

Formalization of Enterprises in Senegal, Benin and Burkina Faso: Segmentation Approach to Informal Entrepreneurs

Abdou Khadre Dieng

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Formalization of Enterprises in Senegal, Benin and Burkina Faso: Segmentation Approach to Informal Entrepreneurs

By

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Contents

List of tables

List of abbreviations and acronyms

Abstract

1.	Introduction	1
2.	Literature review	4
3.	Methodology	7
4.	Empirical analysis and interpretation of results	12
5.	Conclusion and policy implications	17
	Notes	18
	References	19
	Appendixes	22

List of tables

1	Description of model variables	10
2	Productivity, size, business location, and presence of women in firms	12
3	Wish to see own child continue the business: ‘ambition’	13
4	Average duration of social services interruption	13
5	Results of the estimates	14
A1	Prediction table - Senegal	23
A2	Prediction table - Benin	24
A3	Prediction Table - Burkina Faso	24

List of abbreviations and acronyms

AERC	African Economic Research Consortium
ADEPME	Agency for the Development and Support of Small and Medium-sized Enterprises
APDA	Agency for the Promotion and Development of Handcraft
DPS	Forecast and Statistics Direction of Senegal
FAPE	Support fund for the Promotion of Employment
FASI	Support Fund for the Informal Sector
GDP	Gross Domestic Product
ICT	Information and Communications Technology
INSAE	National Institute of Statistics and Economic Analysis
INSD	National Institute of Statistics and Population
ILO	International Labour Organization
LDCs	Least Developed Countries
SMEs	Small and Medium-sized Enterprises

Abstract

This paper aims to identify the determinants of business formalization in West Africa, specifically in Senegal, Benin and Burkina Faso. The methodology used is based on a theoretical model on formality and a Logit model. We adopted the segmentation approach of informal entrepreneurs. We distinguished between the ambitious informal entrepreneur and the default or non-ambitious informal entrepreneur. In the three countries studied, the results showed the importance of access to business premises, firm productivity and the ambition of the informal entrepreneur on formalization. The age of the firm, access to ICT and the business environment have a significant influence on formalization only in Benin. The average level of education for employees is significant only in the case of Senegal.

JEL classification: C25; D24; O17

Key words: Informal; Formalization; Logit model; West Africa.

1. Introduction

In recent decades, the issue of informality has attracted a resurgence of interest among development researchers due to its increasingly recognized importance in the development process of countries, particularly in Africa (Mbaye & Benjamin, 2012). The informal sector has been prominent in the economies of developing countries, and is increasingly affecting those of developed countries despite government policies on formalization (Chen, 2001; Enste & Schneider, 2002). The trend of informal enterprises accounts for the emergence of a large literature on informality. This varied literature deals with conceptual analyses as well as theoretical and empirical modelling. In the 1970s, researchers defined the informal sector, as a whole, based on some criteria, namely the nature of the activity, destination of their production, size of the operation, compliance with regulations, qualifications of the workforce, and access to modern financing (BIT, 1972; Sethuraman, 1976). These early attempts define the informal sector in contrast to the formal sector. They, therefore, ignore the interrelationships between these two sectors of the economy. Charmes (1990) argues that this dichotomy makes the analysis easy. In this paper, we refer to the multi-criteria approach developed by Mbaye and Benjamin (2012). Mbaye and Benjamin (2012) define informal enterprises as a continuum in which a large number of formal enterprises engage in informal practices. They show that none of the commonly cited criteria exactly defines an informal enterprise. In other words, taxation, size, book-keeping, registration, access to credit and type of premises do not individually characterize the informal enterprise. They conclude that each of these criteria covers a particular aspect of informal enterprises, and ignores the phenomenon as a whole, suggesting that informal enterprises are best described as a continuum through a combination of different criteria. In this paper, enterprises that do not meet these criteria are considered informal.

Informality generates much of the wealth in West African countries. The informal sector provided 50.41% of GDP in Burkina Faso, 54.2% of GDP in Benin, and 44.9% of GDP in Senegal in 2011 (national accounts). Indeed, in Senegal, the informal sector created 92.1% of total employment in 2003 (DPS, 2003). In Burkina Faso and Benin, too, informal employment has a considerable share in total employment, accounting for 94.7% and 94.9%, respectively, in 2005 (INSD, 2009; INSAE, 2013). However, informal enterprises are mainly composed of small-scale production units that develop mainly subsistence activities that bring in little income, are low in productivity and are very labour-intensive. They have limited access to financial and technological resources

but allow the population excluded from the formal labour market to survive in the socioeconomic context of developing countries marked by a lack of safety nets. However, it is worth noting that informal enterprises are far from being homogeneous. Informal entrepreneurs do not behave in the same way. A variety of behaviours can be observed in informal entrepreneurs. While some aspire to formalize their activities over time, others prefer to remain informal. Some informal entrepreneurs are active in the sector simply because they have no other options, and are considered 'default' or 'unambitious' entrepreneurs. Other entrepreneurs are 'ambitious' and motivated to stay in the sector to grow their businesses. The latter would be willing to enter the formal sector with the support of the state. The ambitious entrepreneur is an individual who engages in an entrepreneurial project to achieve performance beyond the mere survival of the business created in a competitive environment (Edwards et al., 2012). They analyse the market and set performance targets. What distinguishes ambitious informal entrepreneurs from other informal entrepreneurs is their intention to develop their business, expand it, and make a profit out of it. Verheul and Van Mil (2011) measure 'ambition' not in absolute terms, but based on what the entrepreneurs want, whether they prefer a business that is as large as possible or a business with a size that allows them to run the business alone or with a few key employees. The issue here relates to the segmentation of informal entrepreneurs. We define the ambitious informal entrepreneur as one whose intention and commitment stems from their goal to leave their business to their children at a sufficient organizational and performance level.

