

Full Length Research

Micro-determinants of informal employment in Côte d'Ivoire: The role of socio-demographic factors

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This paper proposes to identify the micro-determinants of informal employment in Côte d'Ivoire, focusing on socio-demographic factors. Using data from the National Survey on Employment and the Situation of the Informal Sector (ENSESI) and the Logit method, the empirical results indicate that unschooled and less qualified individuals are more likely to be in an informal situation; that the probability of engaging in informal activities is higher for women than for men; that the probability of being informal decreases with the age of the individual; that single (or customarily married) individuals are more likely than married individuals to belong to the informal group; that individuals in the agriculture sector are more likely to be informal than those in the service and industrial sectors; and that individuals living in urban areas are less likely to fall into informal employment compared to individuals in rural areas. Consequently, economic choices and decisions must be targeted on the basis of these empirical findings to reduce the weight and consequences of the informal sector in Côte d'Ivoire's economy.

Key words: Informal employment, micro-determinants, socio-demographic factors, Cote d'Ivoire.

INTRODUCTION

The persistence and even growth of informal employment (De Soto, 1994), in all developing economies makes it a structural component of the labour market (Jutting and Laiglesia, 2009). Indeed, according to the IMF (2017), the informal sector is a key component of most sub-Saharan economies, where its contribution to GDP ranges from 25 to 65% and where it accounts for 30 to 90% of non-agricultural employment. Even more so, in francophone Africa, the informal sector accounts for more than 50% of GDP and 90% of total employment (IDRC, 2015). The growth of this sector is explained by an increase in the labour market caused by the structural surplus of labour

and the insufficient absorption capacity of the modern sector in peripheral economies (Razafindrakoto et al., 2012).

The structure of Côte d'Ivoire's economy is no exception to the rule. Indeed, according to World Bank Data (2018), informal employment has grown significantly by more than 90% since the process of liberalization of the economy in the 1980s. This sector represents between 30 and 40% of GDP (IMF, 2017). In addition, it employs almost the entire working population. Indeed, according to data from the survey on employment and the situation of the informal sector (ENSESI, 2016), 93.6%

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of jobs in Côte d'Ivoire are in the informal sector.

Informality is therefore a subject of interest for political decision-makers and the business community in Côte d'Ivoire. In the sense that although the informal economy provides a safety net for a large and growing working-age population, the informal sector is seen as an impediment to economic growth and improved economic policies in many developing countries (Krakowski, 2005). Indeed, the dominant economic philosophy today is that governments should provide sufficient social services (education and health) to create pro-poor growth, with little reliance on debt financing. As a result, many developing countries focus on increasing tax revenues. This seems difficult if there is a large informal economy¹. Reducing the informal economy, broadening the tax base and thus increasing tax revenues is the virtuous circle that many developing country governments are seeking. Thus, reducing the size of the informal sector could open up the possibility of lowering overall tax rates or improving public services. Indeed, although people working in the informal economy benefit from public services, they do not contribute to their financing. Thus, the growth of this sector creates unfair competition among firms and raises equity concerns related to the existence of unprotected workers without health insurance and pension protection (Angel-Urdinola and Tanabe, 2012). La Porta and Shleifer (2014) go even further by highlighting the low productivity and extreme inefficiency of the informal sector compared to the formal sector. Ultimately, in countries with a large informal sector, effective management of the economy by the state may be compromised (Krakowski, 2005).

It is for all these reasons that the empirical literature in recent years has devoted much attention to the identification and analysis of the drivers and disincentives of the informal sector. Thus, among the many factors (Aspilaire, 2014; BIT, 2002; Bounoua et al., 2012; Elbahnasawy et al., 2016; Elgin and Oyvatt, 2013; Hassan and Schneider, 2016; Iguidia et al., 2016; Ouédraogo, 2017; Othmane and Mama, 2016; Medina et al., 2017; Sani, 2009)² identified in the literature, socio-demographic factors appear prominently. For example, a study by Başbay et al. (2018) using micro-data from

