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Entrepreneurship And Informal Economy In Africa

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Abstract

The objective of this paper is to analyze the effects of regulations introduced in the field of entrepreneurship on the size of the informal sector in African countries over the period 2004-2017. For this, the study used the system-based GMM method for linear analysis and the threshold effect model for non-linear analysis. It appears that the ease of entrepreneurship, that is to say less procedure to open a business, a lower cost, less time, and the need for a lower minimum capital, favor the reduction of the size the informal sector. It also emerges that the increase in real GDP per capita, human capital, but also institutional factors such as the fight against corruption, government efficiency and the quality of regulations, are factors that favor the decline of the informal sector. On the other hand, the unemployment rate is a factor exacerbating the size of the informal sector. Finally, it turns out that the size of the informal sector and the ease of doing business have a non-linear relationship.

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1. Introduction

The informal sector is a growing phenomenon in the various economies of the world. But it is more present in developing countries like those in Africa. Defined by the International Labor Office (ILO, 1993) as: "made up of groups of units producing goods and services with the main aim of creating jobs and income for those concerned. These units, having a low level of organization, operate on a small scale and in a specific way, with little or no division between labor and capital as factors of production. Labor relations, where they exist, are predominantly based on casual employment, kinship relations or personal and social relations rather than contractual agreements with formal guarantees ". The notion of the informal sector was introduced by Hart (1971), in a study he carried out on the precarious living conditions of workers in Ghana. The informal sector represents an important part of developing countries. Indeed, according to Mbaye (2014), in these countries, the informal sector more than 50% of the added value of GDP, more than 80% of total employment and more than 90% of newly created jobs. In the same launch, a study by the International Monetary Fund (IMF, 2018) indicates that Africa is one of the regions where the informal economy weighs the most, with an average of around 38% of GDP, over the period 2010- 2014, compared to 34% for Southeast Asia and 23% for Europe.

This preponderance of informality has led researchers to examine the causes and consequences of this phenomenon. This research is part of the determinants of the size of the informal sector. Referring to the literature, there are several factors that can influence the size of the informal sector. The most important being the increase in the weight of taxes (Schneider and Neck (1993), Schneider and Enste (2000) …), labor market regulations; forced reduction of weekly working time; early retirement; unemployment etc. In addition, other authors (Chong and Gradstein (2007), Schneider and Badekow, (2006), Schneider (2010) etc.) attribute the development of informality to the quality of public institutions.

On the other hand, some authors attribute the growth of the informal sector to excessive government regulations. Schneider (1994) considers the intensity of government regulations to be one of the key factors in the development of informality. According to Schneider and Enste (2000), find that increased regulation leads to an increase in the size of the informal sector. Johnson et al (1997), as well as Friedman (2000) develop a model and find that countries with more general regulation of their economy tend to have a higher share of the informal economy in total GDP. This thesis is refuted by Williams and Nadin (2010), who show that entrepreneurship in the informal sector is a matter of corporate culture and not because of the existence of excessive regulations.

In view of the above, it is noted that the previous literature established a relationship between the intensity of government regulations and the size of the informal sector, but this relationship is controversial. The interest of this study lies at two levels. On the one hand, it will provide empirical validation of the effect of regulation on informality in Africa. It will therefore help inform policies aimed at reducing informality in African countries. Moreover,

the study shows that the economies of African countries are characterized by a preponderance of informality, despite the efforts of various states and international institutions to reduce the intensity of regulations. This preponderance could lie in the existence of a threshold effect in this relationship. Specifically, it could be that the reduction in the intensity of regulation must reach a certain level in order to encourage a reduction in the informal sector. This search for a threshold effect between the level of regulation and informality is the first to our knowledge. This study will therefore provide an empirical validation of this relationship and will thus contribute to enriching the literature. This paper is therefore of scientific interest, which is to enrich the empirical literature, and of political interest, which is to shed light on the various actions in favor of reducing informality in Africa.

The objective of this paper is therefore to analyze the effects of regulations introduced in the area of entrepreneurship on the size of the informal sector in Africa. To do so, it hypothesizes that an increase in the ease of doing business index leads to a decrease in the size of the informal sector and then that there is a threshold that the ease of doing business index must reach in order for the size of the informal sector to decrease.