As part of its policy for a business environment conducive to informal enterprises, the Beninese Government has set up a ministry in charge of industry and crafts. Within this framework, it has worked for the promulgation of the handicraft law and has put in place a real policy for the development of handicrafts in Benin. This policy has taken concrete form with the development of the nomenclature of craft trades and the establishment of inter-departmental chambers of crafts and the union of inter-departmental chambers of crafts. To this end, other initiatives such as the creation of a national fund for the promotion of handicrafts are a catalyst for the development of handicrafts, which is one of the important links in the chain of informal enterprises in Benin. In Burkina Faso, a proper financial system for boosting informal enterprises has been set up, including the Support Fund for the Informal Sector (FASI) and Support Fund for the Promotion of Employment (FAPE). While in Senegal, many initiatives have been implemented to improve the business environment for SMEs, and more particularly for informal enterprises; these initiatives have taken the form of support agencies for small and medium enterprises attached to the respective ministries. This is the case with the Agency for the Promotion and Development of Handcraft (APDA), attached to the Ministry of Industry and Handicrafts, and the Agency for the Development and Support of Small and Medium-sized Enterprises (ADEPME), which is attached to the Ministry of Small and Medium Enterprises, Women's Entrepreneurship and Microfinance. Created in November 2001, ADEPME expresses the Senegalese Government's interest in supervising small and medium enterprises, particularly informal enterprises.

Some authors (De Soto, 2000; Djancov et al., 2002; Loayza and Serven, 2005) have sought to explain the informal situation of entrepreneurs. They have shown that it may depend on the high costs of reporting formalities and taxes, which prevent entrepreneurs from entering the formal sector. However, it should be kept in mind that there are different behaviours between ambitious and default entrepreneurs. This paper aims to identify the determinants of business formalization in West Africa in the cases of Senegal, Benin, and Burkina Faso. The main contribution of this paper is the adoption of the segmentation of informal entrepreneurs with, on the one hand, ‘ambitious’ informal entrepreneurs and, on the other hand, those ‘by default’. In the field of investigation considered, the empirical analysis for the determinants of formalization taking into account the segmentation of entrepreneurs remains insufficient. This segmentation approach could enable governments to understand better the typology of informal entrepreneurs and to factor in those aspects with regard to the development of their enterprise formalization policy. Any work on the determinants relating to formalization should emphasize on considering these notions of the ambitious informal entrepreneur. The methodology used revolves around a theoretical model and a Logit model. The World Bank and AERC databases on formal and informal enterprises (2013) were used.

The rest of this paper is organized into four sections. Section 2 presents the literature review. Section 3 deals with the methodology used. Section 4 is devoted to the analysis of the results; while Section 5 provides the conclusion and implications for policy.

2. Literature review

Theoretically, Marxist and neo-Marxist researchers (Mettelin, 1985; Van Dijk, 1986) consider the informal sector as a small-scale market production, not as a sector of informal activities, while liberals like the economist De Soto (1987) believe that there is an informal economy because of an excess of laws and administrative requirements. Inspired by the theories of modernization, proponents of the socioeconomic approach (Nyssens, 1996; Gaiger, 1999; Defourny et al., 1998), hold that informality responds above all to a logic of survival for those who are not yet part of the formal or modern circles of the economy. That means it is analysed based on poverty and the search for survival. The concept of the ambitious entrepreneur dates back to the 2000s, notably with the pioneering work of Gundry and Welsch (2001) and Guzman and Santos (2001). The latter analysed it from an angle determining the capacity and intention to expand the business. Gundry and Welsch (2001) measured the entrepreneur's ambition by the actual increase in the company's sales. Ambitious entrepreneurs identified by Gundry and Welsch (2001) are characterized by a higher level of organization, leadership, and commitment to the achievement of goals than those entrepreneurs considered as by default. The concept has received renewed interest since 2005 in studies related to the explanatory factors of economic growth. This work refers to the concept of the ambitious entrepreneur, either in terms of an independent variable, for example, by explaining economic growth through the rate of ambitious entrepreneurs at the national level (Wong et al., 2005); or in terms of a dependent variable by trying to explain entrepreneurial ambitions (Hessels et al., 2008a; Verheul & Van Mil, 2011).

