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Does Corruption Impact on Firms' Ability to Conduct Business in Mauritania?

Evidence from Investment Climate Survey Data

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Abstract

This paper seeks to understand whether Mauritanian firms deem corruption as an obstacle to operate and grow, to identify the profile of firms that are more likely to make informal payments, and to quantify the size of these payments. The results of the analysis show that perceptions of corruption can be potentially misleading. Corruption is not considered to be one of the most taxing factors impeding the growth of firms in Mauritania. Yet, its cost to firms is significant and greater than in the comparator group countries. This means that corruption is internalized by firms and considered an accepted practice. Alternatively, firms may fear reporting corruption practices for fear of retaliation. Econometric evidence on the propensity and intensity of bribes suggests that medium-size firms suffer the most from corruption in Mauritania. Larger firms are more established and connected, do not fear exiting the market, and are less likely to be harassed. Smaller firms are less visible and may be able to escape the control of public officials by operating largely in the informal sector. Medium-size firms are the most likely to pay bribes and to pay the highest amounts as a percentage of their total annual sales, which places a heavy burden on their ability to grow.

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Keywords: Mauritania, corruption, firm level, firm behavior, bribe intensity, bribe propensity.

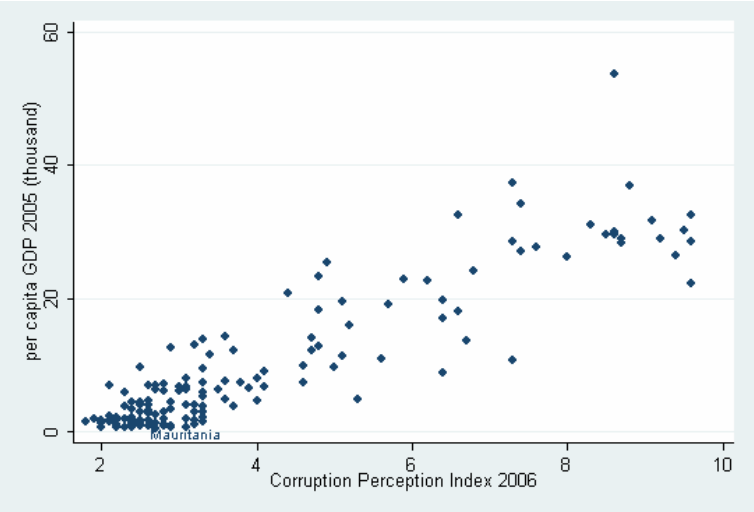
1. Introduction

Governance is one of the key, cross-cutting building blocks of a healthy investment climate and has become the focus of many policy makers in recent years. Weak governance implies a breakdown in one or more parts of the structure created by the complex relationships between a country's institutions and traditions. One of the most harmful symptoms of such a breakdown is widespread corruption.[1] Fighting corruption has therefore become one of the key elements in efforts to promote good governance. Over the last decade, several empirical studies have attempted to examine the relationship between corruption and various indicators of economic development. Overall, weak governance and corruption have been associated with lower levels of development: the higher the perception of corruption, the lower per capita GDP (see Figure 1) (Tanzi and Davoodi, 2000). Studies also show a significant negative correlation between corruption and growth rates (Tanzi and Davoodi ibid., Mauro 2005).

There are different channels through which corruption can affect development: one of them is public finance. Tanzi and Davoodi (1997) show that corruption may increase public investment, but reduces its quality and productivity. This can lead to the deterioration of essential public infrastructure needed for sustained economic growth. Other studies (Mauro 1998, Gupta, Davoodi and Alfonso-Terme 1998) focus on the overall composition of public spending and find that higher corruption is associated with lower spending on education and health. Finally, Tanzi and Davoodi (1997), Johnson, Kaufmann and Zoido-Lobaton (1999) and Friedman, Johnson, Kaufmann and Zoido-Lobaton (2000) show that countries with high corruption tend to collect less tax revenues (as measured by the tax to GDP ratio). The empirical evidence thus suggests that widespread corruption may turn out to be an impediment to sustained growth.

[1] Corruption is commonly defined as the misuse of public office for private gain and personal gain can be defined as financial (bribes, kickbacks etc.) or other benefits (gifts, privileges etc.) (Jain 2001).

Figure 1:Corruption Perception and GDP (in PPP US$)



Source: World Development Indicators and Transparency International.

However, most of these studies establish associations, which do not necessarily imply causality one way or the other. Overall, the impact of corruption is difficult to prove empirically and some findings are open to debate. One of the reasons is the difficulty of measuring corruption. Whether grand, legislative or petty (see Jain 2001), corruption tends to take place in secrecy, making it hard to detect or measure. As a result, corruption data are often perception based indicators which raise concerns about perception bias. The other problem with the results at the aggregate macroeconomic level is the aggregate nature of the data that hides important differences on the relationship between corruption and individual agents. That is, firms facing the same overcharging legal environment may still be affected in different ways because of their idiosyncratic characteristics.

There is relatively little evidence on the determinants of corruption at the firm level in developing countries, notably in Sub-Saharan Africa (SSA). Svensson (2003), using firm-level data for Uganda, tries to identify who are the bribe payers and how much they pay. He applies a simple bargaining model and finds that the extent of dealings with public officials determines the likelihood of having to pay bribes, and that the amount paid is influenced by the firm's ability to pay and power to refuse paying (the firm's bargaining power). Kuncoro (2006) uses firm-level data for Indonesia to estimate bribe intensity both in day-to-day operations and in opening a new business. He finds that higher tax

payments, more time spent on negotiations, and a heavy regulatory burden go hand in hand with larger bribes for day-to-day operations (See Annex 2).

As in Svensson (2003) and Kuncoro (2006) this paper avoids the pitfalls of aggregate data. The analysis is based on the 2006 Investment Climate Survey (ICS) – conducted in 2005 – which contains data on 361 Mauritanian firms, located in Nouakchott and Nouadhibou and representing the manufacturing, retail, information technology, and other sectors (See Annex 4). The data set includes quantitative information on bribe payments. The paper aims to understand whether Mauritanian firms deem corruption as an obstacle to operate and grow, to identify the profile of firms that are more likely to make informal payments, and to quantify the size of these payments. To the authors' knowledge, no analysis of corruption at the firm level in Mauritania has been carried out to date, hence the paper makes an initial contribution in this area of study.

The paper is structured as follows. Section 2 provides an overview of the Mauritanian context and explains why it is important to focus on corruption at the firm level. Section 3 presents the descriptive analysis focusing on the perception of corruption by Mauritanian firms, the main characteristics of petty corruption and the financial cost of corruption. Section 4 presents the theoretical framework and specification of the econometric model used, while Section 5 discusses the results of the econometric analysis on bribe propensity (i.e., the probability of paying a bribe) and intensity (i.e., the payments of bribes as a share of the firm's annual sales). Section 6 concludes.

