affordable	The extent to which courts are perceived to be affordable on a scale $1-4$ where 1 represents strongly disagree and 4 strongly agree
Courts - enforceable	The extent to which courts can enforce their decisions on a scale $1-4$ where 1 represents strongly disagree and 4 strongly agree
Age	Log of firm age
Size	Log of the number of employees in a firm
Manufacturing	Dummy variable =1 if firm is engaged in manufacturing
Retail	Dummy variable =1 if firm is engaged in retail and wholesale trade
Domestic	Log of the percentage of the firm owned by private domestic individuals, companies or organizations
Education	Firm manager's level of education
Experience	Log of the firm manager's level of experience in complete years
Exports	Log of the percentage of firm's sales that were direct exports
Exports - Dummy	Dummy variable if the firm is engaged in export business
Bribe	Log of the percentage of total annual sales informally paid to public officials "to grease the system"
General constraint - electricity	The extent to which electricity is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - transport	The extent to which transport is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - tax rates	The extent to which tax rates is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - tax administration	The extent to which tax administration is a major obstacle in doing business on a scale of 1-5 where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - skills	The extent to which inadequately skilled labour force is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint – finance	The extent to which access and cost of finance is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - macroeconomic factors	The extent to which the macroeconomic environment is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - corruption	The extent to which corruption is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle
General constraint - competition	The extent to which competition from informal businesses is a major obstacle in doing business on a scale of $1-5$ where 1 corresponds to no obstacle and 5 very severe obstacle

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