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# Corruption in the informal sector: evidence from West Africa

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## Corruption in the informal sector: evidence from West Africa

Emmanuelle Lavallée, François Roubaud<sup>1</sup>

### Résumé :

Cet article analyse à partir de données originales les causes et les conséquences de la corruption dans le secteur informel en Afrique de l'Ouest. Il étudie les déterminants et l'ampleur des pots-de-vin payés. Les résultats montrent que les mécanismes en jeu dans l'informel ne sont pas différents de ceux prévalant dans le secteur formel. En ce qui concerne l'impact de la corruption sur les performances des entreprises, cet article met en évidence que la corruption augmente les performances des entreprises, mais que ce résultat est dû à une seule catégorie d'entreprises informelles : les « *constrained gazelles* ».

### Abstract:

Using an unique dataset, this paper analyses the causes and impacts of bribery in the informal sector in West Africa. It investigates the determinants of the incidence of bribery and the magnitude of the bribes actually paid. Our results show that the mechanisms at play are no different than those found for the formal sector by other authors. With respect to the impacts of corruption on a firm's performance, our findings show that experience of corruption increases business performance, but that this effect is driven by just one category of informal firm: constrained gazelles.

**Keywords:** Corruption, informal sector, firm performance, entrepreneurship, West Africa.

**JEL codes:** D73, O12, D22

### 1. Introduction

With the growing availability of survey data, knowledge of the causes and consequences of business corruption increased considerably in the past fifteen years. A number of studies highlight how bribery affects both firm performance and behaviour. In the Latin American and Caribbean region, Şeker and Yang (2014) show that bribery drastically reduces sales growth and that this effect is more acute among low-revenue-generating and young firms. In a study of corruption at the ports of Maputo (Mozambique) and Durban (South Africa), Sequeira and Djankov (2014) observe how firms adjust their transport strategies to adapt to different types of corruption. However, most of these empirical studies use surveys of registered firms and thus miss a large part of the economy in countries where the informal economy is the norm rather than the exception (Jütting and De la Iglesia, 2009; Bacchetta *et al.*, 2009).

This paper intends to fill this knowledge gap using a unique dataset, called the *1-2-3 surveys*, collected in seven West African capitals in the early 2000s. The survey combines an extended labour force survey (phase 1) with a detailed survey on informal (unregistered) entrepreneurial activities (phase 2) and an expenditure survey (phase 3). Phase 2 of the *1-2-3 surveys* provides representative figures on informal firms. Firm heads were interviewed to assess their economic and productive characteristics (production, value-added, investment and financing), their difficulties (including corruption) and their demand for public support. These data were collected through aligned questionnaires to guarantee comparability across countries.

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Sub-Saharan Africa (SSA) is a particularly relevant environment in which to study corruption in the informal sector. A large informal sector and endemic corruption are two key stylized features of SSA economies. The former represents a huge share of the economy (jobs, entrepreneurship and production). It accounted for an average 38 per cent of GDP in Africa in 2005 (Buehn and Schneider, 2012). The International Labour Organization (2013) reports that the informal sector in SSA (excluding South Africa) represents more than 50 per cent of all non-agricultural employment. In two of the seven countries under review in this paper, informal sector employment accounts for 70 per cent of non-agricultural jobs in Côte d'Ivoire (2008) and 72 per cent in Mali (2004). Corruption is a major issue: the 2013 Transparency International (TI) Corruption Perception Index shows that 90 per cent of SSA countries have a serious corruption problem, i.e. a CPI score below 50 on a scale from 1 to 100 (TI, 2013a). By comparison, this proportion stands at about 66 per cent in the Americas and 64 per cent in the Asia-Pacific region. In 2013, the Global Corruption Barometer interviewed more than 100,000 people in 100 countries worldwide and found that 51 per cent of Sub-Saharan African citizens had to pay bribes to obtain a public service, a much higher rate than in any other region (27% on average; TI, 2013b).

This paper conducts a comparative study of the causes and impacts of bribery in the informal sector. It first analyses the determinants of the probability of having to pay a bribe and the magnitude of bribes paid. Second, it assesses the impact of bribery on Informal Firms' (IFs) performance and compares the effect of corruption on different groups of IFs (*top performers, constrained gazelles* and *survivalists*).

We show that, as in the formal sector, bribery incidence is closely associated with visibility, sunk costs and ability to pay. Yet unlike formal firms, this does not hold for interaction with public officials. IFs that have the State as a customer or supplier, informal firms involved in international trade, and IFs connected to water or electricity grids do not have a higher probability of exposure to bribery. It also emerges that the incidence of corruption and the magnitude of payments are driven by different processes. Turning to the informal firms' performance, we find that experience of corruption increases their economic outcomes. This effect is driven mainly by one category of informal firm known as *constrained gazelles*, defined as entrepreneurs with business skills and entrepreneurial behaviour similar to upper tier entrepreneurs but not actually top performers (Grimm, Knorringer and Lay 2012). These results are robust to controlling for endogeneity using instrumental variables estimators.

The paper is structured as follows. In section 2, we describe our data and provide some descriptive statistics. Section 3 analyses what drives informal payments in the informal sector. We study the effects of corruption on IF performance in section 4. Our concluding comments are contained in section 5.

## **2. Data and descriptive analysis**

### *2.1. 1-2-3 Surveys: a unique dataset to capture the informal sector*

Our data are taken from an original series of urban household surveys in West Africa, the *1-2-3 surveys* conducted in seven major West African cities (Abidjan, Bamako, Cotonou, Dakar, Lome, Niamey and Ouagadougou) in 2001 and 2002.<sup>1</sup> The surveys were carried out by the countries' national statistics institutes (NSIs), AFRISTAT and DIAL as part of the PARSTAT Project.<sup>2</sup>

The *1-2-3 Survey* is a three-phase survey<sup>3</sup>. The first phase is an augmented labour force survey (LFS), used as a filter for the second phase to identify a representative sample of IF heads who are then interviewed. Phase 2 is designed to measure the IFs' main economic and productive characteristics

(production, value-added, investment and financing), the main difficulties encountered developing the business, and demand for public support by informal entrepreneurs. Phase 3, not used in this paper, is a specific income/expenditure survey administered to a sub-sample of households. This paper uses extensively Phase 2 which concerned 6,500 IFs (around 1,000 IFs per country).

Table 1 presents the IFs' characteristics. In the West African capitals, the informal sector is made up mainly of micro-units, with the average size of an IF standing at 1.5 people, and IF capital is low, albeit varying across sectors and cities. The average amount of capital is 195,000 CFA francs (i.e. \$312) and almost 10 per cent of IFs have no capital. IFs have a low level of activity: average monthly production and turnover across all cities taken together total 162,000 and 249,000 CFA francs respectively (\$259 and \$399). Two thirds of informal enterprises declare they do not pay any tax. This proportion ranges from 83 per cent in Niger to 51 per cent in Cote d'Ivoire. Nevertheless, 29 per cent of IFs pay at least one kind of tax, in general to local authorities. Few IFs use public utilities like water and sanitation services, electricity and telecommunications services. The 1-2-3 surveys reveal that 73 per cent of IFs use none of these basic utilities.