2. The Importance of Reducing Corrupt Practices and Stimulating Competition for Private Sector Development

Mauritania is at a cross-road. With relatively good natural resource prospects (oil, iron ore, fisheries, copper and gold), the economy is poised to grow rapidly in the future potentially triggering a transition from low to middle-income country.[2] The key challenge confronting policy makers today is to diversify the sources of growth besides

[2] Mauritania has a population of 2.9 million people and a per capita GDP of US$ 921 (World Bank, 2007). The non-oil (oil) GDP growth rate in 2006 was 4.4 percent (11.7 percent with oil).

natural resources, and attract investment by creating an enabling environment for private sector development. But there are significant barriers to overcome. First of all, the country displays already a distorted economy and dependent policy that tends to prioritize rent redistribution over wealth creation (Auty and Pontara 2008). Weak governance and corruption have become a central concern in Mauritania in recent times, as evidence emerged on the existence of significant extra-budgetary spending and embezzlement of public resources between the end of the 1980s and 2004. (See Annex 1 on governance indicators.)

Secondly, the development of the private sector to date has been mainly constrained by lack of competition due, inter alia, to the presence of powerful and well-connected business groups. A key feature of the modern sector is the high concentration of ownership by a few families of large businesses in trade and commerce. Large private trading monopolies thus skim rent from the urban economy at the expense of domestic (more competitive) private producers whose margins are shrunk by high factor costs. The considerable monopolistic power on the domestic market enjoyed by powerful groups is reinforced through formal (e.g. administrative authorizations to enter into some sectors such as tourism, transport, etc.) and informal regulatory barriers that tend to make markets less contestable. A dynamic informal sector also exits but tax and regulatory policies, as well as the dominance of large competitors, restrict the emergence of new entrepreneurs (World Bank, 2007).

Monopolies also dominate bank credit and insurance services at the expense of small and medium-size businesses, potentially the most dynamic economic agents, who do not have preferential access to long-term credit and lack political connections. A further hindrance to private sector development is the under-development of financial markets, unreliable infrastructure, lack of skilled workers, and scarce industrial entrepreneurial experience. Given these market failures it is not surprising that entrepreneurs prefer to invest wherever possible in trade rather than production; or that most urban workers support themselves through the extended family and petty trade. These factors, combined, have restrained the emergence of private sector activity and, notably, the expansion of small

and medium enterprises, putting a lead on the growth potential in Mauritania beyond the exploitation of natural resources.

Some attention has been paid in the literature to the country's political economy. What emerges is that corrupt practices have deep social roots in Mauritania and reflect decades of rent-driven development in the iron ore and fisheries sectors. Under the rule of Ould Taya (1984- 2005) power was de facto retained by a military oligarchy that fostered neo-patrimonialism, i.e. a system where relationships of loyalty and dependence pervade a formal political and administrative system through a predominant party system (Ould Ahmed Salem 2001, Marianne 2001, N'Diaye 2006). The period was also characterized by a general "banalization" of corruption and wide-spread embezzlement (Blundo 2007).[3] Fractiousness within the dominant groups encouraged the leadership to maintain power by using state control of productive activity in order to generate resources to sustain a clientelistic patronage system. The political power sought and obtained the support of the dynamic businessmen elite, while the *milieu d'affaires* sets out to conquer the "state market" (Ould Ahmed Salem 1999).

With a view to adding a further dimension to this analysis, the remaining part of this paper attempts to shed further light on the underdevelopment of Mauritanian private sector, and of SMEs in particular, by focusing on the extent of bribe propensity and intensity as barriers to growth. The results discussed in this paper could be also important input to foster the dialogue with the newly elected Government. Mauritania has the chance to make a fresh start, after a successful coup in August 2005 deposed the long-serving president and led to parliamentary elections in early-2007 and also improvements in the technical quality of governance.[4] To succeed, arguably, the new government will need to deploy economic reforms that will threaten powerful rent-seeking interests.

[3] Increasing income inequality under Taya reflected a process of wealth redistribution towards a clientele chosen because of "ethnicity", "tribalism" or "status" within the system of Mauritanian society. The president rewarded tribal leaders for their loyalty with positions in government and key sectors of the economy that conferred access to public resources to reward their constituencies. Office holders were rotated to spread access to state largesse and to limit incentives to defect to the opposition (Marianne, 2001, Ould Ahmed Salem, 2001).

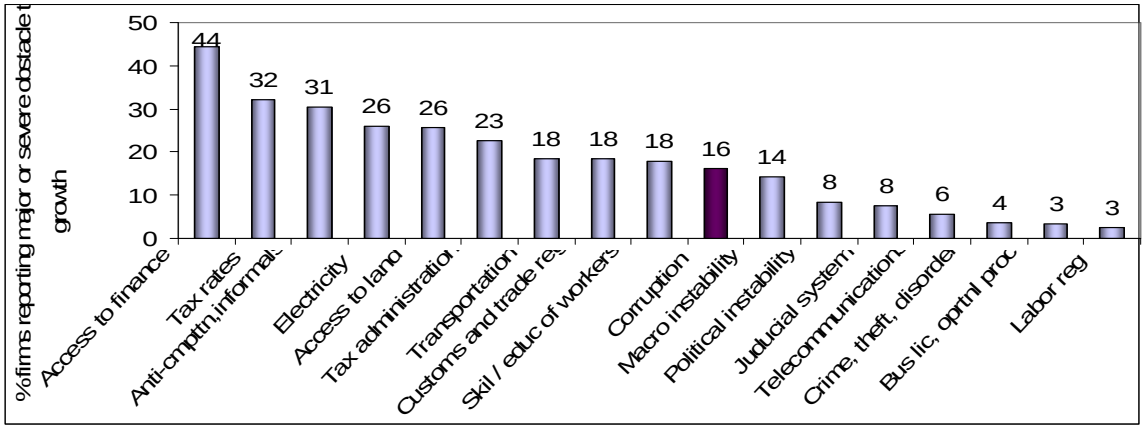
[4] Mauritania's transition culminated in March 25, 2007 with the second round of the presidential election. Sidi Ould Cheikh Abdellahi was elected President. Various initiatives to improve governance and reduce corruption are underway (World Bank 2007).

3. Descriptive Analysis

3.1 Firms' perception of corruption in Mauritania

In 2005, some 303 of the 361 firms surveyed (84 percent) admitted paying bribes to government officials, while only 58 firms (16 percent) in the sample denied it. These shares are similar to those found by Svensson (2003) for Ugandan enterprises surveyed in 1998 (81 percent). Yet, only 18 percent of firms in Mauritania consider corruption as a major or severe constraint for their business operations and growth, while 44 percent of firms rate access to finance a major/severe constraint. Firms consider tax rates (32 percent), anti-competitive practices by informal businesses (31 percent), and electricity and access to land (26 percent) as major/severe barriers to their growth and operations (Figure 2). Breaking down the sample into formal and informal firms, the results show that approximately 18 percent of formal firms perceive corruption as a major/severe obstacle to growth, while this share is around 12 percent for informal firms.

