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Evidence on How African Enterprises Choose Informal Credit

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ABSTRACT

This research studies the hypothesis that enterprises may forgo formal finance in lieu of informal credit by choice. They do so to avoid the additional regulatory scrutiny and harassment that engaging with the formal financial sector invites. We use the maximum likelihood estimates of the binomial logit model of enterprise sectoral choice and test this hypothesis using enterprise level data on 1559 enterprises in 16 African countries from the World Bank Enterprise Surveys. This external finance comes from formal sources, such as commercial banks (59.65%) and informal sources (40.35%), such as trade creditors, or family and friends. A key result is that better institutional mechanisms increase the attractiveness of formality by making market interactions more efficient. In the sample used, 29.73% of enterprises rely exclusively on informal finance. We find that the likelihood of enterprises preferring to only use informal finance is inversely related to the quality of the regulatory environment, particularly the quality of tax administration and overall governance. For instance, we find that when an enterprise has been asked for bribes by tax inspectors, it is 35.82% more likely to prefer informal finance.

Key words: Africa, small and medium enterprises, informal finance, binomial logit model

INTRODUCTION

After a substantial macroeconomic reforms were initiated in many African countries, aggregate growth, has at best remained inconsistent in many of those reforming countries. While, the reasons for poor aggregate performance vary across countries, there is substantial evidence that in many countries, poor private sector investment response in the medium-to-long term has delayed long term growth. The poor response of the private sector might generally be attributed to varying factors in different countries. Indeed, various surveys suggest that a more vigorous response from the private sector in many countries has been impeded by a number of institutional, structural and financial constraints (Aryeetey, 1988).

The apparent lack of medium-term financing, the rudimentary nature of capital markets and the weaknesses in financial intermediation in general have made it difficult for private businesses to find the means of financing other than short term bank credit. On the other hand, the generally low profitability of many private firms and the low overall level of domestic savings limit the prospects for investment financing from their own resources. While the obstacles to private sector development are many, the financing constraints have received the most attention from both governments and donors. It was fashionable to blame the financing constraints of the private sector on the inadequacies of banking systems and their poor perceptions of the creditworthiness of the small ventures that dominate African economies (Aryeetey, 1994).

Perceived evidence of financing constraints often comes in the form of enterprises' reliance on informal financing sources, rather than formal sources such as commercial banks. As informal financing is generally considered an imperfect substitute for formal finance, literature assumes that enterprises that heavily rely on informal credit do so primarily because they are rationed out of formal credit markets.

The segmentation of credit markets between the formal and informal is largely attributed to credit rationing by lenders as a result of information asymmetries (Stiglitz and Weiss, 1981). For example, deficiencies in the legal and institutional environment can make it difficult for banks to enforce contracts (Djankov *et al.*, 2007). Poor financial information makes it more challenging for formal lenders to sort and monitor borrowers (Love and Mylenko, 2003). In rural areas distance to formal providers is a key barrier to lending (McMillan and Woodruff, 1999). The result is that banks exclude some borrowers and the informal sector serves those borrowers who are excluded by banks.

The study focuses on reasons other than rationing that affect enterprises' source of financing choices. In particular, we test the hypothesis that enterprises choose informal sources of financing over formal ones in order to avoid the additional regulatory scrutiny and harassment that engaging with the formal financial sector might invite. Dealing with banks can leave enterprises vulnerable to predatory regulators and onerous regulations. We test this hypothesis using enterprise-level data on over 1559 enterprises in 16 African countries.

In overregulated economies, enterprises have incentives to hide assets and to circumvent burdensome rules and regulations. Examples of this behavior can be found by looking at the negative correlations between burdensome business registration procedures and enterprise registration, or complex tax procedures and the collection of public revenues.

In case business regulations are too complex, costly, or are linked to rent-seeking activities by public officials, enterprises will rationally expend resources or forgo opportunities in an effort to avoid them (Fisman and Svensson, 2007).

Overly burdensome regulations can spill into financial markets because the same information used to signal repayment capacity to banks can also serve as a signal to regulatory authorities and other public officials. The result of this signaling is that enterprises create a greater amount of transparency revolving around their business operations, making it easier for them to be targeted by public officials.

Due to this follows a higher tax burden, retroactive penalties, more frequent inspections, increased licensing requirements and a higher demand for bribes. Enterprises recognize this and may choose to entirely forgo formal finance if the benefits do not outweigh the costs (e.g., the cost of regulatory harassment). We show that this is more likely to be the case in countries and regions characterized by an excessive regulatory environment and/or a corrupt bureaucracy.

This study adds to the sparse literature on the link between corruption, regulation and financial markets. Several authors have examined the link between corruption and access to finance, but from a supply-side perspective. For example, Banerjee *et al.* (2007) found that in Indian public banks, incidences of exposed corruption by bank authorities' result in reduced lending. This is because loan officers in government banks cite fear of prosecution for corruption as a reason for their rigid lending decisions. Beck *et al.* (2007) find that a supervisory strategy that forces banks to disclose accurate information to the private sector tends to lower the degree to which corruption of bank officials is an obstacle to enterprises raising external finance. To the best of our knowledge, this study is unique in that it links corruption and the quality of the regulatory environment to the demand for financial products by enterprises.