The rest of the paper is as follows: first an economy of the literature on the relationship between the informal sector and entrepreneurship, then it presents the methodology, then for the results of the study and finally the conclusion.

2. Literature

The literature on the relationship between entrepreneurship and the informal sector is present. Indeed, on the theoretical level, De Soto (1989) developed a model of which one of the conclusions is that the probability of starting a business has a positive effect on the size of the informal sector. Acemoglu and Johnson (2005) note that constraints on market access issued by governments, in the form of regulations, taking into account elements of protection and stability of property rights, underlie the growth in size of the informal sector. Moreover, for Paula Aureo (2006), the decision of a potential entrepreneur necessarily affects the size of the informal economy. It should be remembered that there are two sectors namely the formal sector and the informal sector, so a company that starts its activities has to face competition in its two sectors. They explain this with two potential facts. First, they note that competition is less fierce in the formal sector, which gives incumbents more power. Also, a new entrepreneur must also face competition from companies in the informal sector; these informal enterprises that produce goods and services at lower costs, because they evade government regulations, wage regulations (guaranteed minimum wage (SMIG)) and tax payments. Important facts to underline according to Aidis et al (2007), entry into the formal and informal sector involves costs, although different. Indeed, if entering the formal sector requires specific costs such as procedures, a minimum capital, sometimes long, entering the informal sector also involves costs. Indeed, informal entrepreneurs must have network capital. The latter can be more complex for new entrants.

On the other hand, some theories do not validate the fact that the development of informality

is due to existence of excessive regulations. This is the case of Williams and Nadin (2010), who provide a theoretical analysis of the relationship between entrepreneurship and the informal sector. They also analyze the preponderance of entrepreneurs to engage in the informal economy, the nature of this informal entrepreneurship, the characteristics of informal entrepreneurs, and the motivations behind participating in such an enterprise. They conclude that there are marked socio-spatial variations in the prevalence and nature of informal entrepreneurship, the characteristics of informal entrepreneurs, and their rationales. They point out that the implication is not only that different theories of informal entrepreneurship apply more to some populations than others, but also that some populations generally considered to lack entrepreneurship may be more enterprising and entrepreneurial than currently recognized. Therefore, according to these authors, legitimizing this hidden entrepreneurial culture could be an important way to promote entrepreneurship and economic development among these populations.

Theoretically, there remains a contradiction in the relationship between entrepreneurship and the size of the informal sector.

Empirically, studies have established a linear relationship between ease of doing business and the size of the informal sector. Indeed, Johnson et al (1997) find that a one-point increase in the regulation index leads to an 8.1 percentage point increase in the share of the informal economy. For these authors, excessive regulatory enforcement is a burden on firms and individuals, pushing them into the informal economy. Similarly, Friedman et al (2000) reach the same conclusion. Indeed, in their study, each measure of regulation or rule they used is significantly and positively correlated with the share of the informal economy, i.e., the more regulation there is, the larger the size of the informal economy in the economy. They find that a one-point increase in the regulatory index (on a scale of 1 to 5) is associated with a 10% increase in the informal economy for 76 developing, transition, and developed countries. They argue that governments should put more emphasis on reducing the number of regulations, or else improve the enforcement of laws and regulations.

This idea is not general. Indeed, some studies show that entrepreneurship in the informal sector is rather cultural and not the consequence of excessive regulation. This is the case of Gurtoo and Williams (2009), who analyze the relationship between entrepreneurship and the informal sector in India. They use survey data collected from 1518 workers. On the one hand, they find that a large proportion are self-employed as informal entrepreneurs. They also find that a large proportion are informal not only out of economic necessity, or because of the lack of alternative livelihoods. The reason is that they have this culture of informal entrepreneurship. So, it is not because of excessive regulations imposed by the government. They reveal that governments lack the insight to ignore this great hidden entrepreneurial culture as a source of entrepreneurship and entrepreneurial effort. The paper concludes by calling for a broader recognition of the opportunity-driven entrepreneurial effort of many people working in the informal sector. The linear relationship thus remains controversial.

