Corruption and the informal sector in Sub-Saharan Africa

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Very preliminary version- Do not quote.

1. Introduction

In Sub-Saharan Africa (SSA) the informal sector is a major engine for employment, entrepreneurship and growth. The size of the sector is estimated to account on average for 43 percent of GDP in Africa in 2005 (Schneider 2007). According to Brilleau, Roubaud and Torelli (2005) informal enterprises account for the vast majority of employment. The share of informal sector employment exceeds 70% in the WAEMU capital cities. It is even above 80% in Cotonou and Lome. Another distinctive feature of SSA is the high incidence of corruption. The latest Transparency International Corruption Perception Index indicates that corruption is a major issue in SSA countries. Almost 70% of SSA countries ranked register score below 3, indicating that corruption is perceived as rampant. In comparison, this proportion is about 33% in the Americas, 43% in the Asian Pacific region and 55% in Eastern Europe and Central Asia.

Since the seminal paper of Johnson et al. (1997), it has been widely agreed that corruption and unofficial activities go hand to hand. Several cross countries empirical studies have repeatedly shown that high tax rates are not the only reason why entrepreneurs operate underground, and that over regulation, weak legal system and corruption are also to blame (Johnson et al., 1997; Johnson et al., 1998; Friedman et al., 2000; Johnson et al, 2000; Johnson et al., 2001; May et al., 2002). Faced with red tape and corruption, local entrepreneurs may choose to divert their activities underground. In other words, operating unofficially is considered as a way to avoid the predatory behavior by government officials, seeking bribes from anyone with officially registered activities. However, the reverse may be true: informality can foster corruption. Indeed, entrepreneurs may bribe public official to secure their unofficial or informal activities. Firms operating underground may also share several characteristics that make them more vulnerable to corruption and in the first place their "illegal status". Indeed, given their "illegal status" informal firms might even more than formal firm exposed to demands for bribes by public official. At the country level, Friedman et al. (2000) conclude that the causal link runs from weak institutions to a large unofficial economy. Generally at the firm level, empirical studies cannot distinguish whether firms hide more to avoid corruption or whether firms that hide more have to make illegal payments (Johnson et al., 2000; Lavallée, 2007).

The interest in the unofficial economy and corruption nexus was deeply rooted in the transition from communism of countries of Eastern Europe and the former Soviet Union[1]. Indeed, the transition process has coincided, on average, with an increase of unofficial activities[2]. Moreover there was evidence of a downward spiral in which firms leaving the official sector reduce state revenue, which

[1] Johnson et al (1997) focus exclusively on the post-communist world, more precisely on countries of Central and Eastern Europe (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia) and of former Soviet Union (Estonia, Latvia, Lithuania, Armenia, Azerbaijan, Georgia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan). The subsequent papers extent the analysis geographically. Johnston et al. (1998) looked at 49 Latin American, OECD, and transition countries, Friedman et al. studies 69 countries: eight Asian countries, four African countries, four Middle Eastern countries, 15 Latin American countries, 20 countries from Europe, US and Australia, and 18 post communist countries in Eastern Europe and the former Soviet Union.

[2] Estimating the share of the unofficial economy in total GDP using the consumption based methodology, Johnson and al. (1997) find that the average unofficial share in east European countries starts in 1989 at 16.6%, peaks at 21.3% in 1992 and falls to 19% by 1995 whereas in former Soviet Union it starts at 12% rises to 32.6 and drops to 34%.

reduce state revenue and further reduces the incentive to register in the official sector. It was then of primary importance to understand what had driven firms underground.

We extent the analysis of the corruption and informal sector nexus in a quite different context: sub Saharan Africa. Indeed, there operating in the informal sector is rather the rule than the exception and no recent systemic change may explain this fact. Thus, concepts used to analyze the informal sector elsewhere are not necessarily applicable to SSA, or at least, their focus may be less relevant in this context. Moreover, we will study exclusively fully informal enterprises. Indeed, micro-level empirical works are generally based on data that covers only firms that are partially registered. They then omit firms that are completely unregistered, and miss an important part of the informal sector.

The paper makes use of a unique data set, called *Enquête 1-2-3*, collected in seven capitals in countries of the West-African Monetary and Economic Union (WAEMU) in the early 2000s. The survey combines an employment survey (phase 1), a detailed survey on informal (not tax-registered) entrepreneurial activities (phase 2) and an expenditure survey (phase 3). It is worth nothing that those surveys used exactly the same questionnaire and were conducted more or less simultaneously, such that these data sets are fully comparable. The paper makes uses in particular of phase 2 data that interview a subsample of production units identified in phase 1. Thank to these data we intend to understand why firms choose to operate informally and what drive corruption in the informal sector? In this respect, our paper merges two intertwined strands of the literature: the first one dealing with the roots of the informal sector, and the second one with the causes of corruption.

2. The informal sector in West African capitals

2.1. Presentation of the data

Our data are taken from an original series of urban household surveys in West Africa, the *1-2-3 Surveys* conducted in seven major WAEMU cities (Abidjan, Bamako, Cotonou, Dakar, Lome, Niamey and Ouagadougou) from 2001 to 2002[3]. The surveys were carried out by the countries' National Statistics Institutes (NSIs), AFRISTAT and DIAL as part of the PARSTAT Project[4].

