

## Education, Employability and Women Choice Occupation in Mali: an Urban/Rural Comparison

Fadogoni Diallo<sup>1</sup>, Breïma Traore<sup>2</sup> & Adama O. Traore<sup>3</sup>

### Abstract

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This article discusses the effects of education on the employability of rural/urban women and their choice to work in the labor market in Mali using data from the National Institute of Statistics, 2017. The main purpose is to analyze these effects. The probability of women entering the labor market is estimated from a *Logit* model and that of their choice of occupation by a *Tobit*. This analysis shows that women's education has a negative and significant impact on their risk of employability and choice of occupancy in any environment. On the other hand, their chance of entering the job market and choice of occupation is appreciated with literacy. The age of women and the head of the household negatively affects the likelihood that a woman may be employable. In rural areas, women's employability increases with the polygamous regime. Nevertheless, single women are less likely to enter the labor market. Poverty has a positive effect on the employability of women in rural area.

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**Keywords:** Education - Employability - Rural Area - Urban Area

### 1. Introduction

According to human capital theory, education is an economic investment (Becker, 1964; Schultz, 1963). Education increases workers' productivity skills and, de facto, constitutes a form of human capital. Current economic and social systems increasingly require new skills and a combination of skills, education is seen as the best social instrument to train and select workers who will be more productive. From a similar perspective, sociologists with a functionalist tendency, such as Sorokin (1959) and Parsons (1974), argue that education is a factor of social mobility and that, since an individual's level of education is the main factor determining his socio-economic status in the occupational hierarchy, they find that the most educated reach higher professional positions and obtain higher incomes than the least educated. There is indeed a close relationship between wages and job type on the one hand, and educational attainment on the other.

In sub-Saharan Africa, education is often seen as the main tool in the fight against poverty, which can help people access better jobs to increase their labor income. Nevertheless, in practice, if education is strongly reaffirmed as an intrinsic component of development and human well-being in this region (notably through the Millennium Development Goals and the Education for All initiative), is its economic efficiency more contested? It is widely acknowledged that the gap between education and employment is widening. Most cities in sub-Saharan Africa are characterized by rising unemployment, especially among educated workers. For example, there is an explosion in the number of highly skilled young people who are unable to find a job in the formal sector that matches their qualifications.

In Mali, the Modular and Permanent Household Survey (EMOP 2017) provides results on women's employment. Thus, in rural areas, 89.3 percent of women with no education are employed; 7.7 percent have reached fundamental level 1 and 2.3 percent have reached fundamental level 2, and less than 1 percent have reached secondary and superior levels.

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<sup>1</sup> Enseignant chercheur à la Faculté des Sciences Economiques et de Gestion de Bamako (Mali). E-mail : [fsegroupe@gmail.com](mailto:fsegroupe@gmail.com)

<sup>2</sup> Enseignant chercheur à la Faculté des Sciences Economiques et de Gestion de Bamako (Mali)

<sup>3</sup> Enseignant chercheur à la Faculté des Sciences Economiques et de Gestion de Bamako (Mali)

In urban areas, we note that 61.6 percent of women without a level have a job compared to 17.8 percent for women who have reached fundamental level 1 and 11.4 percent for those who have reached fundamental level 2, and finally 6.7 percent and 2.5 percent respectively for those who have reached secondary and superior levels. The results also show that 7.5 percent of rural women without a level work as wage earners, 63.8 percent as self-employed and 28.7 percent as family helper. From the analysis of these statistics, the question that emerges is what is the influence of education on women's employability in Mali and their choice of occupation?

Employability nowadays refers to the ability to remain in employment, or to reintegrate professionally in a context where economic, technological and organizational changes inevitably affect jobs and employment (Gazier, 1999). For him, employability is a term that summarizes the problems of our time. This definition, although topical, hides another dimension of employability, namely the skills needed to obtain a first paid job. To address this, Hillage and Pollard (1998) and Abraham (2003) define employability as the ability to obtain an initial job, maintain oneself and obtain a new job if necessary. However, Brown *& al.* (2003) argue that this definition ignores the fact that employability is essentially determined by the labor market rather than by individual capabilities. Ultimately, employability refers to the acquisition of skills (knowledge, skills, and abilities) that enable an individual to obtain and maintain employment given the characteristics of the labor market. It refers to the probability of being employed or continuing to be employed (Ledrut, 1966).