seven developing countries (China, Ecuador, Egypt, Mexico, Peru, South Africa and Yemen) reveals that the socio-demographic characteristics of individuals are strong predictors of their employment in the informal sector. Similarly, Angel-Urdinola and Tanabe (2012), in their study of the informal sector in the Middle East and North Africa (MENA) region, examine the main micro-determinants of informal employment, namely age, gender, education level, employment sector, marital status, occupational status and geographical area. In a similar vein, Aikaeli and Mkenda (2014), modelling the choice of employment type using the multivariate logistic model, found that lack of capital and low education levels prevent micro and small entrepreneurs from engaging in broad formal activity. Such results were also found by La Porta and Shleifer (2008). Indeed, by exploring the sources of productivity differences between formal and informal firms, they conclude that the most striking differences between formal and informal firms are in the human capital of their managers. The work of Gennaioli et al. (2013) also corroborates these results. Still in a similar vein, Malam (2018), using Probit's method, sought to identify the determinants of informal employment in Niger, focusing on the effect of types of degrees. The author's results reveal that workers with some schooling at all levels are more likely to leave the informal sector than those who have never attended school; the better the chance of leaving the informal sector, the higher the level of education. Moreover, the more educated a father is, the less his child is in the informal sector. Also, the father's education is the main difference in the determinants of informal employment between urban and rural areas. Finally, the regions with the lowest gross school enrolment rate are also those that offer the most opportunities for informal activities.

For the specific case of Côte d'Ivoire, scientific studies on the determinants of informal employment are rather rare due to the scarcity of micro-data on the employment situation in Côte d'Ivoire (Premand and Tien, 2017). To our knowledge, the only one that can be cited is that of Günther and Launov (2012), based on the Living Standards Survey (ENV, 1998), showed that the Ivorian informal sector is heterogeneous and that the labour market is characterized by barriers to entry into the sectors, thus reflecting the violation of the competitive market hypothesis. In addition to this study, a number of reports of studies conducted by AGEPE³ (2013, 2014) can be attached, which focus more on the quantitative evaluation of the phenomenon without understanding the factors explaining access to the informal sector that condition public employment policies.

As can be seen, the issue of factors influencing the informal sector is still insufficiently addressed in Côte d'Ivoire due to data limitations, although it is a crucial issue. This deprives political decision-makers of scientific

¹In Côte d'Ivoire, for example, according to the Table of State Financial Transactions (TOFE), the informal sector contributes only 1% to tax revenues while formal companies account for almost all the tax burden.

²Among others, we can cite the work of Ouédraogo (2017), Hassan and Schneider (2016), Medina et al. (2017) who highlight institutional failures as factors encouraging the growth of informal activities; Elbahnasawy et al. (2016) show that political instability and autocratic power are associated with a larger informal economy; the studies by Elgin and Oyvatt (2013) and Othmane and Mama (2016) find a growing relationship between the rate of urbanization and the level of informality; for Iguidia et al. (2016), the social conditions of individuals lead them to resort to informal employment; for Aspilaire (2014) and Bounoua et al. (2012), inflation is a factor stimulating informal activities; the occurrence of economic crises has been cited as a factor favouring the growth of the informal sector (BIT, 2002; Sani, 2009); according to the work of Medina et al. (2017), the degree of trade openness impacts the informal economy, etc. (ILO, 2002; Sani, 2009).

³ The Agency of Study and Employment Promotion (Agence d'Etudes et de Promotion de l'Emploi) of Côte d'Ivoire.

reflections on effective public policies to combat the progress or better orientation of the informal sector, despite its dynamism. This paper therefore fills this gap as far as Côte d'Ivoire is concerned by making exclusive use of the most recent micro-data from the National Survey on Employment and the Informal Sector (ENSESI), collected by the National Institute of Statistics of Côte d'Ivoire in 2016. Therefore, the objective of this article is to identify the micro-determinants that explain informal employment in Côte d'Ivoire with a focus on socio-demographic factors.