DATA AND MAIN VARIABLES

We obtain our data from World Bank's Doing Business database and World Bank's Enterprise Survey (WBES).

Variables from the World Bank indicators on Doing Business are used to capture the regulatory burden at the country level since, 2001. These variables are quantitative measures of business regulations and the protection of property rights across countries in our data set. We use measures of the cost of regulation revolving around taxation, business registration, employment rigidities, property registration and licensing. These country-level variables are interacted with enterprise perception variables matching each of the Doing Business variables in question.

Data from World Bank's Enterprise Survey (WBES) are conducted during 2002-2005 by the World Bank in 79 countries, including many low-income countries.

The hypothesis that a heavy regulatory environment drives enterprises to finance informally is tested using enterprise-level data from the World Bank Enterprise Surveys which contain detailed Firm-level data on the quality of the institutional environment in which firms operate. The data used for the analysis cover 1559 enterprises in 16 African countries (Appendix). We only include enterprises with external sources of credit to finance working capital needs. The World Bank has undertaken large numbers of firm level surveys with the express intention of measuring the quality of the business environment or the investment climate. The main purpose of the survey was to identify obstacles to firm performance and growth around the world. Thus, the survey contains a large number of questions on the nature and severity of obstacles, such as infrastructure, crime, macroeconomic policies, corruption, legal system deficiencies and financing. The database also has information on firms' characteristics, such as ownership, sales, employment and growth. The data also indicate whether a firm is a multinational enterprise, i.e., whether it has operations in other countries and the sector in which the firm is producing. In total, over 10,000 firms were surveyed, with the number varying across countries but with a minimum of 100 firms per country. The sample of surveyed firms in each country was constructed to reflect the sectoral, ownership and size structure. Data were mostly collected through personal interviews. In addition to the detail on the obstacles, one of the greatest values of this survey is its wide coverage of smaller firms. The survey is size-stratified, with 40% of observations on small firms (defined as employing 5-50 employees), 40% on medium-sized firms (51-500 employees) and the remainder from large firms (>500 employees). A more detailed description is shown in Table 1. Table 2 summarizes the main variables by country.

Dependent variable: Hypothesis that enterprises may choose informality to finance their operations is tested exclusively through informal creditors in order to avoid regulatory scrutiny. Informal finance is defined as any financial contract or financing arrangement that is provided by lenders that are not regulated financial intermediaries. The survey data captures the percent of working capital financed externally, either from formal sources (primarily banks), or from an array of informal sources such as trade creditors, moneylenders and friends or family. A 59.65% of external finance comes from commercial banks, while 40.35% of external finance comes from informal sources.

Informal finance sources are quite heterogeneous. They vary in terms of the conditions offered to clients (expensive in the case of a moneylender and trade creditor) and their relationships to the borrower (varies from arms' length to close friend or family).

However, informal sources have a number of common characteristics. Informal creditors can screen and monitor borrowers and enforce contracts without having to rely on written evidence of cash flow, profitability, business plans and without recourse to the legal system. This is because they acquire information through personal or business relationships with borrowers, through interlinked contractual arrangements and/or can credibly threaten to seize a borrower's assets without recourse to the formal legal system. Because of this, informal lenders do not rely on the same sort of formal signals of creditworthiness as banks and other financial intermediaries. In this sense, enterprises who rely exclusively on informal lenders can avoid producing financial statements that could potentially make their operations more transparent to regulatory authorities. To capture enterprise financing choices among external creditors, a binomial dependent variable [1,0] is constructed which measures whether enterprises prefer to rely exclusively on informal finance [1] or whether they prefer bank finance [0]. The variable comes from enterprises reporting of percentage of working capital financed by retained earnings, bank credit and various informal sources.

Explanatory variables: To test the hypothesis explanatory variables used are various measures of corruption, regulation and enterprise transparency, at both the enterprise and country level. Specifically, we look at measures of corruption, tax regulations and administration, business registration and licensing procedures, labor regulations and land registration. The analysis relies on several measures of enterprises at the enterprise level' perceptions of the business environment, including indicators on the transparency of enterprises' operations vis-à-vis the tax authorities, regulatory harassment in the form of bribes or inspections and perceptions of regulatory obstacles.

For robustness purposes, variables from the World Bank indicators on Doing Business are used to capture the regulatory burden at the country level. These variables are quantitative measures of business regulations and the protection of property rights across countries in our data. We use measures of the cost of regulation revolving around taxation, business registration, employment rigidities, property registration and licensing. Because country fixed effects are used in our model, these country-level variables are interacted with enterprise perception variables matching each of the doing business variables in question. For example, Doing Business variables on tax administration at the country level (e.g., number of tax payments in a given country, or days needed to make tax payments) are interacted with enterprise perceptions of tax administration as a business constraint. A similar approach is employed for all country level variables. We control for enterprise characteristics which may influence an enterprise's financing portfolio; enterprise size and legal status.

Table 1 provides a detailed description of all the variables used in this study.

Table 2 presents summary statistics by country of all the main variables. One can see from Table 2 that the preference for informal finance varies considerably across countries. While the mean percent of enterprises from the sample which prefer informal finance is 40.35%, this masks considerable differences across countries from a low of 19.29% in Cameroon, to a maximum of 85.95% in South Africa.