As suggested by its name, the *1-2-3 Survey* is a three-phase survey, the basic rational of this tool is the following. The first phase is a labour force survey (LFS) on employment, unemployment and working conditions of households and individuals. It allows to document and to analyse the labour market functioning and is used as a filter for the second phase, where a representative sample of IPUs is surveyed. Thus, in the second phase of the survey a sample of the heads of the IPUs identified in the first phase are interviewed: it aims at measuring principal economic and productive characteristics of the production units (production, value added, investment, financing), the major difficulties encountered in developing the business activity, and the demands for public support by the informal entrepreneurs. Finally in the third phase, a sub-sample of households, selected from phase 1, is administrated a specific income/expenditure survey, designed to estimate the weights of the formal and informal sectors in households consumption, by products and type of household. The phase 3 also allows estimation of households' living standards, and monetary poverty, either based or income or expenditures.

The following presents a brief description of the sampling plan and the content of the questionnaires implemented in West Africa. Although we use solely phase 2 data, it is worthy to describe phase 1 methodology since it had been used as a filter to draw phase 2 sample. For the LFS (Phase 1), the sampling plan chosen used the classic technique of two-stage area sampling. Primary and/or secondary stratification was conducted where possible. The primary sampling units were small area units:

[3] The surveys were carried out in 2001 in Cotonou, Ouagadougou, Bamako and Lomé and in 2002 in Abidjan, Dakar and Niamey.

[4] Regional Statistical Assistance Programme for multilateral monitoring sponsored by the WAEMU Commission.

Enumeration Areas (*Zones de Dénombrement*), Census Districts (*Districts de Recensement*), segments or even Enumeration Sections (*Sections d'Enumération*), depending on the country. Each area unit contained an average of 200 households. In general, a full list of these units was available from the last population census. Following a stratification of the primary units based on socio-economic criteria, 125 primary units were sampled with probabilities proportional to their size. An exhaustive enumeration of the households in the selected primary units was then conducted. Following a stratification of the secondary units where possible, systematic random sampling was applied to sample approximately 20 households with equal probabilities in each primary unit (see Brilleau, Roubaud and Torelli, 2004, 2005 for more detail).

For phase 2, a stratification of IPUs has been implemented, using phase 1 rich information. 20 strata were defined by industrial sector (10 industries) and the status of IPU's head (employer and/or own account worker). The unequal probabilities in 22 each stratum have been determined according to the number of IPUs in the Labor Force Surveys (LFS) sample and to its economic potential in terms of development policies.

Phase 2 questionnaire comprises eight modules dealing with: i) the characteristics of the establishment, ii) labour force, iii) production, iv) Expenditure and costs, v) customers, suppliers, competitors, vi) capital, investment and financing, vii) problems and prospects, viii) social insurance. Previous to these subject specific modules, the first page of questionnaire begins with a "Filter module". This module aims at checking that information about the IPUs collected in phase 1 are exact. Relevant information from phase1on the IPUs selected for the phase 2 (main characteristics of the IPU – address, industry, legal status, type of accounts, registers, type of premises, etc. - and the IPU's holder - name, age, gender, relation with household's head, job status, etc.) are reported *ex ante* in the phase 2 questionnaire. Then, the same information is collected again in the "Filter module". If the answers are consistent, the others modules are applied. Otherwise, the reason of the change between phases 1 and 2 is collected and if the selected informant is not holding an IPU, the survey stops.

In 1-2-3 surveys the criterions used to identify IPUs are the absence of an administrative registration number and/or of a written book-keeping. In this respect, the 123 surveys follow the international statistical guidelines concerning the measurement of the informal sector.

Labour forces surveys allowed to count 1 906 000 IPUs in the seven capital cities. Once excluded primary sector production units, 1 761 800 UPIs belonging to non agricultural are enumerated, that is to say as many UPIs as households. These UPIs generated 2 671 000 jobs in the seven capital cities which makes the informal sector the first source of employment in these cities (Brilleau et al., 2005).

A three branches nomenclature shows that trade accounts for a major share of informal sector UPIs. 46% of UPIs operate in this sector, against 28% in industry, and 26% in services. The supremacy of trade is observed in almost all the capital cities. Its share goes from 40% in Abidjan to 52% in Bamako. Nevertheless, the weight of other sectors varies dramatically from a city to another. For instance, industry accounts for 43% of UPIs in Niamey against 22% in Cotonou. The share of UPIs belonging to the sector of services is the highest in Abidjan (32%) and Cotonou (28.9%) whereas it is the lowest in the landlocked cities of Niamey and Ouagadougou (17 % and 16 % respectively).

Except for the trade sector greatly predominated by out-of-shop retail sales (street vendors…), the distribution of UPIs' activities within sectors varies dramatically from a city to another. For instance, in Dakar, Niamey and Ouagadougou industrial activities are concentrated in the "other industries and agribusiness" rather than in the clothing industry as in Bamako and Cotonou. Phase 2 surveys also reveal great differences across cities in the services sector. Indeed, in Niamey only 3% of tertiary sector UPIs operate in catering against 36% in Cotonou and 28% in Ouagadougou.