Empirically, the debate has been directed towards identifying the determinants of formalization for the informal enterprises. De Soto (2000) argues that, the public sector is finding it increasingly difficult to employ young university graduates. As a result, despite their university degrees, they prefer creating jobs in the informal sector where it is easier for them to carry out their activities. Arterido et al. (2007), for their part, argue that the unsustainable business environment and weak financing reduce the possibilities of informal enterprises becoming formal enterprises. Diagne and Thiaw (2008) identify the factors that can explain trade-off between formal and informal small enterprises in Senegal. Using a Probit model with data from the World Bank ICA survey¹ in 2004, Diagne and Thiaw conclude that firm size and turnover harm formalization. The entrepreneurs' level of education and experience has a positive influence on the probability of registering nature of activities. Enterprises in sectors such as wood, furniture, metals and paper tend

not to register their activities. Gelb et al. (2009) compare micro-enterprises in Southern and Eastern Africa by distinguishing between formal and informal sector enterprises according to whether they are registered or not. The study was based on World Bank survey data and supplemented by data on the business environment in 20 sub-Saharan African countries in 2005. The main objective of the study was to identify the determinants of firm formalization. Conversely, Diagne and Thiaw (2008) and Gelb et al. (2009) conclude that firm size is well correlated with the probability of formalization. It is due to the rising costs² of informality.

The difference between these two results could be explained by the possibility of large informal firms finding ways to exist in West Africa, and particularly in Senegal. The education level is positively and statistically related to the probability of formal registration in Southern African countries and Kenya. However, the education level does not play a determining role in Tanzania, Uganda, and Rwanda, due probably to the strictness of law enforcement in the Southern African countries. Access to public services is positively correlated with the likelihood of formalizing in all Southern African countries and Kenya, but not in Tanzania and Uganda. This may be as a result of the fact that, unlike in Southern African countries, there is no significant difference between formal and informal firms in terms of access to public services in East African countries. The latter case could be related to a flexible policy on access to public services by firms. Bruhn and McKenzie (2014) study the effects of eliminating registration costs and reducing taxes on the formalization and creation of new businesses in Brazil. The authors find that cutting down the registration costs does not encourage small informal entrepreneurs to formalize their activities or create new businesses. Separately, they find modest effects for formalization and no effect for new business creation.

Abate (2017) explores the processes of enterprise formalization to understand the reasons for the transition from informal to formal and why and how the dynamics of enterprise evolution are stuck in the grey areas, the end of the road of semi-formal to formal transitions. He attempted to understand the business landscape in Cameroon before designing effective policies to address informality in that country. The author came up with two interesting results. First, entrepreneurs follow the evolution of their environment and can detect or perceive opportunities, seize and develop them, and circumvent threats. Indeed, the dynamics of the development of informal enterprises towards formal-looking activities is a calculated choice that follows an opportunistic logic aimed at benefiting from the advantages of the chosen status. Secondly, the dynamics of informal enterprises are supported by the fact that entrepreneurs demonstrate a strategic capacity to form win-win coalitions with controlling actors that allow them to maintain their activities. High regulatory costs, weak tax management and institutional framework, and weak property rights are generally cited as major obstacles in the business environment in developing countries (World Bank, 2006). Several studies have correlated the increase in the number of informal enterprises with the burden of taxation, regulatory requirements, and the quality of institutions (Giles & Tedds, 2002; Auriol & Warlters, 2005). Dabla-Norris et al. (2008) concluded that the tax burden is a significant determinant of

informality. However, other studies have emphasized the insignificance of the tax burden in explaining firm informality (Friedman et al., 2000).

However, a significant part of the literature has emphasized on the existence of segmentation of informal entrepreneurs. On the one hand, some informal entrepreneurs operate out of necessity and seek only to survive in a context of poverty; while on the other hand, there are genuine informal entrepreneurs with good rationality who seize the opportunities offered by informality (Lautier, 2004; Nichter and Goldmark, 2009). The latter group includes autonomous and organized informal entrepreneurs who demonstrate a genuine 'hidden entrepreneurial culture' (Williams, 2006; Frith & McElwee, 2008a; Williams & Nadin, 2010). In reality, informal entrepreneurs find themselves in a continuum of situations with complex motivations combining necessity and opportunity prevailing in their behaviour (Istrate, 2007; Williams & Nadin, 2010).

3. Methodology

The theoretical model

Our analytical framework is based on the model of Gelb et al. (2009) on the formalization of informal enterprises. This model is a partial equilibrium model of firm informality. It explains the formalization of informal firms. Business informality is considered as the result of conscious decisions made by informal entrepreneurs to avoid the cost of formality. Indeed, in West Africa, informal entrepreneurs generally refuse to meet certain social protection expenses for employees and to pay for services related to formality to minimize costs. The basic model is that of Lucas (1978) consisting of capital and labour factors, among which the focus is on entrepreneurship selection. Based on the theory of the distribution of the commercial enterprise size, this model is extended in Rauch (1991) on the theory of formality, and that of Fortin et al. (1997), which introduces direct taxes and endogenizes the cost of concealment in the Rauch (1991) model. At this level, this theoretical model represents better the case of a rational informal entrepreneur who is aware of his decision to avoid the costs of formality. However, most informal entrepreneurs are informal by default because they do not have an occupation in the formal sector. They are generally not 'ambitious' and have less incentive for formalization. They are entrepreneurs 'by default'.