Some authors have shown the existence of a non-linear relationship between entrepreneurship

and informality. This is the case of De Soto (1989), who finds a non-linear U-shaped relationship between the informal sector and the probability of entrepreneurship in the case of Peru. Also, Estrin and Mickiewicz (2010), analyze the impact of the underground economy on entrepreneurship over the period 1998-2005. They use data from the Global Entrepreneurship Monitor and macroeconomic data. They find that the informal economy has a negative impact on entrepreneurial entry, but note that this relationship is more complex than it appears. They show that there is a non-linear relationship between entrepreneurship and informality using a quadratic approximation. They find that there is a U-shaped relationship between the two aggregates, which means that entrepreneurial entry is less likely when the underground economy is about a quarter of gross domestic product (GDP). These analyses use a quadratic approximation analysis method that does not allow for a thorough analysis of the non-linear relationship.

Thus, the linear relationship between entrepreneurship and the size of the informal sector is controversial in the literature. It also shows that there may be a non-linear relationship between these two variables. The objective of our paper is therefore to analyze the linear and non-linear relationship between the size of the informal sector and entrepreneurship in Africa. To do so, it puts forward the following two hypotheses: first, that excessive regulations in the field of entrepreneurship have a positive effect on the size of the informal sector in Africa. Also, that to reduce the size of the informal sector, there is a threshold at which regulations should not be exceeded.

For the examination of the linear relationship, we use the GMM estimator in system. And for the analysis of the nonlinear relationship, we use a more recent estimator than the one used by the previous studies. It should be noted that the previous studies use the quadratic approximation method which does not allow a thorough analysis of the non-linear relationship. In this paper, we use a threshold effect model, which is a more recent method than the quadratic method, and which allows us to analyze not only the existence of a non-linear relationship, but also to determine a threshold.

3. Model Construction and Data Description

3.1. Model

This article aim is to study the impact of entrepreneurship on the size of the informal sector in 41 countries of Sub-Saharan Africa over the period 2004-2017. To this end, we estimate the following dynamic equation:

$$IS = f\left(Bu\sin ess_i, Z_i\right) \quad (1)$$

Where IS is the size of the informal sector, business: ease of doing business and a set of variables that influence the informal sector.

We use the Generalized Moment Estimator (GMM) for estimate our linear model. Indeed, our panel is made up of 41[1] countries and 14 years. Since the number of individuals is greater than the number of periods, the recommended estimator in this case is the GMM estimator. Specifically, we use the system or two-step GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). The GMM estimator has the advantage of solving econometric problems such as heteroscedasticity, endogeneity and over identification.

The relationship between the size of the informal sector and the ease of doing business is expected to be negative.

The estimated linear dynamic empirical model is as follows:

$$IS_{it} = \alpha + \beta_1 \text{Business}_{i,t} + \beta_2 \text{Business}_{i,t-1} + \sum_{l=1}^{6} \beta_j Z_{l,it} + \varepsilon_{it} \qquad (2)$$

To examine the nonlinear effect of entrepreneurship on the size of the informal sector, we use a dynamic threshold effect model, which uses the GMM estimator, developed by Seo et al (2019). Indeed, the threshold-effect model of Hansen et al (1999), did not allow the estimation of dynamic models, which was the main limitation of this model.

The specification of the threshold model estimate is as follows:

$$IS_{it} = \varphi + \eta x'_{i,t} + (1 + x'_{i,t}) + \delta \{ q_{it} \succ \gamma \} + u_{it} + \varepsilon_{it}, \quad i = 1,....,n; t = 1,....,T \qquad (3)$$

Where x' is a matrix of explanatory variables, namely, GDP per capita, Taxation, Credit, Unemployment, GFCF, HAI of the size of the informal sector, including the lagged variable of the size of the informal sector, and q is the variable of transition. In our case, q individually represents the variables: business and the six variables (KKZ) indicating the quality of the institutions.

3.2. Description and data source of variables

The dependent variable (IS)

The dependent variable is the size of the informal sector (IS) or informal economy as a percentage of GDP. It is calculated using the MIMIC (Multiple Indicators Multiple Causes) econometric method. The higher its value is for a country, the more the informal sector is present in it. It is one of the most used measures and commonly recognized as reflecting the extent of informality in a country (Johnson et al, 2000; Schneider and Enste, 2000; Botero et al., 2004; Dreher, Schneider, 2006; Torgler and Schneider, 2009; Rei and Bhattacharya, 2008; Ouédraogo, 2017; Medina and Schneider, 2018). Source: Médina and Schneider, (IMF, 2018).