**Table 1: Main informal firms' characteristics**

	Cotonou	Ouagadougou	Abidjan	Bamako	Niamey	Dakar	Lome	Total
# of employees	1.6	1.5	1.7	1.4	1.4	1.5	1.5	1.5
Value of capital*	307	169	244	114	133	136	154	<b>195</b>
IFs with no capital	1.4	17.7	0.5	28.5	21.9	10.9	19.2	<b>9.8</b>
Turnover*	222	250	323	244	214	234	99	<b>249</b>
Production*	111	102	256	130	105	144	62	<b>162</b>
IFs with water (%)	23.1	5.7	8.2	1.4	12.8	8.9	3.6	<b>8.5</b>
IFs with electricity (%)	33.9	12.3	29.9	7.6	20.9	21.4	12.1	<b>22.0</b>
IFs with telephone (%)	18.3	3.8	8.0	0.9	3.7	8.0	4.6	<b>7.3</b>
IFs paying no tax (%)	79.7	70.2	51.6	69.0	83.2	74.1	78.6	<b>66.9</b>

*Source:* Authors' calculations based on the 1-2-3 surveys, phase 2.

\* in thousands of CFA francs.

## 2.2. Corruption measurement

In addition to the fact that we use a cross-national representative survey of informal enterprises, further corruption measurement elements set our work apart from other studies in this area of research. Each IF head was asked if he or she had personally been affected by corruption in the year preceding the survey and, if so, the type of transaction and service concerned, and the total sum paid out on corruption over the year. More precisely, the survey asked the following series of questions: *"In the past year, have you got into trouble with a public official for doing business?"*; *"How was the dispute settled: by the payment of a fine or a 'gift, or by other means?"*; *"In the past year, in total for your establishment, how much have you had to pay to government officials in the form of 'gifts'?"* To avoid individuals' potential reluctance or 'fear' of expressing their actual experience, which would have raised concerns about a possible source of underreporting and (downward) bias, the questionnaire's wording was carefully chosen to replace the word 'corruption' with the less stigmatic 'gift' expression.<sup>4</sup>

We then measured specifically experience of petty administrative corruption, which occurs when the population is in contact with the public administration. This focus differentiates our survey from those generally used in the literature. Questions about corruption are generally worded indirectly and tend to ask respondents about their perception of corruption rather than their experience of corruption. However, Razafindrakoto and Roubaud (2010) show that measurements of corruption based on perception do not provide a good gauge of the real level of corruption and systematically overestimate the frequency of corruption.

Finally, we take into account the fact that a certain number of constituents did not get into trouble with public officials. This aspect is particularly important in that the frequency of interactions with the administration varies from one business to the next and that some entrepreneurs may steer clear of public officials precisely because they are afraid of being confronted with corruption. This means that not controlling for actual contact with public officials could lead to an underestimation of the real risks of corruption.

The survey's results suggest that there is no will on the part of the State to force IFs to comply with the law. In the seven capital cities, only 6.2 per cent of IF heads said they had got into trouble with public officials in the year before the survey; this proportion ranges from 4 per cent in Bamako to 9 per cent in Dakar (Table 2) and is particularly high (30%) in transport (Brilleau et al., 2005b). This result points to police harassment of taxi drivers, moto-taxis and so on.

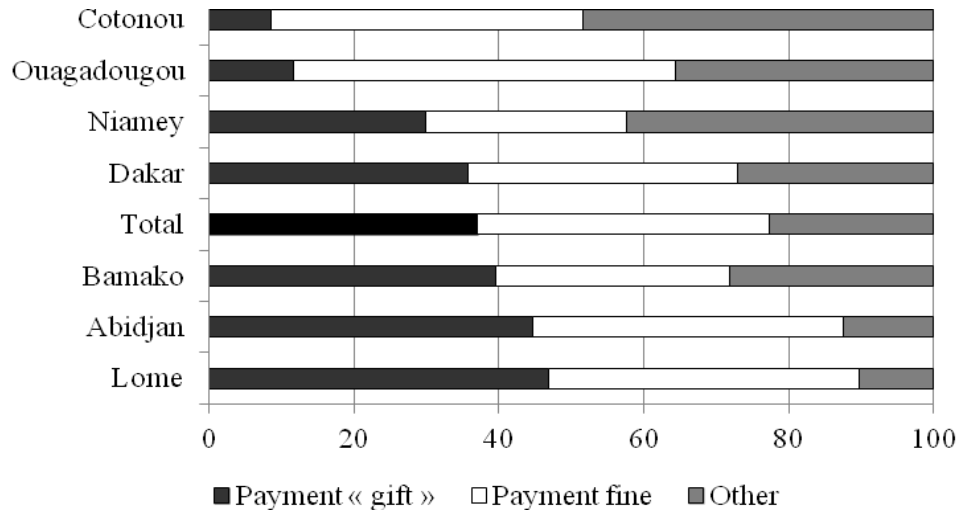
**Table 2: Proportion of informal firms experiencing problems with public officials in the past year (%)**

	Cotonou	Ouagadougou	Abidjan	Bamako	Niamey	Dakar	Lome	Total
Manufacturing	5.8	5.9	7.5	3.0	3.7	2.9	3.3	<b>5.2</b>
Trade	4.8	3.9	4.8	3.2	8.5	9.5	5.0	<b>5.4</b>
Services	3.5	6.4	9.3	5.2	7.2	14.5	10.6	<b>8.7</b>
<b>Total</b>	<b>4.7</b>	<b>5.0</b>	<b>7.0</b>	<b>3.5</b>	<b>6.2</b>	<b>8.5</b>	<b>6.2</b>	<b>6.2</b>

Source: Authors' calculations based on the 1-2-3 surveys, phase 2.

So only a minority of IFs (4.2%) report they had to pay bribes the year before the survey. However, this proportion rises to 37% when we consider only those IFs that had some contact with public institutions in the year before the survey, which makes bribery a significant means of settling disputes with public officials (Figure 1). The incidence of corruption varies dramatically from one city to another. It is particularly high in Lome (47%), Abidjan (45%) and Bamako (40%).

**Figure 1: Settlement of problems with public officials**



Source: Authors' calculations based on the 1-2-3 surveys, phase 2.

At this descriptive stage, our first counterintuitive result suggests corruption is not as widespread as usually described. However, this does not mean that corruption is not an important factor in the informal sector's economic performance. Corruption may have a direct negative impact on those affected. Fear of corruption may also give rise to sub-optimal behaviour, even among those not directly affected by it, with the making of less risky decisions than those that would be made in a corruption-free environment.