We also assume that the production technology, f , is a constant return so that we denote by $r = k/n$, the capital intensity, $f(n,k) = n\phi(r)$, where $\phi: \mathbb{R}^+ \rightarrow \mathbb{R}^+$ is also twice differentiable, increasing and strictly concave. Firms face an identical wage rate, w , in the labour market and a uniform user cost of capital, μ , which are assumed to maximize profit in their production and decisions to recruit. As in Fortin et al. (1997) and Gelb et al. (2009), we assume that all firms are required to pay a profit tax at a constant rate $\tau\pi$ and a wage tax τw . Firms can avoid both taxes and be subject to a hiding cost that is an increasing and convex function of the firm's employment size. Hiding cost can be described as $c = c(n)$ such that $c'(n), c''(n) > 0$. All formal firms pay both taxes while informal firms avoid them. The degree of convexity varies with the overall strength of the business environment. It is greater in countries where regulation and laws are better enforced, for two reasons: first, because in such an environment, detection is difficult to avoid, and second, because the opportunity cost of informality, seen as access to the services that formalization allows, are higher. It follows that, for any firm i , profits are given by:

$$\pi_{if} = (1 - t_{\pi})[x_i g(n\phi(r)) - (1 + t_w)wn - \mu k] \quad (1)$$

if the firm operates in the formal, and

$$\pi_{ii} = x_i g(n\phi(r)) - c(n) - wn - \mu k \quad (2)$$

if it operates in the informal.

If the firm is formal, its entry requirements would maximize (1). This gives the following first-order conditions:

$$x_i g'[n\phi(r)][\phi(r) - r\phi'(r)] = (1 + t_w)w \quad (3)$$

And

$$x_i g'[n\phi(r)]\phi'(r) = \mu \quad (4)$$

It thus follows that:

$$\frac{\phi(r) - r\phi'(r)}{\phi(r)} = \frac{(1 + t_w)w}{\mu} \quad (5)$$

Equation 5 gives the capital intensity, r , as an implicit function of factor prices, and shows that formal sector firms face uniform capital intensity under technological assumptions. Therefore, the labour and capital demand functions of formal firms are functions of x , w , t_w , and μ . Where:

$$n_f = n_f(x, w, t_w, \mu) \quad (6)$$

$$k_f = k_f(x, w, t_w, \mu) = rn_f(x, w, t_w, \mu) \quad (7)$$

Since the cost of concealment is a function of the size of employment in informal firms, the profit-maximizing input demand functions (n, k) (Equation 2) of informal sector firms can be obtained from CPO³. And we have:

$$x_i g'[n\phi(r)][\phi(r) - r\phi'(r)] = w + c'(n) \quad (8)$$

$$\frac{\phi(r) - r\phi'(r)}{\phi(r)} = \frac{w + c'(n)}{\mu} \quad (9)$$

Equation 7 also shows that r is not uniform for all firms in the informal sector and depends on n , and hence on x . Thus, the labour and capital demand functions of informal firms are functions of x , w , and μ . Where:

$$n_i = n_i(x_i, w, \mu) \quad (10)$$

$$k_i = k_i(x_i, w, \mu) = rn_i(x_i, w, \mu) \quad (11)$$

The labour demands, $n_f n_f$ and $n_i n_i$, have the standard property of strict decay in w and μ . They are also strictly increasing in x (managerial talent of the entrepreneur). In Lucas (1978) result, the more talented the entrepreneurs are, the more they run large firms and therefore can influence firms in the informal sector as well as those in the formal sector in this framework. Thus, the net profits of firms are:

$$\text{Formal sector firms: } \pi_{if} = \pi_{if}(x, w, t_w, t_\pi, \mu) \quad (12)$$

$$\text{Informal sector firms: } \pi_{ii} = \pi_{ii}(x, w, \mu, c(\cdot)) = \pi_{ii}(x, w, \mu) \quad (13)$$

These profits are increasing functions of entrepreneurial talent x , decreasing functions of factor prices and both tax rates, and the cost of concealment.

Each of π_{if} and π_{ii} is defined for each entrepreneur i . Thus, entrepreneur i is in the formal sector if $\pi_{if}(x, w, t_w, t_\pi, \mu) \geq \pi_{ii}(x, w, \mu)$ and in the informal sector to the contrary.

Thus,

$$\pi_{id} = \pi_{ii}(x, w, \mu) - \pi_{if}(x, w, t_w, t_\pi, \mu) \quad (14)$$

The empirical model

Specification of the Logit model

The Logit model is used to analyse the probability of an entrepreneur being formal. There is a probability of each entrepreneur moving into a given sector, which constitutes a modality. In other words, each entrepreneur is either formal or informal. Entrepreneur i has a modality j ($j = 0$ or 1) (move into the informal or formal sector).

If we assume that the errors are independently and identically distributed according to a Weibull distribution, then the difference between the errors follows a logistic distribution (Pailhe and Pascal, 2001). The distribution function, F , is given by:

$$F(X_i \beta) = \frac{e^{X_i \beta}}{1 + e^{X_i \beta}} = \frac{1}{1 + e^{-X_i \beta}} \quad (15)$$

The class of model "Logit" carries out the modelling of our dependent variable "the probability of being formal". The Logit model, its specification, method and estimation have been studied successively by Mc Fadden (1974), Albright et al. (1977), Hausman and Wise (1978), and Davidson and Mackinnon (1993). The endogenous variable y_{id}^* is a latent variable that takes two values 0 or 1 as follows:

$$y_{id}^* = \beta X + \varepsilon_i \text{ with } y_{id}^* = \begin{cases} 1 & \text{formal firm} \\ 0 & \text{informal firm} \end{cases} \quad (16)$$

With ε_i the random shock orthogonal to X and capturing the effect of other unobserved determinants of y_{id}^* .