METHODOLOGY

Model specification

The dichotomous nature of the explained variable (informal employment), whether or not belonging to the informal sector, leads to binary choice models (Bourbonnais, 2015), namely the Probit model or the Logit model. In this study, to avoid arbitrariness in the choice of estimation method, we have chosen the best model with as a criterion the minimization of the AIC and BIC information criteria and the maximization of the different R-squares. The results show that the Logit model is the most suitable in our case (Annex A-1).

Our variable of interest is thus specified as follows:

$$Y_i = \begin{cases} 1 & \text{If individual } i \text{ is in informal employment for } i \in \{1, \dots, 14622\} \\ 0 & \text{otherwise} \end{cases}$$

Assuming that y_i^* a latent variable underlying the phenomenon of underemployment defined by:

$$y_i^* = x_i \theta + \varepsilon_i$$

where θ is the vector of parameters and ε_i the vector of residuals. x is the vector of explanatory variables. The probability that individual i is in informal employment ($y_i = 1$) is defined as follows:

$$p_i = P(Y_i = 1) = P(y_i^* > 0) = P(x_i \theta > -\varepsilon) = F(x_i \theta)$$

With F the distribution function of $-\varepsilon$, that is, the function defined by:

$$F(w) = P(-\varepsilon < w)$$

For the binary Logit model used in this study, F denotes the distribution function of the logistic law:

$$F(w) = L(w) = \frac{e^w}{1 + e^w}$$

Study data and variables

The most recent data source that provides the most complete information on socio-demographic characteristics and employment in Côte d'Ivoire is the National Survey on the Employment Situation

and the Informal Sector (ENSESI) conducted in 2016⁴. Quality control of data collection was ensured by ENSEA. The general objective of quality control was to contribute to the respect of the survey protocol and to improve the overall quality of the data collected. To this end, in addition to active participation in the preparatory phase of the study, the methodology proposed by ENSEA focused on the organization of a counter-survey in a sub-sample. The strategies mobilized for the collection of data for the National Survey on Employment and the Informal Sector (ENSESI, 2016) have provided a good knowledge of the labour market. In two phases, the first one, known as the main phase, was carried out among households and made it possible to identify Informal Production Units (IPUs). The second one, called the "Informal Sector" survey, was conducted among heads of IPUs. The 2016 National Survey on Employment and the Informal Sector was conducted using a probability survey, which made it possible to extrapolate the results of the observed sample to the entire surveyed universe and to calculate the sampling errors in terms of coefficient of variation and confidence interval. The sample design was used to calculate extrapolation coefficients that represent the absolute or relative weight of the drawn household (number of households represented) in the sample. ENSESI (2016) covered the national territory. Also, the two-stage stratified sample allowed estimates of indicators at the national level and by region/district (the stratum) with precision variable per stratum but greater than or equal to 92.5%. The study specifically covers 14622 individuals in employment in Côte d'Ivoire.

Following the literature, gender, place of residence, age, nationality, marital status, level of education and disability variables are used to explain the exercise of informal activity in Côte d'Ivoire. These different explanatory variables are detailed in Annex A-2.

Descriptive statistics of variables

Hejase et al. (2012) contend that informed objective decisions are based on facts and numbers, real, realistic and timely information. Furthermore, according to Hejase and Hejase (2013), "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data" (p. 272). Therefore, this study analysed data collected with descriptive statistics such as percentages supported with tables for clarity. Several pieces of information emerge from the aforementioned descriptive statistics. The results reported in Table 1 reveal that employment is almost exclusively informal in Côte d'Ivoire. In fact, 96% of respondents carry out their economic activities in the informal sector against only 3% in the formal sector. It also shows that women are much more exposed than men in terms of informal employment. Also, the figures show that 99.67 and 96.46% respectively of young people between 14-24 and 25-35 years old are more likely to work in the informal sector as opposed to adults. In terms of marital status, almost one-third of those with civil marriages are in formal employment, while those in cohabitation, divorced, never married, customary and religious marriages are mainly concentrated in the informal sector. With regard to place of residence, the results of the survey reveal that employment is practically informal in rural areas. In urban areas, particularly in the capital (Abidjan), informal employment remains very high, but formal employment is still present, at 6.62% (11.17% respectively). In terms of education level, people with higher

⁴ENSESI (2016) was financed by the State of Côte d'Ivoire and the World Bank. It was carried out by the National Institute of Statistics (INS) in collaboration with the Youth-Employment Agency and the Directorate General of Employment. It received technical support from the World Bank, the International Labour Office (ILO), UNDP and ENSEA.