Table 1 : Structure by areas of activities of UPIs (%)

	Cotonou	*Ouagadougou*	*Abidjan*	*Bamako*	*Niamey*	*Dakar*	*Lomé*	*Total*
Industry	**21,9**	**34,2**	**28,5**	**27,3**	**43,2**	**31,1**	**23,0**	**28,4**
Clothing, leather, shoe industry	9,2	7,5	12,4	10,9	8,2	7,6	9,1	10,1
Other industries, agribusiness	8,1	21,1	9,4	10,3	32,0	15,9	10,2	12,4
Building and civil engineering	4,6	5,6	6,7	6,2	3,0	7,6	3,8	5,9
Commerce	**49,2**	**48,7**	**40,0**	**51,5**	**40,6**	**47,3**	**48,5**	**45,5**
In-shop retail and whole sale	13,5	11,4	11,1	9,1	7,3	11,1	11,9	11,1
Out-of-shop retail sale	35,7	37,3	28,9	42,4	33,3	36,2	36,5	34,4
Services	**28,9**	**17,1**	**31,5**	**21,3**	**16,2**	**21,6**	**28,5**	**26,1**
Catering	10,5	4,8	7,0	3,0	0,5	4,1	7,0	6,0
Repair	3,5	4,8	6,0	2,7	2,8	2,1	5,3	4,3
Transport	5,2	1,0	4,1	2,9	1,9	4,3	4,4	3,8
Other services	9,7	6,4	14,4	12,7	10,9	11,1	11,8	12,0
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Brilleau et al. (2005) on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL.

A closer look at IPUs characteristics reveals that informal enterprises in WAEMU capital cities are quite heterogeneous; for instance in terms of size, type of employment offered and age. One person enterprises account for 75% of IPU. Around 20% employ an additional 1 or two worker, but only few more than 2. These dependent workers are often non-remunerated and typically from the family. As regards enterprise age, quite a significant share of IPU reaches an age of more than five; and very young enterprise account (founded less than one year ago) account for more than 10%. In terms of capital endowments, large discrepancies arise between cities of the richer countries (for example, Dakar and Abidjan) and the poorer one (in particular in Bamako and Niamey), where more than 20% of UPI can be considered without capital.

Table 2: The heterogeneity of UPI (% of UPIs)

	Cotonou	*Ouagadougou*	*Abidjan*	*Bamako*	*Niamey*	*Dakar*	*Lomé*	*Total*
Firm size (# number of staff in. own.)								
Owner alone	72.1	72.1	68.2	80.8	79.3	77.1	77.1	73.6
2-3	21.2	22.7	23.4	15.4	16.3	15.5	17.6	19.8
More than 3	6.7	5.2	8.4	3.8	4.4	7.4	5.3	6.6
Average	1.6	1.5	1.7	1.4	1.4	1.5	1.5	1.5
Type of workers								
Self-employed	72.1	72.1	68.2	80.8	79.3	77.1	77.1	73.6
Non-rem.	19.2	14.6	19.8	9.5	13.6	14	16.7	16.4
Remunerated	6	11.8	9.5	8.2	6.2	6.4	5.3	8.0
Mixed	2.6	1.6	2.5	1.5	0.8	2.5	1.0	2.1
Age of the enterprise								
<1 year	13.7	10.5	15.6	7.2	12.4	10.1	13.1	12.6
1 to five years	46.7	48.6	41.9	42.4	29.8	28.6	55.9	42.2
>5 years	39.6	40.9	42.5	50.4	57.8	61.3	31	45.3
Capital/worker (in thousands of CFA F)*								
<100	66.9	80.6	75.9	85	86.7	80.8	80.6	77.8
100 to 300	18.1	10.6	14.5	9.4	9.3	11.6	7.8	12.9
>300	15	8.8	9.6	5.6	4	7.6	9.6	9.3
Enterprises without capital	6.2	17.7	4.8	28.5	21.9	10.9	19.2	12.6

Source: Brilleau et al. (2005) on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL. (*coverage: only UPIs with capital)

3. What Drives a Firm's Decision to operate in the Informal vs. Formal Sector ?

Since the end of the 90's, the informal sector has receiving a lot of attention in the academic literature. Most of the authors argue that firm locate in the informal sector because the benefits of informality outweigh its costs (Djankov et al., 2002). Indeed, operating informally is considered as a way to avoid several costs such as: registration costs, taxes and bribes and others unofficial payments linked with interaction with public officials. Along with these costs, there are several clear benefits in participating to the formal economy. Registered firms may have an easier access to finance, to land and to standard utility connections like electricity, water or communication services.

Expensive and burdensome registration procedures and weakness of public sector generally characterize countries under study. In such a context, formalization may be far from being attractive. Djankov (2008) reports that today in 12 economies in the world, capital requirement are still a major obstacle to starting a business; among them Niger, Togo, Mali and Benin. In these economies, Djankov (2008) reports that entrepreneurs need to put up at least 3 times the average annual income to register. The last *Doing Business Survey* underlies the weakness of public services and infrastructures in WAEMU countries. On average more than 25 days are needed in WAEMU capital cities to start a business. More precisely, it takes 8 days in Senegal and 53 days in Togo; all other countries in our sample lying in between. For comparison, the same procedure takes only 2 days in Australia, 6 in United States and 7 in France. Difficulties to access basic utilities like electricity and the unstable supply of power appear as a major constraint for firms, especially in the poorest countries of the sub-region.