Independent variable: the variable of interest (Business)

The World Bank's "Ease of Doing Business" indicator is used in this paper to measure the

[1] Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Comoros, Congo Republique, Cote d'Ivoire, Egypt, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tchad, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

degree of regulation a company must comply with in order to enter the market. It is a regulatory index, which ranks economies according to their ease of doing business, from 1 (easiest) to 183 (most difficult). A good (low) score on the Ease of Doing Business Index means that the regulatory environment is conducive to business. It is calculated by taking the simple average of the country's percentile rankings of ten (10) indicators which are: starting a business, getting construction permits, hiring workers, transferring property, getting loans, protecting investors, paying taxes, trading across borders, enforcing contracts, and closing a business. It represents our variable of interest. We will note it **Business** in this paper.

Control variables (Zit)

We retain a set of variables that influence the size of the informal sector, according to the literature. Real GDP per capita (GDPh)), tax revenue as a percentage of GDP (TAX), domestic credit to the private sector (CI), unemployment rate (TC), investment represented here by gross capital formation fixed (GFCF) and human capital (HAI). Indeed, Johnson et al. (2000), Friedman et al. (2000), Galli and Kucera (2004), Lederman et al. (2005), as well as Dreher and Schneider (2009), Rei and Bhattacharya (2008), Torgler and Schneider (2009), and Dreher et al. (2009) established a relationship between the size of the informal economy and these different variables. Data on other variables come from the World Bank's World Development indicators (WDI / BM, 2018), except for human capital data which comes from FERDI's Human Assets Index (HAI) (2016).

4. Empirical Results

4.1. Context

Table 1 shows the results of the descriptive analysis. This table shows the mean values as well as the minimum and maximum values of the study variables. It reveals that the average size of the informal sector (IS) in Africa is 34.33% of GDP; with a minimum of 17.8% of GDP and a maximum of 61.4% of GDP. It turns out that the size of the informal sector in Africa is quite large. It also shows that the ease of doing business is 60.72 on average. Remembering that this index varies between 1 and 180 which is the most difficult, we can say that on average, even if African countries are not among the most difficult countries to do business because of regulations, it is not as easy to do business when we know the level of development of the countries.