Sandaradne (1980) for example describes that informal financial services are free of transaction cost and over 70% of informal lending was for production purposes during 1970s and 1980s in Sri Lanka. Cultivation purposes alone accounted for over half their volume of lending and 10% of fund lends to the trading sector. Informal loans have a wide range of sizes and non-interest facilities are smaller sized but moneylenders grant somewhat larger loans. Ninety three percent of

Table 1: Variable definitions and sources

Variables	Abbreviation of variables	Definition	Description	Original source
Informal finance or formal finance	Inform	Dependent binary variable	Variable takes on a value of 1 if the former is the case and 0 if the enterprise uses formal finance	World Business Environment Survey (WBES)
Pay informal payments/gifts to get things done with regard to customs, taxes, licenses and regulation	Brccommon	Subjective categorical variable	Higher values indicate more corruption. Scale of variable is 1-6, with 6 being associated with strong agreement	World Business Environment Survey (WBES)
Pay bribes to obtain government contracts	Brgovcon	Subjective categorical variable	Higher values indicate that bribe payments more common. Scale of variable is 1-6, with 6 indicating 'Always necessary.' common	World Business Environment Survey (WBES)
Pay bribes occupational health and safety inspectious	Brsafeinsp	Subjective categorical variable	Higher values indicate that bribe payments more common. Scale of variable is 1-6, with 6 indicating Always necessary	World Business Environment Survey (WBES)
Pay bribes during fire inspections	Brfireinsp	Subjective categorical variable	Higher values indicate that bribe payments more common. Scale of variable is 1-4, with 4 indicating Always necessary	World Business Environment Survey (WBES)
Pay bribes to deal with taxes and tax collection	Brtaxinsp	Subjective categorical variable	Higher values indicate that bribe payments more common. Scale of variable is 1-6, with 6 indicating Always necessary	World Business Environment Survey (WBES)
Percent of contract value typically paid in additional or informal payments	Brconvalue	Percent of contract	To secure a contract when doing business with the government. Higher values indicate more corruption	World Business Environment Survey (WBES)
Measures the number of tax payments per country	Taxpay	Country level variable	Standardized to reflect the total number of taxes paid, the method of payment, frequency of payment and number of agencies involved. Higher values indicate tax administration is more problematic	World Bank Doing Business Indicators
Measures the time to prepare, file and pay	Taxtime	Country level variable	Higher values indicate tax administration is more problematic	World Bank Doing Business Indicators
Measures the amount of taxes payable by the business in the second year of operation	Taxrate	Country level variable	Expresses as a share of commercial profits. The total amount of taxes is the sum of all different taxes payable after accounting for deduction and exemptious. Higher values indicate tax administration is more problematic	World Bank Doing Business Indicators
Percent of labor force declared by enterprises for tax purposes	taxreport_r	Percent of labor force	Higher values indicate more transparency vis-à-vis the tax authorities	World Bank Doing Business Indicators

Table 1: Continued

Variables	Abbreviation of variables	Definition	Description	Original source
Measures the full number of procedures necessary when a business purchases land and a building	Landreg_proc	Country level variable	To transfer the property title from the seller to the buyer so that the buyer can use the property for expanding its business, as collateral in taking new loans or to sell to another business. Higher values indicate land regulations are more problematic	World Bank Doing Business Indicators
Measures the median duration (in days) that property lawyers or registry officials indicate	Landreg_time	Country level variable	Is necessary to complete the process of property registration for purchases of land and/or a building to transfer the property title from the seller to the buyer so that the buyer can use the property for expanding its business, as collateral in taking new loans or to sell to another business. Higher values indicate land regulations are more problematic	World Bank Doing Business Indicators
Measures cost (as a percent of the property value) for completing the full number of procedures	Landreg_cost	Country level variable	Necessary when a business purchases land and a building to transfer the property title from the seller to the buyer so that the buyer can use the property for expanding its business, as collateral in taking new loans or to sell to another business. Higher values indicate land regulations are more problematic	World Bank Doing Business Indicators
Measures the difficulty of hiring employees	Labregs_hire	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Measures the rigidity of labor regulations governing hours employees can work	Labregs_hors	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Measures the rigidity of labor regulations	Labregs_ri~d	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Measures the difficulty of firing an employee	Labregs_fire	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Measures the costs of firing an employee	Labregs_fi~t	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Measures the costs associated with hiring an employee	Labregs_hi~t	Country level variable	Higher values indicate labor regulations are more problematic	World Bank Doing Business Indicators
Size	Size	Enterprise variable	Measures the number of full-time permanent employees at the enterprise	World Bank Doing Business Indicators

Table 1: Continued

Variables	Abbreviation of variables	Definition	Description	Original source
Measures whether an enterprise is registered as a sole proprietorship or as a company	Legalstatus	Binary variable	0 indicates sole proprietorship, while 1 indicates the enterprise is registered as some form of company	World Bank Enterprise Surveys
Measures whether an enterprise has been asked for an informal gift or payment in the past year	Binarybribe	1 indicates that at least one bribe was solicited	An enterprise can be asked for one or more of the following: Connection/ access to public utilities, obtaining business permits, obtaining government contracts, to deal with safety, fire, or environmental inspections, for tax purposes, for customs, courts, or to influence legislation	World Bank Enterprise Surveys