In such a context, incentives for firms to formalize may be low and economies may be trapped with a high share of informal enterprises which do not come close to the threshold where formality becomes attractive.

Table 3: Time needed for various procedures in WAEMU countries

	Benin	*Burkina Faso*	*Côte d'Ivoire*	*Mali*	*Niger*	*Sénégal*	*Togo*
Starting a business (days)	31	16	40	26	19	8	53
Registering property (days)	120	136	62	29	35	124	295
Enforcing contracts (days)	825	446	770	860	545	780	588
Paying taxes (days)	270	270	270	270	270	666	270

Source: Doing Businness Surveys 2009

Table 4: Access to electricity in WAEMU countries

	Benin	*Burkina Faso*	*Côte d'Ivoire*	*Mali*	*Niger*	*Sénégal*
Number of Power Outages in a Typical Month	..	10.14	4.50	4.35	20.66	11.75
Average Duration of Power Outages (hours)	..	1.61	4.55	3.89	0.50	6.18
Delay in Obtaining an Electrical Connection (days)	71.67	19.57	20.86	48.41	20.64	9.43
% of Firms Identifying Electricity as a Major Constraint***	69.23	48.92	39.83	55.74	21.60	57.73
Year of the survey	2004	2006	2009	2007	2006	2007

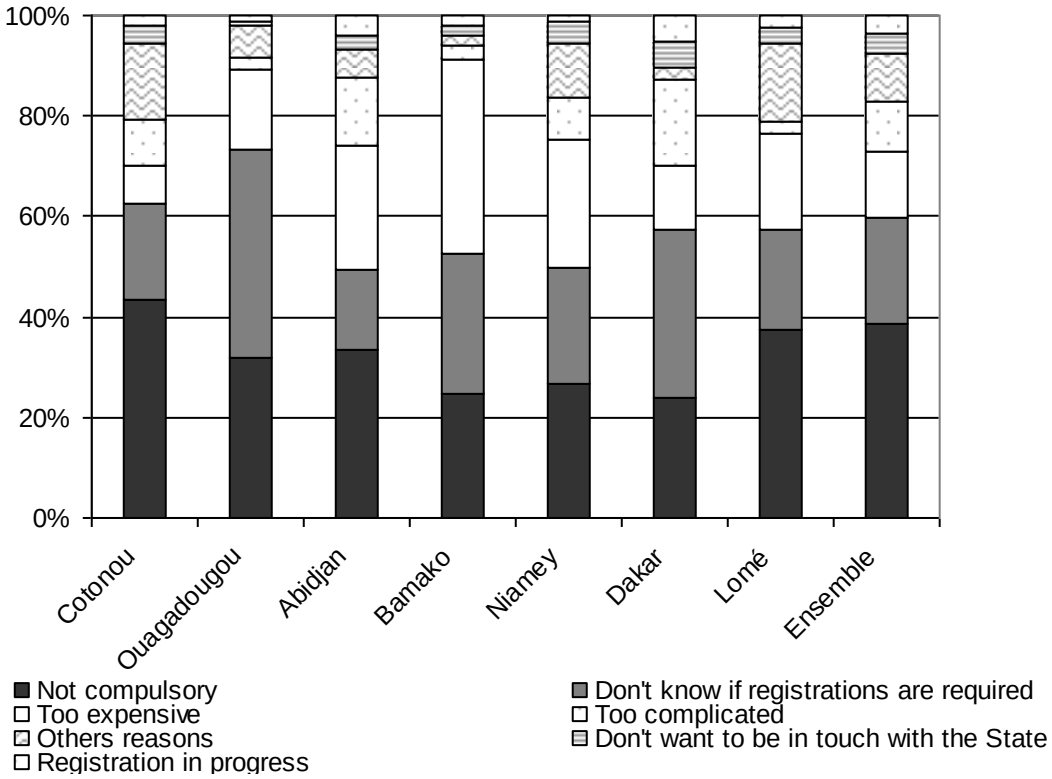
Sources: Doing Business Surveys, data for Togo are not available

The 123 surveys allow us neither to analyze the transition of firm from the informal to the formal sector nor to compare otherwise similar firms in the formal and informal sector. Yet, they provide information on the perceived costs and benefits of formalization, IPUs attempts or willingness to formalize.

First of all, the 123 survey give us a picture of the degree of informality of UPIs or in other words of the institutional links UPIs have with the State. In addition to the administrative or fiscal registration number, in all WAEMU countries, there is at least three records with which a law enforcing firm should register: the licence, trade register and social security (for UPIs with employees). Brilleau et al. (2005) report that in the WAEMU capital cities less than 1 UPIs over 5 records to at least one of these registers. The most extreme cases are Dakar and Lomé where this rate is less than 10%.

In almost 60% of the case, the non registration is due to the ignorance of the law rather than the complexity or the excessive costs of registration process. 39% of IPUs think that registrations are not compulsory and 21% don't know if they are required; and only 22% do not register because the find the procedure too complex or too expensive.

Figure 1: Reasons why IPUs' activities are not registered



Source: Brilleau et al. (2005) on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL. Own computations.