Choice of variables

We chose our variables, not only by referring to the determinants of firm formalization in the literature, but also in line with our research perspective and context. In this work, it is assumed that ambitious entrepreneurs are better at taking into account economic rationality and better at developing the idea of expanding the business and moving towards formalization. As it is difficult to find a perfect variable, we approximated the ambition of the informal entrepreneur by “wish to see own child continue the activity”. Table 1 presents a description of model variables.

Table 1: Description of model variables

Variables	Description
Likelihood of being formal	Equals 1 if the firm meets all the criteria set out in the definition of the formality and 0 to the contrary.
Sector	Equals 1 if the firm is in construction, 2 if it is a trade, and 3 if it provides services. The industries sector is the reference.
Having business premises	It is binary and takes the value 1 if the premises are fixed and 0 if otherwise.
Firm size	It is quantitative and equal to the number of employees of the firm.
Gender of the entrepreneur	It is binary and takes the value 1 if the entrepreneur is a man and 0 if not. It makes it possible to take into account the role of gender with regard to incentives to formalize.
Access to ICT	This variable takes the value 1 if the firm has access to fixed or mobile telephony or the Internet and 0 if otherwise.
Work productivity	It is quantitative and is measured by the ratio of output to the quantity of work. It is measured in one year.
Education level of employees	It is silent and represents the average level of education of the employees. It takes the value 0 if there is no formal education level, 1 if it is primary, 2 if it is secondary, and 3 if it is higher.
Age of the firm	It measures the number of years of the firm.
Average duration of social services interruption	It considers the average annual hours of interruption of water, electricity, Internet, and telephone services. It approximates the business environment.
Wish to see own child continue with the activity	It is qualitative and measures the ambition of the informal entrepreneur. It considers the intention and commitment to achieve profitability objectives that allow for the growth and sustainability of the business. It takes the value of 1 if there is a desire to see own child continue with the activity and 0 if otherwise.

Source: Author.

Therefore, the econometric equation to be estimated is specified as follows:

$$y_{id}^* = f(\text{Trade}_i, \text{Const}_i, \text{Service}_i, \text{Pre}_i, \text{Siz}_i, \text{Gen}_i, \text{ICT}_i, \text{Prod}_i, \text{Edl}_i, \text{ADssi}_i, \text{Age}_i, \text{Wish own child continuing with the activity}_i) \quad (17)$$

Data source

In this study, we use the database on formal and informal enterprises in West Africa, which African Economic Research Consortium (AERC) and the World Bank developed in 2013. In Senegal, AERC conducted the survey. The National Institute of Statistics and Population (INSD) conducted the survey in Burkina Faso, and the National Institute of Statistics and Economic Analysis (INSAE) in Cotonou, Benin. AERC assumed the overall coordination of the three surveys. As the main objective was to carry out logistic type analyses, the approximation of the margin of error would be proportional to $1/\sqrt{n}$. The surveys were conducted simultaneously in the capital cities of each country involved. The sample contains 903 enterprises of which 295 are in Benin, 308 in Senegal, and 300 in Burkina Faso. Regarding the types of enterprises, Benin had 22.7% formal and 77.3% informal; Senegal had 24% formal and 76% informal, and Burkina Faso had 13.3% formal and 86.7% informal enterprises. We used the probability sampling method.

4. Empirical analysis and interpretation of results

Descriptive statistics analysis

Table 2 shows that in all countries, more than half of the formal firms have business premises. For informal firms, however, only those in Burkina Faso exceed 50%. This situation shows the mobility of informal firms compared to formal ones. We also note that, regardless of the country considered, more than half of the formal firms have more than five employees, while, on average, 75% of informal firms have less than five employees in Senegal and Burkina Faso. In Benin, only 45% have less than five employees. This shows the small size of informal enterprises in the countries under investigation. The analysis of Table 2 reveals that, in the three countries, the percentage of formal enterprises having productivity of more than CFAF 50 million does not reach 25%. As for informal enterprises, in all the three countries, no enterprise reaches CFAF 50 million annually.

Table 2: Productivity, size, business location, and presence of women in firms

Designations	Senegal		Benin		Burkina Faso	
	Formal	Informal	Formal	Informal	Formal	Informal
Productivity of CFAF 50 million and more (%)	21.62	0.0	9.68	0.0	17.14	0.0
Proportion of women (%)	34	18	22	26	31	23
Firms less than five years old (%)	14.86	20.65	8.82	24	17.5	27.27
Firms with business premises (%)	62.16	38.26	50	36.99	80	83.24
Size of firms, less than five employees (%)	48.65	75	23.53	45	46.15	74

Source: Author, based on data.

It also appears that, in Senegal and Burkina Faso, the percentage of women in informal firms does not reach 25%. Only in Benin do we have a proportion of 26%. However, women are more present in formal firms, except in Benin. As for the proportion of women in firms, Table 2 shows that, in Senegal and Benin, the percentage of firms under five years does

not reach 25%. It is only in Burkina Faso that we have 27.27%. For formal enterprises, too, and regardless of the country studied, the proportion of firms under five years does not reach 18%.