The objective of this research is to analyze the influence of education on women's employability in Mali and their choice to take up employment on the labor market, by making a comparison between urban and rural areas. Following the introduction, the second section analyzes the effects of human, social and economic capital on job search. The third section deals with methodology. It discusses neoclassical of labor supply, employability and occupational choice models. The fourth section analyses and discusses the results and the fifth section is devoted to the conclusion.

## **2. Effects of human, social and economic capital on job search.**

The publication of articles by Lin *& al.* (1981); Lin *& al.* (1981) raised debate. According to these authors, the socio-economic status acquired by the individual is associated more with the social capital invested in job search than with the human capital at his disposal. The replication studies published as a result of these articles concluded that, in the United States and Europe, it's human capital that more explains the socio-economic status (prestige of the profession and employment income) of the individual (Marsden and Hurlbert, 1988; De Graaf and Flap, 1988; Wegener, 1991). However, in relation to human capital, Lin (1999, 2001a) continues to argue that it is the individual's social capital that has the greatest influence on socio-economic status.

On the face of it, it's therefore difficult to decide the question, at least two reasons underlie this controversy. First, human capital (education) and social capital are interrelated. For example, parents of high socio-economic status and well integrated into social networks facilitate their children's access to high levels of schooling. Moreover, it is the most educated who have rich social capital (Boxman *& al.*, 1991).

Second, job search and recruitment practices vary from one social context to another. The rules for using social relations in this regard follow the same logic (Wegener, 1991, De Graaf and Flap, 1988), making the process of acquiring socio-economic status more complex to study. In other words, the use and influence of social relations on the labor market varies from one socio-economic context to another. Depending on their economic, political and cultural organizations, traditions and level of technological development, some companies allow intermediate persons to be involved in the recruitment and hiring process. On the other hand, others are less tolerant and are strict about formal labor market rules. In this regard, De Graaf and Flap found that the use of personal contacts to find a job is used by 30 percent of job seekers in Holland, 40 percent in the former Federal Republic of Germany and 60 percent in the United States. In some eastern societies such as Taiwan, Singapore and China, people tend to use informal channels (family relationships and personal knowledge) more than formal channels to obtain employment or promotion (Bian, 1997; Bian and Ang, 1997).

As Wegener (1991) notes, the use and effect of social relations in job search depends on the socio-political organization of each society. According to him, the less recruitment and hiring are subject to public regulations, the more personal contacts have a positive influence on access to employment and acquired status, as in the United States. On the other hand, the more recruitment and hiring are regulated and strictly controlled by public authorities, the less decisive is the influence of personal contacts, as in Germany and Holland, for example.

Empirical studies support the thesis that education explains the socio-economic status of the individual. Ishida and *al.* (1995) examined the relationship between education and social mobility in 10 countries with different levels of economic development: United Kingdom, France, Hungary, Republic of Ireland, Japan, Northern Ireland, Poland, Switzerland, Sweden and the former Federal Republic of Germany. They found that, with the exception of practitioners in the agricultural sector, qualified training granted high socio-economic status regardless of the social class of origin. Similarly, the various research studies conducted in Canada show that there is a positive relationship between education and access to employment. These studies statistically show that not only do the better educated tend to enter the labor market more easily in a shorter period of time, but they are also more likely to have access to a good job, that is, permanent, full-time, better paid and socially valued (Audet 1998; Davies, Mosher and O'Grandy, 1994; Gauthier &*al.*, 1997; Statistics Canada, 1986, 1991, 1999d).

Recognizing that there is a positive relationship between educational attainment and socio-economic status, other sociologists and economists show that education is not the only factor explaining access to employment. The distribution of occupations in the labor market is also influenced by socio-economic factors, such as labor market structure, socio-economic conditions, workplace experience, etc.

The distribution of occupations is also influenced by the social capital available to an individual or group of individuals. In reality, the recruitment and hiring of new employees is not only based on the law of supply and demand, but is also influenced by the social interactions between the job seeker and the employer. These interactions may result from direct exchanges between the job seeker and the employer. They can also come from indirect influences, resulting from intermediaries or references who intervene in favor of the job seeker with the employer. The possibility of being recruited and hired then belongs to the one who can get the right references from the members of the networks with power (Putnam, 1996; Burt, 1992). Some job seekers are part of influential socio-economic networks and have good social capital, while others are more likely to be in poor networks. Access to these social networks depends strongly on the social characteristics of the individual.