### 3. What drives corruption in the informal sector?

#### 3.1. Analytical framework

Micro-level studies addressing the determinants of bribe payments across firms in Africa are quite rare despite the widespread corruption. To the best of our knowledge, the only exception is the study by Svensson (2003) on the incidence and magnitude of corruption across 250 formal Ugandan firms. This study found that firms using public services, firms engaged in trade and firms paying more taxes are more likely to have to pay bribes; firm profitability and size have no significant impact on the probability of paying bribes; the higher current and expected profits, the more a firm has to pay whereas the more profitable is an outside option for the firm, the less it has to pay.

Our review of the literature suggests that no work has been done on the incidence and magnitude of corruption in the informal sector in general and SSA in particular. Indeed, as explained in section 1, most of the empirical work on institutional constraints uses surveys conducted mainly on registered firms. In the case of Vietnam, Rand and Tarp (2012) use a sample including 28 per cent non-registered firms and show that they are less likely to pay bribes than registered firms. However, as acknowledged by the authors, their sample is not representative of the informal sector in Vietnam. Given that the SME survey they used is biased upward toward the upper tier of the informal sector, corruption incidence is probably even lower than the figure they present.

We extend Svensson's analysis (2003) of corruption to firms operating in the informal sector. At firm level, Svensson isolates three main factors behind bribe paying: visibility, ability to pay and the power of refusal. Visibility refers to the firm's dealings with the public sector. The idea is that the more a firm interacts with public officials, the greater discretion bureaucrats have in implementing, executing and enforcing business regulations, licensing requirements, taxes, exemptions, and so on. Extensive dealings with the public sector are also supposed to restrict the firm manager's bribe avoidance leverage. The ability or willingness to pay derives from optimal harassment theories (Myrdal, 1968; Kaufmann and Wei, 1999), which suggest that rent-seeking bureaucrats use their discretionary powers to extract from a firm the maximum amount of bribes that the firm is willing to tolerate. A firm's ability to pay is generally modelled as an increasing function of its revenues. A firm's power of refusal represents the cost of refusing to pay. In the most extreme case, not paying a bribe could cause a firm to close down; capital, because it is partly sunk, determines the cost of refusing to pay bribes.

There is no reason to expect the determinants of corruption to be any different in the informal sector. Bear in mind, however, the basic IF characteristics described in section 2. On average, IFs are small in terms of employees and capital, post a low level of performance and have few interactions with the public sector and its officials. In other words, in keeping with Svensson's framework, the IFs' ability to pay and visibility are quite low and their power of refusal is high.

### 3.2. The determinants of bribe paying

We study the propensity to bribery of a firm  $i$  in city  $j$  and sector  $k$ , an event coded  $corruption_{ijk}=1$ , when the firm's vulnerability or propensity to corruption ( $corruption_{ijk}^*$ ) is a latent unobservable variable. This vulnerability or propensity to corruption is assumed to be linked to the IF's characteristics.

$$Corruption_{ijk} = \begin{cases} 1 & \text{if } Corruption_{ijk}^* = \alpha + \sum \beta X_{ijk} + \sum \gamma Y_{ijk} + \sum \delta Z_j + \sum \chi S_k + \varepsilon_{ijk} > 0 \\ 0 & \text{otherwise} \end{cases}$$

Where:

- $X_{ijk}$ : a vector of IF characteristics (factors of production, output, market competition, international integration, etc.);
- $Y_{ijk}$ : a vector of the IF head's characteristics (age, gender, education, etc.);
- $Z_j$ : city fixed effects
- $S_k$ : sector fixed effects
- $\varepsilon_{ijk}$ : is an i.i.d. error term.

We explain the probability of paying a bribe with three sets of independent variables. The first ( $X_i$ ) refers to the IF's characteristics and performance. In keeping with Svensson (2003), we introduce three main determinants of bribery: the firm's ability to pay, its power of refusal and its visibility. We use sales per employee as a proxy for the firm's ability or willingness to pay. The firm's power of refusal is captured by the capital-labour ratio. We include a number of visibility proxies such as the size of the IF (in terms of



employees, turnover and capital), its age, whether it is engaged in international trade (importing intermediate goods and/or exporting products), whether it pays taxes, and the industry it works in. We argue that larger firms are more likely to be harassed by rent-seeking officials. Moreover, older firms may have less probability of paying bribes because they have the benefit of experience and social networks and recurring interactions with public officials forming a learning curve. International trade is supposed to induce corruption because it implies interaction with the customs administration, often a very corrupt agency (Razafindrakoto and Roubaud, 2005). Paying taxes may have ambiguous effect on corruption. On the one hand, it creates interaction with public officials and hence opportunities for corruption. On the other hand, the fact of paying taxes and consequently complying with the tax regulations reduces the public officials' bargaining power in the event of a control. Lastly, the descriptive statistics suggest that some industries are particularly prone to corruption, especially transport. This may be due to the huge impact of discretionary police controls on business operations in this sector.

The second set of independent variables concerns the IF head's individual characteristics ( $Y_i$ ) such as gender, level of education, wealth, ethnic group and social integration. Indeed, some studies show that women are less tolerant and less likely to be victims of corruption than men (Dollar *et al.*, 2001; Gatti *et al.*, 2003; Lavallée *et al.*, 2010). A higher level of education is supposed to reduce corruption by making people more aware of the difference between public and private spheres and by encouraging more impersonal relationships (Treisman, 2000). Ultimately, we add a dummy variable that is turned on if the IF head belongs to the city's main ethnic group to control for discrimination against ethnic minorities. The third set of independent variables ( $Z_i$ ) includes city fixed effects to capture heterogeneity and unobservable characteristic across cities.

Table 3 reports the regression results of a probit model (columns 1 to 4) controlling step by step for the potential determinants of corruption. Column (1) controls only for the IF's basic characteristics; column (2) adds the IF head's individual characteristics; column (3) uses an additional variable to capture the effect of interactions with the public administration; and column (4) presents the preferred specification. The results are fairly robust to different specifications and findings are in keeping with expectations. The estimates of sales per employee and of the capital/labour ratio have the expected positive sign and are all statistically significant.

The effect of firm "size" is trickier. Rather than using a continuous variable, we use a categorical variable denoting whether the IF employs just one person (self-employed worker, the reference) or two to three people (IFs with one or two dependant workers - whether an employee or a contributing family worker) or more. This choice is motivated by two reasons. First, more employment is generally thought to increase the probability of paying bribes. However, this intuition is not always confirmed empirically. Although Rand and Tarp (2012) show that larger firms have a higher probability of paying bribes in Vietnam, Svensson (2003) finds that size in terms of employment has no significant impact on the incidence of corruption. Second, we work on a sample of fully informal firms. These firms are on average in the lower tier of micro-enterprises: more than 70 per cent of the IFs consist of just one own account worker working alone. Consequently, employment size can be seen as a proxy for visibility, but also for bargaining power. The larger the firm, the higher its visibility but the lower the relative amount of time spent on negotiations with public officials and hence the greater the bargaining power. The regression results reported in column 3 confirm this mixed effect of employment size. IFs with more than three employees do not have a higher probability of bribery than self-employed workers' firms.