Nevertheless it is worth noting that 35% of IPUs are ready to enforce the regulation. This rate goes from 21% in Lomé to 44% in Dakar. The willingness to register is lower in trade (28%) than in industry or services (40%). It is worth noting that almost 6% of IPUs had made an attempt to register their activity. In general, attempts to register failed because, according to the chiefs of UPIs, the complexity (27.7%) and the high cost (20.8%) of the registration procedure. Only, 6.5% of UPIs that had made an attempt to register their enterprise say that this procedure had failed because of the high prevalence of corruption.

Table 5: UPI's and registration procedures

	Cotonou	*Ouagadougou*	*Abidjan*	*Bamako*	*Niamey*	*Dakar*	*Lomé*	*Total*
Are you ready to register your activity?								
Yes	60,3	45,6	48,9	30,1	27,3	53,7	31,7	45,2
No	19,2	8,0	40,3	20,2	27,5	12,7	24,4	25,6
Don't know	20,5	46,5	10,8	49,7	45,2	33,7	43,9	29,1
Had you made an attempt to register your enterprise?								
Yes	2.6	6.5	6.3	4.7	6.7	5.7	7.6	5.7
No	97.4	92.8	93.7	94.6	91.1	93	90.3	93.6
Missing	0.0	0.7	0.0	0.7	2.2	1.3	2.1	0.7
If yes, Why it had not been completed?								
Procedure too complex	24.4	20.9	39.8	22.1	20.8	27	11	27.7
Administration too slow	33.4	11.6	13.0	4.0	5.8	34.1	21.7	17.3
Too expensive	10.2	24.2	27.1	21.4	18.8	18	10.3	20.8
Too much corruption	9.9	0	5.6	13.5	9.4	3.6	8.6	6.5
Other reasons	22.1	26.2	12.9	26	22.9	12.1	41.6	21
Missing	0	17.1	1.6	13	22.3	5.2	6.8	6.7

Source: Brilleau et al. (2005) on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL. Own computations.

Besides, contrary to one can imagine, 123 surveys reveals that IPUs have few contact with public official. Indeed, in the seven capital cities, only 6.2% of the heads of UPIs say they had troubles with public agents the year before the survey; this proportion ranges from 4% in Bamako to 9% in Dakar. Brilleau et al. (2005) indicate that this proportion is particularly high (30%) in the sector of transports. This result illustrates the real harassment of police forces towards taxis-drivers, moto-taxi and so one.

A question of the survey question heads of UPIs on the way they solve the dispute. 40.3% of heads of UPIs say they had to pay a fine and 37% they paid a "gift" or in other words a bribe. The proportion of bribe payment varies dramatically from a city to another. It ranges from 8% in Cotonou to 45% and more in Abidjan and Lomé.

Globally speaking, the total amount of money paid to solve disputes with public officials is about 2.5 billion of CFA francs for the seven capital cities, half of which in the form of gifts. Abidjan accounts for half of the gifts (600 million of CFA francs) and two third of fines (900 millions of CFA francs). This total amount of bribe played is relatively low compared to the value added of the informal sector. Nevertheless, it could have been used in a complete different ways by the head of IPUs. Moreover, given the low level of interactions between IPUs and public agents, one can think that an episode of bribery can reinforce a negative opinion on the State and then reduces the readiness to register.

Table 6: UPIs and public agents

	Cotonou	*Ouaga-dougou*	*Abidjan*	*Bamako*	*Niamey*	*Dakar*	*Lomé*	*Total*
Had had a problem with agents of the State	4,7	5	7	3,5	6,2	8,5	6,2	6,2
How had it been settled?								
Payement of a fine	43	52,8	42,9	32,2	27,7	37,3	42,9	40,3
Handover of a gift	8,6	11,6	44,7	39,6	29,9	35,7	46,9	37
Other	48,4	35,6	12,4	28,2	42,4	27	10,2	22,7
Total amont per year								
Fines (in millions of CFAF)	61	62	921	68	25	137	27	1301
Average of fines by IPU (in thousands of CFAF)	14	16	51	24	16	16	5	29
Gifts (in millions of CFAF)	5	29	614	164	22	156	236	1226
Average of gifts by IPU (in thousands of CFAF)	6	40	32	51	16	17	39	31

Source: Brilleau et al. (2005) on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL. Own Computations

In a next step, we intend to analyze the influence of bribery on firm readiness to register. To do so, we analyse the determinants of UPIs' readiness of registration. To the best of our knowledge, there is no study that analyses the influence of experience with corruption with IPUs' formalisation prospect. Indeed, the literature deals rather with the impact of corruption on firms' decision to be informal. The literature on this topic suggests that high marginal corporate or personal income tax rates are not the only reason why firms choose to operate underground. But, that high level of regulation, bureaucratic discretion and corruption are also to blame.

Our problematic is quite different. Indeed, we would like to understand what deter firm from formalising their activities. Unfortunately, we don't have enough information to model properly the trade-off for firm between formality and informality. For instance, we have no data on the effective regulatory burden, tax rate or corruption faced by formal firms in WAEMU capital cities. Therefore, we study only the influence of experienced with corruption and of contact with public official on UPIs readiness to register their activities.

Our estimations on IPUs' formalisation prospects reveal that IPUs that got into trouble with pubic agents are more likely to be ready to register their activities. It seems that contact with public agents helps to spread the law and that once known, sanctions for non registrations are in fact sufficiently dissuasive. However, corruption appears to be completely counterproductive. Indeed, whereas paying a fine or settling disputes by others means increase the chance of registration, paying a bribe has no significant effect, ie an IPU that had to pay a bribe is as likely to be ready to register as an IPU that had no problem with public agents.