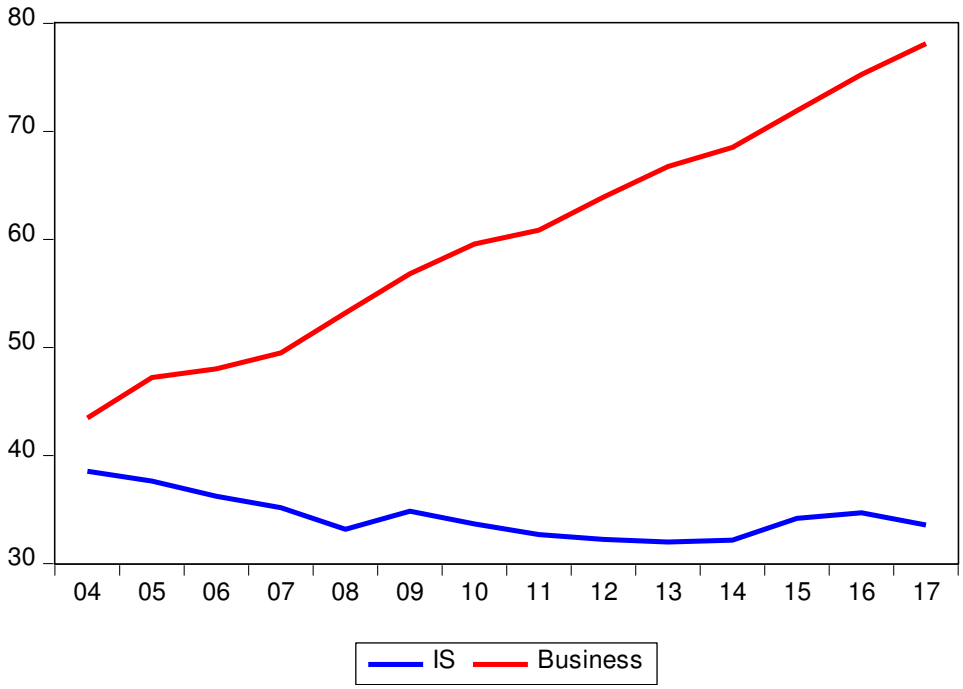
Table 1: descriptive analysis

Variables	Obs	Mean	Std.Dev.	Min	Max
Variables of interest					
IS	574	34.33606	7.63982	17.8	61.4
Business	544	60.72959	20.82239	2.20588	94.50762
Control variables					
GDP per capita	574	1360.005	1833.95	99.7899	9325.839
Taxation	356	17.07886	6.924281	4.381789	39.25765
credit	553	24.47874	27.33542	0.873923	146.8123
GFCF	569	23.62052	10.83194	5.28265	87.24467
Unemployment	574	8.207167	6.817356	0.317	31.786
HAI	451	55.36816	19.93777	13.11183	96.28932
Institutional quality variables					
CC	574	-.5996243	.6134622	-1.826384	1.159934
EG	574	-.6683424	.5995367	-1.891929	1.056994
PSAV	574	-.4345247	.8088574	-2.523785	1.200234
QR	574	-.5955636	.5809609	-2.274461	1.12727
RL	574	-.5948287	.5967542	-1.852296	1.02916
VA	574	-.5508551	.7243884	-2.000246	.9791626
LF	565	73.37982	9.930281	32.3	95

Source: Author

The graph below shows the combined evolution of the size of the informal sector and the ease of doing business. It shows that the two variables move in opposite directions. We also note that the ease of doing business is increasing and monotonous over the entire period of the study. On the other hand, the size of the informal sector is decreasing with a slight fluctuation.

Graph: Joint evolution of the informal sector size (IS) and the ease of doing business index (Business)



Source: Author

4.2. Empirical Results

Table 2 shows the results of the estimation of the linear GMM system model. Column one presents the results of the effect of ease of doing business on the size of the informal sector. It appears that the coefficient associated with the ease of doing business (Business) is negative and significant at the 5% level. In other words, if the ease of doing business improves by 1 score, the size of the informal sector decreases by 0.019%. This result confirms that of Friedman (2000) and Johnson (2000), who find that the development of the informal sector is due to the difficulty of doing business in the formal sector, due to the existence of increased regulation. This effect is stable in all specifications.

It also appears that the coefficient associated with real GDP per capita is negative and significant at the 10% threshold. Indeed, an increase in real GDP per capita of 1 unit leads to a decrease in the size of the informal sector by 0.00011%. This means that the level of development has an effect on informality in countries. In other words, the higher the level of development, the less informality develops. This result corroborates those of Friedman et al. (2000), Kucera and Galli (2004), Loayza et al. (2005), as well as Dreher and Schneider (2008), who find in their studies that economic development, more specifically the increase in real GDP per capita, attenuates the development of informality. More recently, Tiendrébeogo (2020) also corroborates this thesis. Indeed, the author finds that the low level of development of the countries of the West African Economic and Monetary Union (UEMOA) contributes to

the expansion of the size of the informal sector. The author explains this by the fact in the least developed countries, the search for means of subsistence leads to the opening of small businesses, taking place on the fringes of legislation. It also appears that human capital has a negative effect on the size of the informal sector. Indeed, if human capital improves by 1%, the size of the informal sector decreases by 0.05%. In other words, informality grows more in countries with low human capital. The informal sector in Africa therefore brings together actors so for the most part, human capital is quite low. Tiendrebeogo (2020) obtained the same result for the countries of the UEMOA zone. This result is also consistent with that of Traoré (2016) who implements a general equilibrium model computable with data from Burkina Faso, and leads to the result according to which the higher the level of education of an individual, the less 'engage in informal activities. On the other hand, the coefficient associated with unemployment is positive and significant at the 10% threshold. Indeed, an increase in unemployment of 1% leads to an increase in the size of the informal sector by 0.13%. The unemployment rate is therefore a factor that exacerbates the development of informality. The plausible explanation is that the lack of employment and therefore the need to have a remunerative activity in order to meet one's needs is an important factor that pushes agents to engage in informality.

In summary, the ease of doing business, real GDP per capita, human capital are factors that reduce the development of informality. On the other hand, the unemployment rate is a factor that favors the development of informality.

Columns 2 to 7 present the effects of the quality of institutions on the size of the informal sector. Corruption control, government efficiency and the quality of regulation are found to have negative effects on the development of informality in Africa. In other words, an improvement in the quality of these institutional variables leads to a decrease in the size of the informal sector.