Source: Authors' own compilations

Table 2: Summary Statistics by Country (means)

Country	Inform	Brcommon	Brgovcon	Brsafe~p	Brfire~p	Brtaxi~p
Botswana	0.7326733	4.935484	5.734694	4	1.450549	5.693878
Cameroon	0.1929825	3.166667	3.837209	4.4	1.782609	4.191489
Cote d'Ivoire	0.2164948	3.259494	3.903846	4.568182	1.872093	4.411765
Egypt	0.2352941	2.860825	3.717172	3.505618	2.171717	3.434343
Ethiopia	0.4380952	3.643678	4.731183	3.84	1.448718	5.1875
Ghana	0.3193277	3.485149	4.533981	4.106061	2.080808	4.4
Kenya	0.5221239	3.04717	4.191919	4.012658	1.663265	4.551402
Madagascar	0.2327586	2.60	2.854369	4.608108	1.770642	4.06422
Malawi	0.5090909	3.981132	4.811321	4.172414	1.510204	5
Nigeria	0.3763441	2.634146	3.632911	4.295082	2.126582	3.7
Senegal	0.2741935	3.291139	3.544304	4.081633	2.275	4.342105
South Africa	0.8595041	4.448276	5.560345	4.105263	1.646552	5.576271
Tanzania	0.3253012	2.84	4.260274	3.981818	2	4.3625
Tunisia	0.6538462	5.447368	5.60	2.714286	1.695652	5.738095
Uganda	0.3284672	2.868852	4.072581	3.981132	1.725664	4.151515
Zambia	0.2619048	3.702703	4.493333	3.480769	1.947368	4.649351
Total mean	.4034638	3.437638	4.324354	4.025271	1.828464	4.55922

Country	Brconv~e	Taxpay	Taxtime	Taxrate	Taxrep~r	Landre~c
Botswana	1.216867	19	140	17.1	2	5
Cameroon	3	41	1400	50.5	2.387755	5
Cote d'Ivoire	2.586207	66	270	44.7	2.142857	6
Egypt	2.987013	29	480	43.0	2.357143	7
Ethiopia	1.854167	19	198	31.1	1.738636	10
Ghana	1.978261	33	224	32.7	2.164948	5
Kenya	2.854167	41	417	49.7	2.148515	8
Madagascar	4.076923	23	201	39.2	1.793103	7
Malawi	1.833333	19	157	25.8	1.884615	6
Nigeria	3.702703	35	938	32.2	2.051282	13
Senegal	2.826087	59	666	46.0	2.461538	6

Table 2: Continued

Country	Brconv~e	Taxpay	Taxtime	Taxrate	Taxrep~r	Landre~c
South Africa	1.306667	9	200	30.20	3.176471	6.00
Tanzania	2.189189	48	172	45.20	2.608108	9.00
Tunisia	1.166667	22	228	62.80	1.939394	4.00
Uganda	2.892857	32	161	35.70	1.672414	13.00
Zambia	3.2	37	132	16.10	2.197368	6.00
Total mean	2.391911	33.25	374	37.625	2.183077	7.25
Country	Landre~e	Landre~t	Lab~hire	Labreg~s	Labreg~d	Lab~fire
Botswana	16	5.0	0	0	13	40
Cameroon	93	17.8	28	20	39	70
Cote d'Ivoire	62	13.9	33	47	33	20
Egypt	72	0.90	0	20	27	60
Ethiopia	41	2.2	33	20	28	30
Ghana	34	1.1	11	20	27	50
Kenya	64	4.2	22	0	17	30
Madagascar	74	9.7	89	40	56	40
Malawi	88	3.2	44	0	21	20
Nigeria	82	20.9	0	0	7	20
Senegal	124	20.6	72	53	59	50
South Africa	24	8.7	56	20	35	30
Tanzania	73	4.4	100	13	54	50
Tunisia	39	6.1	28	13	40	80
Uganda	77	3.5	0	0	0	0
Zambia	39	6.6	11	33	21	20
Total mean	62.625	8.05	32.9375	18.6875	29.8125	38.125
Country	Labreg..	Labreg..	Small	Legals~s	Binary~x	
Botswana	90	0	0.4158416	0.049505	0.4851485	
Cameroon	33	18.3	0.3157895	0.0877193	0.1578947	
Cote d'Ivoire	49	20.1	0.2680412	0.0309278	0.1752577	
Egypt	132	25.6	0.127451	0.0	0.0588235	
Ethiopia	40	0	0.3714286	0.2380952	0.2190476	
Ghana	178	14.1	0.3781513	0.0672269	0.1848739	
Kenya	47	6.8	0.159292	0.0176991	0.380531	
Madagascar	30	20.3	0.3448276	0.112069	0.0431034	
Malawi	84	1.1	0.2545455	0.0	0.3454545	
Nigeria	50	9.7	0.2258065	0.0752688	0.311828	
Senegal	38	24.1	0.5645161	0.2419355	0.1854839	
South Africa	24	2.4	0.1487603	0.0082645	0.6198347	
Tanzania	18	18	0.4096386	0.0240964	0.1807229	
Tunisia	17	25.2	0.1538462	0.0	0.3846154	
Uganda	13	11.3	0.5912409	0.1605839	0.2189781	
Zambia	178	10.4	0.4166667	0.1071429	0.3095238	
Total mean	63.8125	12.9625	0.33483	0.0846697	0.2636305	