Table 3 shows that, in all the three countries studied, more than half of the informal entrepreneurs want to see their children continue with the business. This phenomenon shows the intention and commitment of many informal entrepreneurs to sustain goals. This ambition also materializes the willingness of the informal entrepreneur to put in place a certain level of organization and profitability that allows the business to continue until their children can take over and continue running the business. However, ambition is much more noticeable in Burkina Faso than in other countries. In Senegal and Benin, almost one-third of informal entrepreneurs are by default or are not ambitious. This could be related to the lack of success of many informal entrepreneurs whose businesses are experiencing growth difficulties.

Table 3: Wish to see own child continue the business: ‘ambition’

Wish to see own child continue with the firm activities (%)	Senegal	Benin	Burkina Faso
No	31.5	23.33	16.92
Yes	68.95	76.67	83.08
Total	100	100	100

Source: Author, based on survey data.

Table 4 shows that, on average, social service interruptions of less than a week are experienced by 76% of enterprises in Senegal, 44% of enterprises in Benin, and 91% of those in Burkina Faso. If we consider an average duration of more than one month, the percentage is low. It is 3% in Senegal, 28% in Benin, and 1% in Burkina Faso. The results show that interruptions in social services are more frequent in Benin than in the other countries in the sample.

Table 4: Average duration of social services interruption

Average length of interruption of social services (% of enterprises)	Senegal	Benin	Burkina Faso
One week or less	76.14	44.81	91.58
Between one week and one month	22.88	37.01	7.92
More than one month	0.98	18.18	0.5
Total	100	100	100

Source: Author, based on survey data.

Model estimates

This section is devoted to the estimates of the Logit model and of the marginal effects in the three countries studied (in Appendix 1). Table 5 presents the results of the estimates.

Table 5: Results of the estimates

Company status (1=Formal, 0=Informal)	(1) Senegal	(2) Benin	(3) Burkina Faso
Manager gender 1=Female, 0=Male	0.331 (0.635)	-0.264 (0.629)	-1.121 (1.565)
Age of the firm	0.00642 (0.0160)	0.0406* (0.0344)	0.0287 (0.0497)
Having business premises 1=Yes, 0=No	2.029*** (0.396)	1.613*** (0.566)	1.548** (0.710)
Wish to see own child continue with the business 1=Yes, 0=No	0.0994* (0.427)	0.878** (0.652)	2.602*** (0.775)
Average duration of social services interruption	0.697 (0.401)	-0.806** (0.409)	-4.386 (3.270)
Firm size	0.0807*** (0.0279)	0.0147 (0.0136)	0.0578*** (0.0216)
Average number of years of employees' education	0.878*** (0.294)	-0.230 (0.340)	0.319 (0.539)
Productivity, in logarithm	0.586*** (0.109)	0.332** (0.151)	1.031*** (0.213)
Sector: Trade	0.874** (0.417)	-1.138 (0.777)	-0.402 (0.983)
Sector: Construction	0.213 (0.866)	-1.898 (1.653)	3.418*** (0.874)
Sector: Services Ref: Industry	0.268 (0.544)	-0.644 (0.701)	0.473 (0.860)
Access to ICT 1=Yes, 0=No	0.623 (0.422)	1.856*** (0.688)	-0.0868 (0.864)
Constant	-15.45*** (2.176)	-5.954*** (2.129)	-13.84*** (5.066)
Observations	277	139	184
Pseudo R-squared	0.381	0.345	0.610
Log likelihood	-96.32	-54.63	-33.17
Wald chi2	74.09	35.07	53.97
Prob > chi2	0	0	0

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The Wald statistic helped us to test the overall influence of the exogenous variables used on the determinants of the probability of being formal. Whichever the country considered, the P-value is less than 5%, so we can conclude that, in general, the variables play a significant influence on the probability of entrepreneurs being formal. In other words, there is at least one statistically significant variable among the k variables of the model. The prediction table (Appendix 2, tables A1, A2, and A3) allows us to assess the explanatory power of the model by calculating the agreement and disagreement between the estimated and observed values (i.e., its quality in predicting the values 1 and 0). The

good predictions are 89.6% for Senegal, 86.1% for Benin, and 91.28% for Burkina Faso. The estimation of marginal effects is in Appendix 1.

Interpretation of results

The estimation results show that, business premises, enterprise productivity and the ambition of the informal entrepreneur significantly and positively influence the probability of being formal in all three countries. The positive effect of the informal entrepreneur's ambition in formalization is consistent with other results in the literature. Indeed, Wong et al. (2005) confirm that not all entrepreneurial activities contribute equally to the economy: a non-negligible part of job creation would come from several businesses in the early stages of development, but driven by the ambition of their entrepreneur (Amorós et al., 2013; Autio, 2007).

Access to ICT and firm age significantly and positively influence the probability of being formal only in Benin. Firm size has a significant and positive influence on the probability of entrepreneurs in Senegal and Burkina Faso being formal. This result is also in line with Gelb et al. (2009) finding. It is because if the number of employees increases, the firm becomes more visible and tax officials will make more visits. The costs associated with informality, such as concealment costs, bribes and lack of access to certain public services also increase. The significant influence of the sector of activity is noted in both Senegal and Benin. Concerning the age of the firm, the significant influence was only noted in Benin. Similarly, the average level of education of employees influences the probability of being a formal entrepreneur only in Senegal. It is not significant either in Benin or in Burkina Faso. This result is in line with Lubbell (1991). He concluded that, in Southeast Asia, informal workers have a relatively high level of education, which makes this variable insignificant on the probability of being formal. It is only in Benin that the average duration of social services interruption significantly and positively influences the probability of being formal.