Table 2: Entrepreneurship and the Informal Sector in Africa (2004-2017)

VARIABLES	(1) IS	(2) IS	(3) IS	(4) IS	(5) SI	(6) IS	(7) IS
IS_{t-1}	0.661***	0.656***	0.659***	0.657***	0.622***	0.681***	0.623***
	(0.0969)	(0.108)	(0.0887)	(0.0884)	(0.117)	(0.115)	(0.131)
Business	-0.0192**	-0.0246*	-0.0194*	-0.0181**	-0.0226*	-0.0210*	-0.0236**
	(0.0776)	(0.0676)	(0.0765)	(0.0783)	(0.0767)	(0.0772)	(0.094)
GDP per capita	-0.000109*	-5.83e-05	-0.00011*	-0.00016*	-0.00348	0.000192	-0.00014*
	(0.00035)	(0.0030)	(0.0036)	(0.0035)	(0.0049)	(0.0030)	(0.0031)
Taxation	-0.0259	0.0216	-0.00754	-0.0236	-0.0483	0.103	-0.0549
	(0.0980)	(0.0976)	(0.0821)	(0.0901)	(0.0948)	(0.0818)	(0.109)
Credit	0.00684	0.000304	0.00369	0.00628	0.00872	-0.0147	0.000819
	(0.0234)	(0.0230)	(0.0241)	(0.0235)	(0.0325)	(0.0172)	(0.0240)
Unemployment	0.132*	0.128**	0.138*	0.135*	0.150*	0.112*	0.198*
	(0.110)	(0.111)	(0.108)	(0.102)	(0.137)	(0.111)	(0.119)
GFCF	0.00448	0.00468	0.00551	0.00545	0.0278	-0.0127	0.0167
	(0.0373)	(0.0448)	(0.0382)	(0.0390)	(0.0578)	(0.0405)	(0.0463)
HAI	-0.0595*	-0.0602	-0.0622	-0.0611*	-0.0828	-0.0398	-0.0703
	(0.0363)	(0.0486)	(0.0408)	(0.0359)	(0.0566)	(0.0490)	(0.0489)
CC		0.343*					
		(0.342)					
GE			0.230*				
			(0.469)				
PSAV				0.0810			
				(0.704)			
QR					1.473*		
					(2.067)		
RL						0.158	
						(1.584)	
VA							1.163
							(1.301)
AR(1) - Probability	(0.002)	(0.005)	(0.002)	(0.002)	(0.012)	(0.002)	(0.008)
AR (2) - Probability	(0.565)	(0.112)	(0.106)	(0.807)	(0.311)	(0.426)	(0.761)
Sargan - Probability	0.654	0.739	0.659	0.661	0.654	0.727	0.672
Instruments	25	27	27	27	27	27	27
Observations	229	229	229	229	229	229	229
Number of Pays	30	30	30	30	30	30	30

Note: All variables are taken in logarithm. The Sargan test is associated with the null hypothesis of validity of the instruments; the AR (2) test is associated with the null hypothesis of no second-order serial correlation of

difference errors. Values in parentheses are standard errors; *** significant at 1%, ** significant at 5%, * significant at 10%.

We also examine the possibility of a non-linear relationship between the informal sector and entrepreneurship.

Table 3: Non-linear relationship between Entrepreneurship and the Informal Sector in Africa (2004-2017)

VARIABLES	Informel
L.Informal	0.448***
	(0.0579)
below threshold	-0.0245*
	(0.0137)
Above threshold	-0.0241*
	(0.0147)
PIB per capita	-7.84e-05
	(0.000187)
Taxation	-0.00844
	(0.0579)
Credit	0.0492**
	(0.0211)
Unemployment	0.183**
	(0.0722)
FBCF	-0.00371
	(0.0140)
HAI	-0.209***
	(0.0422)
Constant	27.61***
	(3.501)
Observations	229
Number of Pays	30

Values in parentheses are standard errors; *** significant at 1%, ** significant at 5%, * significant at 10%.

Transition variables	Threshold	Lower	Upper
Business	81.16089	28.79018	81.16089

Source: Author

It turns out that there is a non-linear relationship between the informal sector and the ease of doing business. Indeed, if the ease of doing business is below the threshold of 81.16%, but above 26.79%, then a 1% increase in business causes the informal sector to fall by 0.245%. On the other hand, if the threshold exceeds 81.16%, the increase in Enterprises by 1% leads to a decrease in the size of the informal sector by 0.241%. We notice that this last variation is lower than the first which seems a bit paradoxical, but this is explained by the fact that there is probably an inverted U-shaped relationship between the ease of entrepreneurship and the size of the informal sector.