Source: Authors' own calculations

the non-interest loans are unsecured but other lending covered by immovable assets, jewellery, durable consumer goods, machinery and equipment. Sandaratne (1980) further elaborates that informal lenders, like institutional sources had recovered only a small proportion of loans and moneylenders recovery is worse than non-interest charged lenders. In

addition, he described that the importance of the informal sector's role in production credit may not have been adequately recognized owing to the fact that informal sources met the needs of consumption credit.

Similarly, measures of regulation and corruption also vary significantly across countries.

The number of tax payments necessary to fulfill tax obligations to the government ranges from a low of 9 payments in South Africa, to a high of 66 in Cote d'Ivoire. In Madagascar, for example, the average degree to which paying bribes is considered common and necessary (Br-common, scale of 1-6) is a low of 2.6, while in Tunisia the mean is a high of 5.44.

Zhu (2004) for example indicated that mainland Chinese citizens, compared to Hong Kong citizens, are less aware of tax laws, which makes tax evasion and fraud more common. Moreover, Li (2002) made a survey on personal income tax evasion, about 20% of taxpayers in mainland China refuse to pay taxes because of the high tax rate. An approximate 51.6% of citizens cannot fulfill their tax obligations. This shows that the phenomenon of personal income tax evasion is quite serious in mainland China.

Table 3 presents correlations between the main explanatory variables. Correlations exist between all measures of corruption identified by enterprises in the sample. In particular, the variable capturing how commonplace bribe payments are considered (Brcommon) is correlated with almost all other dimensions of corruption-including perceptions of bribe demands during inspections (Br-safeinsp, Br-fireinsp, Brtaxinsp) and the two variables measuring bribe levels to secure government contracts (Br-govcon and Br-convalue). The consistency of these correlations is reassuring, given that perceptions of corruption can be noisy (Fisman and Svenson, 2007).

Table 3: Correlations

	Inform	Brcommon	Brgovcon	Brsafe~p	Brfire~p	Brtaxi~p	Brconv~e
Inform	1.0000						
Brcommon	0.2387	1.0000					
Brgovcon	0.1998	0.4036	1.0000				
Brsafeinsp	-0.0156	0.0914	-0.0349	1.0000			
Brfireinsp	-0.1858	-0.1722	-0.1590	-0.0499	1.0000		
Brtaxinsp	0.2019	0.4367	0.6656	0.0175	-0.2244	1.0000	
Brconvalue	-0.2543	-0.4918	-0.6606	0.1505	0.1874	-0.5420	1.0000
Taxpay	-0.2605	0.0303	0.0365	0.3787	0.4167	-0.1879	0.2773
Taxtime	-0.2013	-0.3817	-0.5220	0.3191	0.3369	-0.3661	0.6562
Taxrate	0.0649	0.0469	-0.3401	-0.0031	0.0907	0.0630	-0.1221
Taxreport~r	0.0109	-0.0107	0.0179	-0.0513	0.3036	-0.0231	-0.0150
Landreg_proc	-0.3229	-0.5573	-0.1308	0.2043	0.1427	-0.2301	0.3248
Landreg_time	-0.4377	-0.2506	-0.2477	0.8784	0.7191	-0.0196	0.2989
Landreg_cost	-0.1638	-0.2813	-0.1770	0.3602	0.2328	-0.2598	0.4046
Labregs_hire	-0.0349	-0.0027	-0.0384	0.3589	0.1184	0.3191	-0.3604
Labregs_ho~s	-0.0363	-0.0114	0.0158	0.1390	0.3532	-0.0532	-0.0480
Labregs_ri~d	0.0785	0.1054	-0.1656	0.1898	0.3069	0.1975	-0.2988
Labregs_fire	0.2666	0.2719	-0.4069	-0.1865	0.2305	0.0512	-0.1491
Labregs_fi~t	-0.0304	0.1841	-0.0232	-0.2572	0.0887	-0.3642	0.3411
Labregs_hi~t	-0.2596	-0.0310	-0.2187	0.1781	0.5037	-0.0619	0.0443
Small	-0.0654	-0.1377	-0.1717	0.0176	0.0706	-0.1320	0.2374
Legalstatns	-0.0341	-0.1224	-0.1071	-0.0251	0.0650	-0.0879	0.1228
Binarybrib~x	0.4249	0.2532	0.2805	-0.0552	-0.1946	0.2867	-0.3304