Adding more "exposure" or "interaction with government" controls (column 3) provides interesting results as well. We see that IFs that have the State as a customer or supplier, IFs involved in international

trade and IFs connected to water or electricity grids do not have a higher probability of being exposed to bribery. The level of informality is not associated with the incidence of bribery. The only element that affects the paying of bribes is when the IF pays taxes, which increases the IF's probability of exposure to bribery. So, paying taxes drives up bribery: it instigates contact with corrupt public officials rather than increasing the IF's bargaining power.

Turning to the IF head's characteristics, our results are in line with the literature. Female IF heads appear to be less prone to bribery. Our models are unable to disentangle the reason why: whether they are more upright or less targeted by corrupt bureaucrats. None of the other IF socio-demographic characteristics is significant. In particular, the usual ethnic divide does not appear to play a noticeable role, a feature in keeping with the small ethnic earnings gap (compared with the gender gap) on the labour market found by Nordman, Robilliard and Roubaud (2011) using the same dataset. More generally, discrimination based on personal characteristics does not appear to be an issue.

However, our regression results may suffer from a selection bias. The issue is that only the IFs that get into trouble with public officials are exposed to bribery. As explained in section 2 the absence of trouble with public officials is potentially a consequence of corruption. We test the existence of such a selection bias and correct by estimating a probit model with sample selection (van de Ven and van Pragg, 1981). We use a dummy variable taking the value of 1 if the IF's premises are conducive to controls and zero otherwise. More precisely, we consider that IFs doing business on streets, public markets, vehicles and permanent premises are much more exposed to controls by public officials than "hidden" activities conducted at home or on the customer's premises. The latter kind of businesses represent a huge share of the informal sector, accounting for an average of 54 per cent of IFs in West Africa (Roubaud and Torelli, 2013).

Columns 5 and 6 of table 3 present our results. Whatever the model, the likelihood-ratio test of independent equations does not reject the null hypothesis, indicating that ignoring the selection would not render the estimates of a simple probit on the incidence of corruption biased and inconsistent. It is, nonetheless, worth analysing the results of this selection equation *per se* to identify the correlations with respect to contact with public bodies.

The selection equation shows that, as expected, that the probability of experiencing trouble with public officials is higher for larger enterprises (in terms of employees and capital), for IFs paying taxes and, importantly, for the most visible firms (our identifying variable). Female heads are less likely to contact public agencies (or to be controlled by them), a result consistent with lower participation in the public sphere. Transport IFs are *ceteris paribus* more often in contact with public officials. Country fixed effects are non-significant in the majority of the cases, suggesting a common pattern in the relationship between the State and the informal sector in West Africa. The correction of our sample selection bias does not drastically change our results for the determinants of bribery, with the sole exception of firm employment. Indeed, our categorical variables denoting firm size are no longer significant. Firm size is positively associated with exposure to public officials' controls, but it does not influence the IF's probability of paying. This result suggests that firm size in the informal sector increases the firm's "visibility" rather than its bargaining power.

**Table 3: Determinants of the incidence of bribery in the informal sector**

	Probit models				Probit with selection	
	Corruption equations				Corruption	Contact
	(1)	(2)	(3)	(4)	(5)	(6)
Premises prone to control						0.32*** (0.06)
Sales/employee (log.)	0.11*** (0.03)	0.09** (0.04)	0.07* (0.04)	0.07** (0.04)	0.07* (0.04)	0.02 (0.02)
K/L ratio (log.)	0.10*** (0.02)	0.09*** (0.02)	0.09*** (0.02)	0.08*** (0.02)	0.08*** (0.03)	0.06*** (0.01)
2-4 employees ( <i>ref. self-employ.</i> )	0.24*** (0.08)	0.27*** (0.09)	0.19** (0.09)	0.18** (0.09)	0.12 (0.08)	0.31*** (0.06)
>=5 employees ( <i>ref. self-employ.</i> )	0.31 (0.19)	0.32* (0.19)	0.24 (0.19)	0.18 (0.18)	0.18 (0.17)	0.45*** (0.11)
IF age	0.03* (0.02)	0.03* (0.02)	0.02 (0.01)	0.02 (0.02)	0.02 (0.02)	0.01 (0.01)
IF age squared	-0.00* (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.00 (0.00)
Pay taxes			0.31*** (0.09)	0.30*** (0.09)	0.23** (0.09)	0.35*** (0.06)
Female		-0.41*** (0.11)	-0.40*** (0.11)	-0.40*** (0.11)	-0.35*** (0.11)	-0.25*** (0.07)
Owner age		-0.00 (0.00)				
Born in the city		-0.12 (0.09)				
Primary educ. ( <i>ref. no educ.</i> )		-0.10 (0.12)				
Secondary educ. ( <i>ref. no educ.</i> )		0.16 (0.10)				
University educ. ( <i>ref. no educ.</i> )		-0.26 (0.23)				
Major ethnic group		-0.04 (0.09)				
Imports/Exports			0.14 (0.11)			
State customer/supplier			-0.44 (0.34)			
Connected to water/elec.			-0.06 (0.09)			
Medium level of informality ( <i>ref. low</i> )			-0.05			

			(0.52)			
High level of informality ( <i>ref. low</i> )			0.26			
			(0.47)			
Observations	6,403	5,978	6,330	6,403	6,375	6,375
Uncensored observations						420
Sector fixed	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors clustered at neighbourhood level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively.

### 3.3. Determinants of the bribe amount paid

Having investigated the determinants of the incidence of bribery (extensive margins), we turn to the magnitude of the bribes actually paid (intensive margins). A count model is more suitable to investigate the determinants of the bribe amount paid in view of the truncated nature of the dependent variable. We present the results for a negative binomial model. In these specifications, the dependant variable is the bribe amount paid and the independent variables are the same as in the main specification used to explore the determinants of the probability of a bribe payment.