The table 4 show that the average ease of doing business index for the three countries, Mauritius, Morocco, and Zambia, is above the threshold found, namely 81.16%. This implies that for these countries, a 1% increase in this index results in a decrease in the size of the informal sector for these countries of 0.241%. For countries (Tunisia, Ghana, South Africa, Rwanda, Nigeria, Burundi, Cape Verde, Lesotho, Algeria, Libya, Sierra Leone, Gabon, Botswana, Egypt, Namibia, Kenya, Senegal, Mozambique, Malawi, Madagascar, Uganda, Gambia, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, Mali, Mauritania, Benin, Ethiopia, Niger, Congo, Zimbabwe, Guinea, Equatorial Guinea, Togo) an increase in the ease of doing business index of 1% leads to a decrease in the size of the informal sector for these countries by 0. 245%. Note that for these countries, the value of the ease of doing business index ranges from 28.79% to 81.16% (see Table 4). However, for Chad, the level of freedom to do business is lower than 28.79%, which implies that there are no significant effects for this country. We see that the effects are roughly equal, as the sizes of the informal economy in the economies are also approximated. We can therefore conclude that the overall analysis is valid for all countries except Chad.

Table 4: Ranking of the average of the ease of doing business index: from largest to smallest

CONTRIES	**BUSINESS AVERAGE**
Mauritius	88,497987
Morocco	84,809899
Zambia	82,092502
THRESHOLD	**81,16089**
Tunisia	80,793928
Ghana	80,73049
South Africa	78,674415
Rwanda	77,389543
Nigeria	77,051473
Burundi	76,25586
Cape Verde	74,253536
Lesotho	74,242252
Algeria	73,650233

Libya	72,862758
Sierra Leone	72,053957
Gabon	70,423008
Botswana	70,196887
Egypt	70,006442
Namibia	66,01291
Kenya	65,940728
Senegal	65,53389
Mozambique	65,007678
Malawi	62,997643
Madagascar	62,804328
Uganda	61,185568
Gambia	61,077838
Burkina Faso	60,095006
Cameroon	59,124008
Comoros	58,763302
Cote d'Ivoire	58,384076
Mali	52,57229
Mauritania	51,695638
Benin	49,269241
Ethiopia	43,862662
Niger	43,82821
Congo, Rep.	43,543952
Zimbabwe	43,232977
Guinea	42,155544
Equatorial Guinea	36,662536
Togo	36,524537
GuineaBissau	28,939312
Tchad	26,849535

Source : Author

In summary, we can therefore say that the relationship between the ease of doing business and the size of the informal sector is conditional. That is to say that an improvement in the index of the ease of doing business (a low value) makes it possible to reduce the size of the informal sector but provided that its score does not exceed 86, around (87). The analysis of the linear relationship showed that the index of the ease of doing business has a negative effect on the size of the informal sector in the WAEMU, which is consistent with the nonlinear results since the descriptive analysis in the area showed that the average score of the ease of doing business index is 60.72 or 61. Which is below the threshold of 87. We therefore conclude that there is a non-linear relationship between the size of the sector informality and the ease of doing business index.

5. Conclusion

The objective of this research was to determine the effect of the regulations of entrepreneurship in force in African countries on the evolution of the size of their informal sector. The observations cover the period 2004-2017. For this purpose, we used the GMM system estimator for the linear analysis and the dynamic regime change estimator for the nonlinear analysis. The results show that the relationship between the size of the informal sector and the ease of doing business index is conditioned by the latter. It also emerges that the increase in real GDP per capita, in human capital, but also that of institutional factors such as the fight against corruption, the efficiency of the administration and the quality of regulations, are factors that favor the decline of the informal economy. On the other hand, the unemployment rate is a factor aggravating the size of the informal sector. Finally, it turns out that the size of the informal sector and the ease of doing business have a non-linear relationship.

In terms of economic policy, we advocate improving the business climate and reducing the time and cost of entrepreneurship procedures in African countries. This will reduce the development of informality in its countries and therefore increase the tax base of its countries.

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