Table 3: Continued

	Taxpay	Taxtime	Taxrate	Taxrep~r	Landreg~c	Landreg~e	Landreg~t
Taxpay	1.0000						
Taxtime	0.3194	1.0000					
Taxrate	0.3750	0.3586	1.0000				
Taxreport~r	0.2407	0.3747	0.1243	1.0000			
Landreg_proc	0.0335	0.0568	-0.1208	-0.2282	1.0000		
Landreg_time	0.5379	0.5509	0.3863	0.3328	0.2536	1.0000	
Landreg_cost	0.4827	0.7093	0.2155	0.2763	0.0537	0.5388	1.0000
Labregs_hire	0.1568	-0.1294	0.2717	-0.0829	-0.1449	0.3158	0.1710
Labregs_ho~s	0.4930	0.0417	0.1681	0.3961	-0.3707	0.2354	0.4000
Labregs_ri~d	0.2652	0.0794	0.4704	0.2334	-0.4522	0.2928	0.2684
Labregs_fire	-0.0046	0.3420	0.5944	0.3780	-0.5968	0.0209	0.0545
Labregs_fi~t	-0.0422	-0.1751	-0.5218	0.1444	-0.3158	-0.3113	-0.3473
Labregs_hi~t	0.5266	0.2847	0.7076	0.3829	-0.2198	0.4429	0.2886
Small	0.0953	0.1344	-0.1260	-0.1121	0.0598	0.1981	0.0998
Legalstatus	-0.2474	-0.1332	-0.1395	-0.0760	0.2696	-0.2013	-0.2323
Binarybrib~x	-0.1911	-0.1582	0.2217	0.0001	-0.2888	-0.3976	-0.2180
	Lab~hire	Labreg~s	Labreg~d	Lab~fire	Labreg..	Labreg..	Small
Labregs_hire	1.0000						
Labregs_ho~s	0.4440	1.0000					
Labregs_ri~d	0.8472	0.6879	1.0000				
Labregs_fire	0.1893	0.1728	0.5867	1.0000			
Labregs_fi~t	-0.4648	0.0645	-0.2735	-0.0166	1.0000		
	Lab~hire	Labreg~s	Labreg~d	Lab~fire	Labreg..	Labreg..	Small
Labregs_hi~t	0.2283	0.5407	0.5638	0.5749	-0.0711	1.0000	
Small	0.0548	0.4166	0.1623	-0.0425	0.1516	0.1111	1.0000
Legalstatus	0.0005	0.0203	-0.0283	-0.1030	-0.1169	-0.3802	0.2627
Binarybrib~x	-0.2528	-0.4131	-0.1882	0.2799	-0.1139	-0.1253	-0.1130
			Legals~s				Binary~x
Legalstatus			1.0000				
Binarybrib~x			-0.0774				1.0000

Source: Authors' own calculations

It is also worth noting that corruption and bribe variables are highly correlated with regulatory procedures, but not with regulatory costs. In particular, note that the number of procedures necessary to register and transfer property (Landreg_proc) and the number of payments and procedures necessary to complete the payment of taxes (Taxpay) are both consistently correlated with various measures of bribe payments.

John and Tarp (2010) for example study bribe incidence in a sample of 1,661 Small and Medium-sized Enterprises (SMEs) in 10 provinces in Vietnam. They include firm which operate with a formal business registration license as well as firms (informal) without such a license and show that bribe incidence is highly correlated with firm-level differences in visibility, sunk costs, ability to pay and the level of interaction with public officials. They also find formal registration is positively correlated with bribe incidence.

RESULTS

In this study we argue that enterprises' preference to use informal finance exclusively depends, in part, on the risks and burdens imposed on enterprises by the regulatory environment. When the cost of compliance is high-either through the de jure rules of regulation, or because predatory regulators seek bribes from enterprises-enterprises may choose to stay below the radar screen of regulation. Since applying for formal sector loans entails becoming more financially transparent, enterprises may choose to forgo formal finance. This is because the same mechanisms enterprises use to signal creditworthiness to formal sector lenders, also make enterprise operations more transparent and easier to monitor for regulatory authorities. We test the hypothesis that enterprises are more likely to opt out of the formal financial by choice if they operate in a predatory regulatory environment.

A maximum likelihood estimation technique is used to estimate a binomial logit of unordered enterprise sectoral choice. Y is the dependent variable indicating enterprise sectoral choice:

$Y = 0$ if the i th enterprise has some form of formal finance and $=1$ if the i th enterprise relies only on informal finance and is financially unconstrained. The probability of a particular sectoral choice is given by:

$$Y_{ij}^* = f(X_1, \dots, X_n) + e$$

Where:

- Y_{ij}^* = Probability that some enterprise i will choose outcome j (prefers formal finance)
- Y_{ij} = Observed dummy that is equal to one when outcome j (prefers exclusive use of informal finance) is observed
- X_1 = Enterprise size
- X_2 = Legal status
- $X_3: X_n$ = Measures of corruption and regulation

The choice of explanatory variables X is guided by the analytical arguments discussed earlier. In particular a number of variables capturing corruption and regulatory burden are included. Specifically we look at variables on prevalence of corruption and bribes, tax regulation and administration, business registration and licensing, labor rigidities and constraints to acquiring and transferring immovable property.

Since, the hypothesis is that enterprises' preference for informal finance is a spillover effect of a burdensome regulatory environment, we expect the signs of most of our variables to be positive, indicating a positive association between measures of regulation and exclusive use of informal finance.