Figure 2: Major or severe obstacles to growth, whole sample (% of firms)

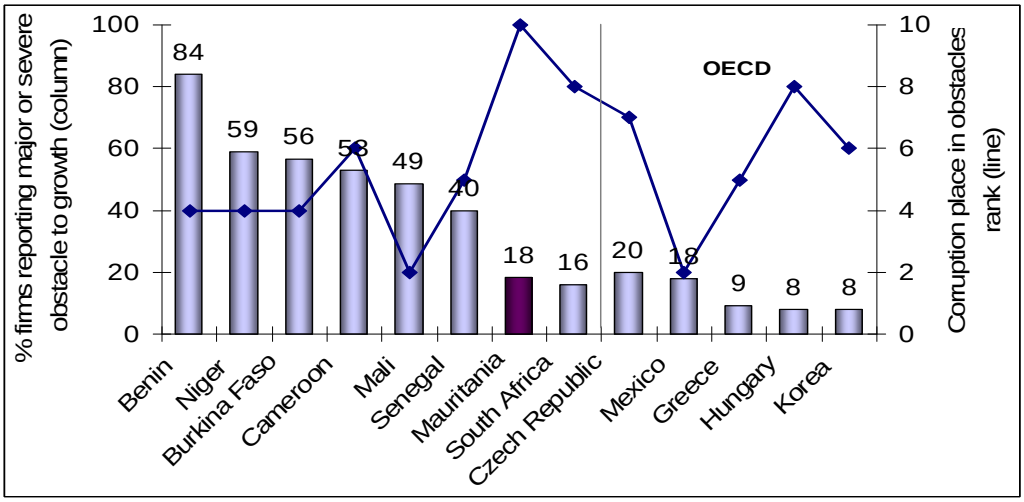


Source: Mauritania ICS, 2006.

The low perception of corruption in Mauritania stands out when comparing it with other countries. The share of formal businesses that identifies corruption as a major/severe impediment to do business in Mauritania (18 percent) is much lower than in neighboring countries such as Mali (49 percent), Senegal (40 percent), or other SSA countries like Cameroon (53 percent). It remains nevertheless higher that in middle-income countries such as South Africa (16 percent) and most OECD countries. If obstacles to business

operations and growth (15 independent questions in the survey) are ranked according to the percentage of firms that consider them a major/severe obstacle, corruption comes in the 10th place in Mauritania, but only in 2nd place, for instance, in Mali (Figure 3).[5]

Figure 3: Corruption as major/severe obstacle to growth (% of firms, right axis) and overall rank as an obstacle to growth (left axis), formal sector, selected countries



Source: ICS database

3.2 Petty corruption

Petty corruption in Mauritania is pervasive.[6] Regardless of the firm category, the most common payment of bribes by entrepreneurs is made in order to: (a) establish a water connection; (b) obtain a construction permit; and (c) establish an electricity connection. Relatively fewer firm, by contrast, make informal payment to establish a connection to a mainline telephone and obtaining an import or operating license. On average, medium-size enterprises operating in Nouadhibou are the most taxed by informal payment although there are notable exceptions (See Annex 5 for the complete set of data).

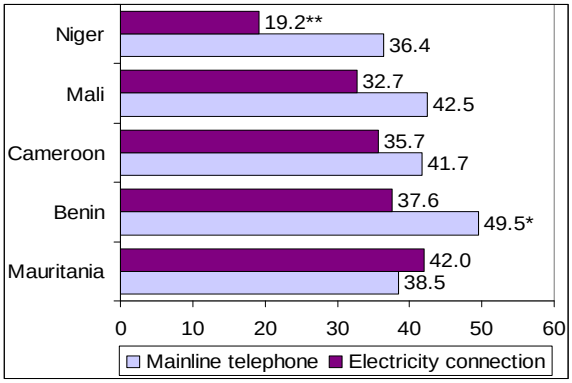
The extent of petty corruption associated with the provision of selected public services becomes even more startling when compared internationally. In water, the share of bribe-paying firms (75 percent) in Mauritania is about the double than those of Benin,

[5] There are 15 independent questions on 15 distinct obstacles to growth in the ICS.
[6] This analysis is based on reported answers of whether bribes were paid in order to speed up the delivery of day-to-day services.

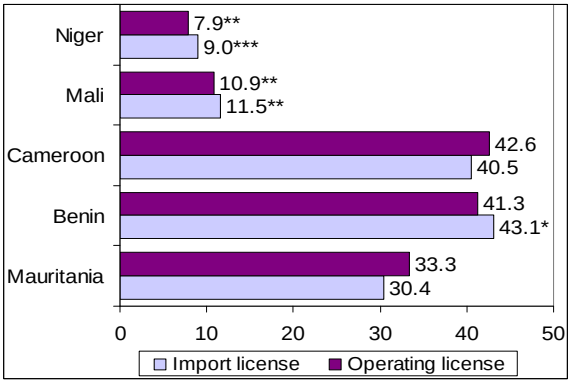
Cameroon, Mali and Niger. Some 42 percent of firms in Mauritania paid to obtain a connection to the electricity grid, a share more than double that of Niger (19.2 percent), and higher than in Benin, Cameroon and Mali. In addition, almost 53 percent of firms in Mauritania were expected to pay bribes to providers of construction permits, once more setting the record in the comparator group. Most of these payments are made to accelerate the speed of connections, as well as their quality, and to reduce the bureaucratic procedures to obtain construction permits. To the extent that inefficiency and red tape assures a bribe payment, there is little incentive to remove them, with adverse consequences on the growth and dynamism of Mauritanian firms (Figure 4).[7]

Figure 4: Informal payments requested (% firms), selected countries

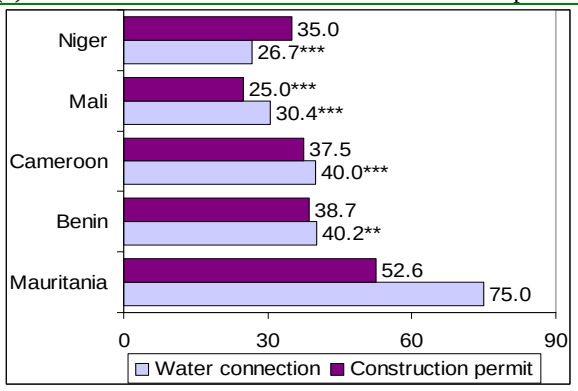
(a) To obtain mainline telephone and electricity connection



(b) To obtain import license and operating license



(c) To obtain water connection and construction permit

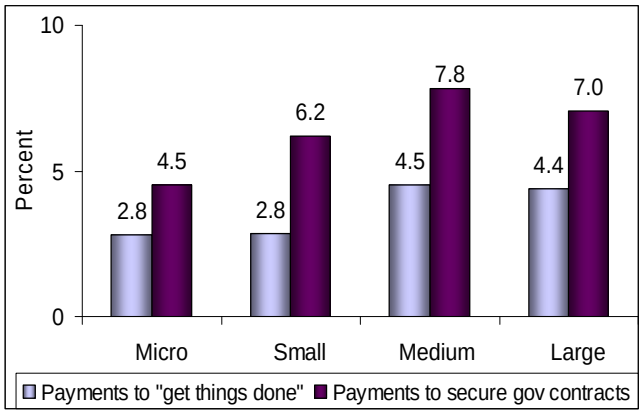


Notes: **Proportion statistically different from Mauritania's at the 5% level. ***Proportion statistically different from Mauritania's at the 1% level. Formal sector only.
Source: ICS database.

[7] The number of connections to the water system is low and leads to high water cost and charges, which are the highest in the sub-region. Water access for industrial use remains problematic. SONELEC, the National Electricity Company, offers an intermittent service: amongst manufacturing firms power outages cause an average loss of approximately 3.3 percent of annual sales.

