A scoring model for studying the determinants of school dropout before the secondary education in Cameroon

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Introduction

The leaders of the world have formalized a commitment at the Dakar Forum in 2000 under the program "Education For All (EFA), which, through six goals, defines the framework within which education will be provided for all children and adult by 2015.

The primary school enrollment rate in Cameroon is estimated at 75.5% in 2008 with a completion rate of primary school of 60% (MINEDUB). This is evidence of leakage between the primary and secondary school. Access to decent employment is crucial to ensure an income that will also help to eradicate poverty, since a low educational level reduces the chance to earn high income. In this regard, EESI (2005) shows that the job structure is such that the number of years of successful studies of workers in the informal sector is on average 4.9 years; With an average monthly income of about 27 300 FCFA against 103 600 FCFA in the formal sector.

With all the efforts made today to achieve universal primary education, the figures are better even if the EFA can't be achieved by 2015.The high enrollment rates in primary education are drastically reduced in high school. It is therefore of interest to know what are the factors that determine the drop before secondary school.

In this study, we determine the variables important to predict from the characteristics of an individual if he abandons his studies before the FLSC or not. To do this, we construct a scoring model, followed by logistic regression, using the data from the third Household survey ECAM3.

The first section of this work, reviews the work on school drop out by highlighting the variables we use as our basis for factors. In the second section, an exploratory analysis of data is used. The third section of the paper is devoted to the implementation of credit scoring model, discriminant analysis is performed and the score function estimated. In the fourth part, we conduct an econometric analysis using logistic regression. In part V we interpret our overall results before concluding the work.

Review of literature

Studies on the determinants of abandonment have highlighted specific features regarding the country level of development. For developing countries, determinants have always related to economic and socio cultural characteristics.

In the supply side of education, the critical lack of school infrastructure implies a problem of distance and therefore accessibility to schools. So that parents withdraw their daughters from school when there is a fear of the assault of the girl [5].

In literature, religion is mentioned as a barrier to enrollment. Islam seems to have a negative influence on the education of children, especially girls, resulting from the conflict between secular public schools and Muslim religious schools [16]. The family is the first society of the child and involves the factors responsible for the drop. The sex of head of household is also a determinant of schooling, with a higher propensity for women to invest in their child, in time, money and above all education [10]. Several studies have also shown that schooling is strongly influenced by the level of education of household head [14]. Another phenomenon not overlooked in the literature is the phenomenon of fostering [11]. In this regard, the Heads of households

prefer the education of their children in opposition to those of children who are entrusted [8].

Economics reasons are the most relevant factors identified in the literature as responsible for the dropout. In fact everything is explained by poverty in poor country. The cost of education is a problem for people of low income in Africa. Almost all studies, households poverty is cited as determinants of further education, but also of inequalities between schooling of girls and boys. Working during the studies, influence the completion of schooling. The time spent at work after the school day, reduced one given to the review of lessons, and thus negatively affects school performance [1].

Descriptive analysis

Reason for cessation of studies

Before considering the factors of abandonment, we first present the reasons for the dropout given by individuals interviewed in the ECAM3.This information is measured by the question S03Q21: "Why does he dropped or stopped going to school?"

| | | Sex | | Total |
		Male	Female	
Reason for cessation or interruption of school	Studies completed	3,8%	2,4%	3,1%
	Cost too high	46,6%	39,8%	43,3%
	Employment / Learning	15,5%	5,7%	10,7%
	School failure	12,7%	12,0%	12,4%
	Sickness / disability	2,3%	2,5%	2,4%
	Marriage / Pregnancy	0,5%	18,4%	9,2%
	Distance	0,7%	0,8%	0,8%
	Too young	7,4%	7,6%	7,5%
	Parent refusal	3,7%	6,0%	4,9%
	Other	6,7%	4,8%	5,8%
Total		100,0%	100,0%	100,0%

Table 1: Reason for cessation or interruption of school

The analysis of the above table reveals that in Cameroon case, studies are usually stopped because of the high cost for boys (46.6%) as girls (39.8%).The second reason for the closure or interruption for girls is marriage or pregnancy. Here the level of interruption doesn't matter.

Further, we designate an individual who has dropped out as a person who has no better than the class 6.That is to say a person who stops the school without having First School Certificate.

Dropping and potential factors

Literacy and education of Household head: Households, whose head has had the chance to study, have an understanding of the importance of education. For them, the dropout rate is 17.6% against 50.3% from households where the household head is illiterate.

This is in the same direction as the educational level of head of household. Indeed we find that the more the head of household has continued his studies, and more people are doing. This result just shows that

the parent, who left school at primary, does not see the benefit for children to go further. These parents seem to think that the fact that children can read or write is sufficient for their development in society. Thus we have a dropout rate of 76% when the household head has stopped in primary, against only 28% among heads of household with a higher education. Figure

Household composition: Analysis of dropout highlighted that the polygamous households have the highest dropout rate (68.8%), relative to the single (34.9%).

Place of residence: Dropping out is a more recurring phenomenon in urban than rural areas. It is observed that the dropout rate in rural areas is 60.8% against 31% in urban areas.