Table 1. Descriptive statistics of variables.

Nature of employment	Formal (%)	Informal (%)
Gender		
Female	2.10	97.90
Male	5.40	94.60
Place of residence		
Abidjan	11.17	88.83
Rural	1.10	98.90
Other Urban	6.62	93.38
Nationality		
Ivorian	4.81	95.19
Non-Ivorian	1.17	98.83
Level of education		
No level	0.60	99.40
Primary	1.27	98.73
Secondary	12.72	87.28
Tertiary	43.16	56.84
Sector of activity		
Agriculture	0.33	99.67
Trade	2.24	97.76
Industry	6.97	93.03
Service	16.44	83.56
Marital status		
Cohabitation	5.30	94.70
Divorced (e)	2.46	97.54
Never married	3.20	96.80
Civil marriage	30.26	69.74
Customary marriage	2.48	97.52
Religious marriage	2.02	97.98
Separate (e)	1.91	98.09
Widow/Widower	1.51	98.49
Limb disability		
Yes	97.25	2.75
No	95.96	4.04
Age		
Age group 14-24	99.67	0.33
Age group 25-35	96.46	3.54
Age group 36-59	93.61	6.39
Age group 60+	97.41	2.59

Source: ENSESI (2016).

education are most often found in the formal sector (43.16%), while those with no education or a relatively low level of education (primary and secondary) are more likely to be in the informal sector. With regard to the sector of activity, the primary sector (agriculture,

livestock, forestry, and fishing) is dominated by informal employment, with almost 99.67% of jobs in this sector being informal. Commercial activity has a high proportion of informal employment (97.76% of jobs are informal). In services, 16.44% of

Table 2. Estimation results.

Explanatory variables (reference modality)	Marginal effects	P-values	Coefficient
Education (No level)			
Primary	-0.005	0.036	-0.47
Secondary	-0.062	0.000	-2.27
Tertiary	-0.112	0.000	-3.01
Gender (Male)			
Women	0.017	0.000	0.69
Nationality (Ivorian)			
Non-Ivorian	0.014	0.000	0.61
Age (14-24 years)			
25-35 years	-0.027	0.000	-1.79
36-59 years	-0.042	0.000	-2.31
60 years and over	-0.045	0.000	-2.41
Sector of activity (Agriculture)			
Industry	-0.044	0.000	-2.39
Trade	-0.021	0.000	-1.64
Service	-0.072	0.000	-2.98
Limb disability (Yes)			
Yes	0.011	0.308	0.471
Place of residence (Rural)			
Abidjan	-0.002	0.509	-0.104
Other Urban	-0.006	0.069	-0.260
Marital status (Customary marriage)			
Civil marriage	-0.034	0.000	-0.960
Religious marriage	0.003	0.481	0.135
Cohabitation	0.002	0.527	0.102
Divorced (e)	0.014	0.246	0.622
Separate (e)	0.015	0.113	0.696
Widow/Widower	-0.0003	0.974	-0.012
Never married	0.006	0.092	0.259
Number of observations		14622	
LR Chi ² (6)		2106.14	
Prob > Chi ²		0.0000	
Pseudo R ²		0.42	

Source: ENSESI (2016).

all jobs held by the active population are formal jobs, compared to 6.97% in the industrial sector. These two sectors have a large number of formal enterprises, which could explain this high proportion of formal employment for these two sectors. The results also reveal that foreigners (non-Ivorians) are mostly employed in the informal sector (98.83%). Finally, we find that people with physical disabilities are mostly employed in the informal sector.