3.3 The financial cost of corruption

Figure 5: Average bribes to "get things done" (% of sales) and to secure public contracts (% of contract)

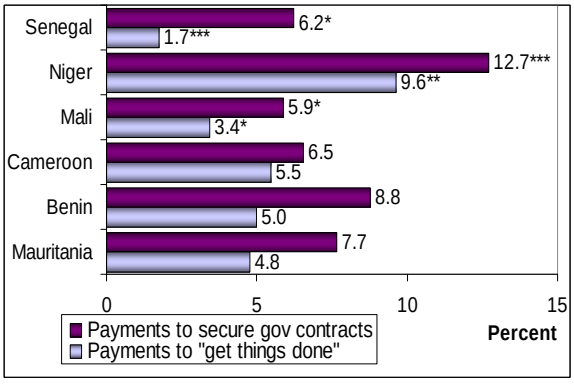


Source: Mauritania ICS, 2006

On average, Mauritanian firms make informal payments to "get things done" of about 4.8 percent of the annual sales and of 7.7 percent of the contract value to secure contracts with the government. Survey results show bribes in percentage of the sales increase with size up to a point and then decrease. Medium companies are the ones that pay a larger percentage of their sales (7.8 percent).[8] To secure government contracts, medium and large firms report to pay, on average, 7.8 and 7.0 percent of the contract value, respectively, while micro and small firms pay on average 4.5 and 6.2 percent (See Figure 5). Furthermore, the payment of bribes as a percentage of sales are, on average, larger for firms with foreign capital, and with accounts audited externally (see Annex 6).

The average payment of firms in Mauritania to "get things done" (as a percentage of total sales, 4.8 percent) is higher than in neighboring countries such as Senegal (1.7 percent) and Mali (3.4 percent), but around half the value for Niger (9.6 percent) and lower than Cameroon and Benin. Informal payments to secure contracts with the government (as a share of the value of the contract) are higher in Mauritania (7.7 percent)

Figure 6: Bribes to "get things done" (% of sales) and to secure public contracts (% of contract) in selected countries



Note: *Means statistically different from Mauritania's at the 10% level. **Means statistically different from Mauritania's at the 5% level. ***Means statistically different from Mauritania's at the 1% level.
Source: Mauritania ICS, 2006.

[8] The size categories are (number of employees): micro (1-5); small (6-10); medium (11-20), and large (more than 21). Employment is a variable with a left-skewed distribution, which makes it difficult to create an even distribution for the four size categories.

than in the whole comparator sample with the exception of Benin and Niger (8.8 percent and 12.7 percent respectively) (See Figure 6). These results suggest that while the perception of corruption in Mauritania is low, its costs are relatively high, suggesting that paying bribes is a practice that has been internalized by firms and commonly accepted. Alternatively, this discrepancy could mean that firms do not report accurately corruption practices for fear of retaliation.

4. Empirical Analysis: The Theoretical Framework and Specification

4.1 Bribe propensity

Firms typically have to pay bribes when dealing with public officials whose actions (and power) directly affect firms' business operations and profitability. Examples include demands for basic infrastructure services, construction or import/export licenses. Firms with extensive dealings with public officials are more likely to be under bureaucratic control and therefore more exposed to bribe harassment (Svensson, 2003). Therefore, the probability that a firm may have to pay a bribe can be stated as:

$$p_i = \chi\, w_i + u_i \qquad (1)$$

where p_i is the probability that firm *i* will have to pay bribes, w_i is a vector measuring the required dealing and thus exposure to the public sector, χ is a vector coefficient, and u_i is an unobserved error term. Since the probability of a firm *i* to pay bribes (p_i) is not directly observed, the propensity equation is revised as a probit model:

$$\Pr(pi = 1) = \Phi\,(\chi_w\, w_i + \chi_z\, z_i) \qquad (2)$$

where $pi = 1$ [$pi = 0$] is the event that a firm (does not) faces a bureaucrat and must pay bribes. Φ is the standard normal distribution function. As proxies for firms' dealings with public officials, we consider the number of fiscal inspections, and an infrastructure index, the latter following Svensson (2003). In addition, the probability of facing a bureaucrat is also explained by sector, regional and firm related variables. Firm-related variables

follow the descriptive analysis above as suggested by Kuncoro (2006). (See Annex 3 for the complete set of variables).

4.2 Bribe intensity

If all firms face the same set of rules and regulations, then the amount to be paid in bribes depends on the bargaining power of the firm. Therefore, firm-specific characteristics would influence the magnitude of the bribe demanded by public officials. For instance, firms with high profits today or higher profits expected tomorrow have a weaker bargaining position, which forces them to pay higher bribes. The bargaining hypothesis suggests that the amount of bribes a firm is requested to pay depends on the bureaucrats' perception of the firm's ability to pay, which varies from firm to firm as the bureaucrat discriminates bribes. We assume as variables capturing the bargaining power: size in terms of employment (Kuncoro, 2006, uses size measured in sales) and investments as a share of total sales (i.e., an alternative for the firm's expected future profits or its ability to pay, as in Svensson, 2003). Therefore, the bargaining hypothesis can be stated as:[9]

$$b_i = \beta_0 + \beta_1 E_i^2 + \beta_2 E_i + \beta_3 IS + \beta_4 z_i + e_i \qquad (3)$$

where b_i are the bribes paid as a share of the annual total sales of firm *i*, *E* is size in terms of employment, *IS* are the investments as a share of total sales, e_i is an error term. β_0, $\beta 1$, β_2 and β_3 are coefficients. The descriptive analysis suggests that the relation between the bribe-intensity and size is non linear. To capture the non-linearity we add employment squared to the equation and we expect that $\beta 1 < 0$. Let the vector characterizing the bargaining position to be denoted by $v = (E_i, IS)$. z_i is the vector of the remaining firm-related variables that may explain bribe intensity. The magnitude of the bribe payment as a share of the firm's annual sales (2) is estimated by ordinary least-squares (OLS). (See Annex 3 for the complete set of variables.)

[9] This non-linear assumption is based on the descriptive statistics firm size considering bribes as a share of total sales, for which a smooth inverted U-shape was found.

Both equations (2) and (3) were estimated using continuous and discrete (i.e., micro, small, medium, and large) variables for employment, because the cut-off rule for firm size is debatable. Furthermore, the two processes (propensity and intensity) are independent as suggested by the Heckman selection model for specifications (2) and (3) which shows that the two error terms are not correlated. The null-hypothesis that the correlation term (ρ) equals zero cannot be rejected at the 10 percent level (using firm size in terms of employment: Prob>χ^2=0.5524; using firm size categories: Prob>χ^2=0.4355). Therefore, the two "decisions" made by the firm (i.e., bribe propensity, and bribe intensity) are independent, justifying the use of a probit model to estimate bribe propensity and an OLS model to estimate bribe intensity.

5. Results

5.1 Bribe propensity

Table 1 reports a series of six probit regressions, according to equation (2), which estimate the probability of a firm to pay bribes to public officials in Mauritania (bribe propensity). All regressions control for sector and region[10,11]. Results are robust and stable, and support the hypothesis on which the development of the model was based. A non-linear relationship between bribes and firm size is found. Bribe rates increase with firm size, but then decrease. The employment variable is statistically significant at the 10 percent level and employment squared is negative and statistically significant at the 1 percent level. This result is corroborated when using discrete variables for size.[12] Only medium-size firms have a significantly higher probability of paying bribes to government officials than micro enterprises (omitted dummy). A possible interpretation for this results is that medium firms while visible and exposed do not have the bargaining power of the large companies and may fear to leave the market.