Table 7: Determinants of the readiness of registration

Specification	*1*	*2*	*3*
Characteristics of the head of UPI			
Educational level *(Reference: secondary education and more)*			
No formal education	-0.21***	-0.21***	-0.21***
	[0.00]	[0.00]	[0.00]
Primary education	-0.18***	-0.19***	-0.18***
	[0.00]	[0.00]	[0.00]
Others:			
Woman	-0.29***	-0.29***	-0.29***
	[0.00]	[0.00]	[0.00]
Out of town migration	-0.11***	-0.12***	-0.11***
	[0.00]	[0.00]	[0.00]
Characteristic of the UPI			
Age *(Reference : >5 years)*			
<1 year	-0.15***	-0.15***	-0.16***
	[0.00]	[0.00]	[0.00]
1 to 5 years	-0.03***	-0.04***	-0.03***
	[0.00]	[0.00]	[0.00]
Workforce's size *(Reference: 1 person)*			
2 peoples	0.29***	0.29***	0.29***
	[0.00]	[0.00]	[0.00]
3-10 peoples	0.30***	0.30***	0.28***
	[0.00]	[0.00]	[0.00]
> 10 peoples	0.53***	0.56***	0.51***
	[0.01]	[0.01]	[0.01]
Turnover (in log)	0.15***	0.14***	0.15***
	[0.00]	[0.00]	[0.00]
Access to electricity	0.36***	0.35***	0.35***
	[0.00]	[0.00]	[0.00]
Contact with public administration *(Reference: had no problem)*			
Had a problem		0.19***	
		[0.00]	
Fine paid			0.33***
			[0.01]
Bribe paid			-0.08***
			[0.01]
Other			0.42***
			[0.01]
Area of activity fixed effects	YES	YES	YES
Country fixed effects	YES	YES	YES
Constant	-1.15***	-1.14***	-1.18***
	[0.01]	[0.01]	[0.01]
Observations	5479	5479	5479
Pseudo R^2	0,12	0,13	0,13

Robust standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Predicted probability of the will to register according to the types of contact with public agents

Ideal Type	*Probability of willing to register*	*95% confidence interval*
An "average" IPU that had no problem with public agents	0.36	0.36-0.36
An "average" IPU that had to pay a bribe	0.33	0.33-0.34
An "average" IPU that had to pay a fine	0.49	0.49-0.50
An "average" IPU that used other means to settle its dispute with public agents	0.53	0.52-0.54

Source: authors' estimations on the basis of *1-2-3 surveys*, phase 2, Informal sector, 2001-2003, National Statistics Institutes, AFRISTAT, DIAL.
Note: These predicted probabilities are computed on the basis of a probit model explaining the head of UPIs will to register officially their activities. The values of the other independent variables (turnover, size, educational level…) are held at their mean.

4. What drives corruption in the informal sector?

In a second step of our analysis, we explore the firm-specific determinants of paying a bribe, being exposed to demands for it. Indeed, we think that this analysis is particularly warranted because little is known about the extent and the intensity of corruption across firms in the informal sector. Most empirical studies explore the determinants of corruption at the country level (see for instance Treisman, 2000; Svensson, 2000; Ades and Di Tella, 1999). An exception is Svensson (2003) who study the exposure to bribery and the amount paid in a sample of mostly formal Ugandan firms.

4.1. Literature overview

The empirical literature on the determinants of corruption has of late received a boom. With few exceptions, the existing literature on the causes of corruption focuses mainly on national-level determinants using cross-country databases. The general picture that emerges from this literature is that common law legal system, Protestant traditions and British colonial rule (Treisman, 2000), fiscal decentralization (Fisman and Gatti, 2002), higher relative civil service pay (van Rijckeghem and Weder, 2001) and the absence of an industrial policy (Ades and Di Tella, 1997) are associated with lower corruption. But most of these studies are plagued by methodological issues, such as reverse causation, and fail to provide clear guidance for policy design. Another strand of the existing literature explores the determinants of corruption at the individual level. The growing availability of micro-level data on corruption enables to understand the individual or firm characteristics associated with the probability of being victim of corruption or on the proneness to tolerate corruption (Swamy *et al*., 2001; Miller, 2006; Hunt, 2006, 2007; Lavallée, 2007; Svensson, 2003; Safavian, Graham and Gonzalez-Vega, 2003).

However, micro-level studies dealing with the determinants of bribes payments across firms are quite rare, especially in Africa despite the fact that corruption is widespread in this area of the world. To the best of our knowledge, the only exception is the study by Svensson (2003) that analyses the incidence and magnitude of graft across 250 Ugandan formal firms. As regards the incidence of bribery, Svensson shows that firms receiving public services, firms engaged in trade and firms paying more types of taxes face a higher probability of having to pay bribes. His results also indicate that firm with extensive dealing with the public sector face a higher probability of having to pay bribe; but that the firm profitability and the size of the firms have no significant impact on the probability bribe paying. As far as the amount of bribes paid is concerned, the basic findings are the following. The more a firm

can pay; i.e. the higher are its current and expected future profits, the more it must pay. The more profitable is outside option for the firm, the less it must pay.