EMPIRICAL RESULTS

Estimation results

The results of the regressions using the Logit method are summarized in Table 2.

Model validity tests

At the end of the likelihood ratio test, the p-value associated with the Chi-square test is well below the 1% threshold. We therefore reject the null hypothesis. Thus, all the explanatory variables provide significant information to explain the model. To apprehend the predictive qualities of the model, we analysed the confusion matrix (Annex A-3). The predictive power of the model is 91.77% for a threshold cut-off = 0.9. Overall, we can say that the model predicts an acceptable classification of individuals. This means that just over 91 out of 100 informally employed individuals are well ranked by the model. The area under the ROC curve, estimated at 0.9386, also indicates that the discriminant power of the model is good (Annex A-4).

DISCUSSION

The results of the test are globally significant. Indeed, according to the model's maximum likelihood estimates, the p-value associated with the Chi-square test is 0.000, which means that there is at least one variable that can explain whether an individual is in informal employment or not.

The results show that the level of education, age, gender, sector of activity, place of residence, nationality and marital status are significantly associated with informal employment at the 5 and 10% thresholds, while the presence of a disability (limb disability) was not significant in predicting those in informal employment.

Level of education

With respect to education level, the results of the model show that the probability of being in the informal sector decreases with the level of education. In other words, individuals with no education and those with fewer qualifications are more likely to be in an informal situation. Indeed, according to our results, when we move from an individual with a primary, secondary or tertiary education level, the probability that this individual falls into informal employment decreases by 0.5, 6.22 and 11.23% points, respectively compared to an individual with no education level. This result is perfectly in line with those obtained by Adair and Bellache (2012) then Souag (2018) in Algeria, Aikaeli and Mkenda (2014) for Tanzania, Tsafack et al. (2019) in Cameroon and Malam (2018) for Niger.

Marital status, gender, and age

Preference for informal employment also depends on other characteristics such as marital status, gender and age. Indeed, the probability of a person working in

informal employment decreases by 3.40% point for those who have had a civil marriage compared to those who have had a customary marriage⁵. This means that customarily married persons are more likely to choose a job in the informal sector than married persons who are looking for permanent jobs. Also, we find that gender is another factor that significantly influences informal employment. Indeed, being a woman increases the probability of working in the informal sector by 1.76% point compared to a man. Such a result, which joins those of Malam (2018), Aikaeli and Mkenda (2014) and Tegoum (2012), Tansel and Kan (2012) and Adair and Bellache (2012), could be explained by the fact that women in developing countries are most often housewives and practice income-generating activities to meet their extra-familial expenses. These activities are mostly informal (Malam, 2018). Also, age reduces the likelihood of being in informal employment rather than formal employment. In fact, being in the 25-35, 36-59 and 60+ age groups decreases the probability of falling into informal employment by 2.7, 4.2 and 4.5% points, respectively, compared to an individual in the 14-24 age group. Young people, given their low experience and lack of employment, tend to work in informal employment. As a result, informal employment could be considered a transitional job before obtaining a formal job (Tsafack et al., 2019).

The sector of activity

According to our descriptive analyses, there is a high concentration of informal employment in agriculture compared to other sectors. Our econometric results support these findings. Indeed, our estimates reveal that individuals working in the agriculture sector have a higher probability of being informal than individuals in the services, industry and trade sectors⁶. The largest decrease is in the service sector where it is 7.26% point.

Place of residence and nationality

The results reveal that the place of residence significantly influences informal employment in Côte d'Ivoire at the 10% threshold. Indeed, people living in Abidjan (resp. other urban) are less likely to fall into informal employment compared to individuals in rural areas. Indeed, being in Abidjan (resp. other urban) reduces the probability of informal employment by 6.95% point compared to individuals in rural areas. This result is similar to that of Malam (2018). This result, which runs counter to the findings of the 1-2-3 survey conducted in

⁵Customary or traditional marriage is still not legalized in Côte d'Ivoire. Only civil marriage is officially recognized.