[10] Control for formality is captured by the size discrete variable. All informal firms are micro firms.
[11] Svensson (2003) found that the probability of a firm paying bribes increases between 14 and 20 percent if it is a formal enterprise (*vs*. an informal enterprise).
[12] Specifications (2), (4), and (6), Table 1.

Companies with foreign ownership are more prone to pay bribes to government officials. Firms with some degree of foreign ownership are about 10 percent more likely to make informal payments to government officials than purely domestically-owned firms, *ceteris paribus*. For Smarzynska and Wei (2000), corruption makes local bureaucracy less transparent and increases the value of using a local partner to cut through the bureaucratic maze. Furthermore, as pointed out by Kuncoro (2006), foreign ownership may make a firm more vulnerable to bureaucratic predation, and for this reason foreign firms typically have domestic partners – for their ability to ward off such predation. Moreover, the likelihood of a firm paying bribes in Mauritania decreases as the average monthly wage per worker increases. It is expected that firms that pay higher wages would hire more formal workers (and more skilled labor). As this can be interpreted as a measure of formality and legal compliance (labor rules), one should expect these firms to be less vulnerable to be harassed by officials.

The higher the percentage of senior management time spent dealing with government regulations each week (i.e., tax time), the lower the probability of a firm to pay bribes in Mauritania. A 10 percent increase in the tax time would be associated with a 3 percent decrease in this probability, everything else held constant. This result suggests that companies that comply with procedures are less vulnerable to bribe predation. Another possible interpretation is that more time spent dealing with government regulations may be reflected in having closer ties with officials and thus being less likely to be asked to pay bribes. Nevertheless, Svensson (2002) found that senior management in firms reporting that they had to pay bribes spend significantly more time dealing with government regulations than in enterprises that reported that they did not have to pay bribes.[13]

As the number of dealings between firms and tax officials increases, so does the firm's probability of paying bribes. Results show that one additional tax inspection (in a year) is associated with an increase of 16 to 17 percent in the probability of paying a bribe. In addition, firms that rate corruption as a major or severe obstacle to their growth and

[13] A similar result was found by Gaviria (2000), who used perception-based data at the firm-level in 20 Latin American countries.

operations are around 12 percent more likely to pay bribes than firms that rate this obstacle differently.[14] Furthermore, the firm's location is a determinant of bribe propensity in Mauritania, while sector is not. Firms located in Nouadhibou are around 10 percent more likely to pay bribes to public officials than firms operating in Nouakchott.

[14] Corruption can be considered an endogenous variable to the model and, therefore, this is only included in two of the specifications.

Table 1: Probit estimations on the incidence of corruption among Mauritanian firms – the probability of a firm paying bribes

Independent variable	Specification					
	(1)	(2)	(3)	(4)	(5)	(6)
Employment	0.004*	--	0.004*	--	0.003*	--
	(1.60)		(1.56)		(1.52)	
Employment squared	-0.00002**	--	-0.00002**	--	-0.00002**	--
	(2.11)		(2.03)		(1.96)	
Age	0.001	0.001	0.001	0.002	0.0001	0.001
	(0.24)	(0.28)	(0.48)	(0.67)	(0.04)	(0.29)
Economic group	0.0222	0.002	0.018	0.0004	0.00002	-0.007
	(0.32)	(0.03)	(0.26)	(0.01)	(0.00)	(0.10)
Foreign	0.103*	0.101*	0.102*	0.095*	0.094*	0.09*
	(1.67)	(1.78)	(1.65)	(1.70)	(1.68)	(1.84)
Loan	0.118**	0.087*	0.114**	0.078	0.100*	0.067
	(1.91)	(1.67)	(1.89)	(1.43)	(1.74)	(1.28)
Monthly wage per worker	-2.06E-06**	-2.07E-06***	-2.09E-06***	-2.06E-06***	-2.25E-06***	-1.98E-06***
	(2.34)	(2.42)	(2.40)	(2.44)	(2.76)	(2.57)
Tax-time	-0.003**	-0.002*	-0.003**	-0.003*	-0.003***	-0.003**
	(2.12)	(1.71)	(2.27)	(1.90)	(2.27)	(1.96)
Corruption	--	--	--	--	0.134***	0.119***
					(2.70)	(2.67)
Fiscal inspections	--	--	0.159***	0.163***	0.158***	0.168***
			(2.39)	(2.54)	(2.43)	(2.64)
Infrastructure index	--	--	0.042	0.05**	0.030	0.039
			(1.56)	(1.96)	(1.18)	(1.62)
Small	--	-0.006	--	-0.02	--	-0.014
		(0.14)		(0.48)		(0.36)
Medium	--	0.154***	--	0.149***	--	0.132***
		(2.79)		(2.79)		(2.69)
Large	--	0.026	--	0.014	--	-0.004
		(0.36)		(0.20)		(0.05)
Retail and IT	0.0004	0.004	-0.013	-0.014	-0.002	-0.007
	(0.01)	(0.07)	(0.23)	(0.26)	(0.04)	(0.13)
Other services	-0.086	-0.089	-0.088	-0.093*	-0.071	-0.081
	(1.52)	(1.58)	(1.55)	(1.69)	(1.32)	(1.56)
Nouadhibou	0.110*	0.098*	0.105*	0.09*	0.098*	0.083*
	(1.92)	(1.79)	(1.85)	(1.68)	(1.83)	(1.64)
No. observations	359	359	359	359	358	358
LR χ^2	30.31	37.07	37.54	46.25	47.39	55.45
Pseudo R^2	0.095	0.117	0.118	0.146	0.149	0.175

Note: *Significant at the 10 percent level. **Significant at the 5 percent level. ***Significant at the 1 percent level. Absolute value of z-statistics in parentheses. Micro is the omitted category for size. Manufacturing is the omitted category for sector. Nouakchott is the omitted category for region.

5.2 Bribe intensity

Table 2 reports a series of six OLS regressions, according to equation (3), which estimates the payment of bribes as a share of the firm's annual sales (bribe intensity). All regressions control for sector and region. Results are robust and stable and support the hypothesis developed above. The bargaining hypothesis suggests that bribery payments as a share of total sales depend on the firm size. An inverted U-shape relationship between size and bribe intensity was also found and, corroborating with the descriptive statistics illustrated in Figure 4, medium-size firms are the ones that suffer most from corruption in Mauritania. Since harassment takes up public officials' time, they may focus on large firms in order to receive higher returns for their (time) investments. However, it might be true that officials may be content to accept lower bribe rates (as shares of the firms' annual sales) from large firms, given that these will translate into higher absolute amounts. Public officials may also be reluctant to try to extract bribes from large firms given their networks with higher ranking local or national officials.

This is confirmed when the estimations use firm discrete categories for size. Only medium-size enterprises present significantly higher bribe intensity than micro enterprises. Kuncoro (2006) found a similar result for Indonesian firms using data for 2001: the coefficients of the three firm size dummies used in his OLS estimations suggested some degree of non-linearity in the bribe intensity function.[15,16] In addition, the bargaining hypothesis also suggests bribe intensity to be dependent on the firm's investments as a share of total sales. Indeed, a 1 percent increase in investments as a share of total sales is associated with a 0.3–0.5 percent increase in bribe intensity, *ceteris paribus*.