Table 4 reports our estimation results, controlling step by step for the potential determinants of the bribe amount paid. Overall, these results confirm our previous findings. Firms with more ability to pay and less bargaining power pay higher bribe amounts. Indeed, the sales per employee and capital-labour ratio variables are positive and significant in all specifications. Here again, we find that female IF heads are less prone to bribery. Women pay fewer bribes on average than men. Our results also confirm that the transport sector is particularly exposed to bribery, with the highest bribe amounts. Like Rand and Tarp (2012), results suggest that the incidence and the magnitude of bribery are driven by different processes. For example, while being involved in international trade is not a significant variable in explaining the incidence of paying bribes, it does have a positive and significant impact on the bribe amount paid. Whereas the country fixed effects in the incidence regression were low and generally non-significant, they now point to Lome, Abidjan, Bamako and Dakar being the cities where the highest bribe amounts are paid.<sup>5</sup>

**Table 4: Determinants of the bribe amount paid in the informal sector**

	Count models (Dependent variable: bribe amount)			
	(1)	(2)	(3)	(4)
Sales/employee (log)	0.31*** (0.10)	0.22** (0.10)	0.24*** (0.08)	0.18* (0.11)
K/L ratio (log)	0.31*** (0.06)	0.29*** (0.06)	0.22*** (0.06)	0.25*** (0.06)
2-4 employees ( <i>ref. self-employ.</i> )	1.29*** (0.21)	1.41*** (0.22)	1.23*** (0.22)	1.22*** (0.21)
>=5 employees ( <i>ref. self-employ.</i> )	1.98*** (0.53)	1.99*** (0.55)	1.46*** (0.53)	1.47*** (0.53)
IF age	0.05 (0.04)	0.06 (0.04)	0.03 (0.03)	0.04 (0.04)

IF age squared	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Owner age		-0.01 (0.01)		
Female		-1.29*** (0.27)	-1.29*** (0.25)	-1.24*** (0.25)
Born in the city		-0.37 (0.23)		
Primary education		0.23 (0.32)		
Secondary educ. ( <i>ref. no educ.</i> )		1.12*** (0.28)		
University educ. ( <i>ref. no educ.</i> )		-0.52 (0.50)		
Major ethnic group		0.07 (0.22)		
Pay taxes			0.68*** (0.23)	0.58** (0.24)
Imports/Exports			1.04*** (0.29)	1.15*** (0.31)
State customer/supplier			-0.65 (0.54)	
Connected to water/elec.			0.06 (0.29)	
Medium level of informality ( <i>ref. low</i> )			-3.64** (1.78)	
High level of informality ( <i>ref. low</i> )			-2.84* (1.70)	
Observations	6,276	5,856	6,205	6,276
Sector fixed effects	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes

Standard errors clustered at neighbourhood level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively.

#### 4. Does bribery reduce Informal Firms performance?

Now we have more insight into the mechanisms behind corruption in the informal sector, let us investigate its impacts on IF economic performance.

##### 4.1. Analytical framework

Corruption is generally found to be detrimental to both economic performance and development outcomes at the macro-level (see Mauro, 1995; Méon and Sekkat, 2005). This is in contrast to an earlier body of political science and economic literature on “efficient grease” and “second-best” analyses of corruption arguing that bribery is an efficient way to cut through red tape where bureaucracy is

cumbersome and longwinded, and therefore that corruption can boost economic development (see Leff, 1964; Huntington, 1968).

Studies on the impact of corruption on firm growth find contradictory results. Some find that bribery is detrimental to firm performance, such as Şeker and Yang (2014) for Latin America and Caribbean and Fisman and Svensson (2007) for Uganda.<sup>6</sup> Vial and Hanoteau (2010), on the other hand, find a positive relation between corruption and firm output and labour productivity using unique panel data on Indonesian manufacturing firms in the Suharto era.<sup>7</sup> Their results support the efficient grease hypothesis for individual plants that pay bribes are better able to cut through red tape and barriers to doing business.

The repercussions of corruption on the performance of formal firms appear to depend on the nature of corruption. Shleifer and Vishny (1993) and Sequeira and Djankov (2014) differentiate between two types of corruption: “coercive” and vs “collusive” corruption. Coercive corruption is like extortion when a public official coerces an individual into paying undue fees, thereby increasing firm costs and reducing firm performance. Collusive corruption is when public officials and private agents collude to share the rents generated by the illicit transaction, thereby reducing firm costs and potentially raising firm performance in the short run. This same distinction should hold in the informal sector. Unfortunately, our data do not allow to discriminate between the two kinds of corruption in the West African capitals.

In this section, our empirical question is whether a link can be found between experience of corruption and IFs’ economic performance. We consider the following standard production function:

$$y_{ijk} = \alpha + \beta_1 k_{ijk} + \beta_2 l_{ijk} + \sum \gamma X_{ijk} + \varepsilon_{ijk}$$

where  $y_{ijk}$  is the log of turnover for firm  $i$  in sector  $j$  in city  $k$ ,  $k_{ijk}$  is the log of capital input,  $l_{ijk}$  is the log of labour input,  $X_{ijk}$  is a vector of IF and IF’s head characteristics and  $\varepsilon_{ijk}$  is an error term. The regression is a production function that compares sales with physical capital and labour, and IF head characteristics including level of education and knowledge of French. All the models control for city and industry fixed effects.

#### 4.2. Bribery and firm performance: discussion

Column (1) of Table 5 displays results for the estimated production function using OLS for the entire sample of IFs. To save space, the coefficients of controls variables are not reported. But, all control variables are either intuitively signed or (at worst) insignificant<sup>8</sup>. The experience of corruption coefficient is positive and significant at the 5 per cent level, indicating that experience of corruption increases firm performance.

One obvious concern is the possible endogeneity of our variable of interest: corruption. Here, we suspect endogeneity to occur because of an omitted variable bias and simultaneity in the determination of IF performance and occurrences of bribery episodes.<sup>9</sup> Fisman and Svensson (2007) give a clear presentation of the omitted variable issue. They argue that unobservable features, such as buoyant demand forecasts and expected profits, may influence the firms’ willingness to invest and expand as well as their ability to bribe. As regards simultaneity, optimal harassment theories (see section 3) suggest that public officials seek bribes more often from the better performing firms. Moreover, as pointed out above and by Shleifer (2004) and Fisman and Svensson (2007), corruption can be used by some entrepreneurs as a strategy to develop their business. Indeed, it is possible that IFs choose to earmark resources for bribery.

We use instrumental variable estimators to overcome the problem raised by the potential endogeneity of our variable of interest. Our instrument is the average rate of contact with public officials of IF *i*'s peers computed for each types of premises in each city. The underlying hypothesis behind the choice of this instrument is that IFs operating in premises controlled regularly by public officials are more vulnerable to corruption. In the informal sectors of West African capital cities, contacts with public officials are driven by a combination of country specific factors (like local regulations, customs or habits) and characteristics inherent to particular premises. Our instrument presents several advantages in comparison with country/locations-industry average rates of corruption generally used in the literature (Fisman and Svensson, 2007; Şeker and Yang, 2014 and Vial and Hanoteau, 2010)<sup>10</sup>. First, it focuses on peer's contacts with public officials rather than average rates of corruption. Then, it avoids the arithmetic correlation between individual *i*'s experience of corruption and the average rate of corruption of the group the IF *i* belongs to (Angrist and Pischke, 2009, p. 195). It is computed at the premises levels and is not affected by common shocks at the country-industry level.