The analysis of marginal effects shows that, enterprise productivity positively affects the probability of being formal in all the three countries. This result confirms those found by Boeri and Garibaldi (2005), Albrecht et al. (2005), Galiani and Weinschelbaum (2007) and Dabla-Norris et al (2008). It is because the increase in productivity increases the size of production and decreases fixed costs, which leads to an improvement in the entrepreneur's profit. However, the increase in the size of the production leads to better visibility of the firm and visits from tax inspectors. As a result, the entrepreneur would tend to be formal to continue receiving these benefits from formality.

Similarly, having business premises increases the probability of entrepreneurs being formal by 29.7% in Senegal, 32% in Benin, and 4.2% in Burkina Faso. This result can be explained by the fact that, if you have fixed premises you become more visible and more stable. Of course, you have better control over your clientele, but you are also easier to spot by government inspectors. Moreover, the way to benefit from the advantages of business premises for informal entrepreneurs would be to formalize their activities. Operating in the trade sector increases the probability of an entrepreneur being formal

by 10.9% in Senegal and decreases it by 16.7% in Benin compared to an entrepreneur operating in the industry sector. In Benin, being in the construction sector decreases the probability of entrepreneurs being formal by 18.1% compared to entrepreneurs in the industry sector. Serge (2018) reveals that, the motivations of informal entrepreneurs vary according to the sector of activity and the degree of informal activity, and whether they consider themselves to be in a transition towards formalization of their activity or not. If the level of education of employees increases by one cycle, then the probability that the business becomes formal increases by 10.2% in Senegal.

Being an ambitious informal entrepreneur increases the probability of being formal by 1.17% in Senegal, 12.2% in Benin, and 16.5% in Burkina Faso compared to the default informal entrepreneur. This result confirms Serge's (2018) finding that entrepreneurs who have individual growth intentions or who need access to government subsidies or financial support will want to move towards formalizing their activities. This result would be explained by the fact that the ambitious informal entrepreneur is much more responsive to incentives for formalization than the default one. As for the average duration of interruption of social services, if it increases from one cycle to another, the probability of being formal decreases by 13.2% only in Benin.

5. Conclusion and policy implications

This study focused on the analysis of the business formalization determinants in Senegal, Benin and Burkina Faso. The theoretical model used is that of Lucas (1978) based on the theory of the distribution of the commercial enterprise size and expanded through by Rauch (1991) on the theory of formality, and by Gelb et al. (2009) on the probability of being formal entrepreneur. The empirical model used is a Logit model. In the empirical model, we segmented the entrepreneurs into two categories: the ambitious informal entrepreneur and the default informal entrepreneur.

The results showed the importance of the variables of access to business premises, firm productivity and entrepreneurial ambition on the probability of being formal in the three countries studied. The age of the firm, access to ICT and the average duration of interruption of social services have a significant and positive influence on formalization only in Benin. The average level of education of employees is only significant in Senegal. We also found that the gender of the entrepreneur has no significant influence on the probability of being formal in any of the countries considered in the study. The sector of activity is significant in both Senegal and Benin. As for the size of the firm, it is significant in Senegal and Burkina Faso.

With regard to policy recommendations, the governments of the countries concerned should develop policies to improve the productivity of informal enterprises. Emphasis should be placed on the considerable improvement of human capital through vocational training (trade chambers promotion, initiation of capacity building programmes, and promotion of distance and evening learning). States should also make efforts to improve the business environment and facilitate access to basic public infrastructure. Finally, governments should ensure that there are entrepreneurs that are more ambitious. This will require a government policy that allows informal entrepreneurs to access a larger client base, partnership opportunities, public tenders, and social security coverage.

The main limitation of this work is the lack of a strong coverage of recent (less than five years) formal and informal enterprises in the database. This coverage would allow us to distinguish differences in the effect of explanatory variables on the probability of being formal between recent and old entrepreneurs.

Notes

- 1 Investment environment in Senegal.
- 2 Cost of concealment and lack of access to certain public infrastructure.
- 3 First Order Conditions.

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Appendixes

Appendix 1: Estimation of marginal effects

Firm status (1=Formal, 0=Informal)	(1) Senegal	(2) Benin	(3) Burkina Faso
Manager gender 1=Female, 0=Male	0.0422 (0.0885)	-0.0420 (0.0972)	-0.0189 (0.0198)
Age of the firm	0.000746 (0.00186)	0.00665* (0.00580)	0.000682 (0.00122)
Having business premises 1=Yes, 0=No	0.297*** (0.0644)	0.320*** (0.116)	0.0420 (0.0257)
Wish to see own child continuing the business 1=Yes, 0=No	0.0117* (0.0514)	0.122* (0.0800)	0.165** (0.0848)
Average duration of social services interruption	0.0810 (0.0483)	-0.132* (0.0704)	-0.104 (0.0921)
Firm size	0.0094*** (0.00354)	0.0024 (0.00235)	0.0014* (0.000731)
Average number of years of employees' education	0.102*** (0.0324)	-0.0377 (0.0549)	0.00758 (0.0117)
Productivity, in logarithm	0.0682*** (0.0129)	0.0544** (0.0260)	0.0245** (0.0101)
Sector: Trade	0.109* (0.0583)	-0.167* (0.100)	-0.00955 (0.0224)
Sector: Construction	0.0265 (0.116)	-0.181** (0.0722)	0.308 (0.194)
Sector: Services Ref: Industry	0.0333 (0.0722)	-0.100 (0.101)	0.0132 (0.0287)
Access to ICT 1=Yes, 0=No	0.0798 (0.0601)	0.313*** (0.105)	-0.00202 (0.0195)
Comments	277	139	184

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Appendix 2: Adjustment quality

Prediction table

The prediction table allows us to assess the model explanatory power by calculating the agreement and disagreement between the estimated and observed values (i.e., its ability to predict the values 1 and 0). In Table A1, the number of good predictions is on the diagonal (50+200) and represents a rate of $250/279 = 89.6\%$.