[15] Kuncoro (2006) also created four size categories in terms of annual sales (i.e., small, smaller medium, larger medium, and large). In his specifications for bribe intensity, "small" (annual sales lower than Rp 1 billion) was the omitted category and the firm size (negative) coefficients that statistically differed from the omitted category were "larger medium" (annual sales between Rp 5 billion and Rp 10 billion) and "large" (annual sales greater than Rp 10 billion).

[16] Svensson (2003), analyzing corruption among Ugandan enterprises, developed five OLS corruption regressions having graft in absolute terms (US$) as the dependent variable and he found firm size in terms of employment to be one of its determinants. Everything else held constant, one additional worker would be associated with an increase in bribes paid to government officials between of US$10.2 and US$16.4.

Bribe payments as a share of a firm's annual sales are lower the older the firm. One-year increase in age is associated with a decrease of 0.04 to 0.06 percent in bribe intensity. This may reflect the fact that older firms are more likely to have mastered the workings of the country's bureaucratic system. On the contrary, firms with external auditing and/or access to credit have to pay a larger percentage of their sales in bribes. Firms that have their statements and certificates audited by an external party pay around 2.0 percent more bribes as a share of their total sales than those that do not, everything else constant. In addition, firms with credit access pay between 2.03 and 2.7 percent more bribes as a share of their annual sales than firms without loans, *ceteris paribus*.

The higher the number of tax inspections in a given year, the higher the bribe intensity. On average, an additional fiscal inspection increases the share of annual sales paid in bribes by about 1.1 percent. The more exposed firms are to bribe requests (i.e., the more visits by tax inspectors), the higher the probability of the firm paying bribes and, as a result, the higher the bribe intensity. In addition, the infrastructure index is a determinant of bribe intensity: if a firm requests the connection of a telephone mainline or electricity, the amount of bribes it pays as a share of its total sales increases by 0.60-0.85 percent, *ceteris paribus*. Proxying the regulatory burden on Indonesian firms by the number of operational licenses required for normal business operations, Kuncoro (2006) found it to be a determinant of bribe intensity in his 2001 sample – one additional license would be associated with an increase in bribe intensity between 0.13 and 0.16 percent.

Table 2: OLS corruption regressions, bribes as a share of total sales is the dependent variable in percentage

Independent variable	Specification					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.654***	2.847***	1.217	1.468*	1.057	1.286*
	(4.14)	(4.02)	(1.52)	(1.84)	(1.48)	(1.76)
Employment	0.072**	--	0.07***	--	0.072**	--
	(2.46)		(2.41)		(2.51)	
Employment squared	-0.0003***	--	-0.0003***	--	-0.0003***	--
	(3.29)		(23.17)		(3.25)	
Age	-0.064**	-0.057*	-0.046	-0.035	-0.057*	-0.044
	(1.98)	(1.73)	(1.41)	(1.08)	(1.92)	(1.47)
Audit	2.196***	2.19***	1.97**	1.947**	1.786**	1.814**
	(2.51)	(2.51)	(2.30)	(2.30)	(2.19)	(2.25)
Economic group	-0.945	-0.972	-0.970	-1.021	-1.115	-1.100
	(0.96)	(0.89)	(1.02)	(0.99)	(1.15)	(1.07)
Investments over sales	0.0003***	0.0003***	0.0005***	0.0005***	0.0005***	0.0005***
	(4.82)	(4.33)	(5.25)	(4.92)	(5.74)	(5.37)
Loan	2.645***	2.505***	2.628***	2.466***	2.172***	2.032***
	(4.23)	(3.89)	(4.16)	(3.82)	(3.55)	(3.23)
Tax-time	-0.019	-0.016	-0.024	-0.020	-0.024	-0.022
	(1.26)	(1.06)	(1.37)	(1.29)	(1.57)	(1.51)
Corruption	--	--	--	--	2.214***	2.239***
					(3.54)	(3.41)
Fiscal inspections	--	--	1.156*	1.089*	1.220**	1.143**
			(1.95)	(1.74)	(2.30)	(2.04)
Infrastructure index	--	--	0.74***	0.849***	0.595**	0.701***
			(2.64)	(3.04)	(2.11)	(2.52)
Small	--	0.108	--	-0.055	--	0.003
		(0.23)		(0.12)		(0.01)
Medium	--	1.329*	--	1.369**	--	1.464**
		(1.87)		(2.01)		(2.12)
Large	--	1.217	--	1.109	--	1.040
		(1.10)		(1.06)		(1.06)
Retail and IT	-0.004	-0.006	-0.171	-0.209	-0.127	-0.159
	(0.01)	(0.01)	(0.30)	(0.34)	(0.25)	(0.28)
Other services	0.092	0.084	0.117	0.094	0.155	0.109
	(0.15)	(0.14)	(0.20)	(0.16)	(0.29)	(0.20)
Nouadhibou	0.857	0.820	0.698	0.639	0.692	0.634
	(1.52)	(1.44)	(1.23)	(1.12)	(1.25)	(1.14)
No. observations	266	266	266	266	266	266
R^2	0.187	0.166	0.219	0.204	0.268	0.254

Note: *Significant at the 10 percent level. **Significant at the 5 percent level. ***Significant at the 1 percent level. Absolute value of t-statistic in parentheses. Micro is the omitted category for size. Manufacturing is the omitted category for sector. Nouakchott is the omitted category for region.

6. Conclusions

This paper has attempted to make an initial contribution to the analysis of the determinants of corruption at the firm level in Mauritania, using both descriptive and econometric analysis, on the basis of the ICS data for 2005. The paper builds on the work conducted in Uganda by Svensson (2003) and in Indonesia by Kuncoro (2006). The overarching aims of the present work were to understand whether Mauritanian firms deem corruption as an obstacle to operate and grow; identify the profile of firms that are more likely to make informal payments; and quantify the size of these payments. The analysis conducted in this paper has yielded the following key results:

- Perceptions of corruption can be potentially misleading. As illustrated above, in the case of Mauritania, data on the perception of corruption at the firm level show that: (i) corruption is not considered to be one the most taxing factor impeding firms' growth in Mauritania, and: (ii) the perception of corruption as an obstacle to growth is significantly lower that in neighboring countries. However, the cost of corruption to firms is significant – both when expressed in percentage of firms' annual sales or contract value – and higher than in the comparator group's countries. By broadening the analysis beyond perception, it is apparent that corruption is internalized by firms and considered common, accepted practice in Mauritania.

- Econometric evidence on *bribe propensity* and *intensity* suggest that medium-size firms are the ones that suffer most from corruption in Mauritania. Larger firms are more established and connected, do not fear exiting the market and less likely to be harassed. Smaller firms are less visible and may be able to escape the control of public official, by operating largely in the informal sector. The results add value to the hypothesis that these firms are disadvantaged in two fundamental ways in Mauritania: first of all, they are squeezed by the presence of powerful business groups/large firms which have de facto monopolies in important sectors of the economy. Secondly, they are the most likely firms to pay bribes and pay the highest amounts in percentage of their total annual sales, which places an additional burden on their ability to grow.