Column 2 of table 5 reports our IV estimation results for the entire sample of IFs. Our new estimates confirm that experience of corruption increases business performance. The IV estimate is higher than the OLS estimate (1.47 vs 0.28). Such a coefficient increase is quite usual in IV estimations (see Wooldridge, 2001, p. 624) and this large coefficient is reasonable given the low level of IFs' sales.

A series of tests validates the relevance of our instrument. The exogeneity test confirms the simultaneity in the determination of turnover and bribe payment. The first stage F-statistic, higher than 10, enables us to reject the null hypothesis that our excluded instrument is weak. One may worry that, within cities, the best-performing IFs might self-select into low-controlled premises. If this was the case, our instrument would no longer be valid. The identifying assumption, according to which, within countries, the IFs premise' choice is not correlated to IFs' performance, would not hold anymore. To test for this assumption, we estimate the determinants of the probability of an IF *i* in sector *j* in city *k* to operate in a highly controlled kind of premise. We use different definitions of highly controlled premises: premises with control rate higher than the mean, the third quartile and the upper decile (in city *k*). Whatever the threshold we use, the coefficient on IF's sales is never significant at conventional levels<sup>11</sup> suggesting that IFs do not choose their premises according to their performance.

To investigate the effect of corruption on firm sales further and consider the heterogeneity of the informal sector, we estimate our production function for three categories of IFs suggested by Grimm et al. (2012): *top performers*; *constrained gazelles*, which share certain characteristics with *top performers* such as education, sector choice and language skills, but are not successful; and *survivalists*. Consistent with Şeker and Yang (2014),<sup>12</sup> we test whether the effect of corruption on economic performance varies by IF category. We expect the positive effect of bribery on IF performance to be driven by *constrained gazelles*. Indeed, they are the only entrepreneurs for whom petty corruption can make a difference. In the absence of access to capital, credit and insurance, bribery for them is an accessible way to lift a constraint. When investing in new capital is not an option, they may choose to spend some resources to obtain special privileges or cheaper access to public infrastructures and services. Such a strategy would be meaningless for *top performers* and not even an option for *survivalists*. Of course, this strategy is conceivable only if corruption gives IFs a net gain, however small.

We identify *top performers* based on size and productivity criteria as the 40 per cent with the highest capital profitability (value-added per unit of physical capital) among the entrepreneurs in the top 25 per cent of the capital distribution for their respective country. The *constrained gazelles* are distinguished

from *survivalists* by estimating a probit model of the probability of being a *top performer*. In each country, we define the cut-off point for the predicted probability of being a *top performer* between *constrained gazelles* and *survivalists* such that the mean of this predicted probability is the same for the group of *top performers* as it is for the *constrained gazelles* (see Grimm et al., 2012, for an in-depth presentation of the identification process). In other words, *constrained gazelles* should on average be as likely to be *top performers* as the actual *top performers*. The basic idea behind this strategy is to single out from among the non-*top performers* those entrepreneurs with business skills and entrepreneurial behaviour similar to upper tier entrepreneurs.

Columns 3, 4 and 5 of table 5 present our IV estimates of our turnover functions for each IF category. Our results show that corruption has no significant impact on the sales made by *top performers* and *survivalists*, but that it has a positive and significant effect on *constrained gazelles'* turnover. Corruption for these particular entrepreneurs is beneficial to their business. To gain further insight into the mechanisms at stake, we run regressions in which the dependent variable is annual value-added rather than turnover<sup>13</sup>. Our results show that corruption has no significant effect on the IFs' value-added, even for *constrained gazelles*. In other words, corruption does not increase the wealth generated by IFs. These results suggest that bribery has an intensive effect on IF activity. It enables them to increase their turnover by gaining cheaper access to public goods and services and/or saving time in their interactions with public officials (such as a taxi driver choosing to bribe a policeman). As supplementary robustness checks, we estimate the effect of corruption using Inverse Probability Weighting (IPW) and Propensity Score Matching (PSM) estimators. Both estimators use a model to predict treatment status, i.e. having paid a bribe. Estimations of the Average Treatment Effect confirm our previous finding: bribery has an impact on firm performance for only one category of IFs: the *constrained gazelles*. This influence is positive and statistically significant.<sup>14</sup>

**Table 5: Bribery and Informal Firms' turnover**

	OLS		Instrumental variable		
	Full sample	Full sample	Top performers	Constrained gazelles	Survivalists
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: second stage</i>					
<i>Dependant variable: log of annual turnover</i>					
Bribe paid (dummy)	0.27** (0.12)	1.43* (0.78)	0.57 (0.44)	1.79** (1.00)	7.71 (5.10)
Controls for IF's and IF's head	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes
<i>Panel B: first stage</i>					
<i>Dependant variable: bribe paid (dummy)</i>					
City-premises average rate of contact of firm <i>i</i> ' peers		0.87 *** (0.09)	1.34 *** (0.22)	0.80 ** (0.12)	0.61 ** (0.26)
Controls for IF's and IF's head		Yes	Yes	Yes	Yes
Sector fixed effects		Yes	Yes	Yes	Yes
City fixed effects		Yes	Yes	Yes	Yes
Observations	6,080	6,080	619	2,637	2,824
Test of endogeneity		2.75 (0.10)	1.26 (0.26)	3.90 (0.05)	11.9 (0.00)
First-stage F		80.43 (0.00)	38.49 (0.00)	42.4 (0.00)	5.52 (0.02)



Underidentification test	5.366 (0.02)	6.04 (0.01)	3.90 (0.04)	1.95 (0.16)
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Standard errors are clustered at the country\*sector level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively. The log of IF turnover is explained by the log of capital and labor inputs, a dummy variable denoting that the IF has no capital, the IF's age, the age, gender, knowledge of French and level of education of IF's head. Bribery is instrumented by the average rate of contact with public officials of IF's peers computed for each types of premises in each city.

## 5. Conclusion

This paper investigates the intensity of corruption and its impacts on the informal firms. It is the first time ever that corruption in the informal sector, measured by experience rather than perception, has been extensively analysed. Our study provides a number of new insights. Firstly, and contrary to popular belief, our data show that IFs in West African capital cities are not massively victims of corruption by public officials. Only 4.2 per cent of IFs reported they had to pay bribes in the year before the survey. This figure does not mean that corruption is an anecdotal phenomenon. If we look solely at IFs that had contact with the State in the year before the survey, this proportion rises to 37 per cent which makes bribery a significant means of settling disputes with public officials.