We propose to first extend Svensson's (2003) analysis of the incidence of graft to firms operating in the informal sector. The novelty of our approach is not only its extension to the informal economy but also its cross-country dimension. Indeed, our data were collected trough questionnaires that were perfectly harmonized, which guarantee comparability across countries.

4.2. Empirical strategy and construction of the variables

This section aims at identifying the factors that influence the risk for IPUs of paying bribes. The issue is that only IPUs that get into trouble with public agents are exposed to bribery. But, several theoretical arguments suggest the absence of trouble with public agents is potentially a consequence of corruption. For instance, corruption is often presented as reducing the quantity (Shleifer and Vishny, 1993) and the quality (Bearse, Gloom and Janeba, 2000) of publicly provided goods and then corruption could reduce the administrative controls over firms and particularly UPIs. Therefore, an analysis done exclusively on a sample of IPUs that got into trouble with public agents could be biased by under-estimating potential bribe payments. Our analysis of the determinants of bribe payments tests the existence of such a selection bias and corrects it. More precisely, we use a probit model with sample selection (van de Ven et van Pragg, 1981).

We study the probability of a firm *i* to face bribery when it gets into trouble with public officials, event coded $corruption_j=1$, when the firm vulnerability or propensity to corruption $(corruption_i^*)$ is unobservable. This vulnerability or propensity to corruption is supposed to be linked to characteristics of UPIs.

$$Corruption_i = \begin{cases} 1 \quad if \quad Corruption_i^* = \alpha_0 + \sum \gamma_{0,n} X_i + \varepsilon_{0,i} > 0 \\ 0 \ otherwise \end{cases}$$

Where :

- X_i : is a vector of n characteristics of the UPI i (age, educational level of the head of the UPI, turnover…) ;
- $\varepsilon_{0,i}$ is a disturbance term

However, this dependant variable is not always observed. Its probability of observation ($contact_{ij}=1$) also depend of a latent variable unobservable linked to characteristics of UPIs.

$$Contact_i = \begin{cases} 1 \quad if \quad Contact_i^* = \alpha_1 + \sum \gamma_{1,n} Z_i + \varepsilon_{1,i} > 0 \\ 0 \ otherwise \end{cases}$$

Where:

- Z_i is a vector of *m* UPI *i* characteristics ;
- $\varepsilon_{1,i}$ is a disturbance term ;
- and corr($\varepsilon_{0,j}$, $\varepsilon_{1,j}$)=ρ, when $\rho \neq 0$ the standard regression technique applied to the first equation yield biased results.

For the model to be well identified, the selection equation should have at least one variable that is not in the first equation. Otherwise the model is identified only by functional form, and the coefficient has no structural interpretation. We therefore computed a dummy variable taking the value of 1 if IPU's premises are favourable to control and zero otherwise. More precisely, we consider that UPIs which activities take place on highways, public markets or permanent locals are particularly exposed to control by public agents.

4.3. Variables of interest

We now turn to an explanation of the key variables we use. Our dummy variables of contact with public agents and experience with corruption are built based on the following series of questions in the *phase 2* surveys: *"In the past year, did you get into trouble with public official for exercising your activity?"; "How did the dispute settle: by the payment of a fine, of a bribe, or by other means?"*

We explain the probability of having paid a bribe by three types of independent variables. The first one refers to IPUs' characteristics. Optimal harassment theories (Myrdal, 1968; Kaufmann et Wei, 1999) suggest that the ability to bribe varies greatly from a firm to another. Rent-seeking officials manipulate regulation, tax, and bureaucratic red tape and their discretionary enforcement according to the firm "ability to pay" in order to induce firm to pay, and to pay the maximum amount of bribe it is willing to tolerate. We use three firms' characteristics: the size of the UPI (in term of employees and turnover), the area of activities, and the fact the UPIs is a start up. As regard the size of the UPIs, we argue that the larger the firm, the more it is likely to be harassed by rent seeking officials. The descriptive statistics suggest that some areas of activities are particularly prone to corruption and especially transport. This fact could be explained by the huge impact of discretionary police control on the business operations in this sector. At last, one can think that start-up pay more bribes because they do not benefit from the experience and from repeated interactions with public officials.

The second type of independent variables deals with the personal characteristics of the heads of IPUs. We introduce the educational level of the head of UPI. The link between corruption and education is quite ambiguous. On the one hand, people with higher educational level may be less victim of corruption because they may know better their right and their means of defence. One the other hand, educational level can be seen by public officials as a proxy of heads of UPIs ability to pay. We also use gender as an independent variable because numerous studies show that women are less victim of corruption than men. Ultimately, we introduce a dummy variable denoting that the head of UPI is a migrant as proxy for social integration.

The third one is a set of cities fixed effects which aims at capturing cities heterogeneity and unobservable characteristics.

4.4. Results

Our results are depicted in tables 4 and 5. Table 5 presents our estimations of the selection equation and table 5 of the corruption equation. Above all, these estimations confirm the first conclusion drawn from descriptive statistics i.e. that in Sub-Saharan Africa the informal sector is rather an issue of weak law enforcement than of corruption. Indeed, our estimation shows that the estimated probability for an IPU to get into troubles with public agent is very low, around 5%. Then, an UPI has less than 2 chances over 100 to face corruption. Nevertheless, it is worth noting that if an UPI get into trouble with public official, its probability to have to pay bribe is around 30% which quite significant.