⁶In general, countries where agricultural employment accounts for a large share of overall employment, such as Côte d'Ivoire, are associated with higher levels of general informality (Angel-Urdinola and Tanabe, 2012).

the seven capitals of WAEMU⁷ member countries could be justified by the fact that, nowadays, carrying out economic activity in the urban environment requires compliance with several administrative formalities. The proximity of the services in charge of regulation, permanent monitoring and incentives such as tax reductions granted to small and medium-sized enterprises (SMEs) declared to the tax authorities are factors that reduce informal employment and are specific to the urban environment (Malam, 2018). Thus, nationality has a significant impact on informal employment at the 5% threshold. In fact, non-Ivorians are more likely to fall into informal employment compared to Ivorians, with a probability of 1.48%. This could be explained by the fact that most foreigners in Côte d'Ivoire engage in street vending or work in agricultural plantations.

Conclusion

To remedy the lack of scientific research in Côte d'Ivoire on the informal sector, we attempt in this paper to identify the micro-determinants of informal employment by focusing on socio-demographic factors. The data come from the most recent database of the National Survey on the Situation of Employment and the Informal Sector (ENSESI, 2016), of the National Institute of Statistics. The results of the binary logistic regression allowed us to highlight a number of determining factors in access to informal employment. These include level of education, gender, age, nationality, sector of activity, place of residence and marital status.

In the light of these results, a number of policy implications can be formulated. Firstly, it is important to note that education should not be neglected if policy-makers want to reduce the weight and consequences of the informal sector in the economy of Côte d'Ivoire. In the sense that the results reveal that the probability of being in the informal sector decreases with the level of education. This result reaffirms the crucial role of human capital in a country's development. Moreover, to combat the informal sector, policy makers must facilitate access to formal jobs for certain disadvantaged populations, namely women and young people because of their level of education, lack of work experience or geographical residence. And finally, special attention must be paid to customary marriage to legalize it, as results show that customarily married people are more likely to choose employment in the informal sector than married people who are more likely to seek permanent employment in the formal sector.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

⁷Except Guinea-Bissau

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Annexes

Annex A-1. Choice of the Model.

Variable	Current	Saved	Difference
Model:	Probit	logit	-
N:	14622	14622	0
Log-Lik Intercept Only:	-2465.586	-2465.586	0.000
Log-Lik Full Only:	-1407.464	-1400.166	-7.297
D:	2814.927(14592)	2800.332(14592)	14.595(0)
LR:	2116.245(21)	2130.840(21)	-14.595(0)
Prob> LR:	0.000	0.000	0.000
McFadden's R ² :	0.429	0.432	-0.003
McFadden's Adj R ² :	0.417	0.420	-0.003
Maximum Likelihood R ² :	0.135	0.136	-0.001
Cragg & Uhler's R ² :	0.471	0.474	-0.003
Mckelvey and Zavoina's R ² :	0.488	0.584	-0.096
Efron's R ² :	0.302	0.304	-0.002
Variance of y*:	1.953	7.912	-5.959
Variance of error:	1.000	3.290	-2.290
Count R ² :	0.963	0.963	0.000
Adj Count R ² :	0.082	0.075	0.007
AIC:	0.197	0.196	0.001
AIC*n:	2874.927	2860.332	14.595
BIC:	-137126.476	-137141.070	14.595
BIC:	-1914.849	-1929.444	14.595

Warning: Current model estimated by probit, but saved model estimated by logit. Difference of 14.595 in BIC provides very strong support for saved model.

Source: ENSESI (2016).

Annex A-2. Description of study variables.

Variable	Modalities
Gender	1= Man 0= Woman
Place of residence	1= Abidjan 2= Other Urban 3= Rural
Limb disability	1= Yes (limb disability) 2= No (no limb disability)
Age	1= 14-24 years 2= 25-35 years 3= 36-59 years 4= 60 years and over
Nationality	1= Ivoirian 2= Non-Ivoirian
Marital status	1= Civil marriage 2= Customary marriage 3= Religious marriage 4= Cohabitation 5= Divorced 6= Separate 7= Widow/Widower 8= Never married

Annex A-2. Contd.