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Annex 1: Key governance indicators

	Indicators	Definition/Explanation	Latest Year Available	Mauritania's Performance
Aggregate Governance Indicators	Kaufmann Kraay Mastruzzi (KKM)	Six composite governance indicators: 1. Voice and accountability 2. Political stability and absence of violence 3. Government effectiveness 4. Regulatory quality 5. Rule of law 6. Control of corruption	2005	Percentile ranks: 1. 19.8 2. 35.4 3. 48.8 4. 49.0 5. 37.7 6. 50.2
	Transparency International-Corruption Perception Index (CPI)	Composite index that relates to perceptions of the degree of corruption as seen by business people and country analysts, and ranges between 10 (highly clean) and 0 (highly corrupt).	2006	84th out of 163 countries
	Country Policy and Institutional Assessment (CPIA)	Evaluates country's policies and institutions by analyzing 16 dimensions. Governance-related dimensions are: Property rights and rules-based governance; Quality of budgetary management; Quality of public administration; Transparency, accountability & corruption in the public sector (Also serves as one of the sources for the KKM and CPI)	2005	On a scale from 1 (worst) to 6 (best), Mauritania scored: 3.0 for property rights and rules-based governance; 2.0 for quality of budgetary management; 3.0 for quality of public administration; 2.5 for transparency, accountability & corruption
Business Environment Indicators	Doing Business (DB)	Evaluates ease of doing business by monitoring ten categories: 1. Starting a business; 2. Dealing with licenses; 3. Employing workers; 4. Registering property 5. Getting credit; 6. Protecting investors; 7.Paying taxes; 8. Trading across borders; 9. Enforcing contracts; 10. Closing a business.	2006	Overall rank: 148 out of 175 In top half for Registering property and Enforcing contracts Among lowest performers in Starting a business and Paying taxes
	Investment Climate Survey (ICS)	Survey of private sector firms and employees to evaluate the overall business environment.	2006	29.1% of firms say corruption is major or severe constraint 6.6% of yearly turnover spent on informal payments
Political and press freedom	Polity IV Country Report	Records annual information on political regime and authority characteristics. Includes indicator on executive constraints, defined as the extent of institutionalized constraints on the decision-making powers of chief executives.	2004	On a scale from 1 (worst) to 7 (best): Executive constraints: 3.0
	Freedom House	Status of civil liberties	2006	"Partly free"
	Reporters without Borders	Press freedom index	2006	77th out of 168 countries
Country-Specific Assessments	Country Financial Accountability Assessment (CFAA)	Principle diagnostic tool in public financial management designed to help the borrowing country and the Bank assess financial accountability arrangements in the public and private sectors.	2002	External controls of public spending virtually non-existent. Audit court does not check public accounts, and capacity of General Finance Inspectorate is limited.
	Country Procurement Assessment Report (CPAR)	Main instrument of the World Bank for analyzing the member countries' present procurement policies, organization, and procedures.	2002	Lack of uniformity and confidentiality in the evaluation process opens up opportunities for corruption.

Annex 2: Variables used on research with quantitative data on corruption

Study	Source of information	Sample	Dependent corruption variables (Model in brackets):
Svensson (2003)	1998 Ugandan World Bank enterprise survey	250 firms, 5 sectors, 5 regions	(a) Likelihood of a firm paying bribes (probit), determined by: The provision of infrastructure services; International trade; Tax rate, formal sector; Number of competitors for the firm's main product; Exemptions from corporate tax and import duties. (b) Bribe payment in US$ per employee (OLS), determined by: Profits per employee; Capital stock per employee; Alternative return per employee.
Kuncoro (2006)	2001 and 2003 Cost of Doing Business Surveys, Institute of Economic and Social Research	1,808 firms, 3 sectors, 4 locations	(a) Bribe payment in day-to-day operations as a share of production costs (OLS), determined by: Tax rate; Time spent with bureaucrats; Bribe uncertainty (i.e., other parties asking bribes); Firm size in terms of annual sales. (b) Bribe payment to set up a new business as a share of production costs (OLS), determined by: Time spent with bureaucrats; Number of licenses; Bribe uncertainty; FDI.

Source: Svensson (2003) and Kuncoro (2006).

Annex 3: List of variables for model used

Variable name	Definition	Expected sign
Dependent		
Bribery	Binary variable that takes the value 1 if the firm reports to have paid bribes in 2005 and 0 otherwise	
Bribes over sales	Bribes as a share of firm's total sales in 2005 (percentage)	
Independent		
Age	Age of the firm	-
Audit	Binary variable taking the value 1 if the firm had its statements and certificates audited by an external party in 2005 and zero otherwise	+
Foreign	Binary variable taking the value 1 if at least 3 percent of the firm's capital is foreign-owned and zero otherwise	+
Economic group	Binary variable taking the value 1 if the firm belongs to an economic group and zero otherwise	+
Employment	Total employment at the end of 2005	+/-
Employment squared	Total employment at the end of 2005 squared	-
Micro	Dummy for employees [1, 6[	
Small	Dummy for employees [6, 11[	
Medium	Dummy for employees [11, 21[	
Large	Dummy for employees [21, 276]	
Investments over sales	Investments in machinery, equipment, and real estate as a share of total sales in 2005 (percentage)	+
Loan	Binary variable taking the value 1 if the firm had a loan in 2005 and zero otherwise	+
Monthly wage per worker[1]	Monthly wage received per worker in 2005 (LCU)	-
Tax time	Percentage of senior's management time spent dealing with government regulations each week	-
Corruption	Binary variable taking the value of 1 if the firm rate corruption as a major or severe obstacle to its growth and operations, and zero otherwise	+
Fiscal inspections	Number of fiscal inspections in 2005	+
Infrastructure index	Index (0-2) of unavailability of public services. The index is the sum of two dummy variables indicating if electricity and telephone are unavailable (service dummy = 1 if unavailable, and zero otherwise)	+

Notes: A variable for international trade was initially considered, but only 4 percent and 10 percent of firms in the sample export and import, respectively. A dummy variable for informal sector was not included in the regressions because informality is captured by firm size (all micro firms are informal and vice-versa).
[1]See Table A4 in the Annex for a distribution of the monthly wage per worker by firm size.

Annex 4: Summary statistics, all firms

Variable	Obs.	Mean	Standard Deviation	Minimum	Maximum
Age	361	9.42	7.52	1.00	48.00
Audit	361	0.12	0.32	0.00	1.00
Foreign	361	0.10	0.30	0.00	1.00
Employment	361	11.97	24.56	1.00	276.00
Employment squared	361	744.64	5,142.10	1.00	76,176.00
Micro	361	0.44	0.50	0.00	1.00
Small	361	0.31	0.46	0.00	1.00
Medium	361	0.14	0.34	0.00	1.00
Large	361	0.11	0.32	0.00	1.00
Investments over sales	350	109.86	1,197.95	0.00	20,833.33
Loan	360	0.12	0.33	0.00	1.00
Monthly wage per worker	361	36,219.98	21,839.37	6,250.00	166,666.70
Tax time	360	6.10	12.70	0.00	100.00
Corruption	360	0.16	0.37	0.00	1.00
Fiscal inspections	361	0.89	0.31	0.00	1.00
Infrastructure index	361	0.48	0.73	0.00	2.00

Source: Mauritania ICS, 2006.