Senegal

Table A1: Prediction table - Senegal

Logistic model for statut

Classified	True		Total
	D	~D	
+	50	9	59
-	20	200	220
Total	70	209	279

Classified + if predicted $\Pr(D) \geq .5$
 True D defined as statut != 0

Sensitivity	$\Pr(+ D)$	71.43%
Specificity	$\Pr(- \sim D)$	95.69%
Positive predictive value	$\Pr(D +)$	84.75%
Negative predictive value	$\Pr(\sim D -)$	90.91%
False + rate for true ~D	$\Pr(+ \sim D)$	4.31%
False - rate for true D	$\Pr(- D)$	28.57%
False + rate for classified +	$\Pr(\sim D +)$	15.25%
False - rate for classified -	$\Pr(D -)$	9.09%
Correctly classified		89.61%

Benin

Table A2: Prediction table - Benin

Logistic model for statut

Classified	True		Total
	D	~D	
+	40	14	54
-	27	214	241
Total	67	228	295

Classified + if predicted $\Pr(D) \geq .5$
 True D defined as statut != 0

Sensitivity	$\Pr(+ D)$	59.70%
Specificity	$\Pr(- \sim D)$	93.86%
Positive predictive value	$\Pr(D +)$	74.07%
Negative predictive value	$\Pr(\sim D -)$	88.80%
False + rate for true ~D	$\Pr(+ \sim D)$	6.14%
False - rate for true D	$\Pr(- D)$	40.30%
False + rate for classified +	$\Pr(\sim D +)$	25.93%
False - rate for classified -	$\Pr(D -)$	11.20%
Correctly classified		86.10%

Burkina Faso

Table A3: Prediction Table - Burkina Faso

Logistic model for statut

Classified	True		Total
	D	~D	
+	23	10	33
-	16	249	265
Total	39	259	298

Classified + if predicted $\Pr(D) \geq .5$
 True D defined as statut != 0

Sensitivity	$\Pr(+ D)$	58.97%
Specificity	$\Pr(- \sim D)$	96.14%
Positive predictive value	$\Pr(D +)$	69.70%
Negative predictive value	$\Pr(\sim D -)$	93.96%
False + rate for true ~D	$\Pr(+ \sim D)$	3.86%
False - rate for true D	$\Pr(- D)$	41.03%
False + rate for classified +	$\Pr(\sim D +)$	30.30%
False - rate for classified -	$\Pr(D -)$	6.04%
Correctly classified		91.28%

Appendix 3: Descriptive statistics

		Firm Size	Productivity	Age of Company
Senegal	Average	5.56	2.27E+07	13.38
	Standard deviation	10.10	9.28E+07	11.45
	min	1	4500	0
	max	100	1.44E+09	64
Benin	Average	13.41	9492171	9.45
	Standard deviation	35.14	4.26E+07	9.14
	min	1	5768.889	0
	max	330	4.95E+08	108
Burkina Faso	Average	8.55	6800821	8.06
	Standard deviation	22.93	1.93E+07	6.23
	min	1	-2271467	0
	max	300	1.72E+08	34
Total	Average	9.11	1.32E+07	10.36
	Standard deviation	24.92	6.12E+07	9.52
	min	1	-2271467	0
	max	330	1.44E+09	108

Activity Sector	Senegal	Benin	Burkina	Total
Industry (in %)	39.14	23.51	20.57	28.01
Trade (in %)	40.13	35.09	50.71	41.91
Construction (in %)	5.59	4.56	11.35	7.12
Service (in %)	15.13	36.84	17.38	22.96
Total (in %)	100	100	100	100

Work Premises	Senegal	Benin	Burkina	Total
No (in %)	66.45	72.51	59.23	66.1
Yes (in %)	33.55	27.49	40.77	33.9
Total (in %)	100	100	100	100

Manager's Gender	Senegal	Benin	Burkina	Total
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Male (in %)	%	89.25	70.79	85.02	81.81
Female (in %)	%	10.75	29.21	14.98	18.19
Total (in %)	%	100	100	100	100
Access to ICT					
No (in %)	%	71.66	56.7	76.66	68.36
Yes (in %)	%	28.34	43.3	23.34	31.64
Total (in %)	%	100	100	100	100

Average Level of Employees' Education					
		Senegal	Benin	Burkina	Total
None	%	11.73	1.03	16.38	9.72
Primary	%	22.8	5.15	18.12	15.48
Secondary	%	44.95	52.58	56.45	51.19
Higher	%	20.52	41.24	9.06	23.62
Total	%	100	100	100	100



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