Level of education

1= No level
 2= Primary
 3= Secondary
 4= Tertiary

Source: ENSESI (2016).

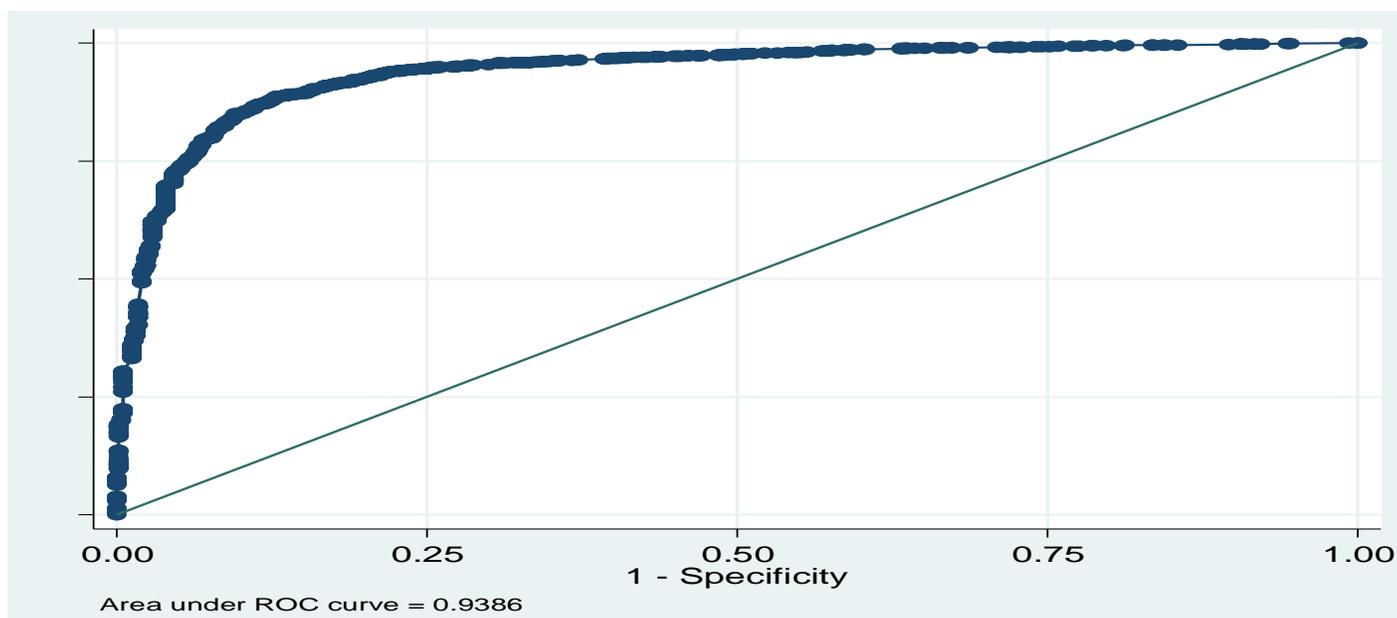
Annex A-3. Confusion matrix.

Probit model for employ_inf	True		Total
	D	~D	
Classified +	12943	112	13055
Classified -	1091	476	1567
Total	14034	588	14622

Classified + if predicted $\Pr(D) \geq 0.9$, True D defined as employ_inf! =0

Sensitivity	Pr(+/D)	92.23%
Specificity	Pr(-/~D)	80.95%
Positive predictive value	Pr(D/+)	99.14%
Negative predictive value	Pr(~D/-)	30.38%
False + rate for true ~D	Pr(+/~D)	19.05%
False - rate for true D	Pr(-/D)	7.77%
False + rate for classified +	Pr(~D/+)	0.86%
False - rate for classified -	Pr(D/-)	69.62%
Correctly classified		91.77%

Source: ENSESI (2016).



Annex A-4- Representation of the ROC curve.
 Source: Our calculations.