Our analysis of the determinants of corruption among IFs shows that the mechanisms are not fundamentally different from those prevailing in the formal sector. Larger firms and transport firms are more likely to face predatory behaviour by government officials. Moreover, our findings show that experience of corruption increases firm performance, but this effect is driven by just one category of IF: *constrained gazelles*. From a policy point of view, the latter result calls for specific anticorruption policies. There is a high potential among *constrained gazelles* to use corruption as an undue advantage to distort competition.

<sup>1</sup> The surveys were carried out in Cotonou, Ouagadougou, Bamako and Lome in 2001, and in Abidjan, Dakar and Niamey in 2002.

<sup>2</sup> Regional Statistical Assistance Program for multilateral monitoring sponsored by the WAEMU Commission.

<sup>3</sup> The surveys are presented in detail in appendix.

<sup>4</sup> In addition, particular care was taken to guarantee the quality of the information collected (training interviewers, building a relationship of trust with the interviewee, guarantee of confidentiality, translation of the questionnaires into the local languages, harmonised definition of the term 'corruption', etc.). Obviously, despite all the precautions taken with data collection, the possibility of a response bias cannot be totally ruled out.

<sup>5</sup> To save space, we do not report on the estimates for the city fixed effects. They are presented in appendix.

<sup>6</sup> They use the same data as Svensson (2003) on mostly formal Ugandan firms. Note that Fisman and Svensson's data comes from an industrial survey, which implies that these firms are more likely to be registered with the tax administration.

<sup>7</sup> They use a plant-level dataset on all Indonesian manufacturing plants with 20 or more employees for the 1975–1995 period. The dataset is taken from an annual survey conducted by the Indonesian Bureau of Public Statistics.

<sup>8</sup> Results available upon request.

<sup>9</sup> For the production factors (labour and capital), potential endogeneity is not addressed here to keep our models manageable.

<sup>10</sup> The use country-sector averages rate of corruption as instrument yields results consistent with our main findings. Results available upon request.

<sup>11</sup> Results available upon request.

<sup>12</sup> They show that the effect of corruption on firm growth in the Latin American and Caribbean region varies with firm sales, with the effects of corruption being more severe for low-revenue-generating firms.

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<sup>13</sup> Results available upon request.

<sup>14</sup> Results are presented in appendix.

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## APPENDIX

### 1-2-3 SURVEYS

As suggested by its name, the *1-2-3 Survey* is a three-phase survey. The basic rationale of this tool is the following. The first phase is an augmented labour force survey (LFS). It documents and analyses labour market functioning and is used as a filter for the second phase to identify a representative sample of IF heads who are then interviewed. Phase 2 is designed to measure the firms' main economic and productive characteristics (production, value-added, investment and financing), the main difficulties encountered developing the business, and demand for public support by informal entrepreneurs. Lastly, in the third phase, a specific income/expenditure survey is administered to a sub-sample of households selected from phase 1 to estimate the weights of the formal and informal sectors in household consumption by product and household type. Phase 3, not used in this paper, is also used to estimate households' living standards and monetary poverty, based on either income or expenditure.

The following presents a brief description of the sampling plan and the content of the questionnaires administered. The sampling frame for the LFS (phase 1) was a classic two-stage stratified sample. The primary sampling units were census enumeration areas (EAs). In each EA (125 per country), some 20 households were randomly selected with equal probabilities (see Brilleau, Roubaud and Torelli, 2005a for more details). The final sample size was 18,000 households (approximately 2,500 households in each country, except in Benin where 3,000 households were interviewed). The IFs were stratified for phase 2 using phase 1's rich data. Twenty strata were defined by industry (10 industries) and IF head status (employer and/or own account worker). The unequal probabilities for each stratum were calculated based on the number of IFs and their economic potential in terms of development policies (employer and industrial IFs are overrepresented). Here again, IFs were randomly selected from phase 1 master samples for each stratum. Lastly, 6,500 IFs completed the questionnaires (around 1,000 IFs per country). Sample weights were computed by adjusting the theoretical probability of inclusion by the usual post-stratification procedures.

Note here that the *1-2-3 surveys* have three major advantages over other alternative datasets. First, the mixed household-enterprise survey frame is the only way to ensure the full representativeness of the informal sector (ILO, 2013). Previous studies, especially in SSA, are typically based on enterprise surveys, which cover just part of all informal firms; the upper tier of the informal sector generally works in specific industries, mainly manufacturing. Second, our seven surveys are fully comparable, as sampling methodology and questionnaire were kept constant across all countries. To our knowledge, this is the first time ever that such a series of repeated cross sections on representative IFs has been made available for SSA. Third, given that IFs do not usually keep books (and, in many cases, do not even have any written records), the survey questionnaire was designed to help the owners of the firms establish all their sales and expenses product by product over a flexible period of time adjusted to each individual case. This detailed and comprehensive information collection procedure is the only way to get reliable data and avoid the usual underestimation biases caused by more aggregate questions. The same extensive process was used to reconstitute the stock of capital evaluated at replacement cost to take into account depreciation.

In the *1-2-3 surveys*, the criteria used to identify IFs are the absence of an administrative registration number and/or of written bookkeeping, excluding farming activities. An aggregate three-industry nomenclature shows that trade accounts for a large share of the informal sector (Table 1). A full 46 per

cent of IFs work in trade, as opposed to 28 per cent in manufacturing (including construction) and 26 per cent in services. The dominance of trade is observed in almost all the capital cities. Its share ranges from 40 per cent in Abidjan to 52 per cent in Bamako. One of the upshots of these results is that the usual surveys covering solely manufacturing overlook the majority of informal firms.

**Table A1: Informal firms' distribution by industry (%)**

	Cotonou	Ouagadougou	Abidjan	Bamako	Niamey	Dakar	Lome	Total
<b>Manufacturing</b>	<b>21.9</b>	<b>34.2</b>	<b>28.5</b>	<b>27.3</b>	<b>43.2</b>	<b>31.1</b>	<b>23.0</b>	<b>28.4</b>
Clothing, leather, shoes	9.2	7.5	12.4	10.9	8.2	7.6	9.1	<b>10.1</b>
Other manufacturing	8.1	21.1	9.4	10.3	32.0	15.9	10.2	<b>12.4</b>
Construction	4.6	5.6	6.7	6.2	3.0	7.6	3.8	<b>5.9</b>
<b>Trade</b>	<b>49.2</b>	<b>48.7</b>	<b>40.0</b>	<b>51.5</b>	<b>40.6</b>	<b>47.3</b>	<b>48.5</b>	<b>45.5</b>
In-shop retail and wholesale	13.5	11.4	11.1	9.1	7.3	11.1	11.9	<b>11.1</b>
Out-of-shop retail	35.7	37.3	28.9	42.4	33.3	36.2	36.5	<b>34.4</b>
<b>Services</b>	<b>28.9</b>	<b>17.1</b>	<b>31.5</b>	<b>21.3</b>	<b>16.2</b>	<b>21.6</b>	<b>28.5</b>	<b>26.1</b>
Catering	10.5	4.8	7.0	3.0	0.5	4.1	7.0	<b>6.0</b>
Repairs	3.5	4.8	6.0	2.7	2.8	2.1	5.3	<b>4.3</b>
Transport	5.2	1.0	4.1	2.9	1.9	4.3	4.4	<b>3.8</b>
Other services	9.7	6.4	14.4	12.7	10.9	11.1	11.8	<b>12.0</b>
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Authors' calculations based on the 1-2-3 surveys, phase 2.