We now consider the maximum likelihood estimates of the binomial logit model of enterprise sectoral choice. Table 4-6 show the cross-sectional results on the factors influencing the choice of informal finance, testing the impact of various dimensions of the regulatory environment for businesses on enterprises' financing patterns.

Table 4 shows the results of the regressions using variables measuring corruption and paying bribes. Controls for enterprise size and legal status are included. A number of the variables are positive. In particular, the variables measuring the degree to which bribes are solicited during meetings or inspections ($Brtaxinsp$) are positive. Our composite variable for overall bribes (Binary Bribe Index) is also positive.

Table 4: Corruption regression dependent variable: prefer informal to formal finance

Variables	All enterprises	Small enterprises	All enterprises	Small enterprises	All enterprises	Small enterprises
Size	0.10 (0.07)	-0.14 (0.13)	0.19 (0.10)	-0.19 (0.17)	-0.03 (0.09)	-0.01 (0.16)
Legalstatns	0.01 (0.22)	0.01 (0.23)	-0.12 (0.29)	-0.15 (0.29)	0.19 (0.25)	0.22 (0.25)
Brcommon	0.31*** (0.04)	0.31*** (0.04)				
Brconvalue			-0.33*** (0.06)	-0.34*** (0.05)		
Brsafeinsp					-0.02 (0.05)	-0.02 (0.05)
Constant	-1.55*** (0.20)	-1.32*** (0.15)	0.27 (0.28)	0.73*** (0.15)	-0.56* (0.28)	-0.62** (0.22)
Log_likeli-d	-884.37	-885.28	-469.28	-470.32	-528.69	-529.15
LR_chi_squ-e	80.41	79.70	51.79	49.70	1.07	0.97
R ² _pvalue	0.04	0.04	0.05	0.05	0.00	0.00
Vaibles	All enterprises	Small enterprises	All enterprises	Small enterprises	All enterprises	Small enterprises
Size	0.17* (0.07)	-0.27* (0.13)	0.05 (0.07)	-0.12 (0.12)	0.06 (0.07)	-0.10 (0.13)
Legalstatns	-0.17 (0.23)	-0.17 (0.23)	-0.06 (0.22)	-0.05 (0.22)	0.03 (0.21)	0.03 (0.21)
Brfireinsp	-0.46*** (0.07)	-0.46*** (0.07)				
Brtaxinsp			0.28*** (0.04)	0.28*** (0.04)		
Binarybrib-x					2.05*** (0.13)	2.05*** (0.13)
Constant	0.23 (0.21)	0.66*** (0.14)	-1.70*** (0.20)	-1.57*** (0.23)	-1.06*** (0.16)	-0.92*** (0.08)
Log_likeli-d	-885.39	-886.38	-931.20	-931.28	-909.00	-909.34
LR_chi_squ-e	54.71	53.87	59.77	60.72	283.71	284.08
R ² _pvalue	0.03	0.03	0.03	0.03	0.13	0.14

Source: Authors' own calculations. ***Significant at 1%; **Significant at 5%; *Significant at 10%

Goel (2008) for example finds that having more regulation, including number of procedures and time involved across four categories (business startup, licensing, property registration and taxation), leads to greater corruption. More regulatory procedures, especially for business startups and property registrations, have the most corruption-enhancing effect.

In Table 5, the results of measures of tax administration and regulation on enterprise financing preferences are shown. The findings suggest that the administration of taxes is an important factor in enterprise financing patterns, while tax rates are not. In particular, the variables approximating the number of tax payments and the time needed to complete the revenue collection system (Taxpay and Taxtime, respectively) are negatively associated with the preference for informal finance. Tax Report Labor (variables that measure truth in reporting to tax authority on employment) has a positive sign and the variable is insignificant.

Almeida and Carneiro (2005) for example find that in Brazil the degree of informality chosen by the firm is determined by the firm's benefits and costs of hiring informally. Informal contracts have several advantages over formal contracts. The monetary costs associated with taxes and

Table 5: Tax regressions dependent variable: prefer informal to formal finance

Variables	All enterprises	Small enterprises	All enterprises	Small enterprises
Size	-0.43 (0.77)	-0.32 (1.13)	-0.56 (0.76)	-0.37 (1.12)
Legalstatns	35.87 (6.7e+07)	35.43 (4.2e+07)	33.95 (2.7e+07)	38.68 (.)
Taxpay	-0.03 (0.04)	-0.03 (0.04)		
Taxtime			-0.00 (0.00)	-0.00 (0.00)
Constant	1.38 (2.04)	0.64 (1.38)	1.13 (1.70)	0.13 (0.89)
Log_likeli~d	-9.61	-9.74	-9.57	-9.80
LR_chi_squ~e	2.70	2.46	2.79	2.32
R ² _pvalue	0.12	0.11	0.13	0.11
Variables	All enterprises	Small enterprises	All enterprises	Small enterprises
Size	-0.44 (0.74)	-0.43 (1.10)	0.19** (0.07)	-0.30* (0.12)
Legalstatns	36.45 (6.7e+07)	36.03 (4.2e+07)	-0.19 (0.23)	-0.19 (0.23)
Taxrate	0.02 (0.04)	0.02 (0.04)		
Taxreport_~r			0.00 (0.06)	0.00 (0.06)
Constant	-0.43 (2.10)	-0.90 (1.85)	-0.62** (0.20)	-0.15 (0.15)
Log_likeli~d	-9.82	-9.92	-885.97	-887.28
LR_chi_squ~e	2.29	2.08	9.35	7.88
R ² _pvalue	0.10	0.10	0.01	0.00