As regards the selection equation, some findings are in keeping with our expectations. The larger the workforce size, the more UPI is likely to get into trouble with public official. For instance, having a workforce size of 3 to ten people rather than one, increase the probability of getting trouble with public agents by 3%. Transport is the area of activities where the probability of control is the greatest. For instance, doing in-shop retail and whole sale rather than transport decreases the probability of getting into trouble with public by 5%.

As regards our results concerning, the probability to pay bribe, some findings are quite surprising. For instance, they show that workforce size, the educational level of the head of UPI have no impact of the probability to bribe whereas starts up are less likely to bribe. Other results are in keeping with our expectations. Our estimations confirm that transport is the area of activity the most exposed to the predatory behaviour of public official. Operating in any other sector decrease drastically the chance to

have to pay bribe. There is also strong evidence that turnover influences positively the likelihood of having to pay bribes and than women are less exposed to corruption than men.

Table 9: determinants of contact with the state

Specifications	*1*		*2*	
	Selection equation	*Bribe payment equation*	*Selection equation*	*Bribe payment equation*
UPI's characteristics				
Workforce's size *(Reference: 1 person)*				
2 peoples	0.18***	0.09	0.16**	0.12
	[0.07]	[0.13]	[0.08]	[0.12]
3-10 peoples	0.23***	-0.24	0.24***	-0.24
	[0.07]	[0.19]	[0.07]	[0.15]
> 10 peoples	0.31*	-0.10	0.31	0.02
	[0.18]	[0.34]	[0.20]	[0.31]
Area of activity *(Reference: transport)*				
Clothing, leather, shoe industry	-0.76***	-0.61***	-0.66***	-0.54***
	[0.12]	[0.22]	[0.12]	[0.19]
Other industries, agribusiness	-0.87***	-1.00***	-0.78***	-0.88***
	[0.10]	[0.19]	[0.11]	[0.17]
Building and civil engineering	-1.18***	-1.06***	-1.21***	-0.97***
	[0.15]	[0.35]	[0.16]	[0.27]
In-shop retail and whole sale	-0.80***	-0.77***	-0.69***	-0.64***
	[0.11]	[0.17]	[0.12]	[0.17]
Out-of-shop retail sale	-0.86***	-0.90***	-0.72***	-0.66***
	[0.10]	[0.15]	[0.11]	[0.15]
Catering	-1.07***	-1.29***	-0.88***	-0.90***
	[0.13]	[0.25]	[0.15]	[0.27]
Repair	-0.70***	-0.64***	-0.69***	-0.64***
	[0.12]	[0.19]	[0.13]	[0.18]
Other services	-0.93***	-1.34***	-0.88***	-1.24***
	[0.13]	[0.24]	[0.13]	[0.23]
Others:				
Premises favourable to control	0.47***		0.41***	
	[0.08]		[0.08]	
Start-up	-0.13**	-0.35***	-0.09	-0.27**
	[0.06]	[0.12]	[0.07]	[0.11]
Turnover	0.10***	0.16***	0.08***	0.14***
	[0.02]	[0.04]	[0.02]	[0.04]
Manager's characteristics				
Educational level *(Reference: secondary education and more)*				
No formal schooling			-0.07	-0.04
			[0.07]	[0.12]
Primary education			-0.16**	-0.06
			[0.07]	[0.11]
Others:				
Woman			-0.23***	-0.40***

			[0.07]	[0.12]
Out of town migration			0.07	0.10*
			[0.05]	[0.06]
Constant	-1.88***	-1.94***	-1.62***	-1.91***
	[0.18]	[0.39]	[0.20]	[0.34]
Country fixed effects		YES		YES
Wald test of independent equations				
Chi2(1)	6.57		8.56	
Prob>Chi2(1)	0.01		0.00	
Number of observations	6291	6291	5483	5483

Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

5. Conclusion

This paper analysis the links between two major features of SSA economies, the large weight of the informal sector and the high prevalence of corruption. This paper makes use of a unique data set, called *1-2-3 surveys*, which covers seven major Western African Economic and Monetary Union (WAEMU) cities. It uses specifically the phase 2 of these surveys which interviews heads of informal production units (IUP). A detailed analysis of these data leads to three conclusions.

The informal economy is rather an issue of weak law enforcement than of corruption, or in other words of a will to avoid the predatory behaviour by government officials seeking bribes from anyone with officially registered activities. As a consequence, only a minority of IPUs declare they had to pay bribes the year before the survey. Nevertheless, if we take into account only IPUs that had contact with the State that year before the survey, this proportion rises dramatically and makes bribery a significant mean of settling disputes with public agents.

Our analysis of the determinants of corruption among UPIs shows that the mechanisms are not different from those prevailing in the formal sector. The more profitable firms, firms operating in transports are more likely to face the predatory behaviour by government officials. However our findings strongly suggest that experience with corruption has counterproductive effects on firms' formalisation prospects. An IPU that had to pay a bribe is less likely to be ready to register than an IPU that had no problem with public agents whereas other mean of settling disputes with public agents increase the chance that the UPI is ready to register its activities.

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