Poverty: From a classification of person on the basis of an indicator of monetary poverty, it appears that in the poor side, those who drop out are many (55.9%) than those who complete their primary education.

Religion: It appears here in Cameroon, the dropout rate is higher among Muslims (54.3%) than Christians (34.6%).

Work during studies: We find that among those who have left school, 73% began working before the age of 12 years.

		Drop out rate
Age at start of first job	Under 12	73,0%
	13-22 years	23,7%
	22 and over	3,4%

Table 2: Dropout rate by age in the early first

It is here that the population of school dropouts, about 99.93% returned the last class attended. This means that despite other factors, discouragement can appear as "the straw that broke the camel's back". We note further that the population of those who have not taken the last class attended, the dropout rate is almost 77%. In the latter justification necessarily come from other factors such as costs of education, pregnancy, etc.

Implementation of the Linear discriminant analysis (LDA)

Brief description of the method

The LDA in the traditional sense is a statistical technique wich consists in discriminating or separating individuals in the manner of a categorical variable, using a set of quantitative characteristics. When explanatory variables are qualitative, it is a set of method with LDA at the center. This is one we use here, which leads to a score function which is an easy decision tool for assigning an individual to a group. The method is known under the name DISQUAL (Saporta, 1977.

Results of Multiple Correspondence Analysis

Note here that the variables that are included in the MCA are significant variables in the discrimination of two groups. The first factorial plan summarizes approximately 16% of the total inertia (figure 1); there we can see a correlation between the modality drops out, the modality of primary level of head of household, polygamy, Muslim modality. This is opposed to "do not drop out", correlated to the modality 'urban', to a secondary level of head of household.
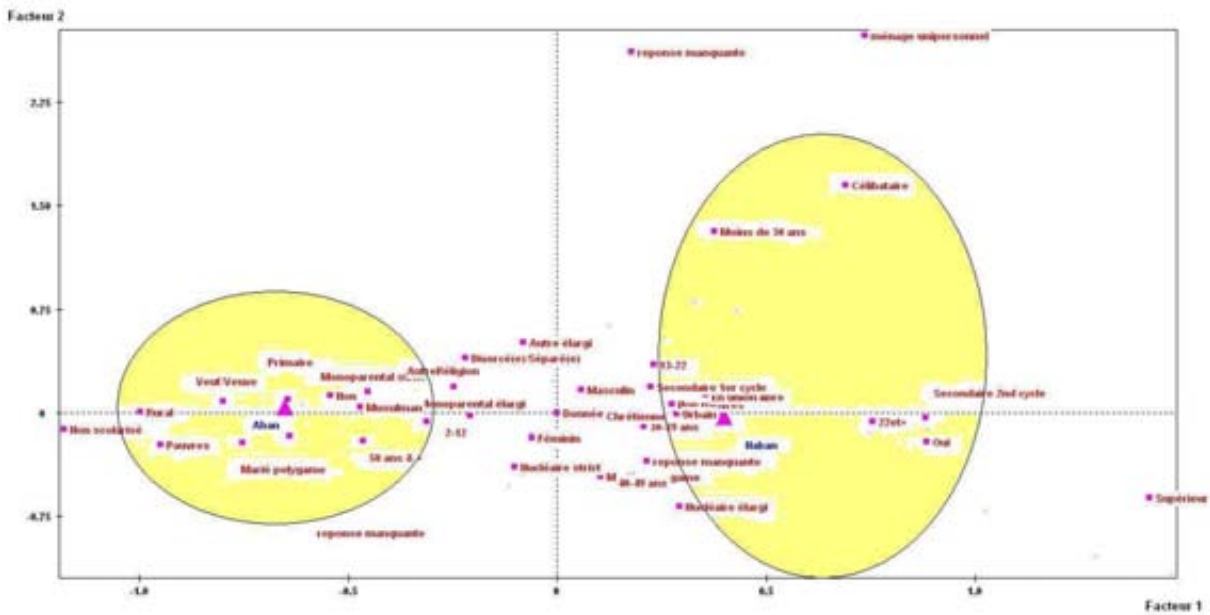
Figure1: Cloud of variables from the MCA

The usefulness of the MCA is to use its arguments for factors of the LDA. Figure 1 shows the cloud of individuals, projected onto the first factorial designs. They show that our factors separate well enough individuals and are therefore suitable for our LDA.
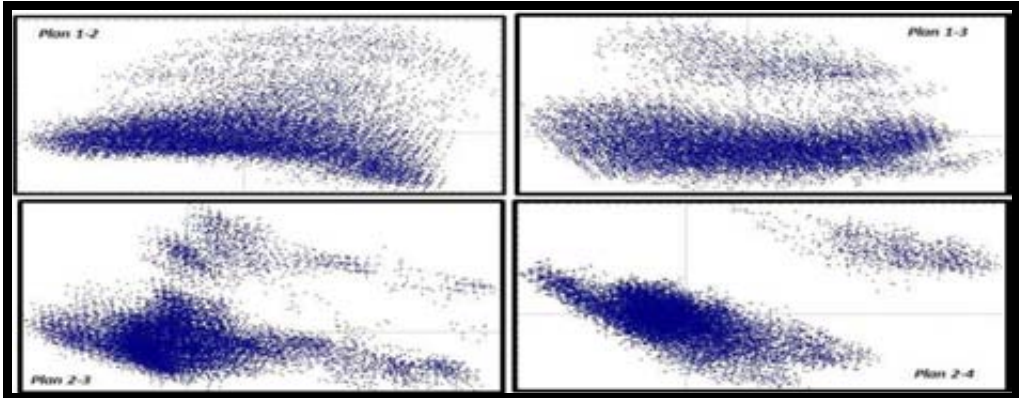