**Table A2: City and sector fixed effect estimates in regressions on the probability of paying a bribe**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Country fixed effect (ref. Togo)</b>						
Benin	-0.67*** (0.16)	-0.57*** (0.17)	-0.66*** (0.17)	-0.63*** (0.16)	-0.62*** (0.16)	-0.22** (0.10)
Burkina Faso	-0.73*** (0.18)	-0.76*** (0.20)	-0.77*** (0.19)	-0.77*** (0.19)	-0.70*** (0.19)	-0.06 (0.11)
Ivory Coast	-0.08 (0.14)	-0.03 (0.14)	-0.13 (0.15)	-0.12 (0.14)	-0.06 (0.14)	-0.08 (0.10)
Mali	-0.25* (0.15)	-0.20 (0.15)	-0.31** (0.15)	-0.28* (0.15)	-0.21 (0.16)	-0.17 (0.11)
Niger	-0.28 (0.17)	-0.35* (0.19)	-0.24 (0.17)	-0.23 (0.17)	-0.21 (0.17)	0.08 (0.12)
Senegal	-0.08 (0.14)	-0.03 (0.13)	-0.08 (0.14)	-0.08 (0.14)	-0.08 (0.14)	0.18* (0.10)
<b>Sector fixed effects (ref. Transport)</b>						
Clothing, leather, shoes	-0.71*** (0.16)	-0.72*** (0.16)	-0.60*** (0.16)	-0.57*** (0.16)	-0.49*** (0.16)	-0.65*** (0.12)
Other manufacturing	-0.89*** (0.17)	-0.87*** (0.17)	-0.81*** (0.17)	-0.79*** (0.17)	-0.79*** (0.17)	-0.68*** (0.11)
Construction	-1.11***	-1.25***	-1.04***	-1.01***	-0.99***	-1.00***

	(0.23)	(0.23)	(0.25)	(0.25)	(0.24)	(0.17)
In-shop retail and wholesale	-0.58***	-0.57***	-0.56***	-0.51***	-0.55***	-0.58***
	(0.15)	(0.16)	(0.16)	(0.15)	(0.16)	(0.11)
Out-of-shop retail	-0.63***	-0.52***	-0.49***	-0.45***	-0.50***	-0.49***
	(0.15)	(0.17)	(0.16)	(0.16)	(0.16)	(0.11)
Catering	-1.11***	-0.90***	-0.82***	-0.81***	-0.82***	-0.72***
	(0.22)	(0.24)	(0.23)	(0.23)	(0.26)	(0.14)
Repairs	-0.57***	-0.75***	-0.67***	-0.60***	-0.59***	-0.61***
	(0.18)	(0.18)	(0.19)	(0.18)	(0.18)	(0.13)
Other services	-1.20***	-1.23***	-1.12***	-1.10***	-1.07***	-0.76***
	(0.21)	(0.22)	(0.21)	(0.21)	(0.22)	(0.13)

Note: The estimated models are those reported in Table 3.

Standard errors are clustered at neighbourhood level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively.

**Table A3: City and sector fixed effect estimates in regressions on the bribe amount paid**

	(1)	(2)	(3)	(4)
<b>Country fixed effect (ref. Togo)</b>				
Benin	-4.60***	-3.04***	-2.82***	-2.73***
	(0.78)	(0.64)	(0.69)	(0.68)
Burkina Faso	-4.69***	-3.41***	-4.94***	-3.31***
	(0.79)	(0.74)	(0.62)	(0.62)
Ivory Coast	-2.17***	-0.90	-1.46***	-0.77
	(0.72)	(0.59)	(0.52)	(0.55)
Mali	-1.89**	-0.21	-0.91*	-0.52
	(0.81)	(0.60)	(0.53)	(0.52)
Niger	-2.48***	-1.56**	-1.87***	-1.73***
	(0.79)	(0.64)	(0.56)	(0.59)
Senegal	-1.62*	-0.25	-0.06	0.11
	(0.90)	(0.57)	(0.59)	(0.62)
<b>Sector fixed effects (ref. Transport)</b>				
Clothing, leather, shoes	-3.08***	-4.05***	-2.55***	-2.28***
	(0.69)	(0.81)	(0.80)	(0.75)
Other manufacturing	-3.31***	-5.14***	-4.07***	-3.44***
	(0.70)	(0.73)	(0.66)	(0.66)
Construction	-4.59***	-7.51***	-5.36***	-5.38***
	(0.80)	(0.77)	(0.81)	(0.75)
In-shop retail and wholesale	-0.70	-1.15	-2.72***	-1.42*
	(0.74)	(0.81)	(0.77)	(0.73)
Out-of-shop retail	-0.77	-1.21*	-2.15***	-1.47**
	(0.61)	(0.66)	(0.67)	(0.66)
Catering	-4.91***	-5.22***	-3.66***	-3.19***
	(0.80)	(0.81)	(0.80)	(0.81)
Repairs	-1.31	-3.41***	-2.61***	-2.05***

	(0.88)	(0.80)	(0.87)	(0.77)
Other services	-4.26***	-6.42***	-5.01***	-4.36***
	(0.79)	(0.88)	(0.79)	(0.82)

Note: The estimated models are those reported in Table 4. Standard errors are clustered at neighbourhood level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively.

**Table A4: Bribery and Informal firms' turnover: Average Treatment Effects (ATEs)**

	Coef.	Std errors	# of obs.
<b>Panel A: Inverse Probability Weighting Model (IPW)</b>			
Full sample	0.27	0.27	6,442
<i>Top performers</i>	-0.14	0.56	645
<i>Constraint Gazelles</i>	0.31***	0.08	2,973
<i>Survivalists</i>	0.58	0.39	2,824
<b>Panel B: Propensity Score Matching Model (PSM)</b>			
Full sample	0.40	0.15	6,442
Top performers	-0.06	0.39	645
Constraint Gazelles	0.28**	0.14	2,973
Survivalists	0.23	1.14	2,824

Note: In panel A and B, the incidence of corruption is explained by sales per employee (in log), the capital/labour ratio (in log), dummies denoting IF size and the fact that the entrepreneur pays taxes as well as 3-digit sector indicators and city fixed effects. Figures in parentheses are probability tests. Standard errors are clustered at neighbourhood level. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level respectively.