Source: Authors' own calculations. ***Significant at 1%; **Significant at 5%; *Significant at 10%

Table 6: Land regressions dependent variable: prefer informal to formal finance

Variables	All enterprises	Small enterprises	All enterprises	Small enterprises	All enterprises	Small enterprises
Size	-0.32 (0.80)	-0.84 (1.27)	-0.48 (0.75)	-0.41 (1.11)	-0.55 (0.84)	-0.10 (1.21)
Legalstatns	37.62 (4.2e+07)	39.75 (6.7e+07)	34.01 (2.7e+07)	36.72 (6.7e+07)	35.49 (6.7e+07)	35.99 (6.7e+07)
Landreg_proc	-0.63 (0.49)	-0.73 (0.53)				
Landreg_cost			-0.04 (0.09)	-0.03 (0.08)		
Landreg_time					-0.03 (0.02)	-0.03 (0.02)
Constant	4.27 (3.15)	4.65 (3.44)	0.79 (1.69)	-0.02 (0.92)	2.71 (2.18)	1.74 (1.55)
Log_likeli~d	-8.05	-7.91	-9.80	-9.95	-8.54	-8.77
LR_chi_squ~e	5.82	6.11	2.32	2.04	0.22	0.20
R ² _pvalue	0.27	0.28	0.11	0.09		

Source: Authors' own calculations

non-wage benefits of formal labor contracts can be as high as 102% of wages. Almeida and Carneiro (2005) also find that informal labor is also associated with more flexibility since formal labor contracts demand a notification period in case of dismissal and severance payments. Firms will demand more informal workers the larger is their benefit of avoiding the labor regulation. On the other hand, the higher is the direct or indirect exposure of firms to labor inspections; the lower will be their incentive to avoid regulation.

Variables on other regulatory procedures were also tested. Table 6 shows the results for land regulations, which are consistent with the findings on corruption and tax regulation. More burdensome and onerous procedures for registering property are associated with informal financing preferences.

Besley and Burgess (2000) for example, look at the impact of land reform legislation in Indian states on poverty at the state level. They find that poverty was reduced by land reform, particularly tenancy reform, even though there is no evidence that it increased income per capita. This evidence flies in the face of the general pessimism that surrounds efforts to redistribute towards the poor.

As a robustness check, we also test the relationship between financing patterns and regulatory burdens on small enterprises exclusively. Table 4-6 also show the results of regressions for small enterprises only. One concern with the cross-section data is that there is endogeneity in enterprise location choices. Enterprises may choose *ex ante* not to locate in countries or regions with unfavorable regulatory environments and this could bias our results. We try to check for this by limiting our analysis to small, indigenous enterprises. Presumably these enterprises do not have the same mobility and location choice options as large, foreign-owned enterprises.

The results show that the regulatory environment matters for small enterprise financing decisions as well. The results on the corruption regressions (Table 4) show that one additional variable becomes significant (Br-common) and that the direction and significance for the other corruption variables hold. The impact of tax regulation and administration on small enterprise financing preferences is also similar to the larger population of enterprises from our sample (Table 5). The significance and direction of all the tax variables hold. Additionally, all the significance and direction of the variables on land registration costs and regulations for small enterprises are constant (Table 6).

CONCLUSIONS

This study is motivated by the limited empirical evidence regarding the validity of the credit rationing hypothesis for enterprises. We investigate if the regulatory environment may be a factor in driving the decision-making process.

Focusing on enterprises with short-term loans for working capital, evidence from 1559 enterprises in 16 African countries suggests that the regulatory environment is a factor in enterprises' preference for informal creditors. Enterprises facing higher and more frequent demand for bribes and that deal with onerous regulatory obstacles, are more likely to prefer informal finance.

In predatory regulatory environments, enterprises will forgo opportunities in order to avoid the burden of regulation. Enterprises may forgo opportunities to engage in borrowing from banks because they do not want to make their operations more transparent, want to hide assets in order to minimize tax payments and do not want to make themselves vulnerable to rent-seeking officials.

An important policy is that countries that implement policies to reduce tax and regulatory constraints and improve their legal environments reduce the incentives for firms to operate informally.

APPENDIX

No. of firms by country

Country	No. of firms	Percent
1 Botswana	101	6.48
2 Cameroon	57	3.66
3 Cote d'Ivoire	97	6.22
4 Egypt	102	6.54
5 Ethiopia	105	6.74
6 Ghana	119	7.63
7 Kenya	113	7.25
8 Madagascar	116	7.44
9 Malawi	55	3.53
10 Nigeria	93	5.97
11 Senegal	124	7.95
12 South Africa	121	7.76
13 Tanzania	83	5.32
14 Tunisia	52	3.34
15 Uganda	137	8.79
16 Zambia	84	5.39
All Sample	1,559	100.00

Source: Authors' own compilations

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