Annex 5: Breakdown by size, region, sector, legal status, ownership, exporting status, external auditing, and competition

Category	Informal payments requested to obtain government services (% of firms)						Inspections		
	Mainline telephone	Electricity connection	Water connection	Construction permit	Import license	Operating license	Inspected (% firms)	Average #	Bribe requested (% firms)
All firms	34.7	35.6	56.5	46.9	28.6	30.0	89.5	2.4	44.0
Formal	38.5	42.0	75.0	52.6	30.4	33.3	89.9	2.3	50.2
Informal	21.7	21.7	36.4	27.3	20.0	0.0	88.7	2.8	31.8
Size									
Micro	28.2	27.8	36.4	26.7	42.9	20.0	88.6	2.7	34.3
Small	30.3	31.8	75.5	45.4	25.0	27.3	93.8	2.2	51.9
Medium	63.6	71.4	50.0	75.0	33.3	50.0	89.8	2.4	61.4
Large	38.9	50.0	100.0	75.0	20.0	50.0	80.5	2.2	36.4
Region									
Nouakchott	10.0	6.2	66.7	40.0	40.0	0.0	88.8	2.3	47.1
Nouadibou	37.4	43.9	55.0	48.7	26.1	31.6	93.8	3.5	24.4
Formal sector									
Manufacturing	40.0	58.8	75.0	70.0	11.1	25.0	87.5	2.4	55.7
Retail and IT	33.3	25.0	37.5	26.3	44.4	14.3	95.2	2.0	53.3
Other services (RofU)	24.5	18.1	n.o.	16.0	7.5	6.4	88.3	2.4	43.4
Legal status									
Publicly listed company	42.9	54.6	77.8	70.0	23.5	66.7	85.9	2.8	50.8
Partnership	25.0	20.0	33.3	50.0	50.0	0.0	92.7	2.5	57.9
Family business	31.0	28.3	45.4	37.9	28.6	26.7	90.0	2.3	39.7
Ownership									
Domestic	29.4	30.5	57.9	43.2	31.8	18.7	89.9	2.4	42.5
Some foreign	62.5	57.1	50.0	58.3	16.7	75.0	85.7	2.7	56.7
Exports in 2005									
Exporter	80.0	100.0	100.0	100.0	0.0	0.0	86.7	3.7	46.2
Non-exporter	32.3	31.9	54.5	45.8	29.6	31.6	89.6	2.4	43.9
External auditing									
Yes	43.5	53.8	50.0	50.0	10.0	75.0	88.4	2.0	44.7
No	32.0	31.7	58.8	46.5	38.9	18.7	89.6	2.5	43.9
Competition									
Domestic	33.3	60.0	80.0	33.3	0.0	0.0	90.7	2.1	59.0
Foreign	44.4	66.7	66.7	75.0	0.0	0.0	83.3	2.0	66.7

Source: Mauritania ICS, 2006.

Annex 6: Breakdown by size, region, sector, legal status, ownership, exporting status, external auditing, and competition

Category	Obs.	Share of firms reporting corruption as a major or severe obstacle to growth (%)	Share of firms that believe firms in their business were requested to make informal payments to "advance things" (%)	Share of firms believe firms in their business were made informal payments to "advance things" (%)	Informal payments to "advance things:" average share of total sales (%)
All firms	361	16.1	48.5	49.4	3.2
Formal	237	18.2	59.5	46.8	3.4
Informal	124	12.1	54.0	54.2	2.7
Size					
Micro	158	13.3	55.4	51.0	2.8
Small	113	11.5	58.0	40.2	2.8
Medium	49	20.8	55.3	62.2	4.5
Large	41	34.1	66.7	54.3	4.4
Region					
Nouakchott	313	16.0	54.6	45.0	3.1
Nouadibou	48	17.0	76.6	76.6	4.2
Formal sector					
Manufacturing	80	29.1	60.3	49.3	4.0
Retail and IT	63	11.1	61.9	33.3	2.9
Other services (RofU)	94	13.8	57.1	53.4	3.1
Legal status					
Publicly listed company	71	34.3	63.8	53.2	5.0
Partnership	41	17.1	56.1	55.0	3.1
Family business	249	10.8	55.9	47.4	2.8
Ownership					
Domestic	325	16.1	56.4	48.0	3.1
Some foreign	35	17.1	68.6	61.3	4.3
Exports in 2005					
Exporter	15	26.7	66.7	57.1	4.8
Non-exporter	346	15.7	57.1	49.1	3.2
External auditing					
Yes	43	32.6	60.5	35.0	5.5
No	318	13.9	45.8	51.4	2.9
Competition					
Domestic	43	31.0	53.4	59.5	3.2
Foreign	18	44.5	61.1	25.0	5.5

Annex 7: Independent variables used in the probit and OLS regressions

	Age	Audit	Econ group	E-mail	Foreign	Invest / worker	Invest / sales	Loan	Monthly wage / worker	Tax sales	Tax time	Corruption	Fiscal insp	IF index
Age	1.000													
Audit	0.110	1.000												
Econ group	0.199	0.355	1.000											
E-mail	0.097	0.407	0.372	1.000										
Foreign	0.133	0.254	0.108	0.137	1.000									
Invest/worker	0.031	0.065	0.161	0.026	0.075	1.000								
Invest/sales	-0.079	-0.031	0.138	-0.052	-0.018	0.844	1.000							
Loan	0.095	0.210	0.242	0.148	0.073	0.000	-0.005	1.000						
Monthly wage/worker	0.159	0.321	0.202	0.303	0.164	0.056	-0.090	0.189	1.000					
Tax sales	-0.037	0.284	0.255	0.263	0.143	0.081	0.005	0.084	0.208	1.000				
Tax time	0.101	0.160	0.199	0.271	0.181	0.056	0.021	0.153	0.101	0.098	1.000			
Corruption	0.158	0.138	0.141	0.105	0.013	0.107	0.100	0.189	0.090	0.088	0.103	1.000		
Fiscal insp	-0.062	-0.028	-0.111	-0.067	-0.041	0.013	-0.034	-0.015	-0.034	0.110	-0.048	-0.067	1.000	
IF index	-0.109	0.177	0.058	0.226	0.144	0.142	0.085	0.049	0.046	-0.020	0.117	0.194	-0.038	1.000
Emp	0.221	0.437	0.395	0.330	0.298	0.108	0.009	0.322	0.363	0.179	0.130	0.061	-0.051	0.053
Emp sq	0.123	0.325	0.269	0.126	0.215	0.040	-0.007	0.271	0.260	0.046	0.018	0.018	0.004	0.018
Small	-0.043	-0.070	-0.084	-0.038	-0.065	-0.040	-0.061	-0.130	0.108	0.038	-0.059	-0.087	0.100	0.005
Medium	0.068	0.036	0.086	0.265	0.063	-0.040	-0.037	0.071	0.114	0.104	0.094	0.032	-0.005	-0.064
Large	0.263	0.382	0.454	0.396	0.159	0.222	0.128	0.244	0.239	0.240	0.251	0.169	-0.124	0.070
Retail and IT	-0.199	-0.254	-0.288	-0.309	-0.122	-0.072	0.001	-0.093	-0.272	-0.274	-0.097	-0.088	0.081	0.024
Other services	-0.013	0.047	0.023	0.116	0.011	-0.054	-0.065	-0.131	0.071	0.133	-0.091	-0.041	-0.051	-0.024
Nouadhibou	-0.066	-0.066	-0.079	0.041	0.133	-0.048	-0.035	0.131	-0.076	-0.026	0.294	-0.008	0.047	0.031
SA	0.262	0.470	0.449	0.529	0.233	0.049	-0.042	0.300	0.324	0.341	0.270	0.256	-0.084	0.219

Source: Elaborated by the author based on data from the Mauritania ICS, 2006.