Figure2: Scatter of individuals from the MCA

Result of the Linear Discriminant Analisys (LDA)

The good discrimination can be assessed by the significance of the factorial axes involved in the linear discriminant function. The observation of probabilities shows that for all chosen factors, the coefficients are significant at 5%. The second criterion we use is an assessment of the quality rankings on the test sample and training sample. It would require that the rate of well classified in these two samples do not vary too much. In our case, in individuals who have studied the rate of correct classification is at 70.60% in the sample test against 70.91% in the baseline sample. We have also implemented the LDA regression using the two step Heckman methodology, the results didn't reject the previous.

Results of the score function

- Approximately 41% of individuals in the first group (those who do not drop out) are well ordered,

10.11% are misclassified, and almost 49.03% are undecided in the area.

- 42% of individuals of the second group (dropouts) are classified only 10.17% are misclassified and about 47.6% are in the zone of indecision.

The scoring function has allowed us to clear the procedures the most contributive to the assignment of an individual within the group of school leavers. We can cite in order of score: The head of household can not read and write, the household head is a laborer; the household head is Muslim, head of household has a primary education level. Individuals living in rural areas, the individual is poor. The main usefulness of this score function is the prediction or assignment of a new individual in the group of dropouts or the non dropouts.

Results of Econometrics Analysis

For the econometric model we use logistic regression. It will allow us to refine the findings of LDA by identifying the modality significant in increasing the probability of dropping out.

In summary, it appears that educational level is very significant, and the variable literacy is not to a 10% threshold. The standard of living (poverty), place of residence, religion and age at the beginning of the first work is very significant. The number of last year in the last class is significant at 10% but not to a threshold of 5%.The observation of signs of the coefficients show how each characteristic influences the probability of dropping out. For example, being non-poor reduces the probability of leaving school while living in a rural area increases it. Using odds ratio we can say that: There are two times more chance for an individual whose parent level is primary school to abandon his studies than to continue; if a householder has a level Study higher, and then her children are 200 times more likely to continue their studies than abandon. The children of non-poor households have 1.41 times more chance to continue than to dropout, students who live in the rural environment had 1.5 times more chance to drop out than do not; A child who started working at age 12 months is more likely to drop out than to continue, a student of Islam has 150 against 100 chance of dropping out.

Conclusion and recommendations

Determinants of dropout as indicated by previous studies in the world can be grouped into institutional factors, economic factors, family factors. In Africa, especially in Cameroon, some factors appear to be more relevant than others. We used survey data ECAM3 to implement a scoring model and logistic regression, this approach allows us to explain the students belonging to one of two groups that we formed. It emerged from the analysis that the educational level of parents with whom the children live, the state of poverty in household, and culture of these households especially in rural areas are the main determinants of dropout. These factors, as true as they are relevant for such a study, seem simplistic to assess the impact of categories of factors on dropout. For example, reduce the socio-economic constraints to a single indicator or reduce the parents' love for the school to the variable level of education, is not without criticism. Some parents even when they did not attended high school, can captured in the society the benefits of education and wish it for their children. It appears, therefore, a need for additional information to perform this kind of study. That can be done through thematic surveys, specific to education.

In terms of recommendation, to fight against the drop, policies that today are mostly geared towards improving the supply of education services should look more towards action on the family environment and household members. It is thus important to fight against illiteracy among adults and especially women by providing training in areas with low literacy rates. To conduct mass media campaigns on the importance of education using suitable media for each environment. Improve access to secondary education by reducing the costs of education in high schools and colleges. Another interesting measure is to encourage children to attend school in sustaining the grant of awards or rewards for best students, especially in rural areas

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RÉSUMÉ (ABSTRACT)

In this paper we try to identify the main factors that push the student out of school before having their First Living School Certificate (FLSC). For this we construct a scoring model using by turn Fisher Linear Discriminant Analysis (LDA) on qualitative variable and Scoring methodology. The LDA is also implemented using the two step estimation method of Heckman in order to check if the selection bias does not change the results. We also use logistics regression to find the robustness of our conclusion and deal with probability. This methodology allows us to predict for a new student if he would achieve primary school. We use data from the third Household survey ECAM3. Our students are separated into two groups, those who achieve with the Class 6 and those who do not. We separate our data into two samples, 70% as learning sample and 30% as test sample. The results show that, poverty, parental level of education and the age at the first work increase the probability of drop out the school.