The influence of individual characteristics on job search patterns was examined by Beduwé and Cahuzac (1997), Epiphane and Martinelli (1997) and Forsé (1997, 2004). These authors find that the approach used to access employment varies according to social characteristics (socio-economic status of the job previously held, social origin, gender, age, marital status, etc.). They also argue that, in turn, these job search instructions predict the socio-economic status of the job obtained. For example, compared to other job seekers, unemployed people use family relationships more to get a job; young graduates and trainees are recommended more by their schools, while those who already hold a job are recommended by their employer (Forsé, 1997).

Overall, adult jobseekers, better educated candidates, children of civil servants and managers use the most effective job search methods such as competitions, contact with employers and advertisements (Epiphane and Martinelli, 1997). On the other hand, the less educated, those destined for the trades of workers and inferiors, graduates from modest backgrounds and the younger ones rely more on family and personal relationships. However, the authors find that, regardless of the level of education, this job search method generally does not provide the best jobs (Epiphane and Martinelli, 1997).

Social characteristics explain the job search process and the difficulties encountered during post-graduate professional integration (Beduwé and Cahuzac, 1997). These difficulties vary with the same variables cited (age, gender, social origin, marital status). Thus, they find that women, unmarried people and younger graduates are more likely to experience more difficult pathways to employment than men, married and older people.

Similarly, job search instructions predict the employment status obtained, while competition, the use of advertisements and contacts with the employer increase the probability of finding stable employment, the use of employment agencies tends to lead to precarious employment (Forsé, 1997). All the evidence suggests that social characteristics directly or indirectly influence the type of employment and salary achieved by the graduate in the medium term on the labor market. In general, the likelihood of moving into a higher position in the occupational hierarchy (e.g., becoming a business executive) is higher among male, married, executive and older candidates (Beduwé and Cahuzac, 1997; Forsé, 1997). They also increase if the graduate has been in paid employment or has completed an internship before the end of schooling. Having had paid employment before graduation increases the probability of escaping unemployment and is what Beduwé and Cahuzac call pre-integration. This pre-integration presents an asset for accessing a good job because: "Creating links within the company during training - either by internship or by paid activity increases the chances of occupying a valued social position" (Beduwé and Cahuzac, 1997).

Examining the influence of work-study programs among college graduates in Quebec, Veillette (2004) found that the probability of accessing full-time employment in the field of study is higher among candidates who completed an internship in a company before graduation. All this leads us to conclude that the characteristics of the job performed by the new graduate cannot be explained solely by his or her education, or by the contacts made to find the job, or by his social characteristics. Rather, it is the result of complex influences from all these factors. Before establishing an analytical model in which we include all these concepts, let us briefly review the theories of human capital and social capital.

### 3. Methodology

#### 3.1. Neoclassical labor supply model

The microeconomic analysis of participation or career guidance is based on the neoclassical model of trade-offs between paid work and leisure. Today, in the economic literature, it is a model that serves as a conceptual framework for reflection and for which the fundamental assumptions are unrealistic.

Assuming the rational individual, this model is presented as a program to maximize the utility function, which depends on both working time and consumer goods needs, under income and disposable time constraints. The basic program is written:

$$\max_{lei;C;L} U(lei, C)$$

- Under the constraint of the maximum time available:  $lei + L = T$ ;

- Under income constraint:  $Pc * C = \omega * L + v$ ;

- And under the constraints of positivity of endogenous variables:  $lei \geq 0$ ; and  $C \geq 0$ .

With  $U$  defining the utility function of the individual, which is a function of the time spent on  $lei$  leisure and consumption  $C$ .  $Pc$  the price vector associated with the consumption vector,  $\omega$  the hourly wage,  $L$  the time spent by the individual on work and non-wage income  $v$ . By making the necessary assumptions about the functional form of utility, we can determine an optimal solution that verifies first and second order conditions.

The labor supply model could be summarized as follows:

$$L = 0 \text{ if } \omega \leq \omega_r$$

$$L > 0 \text{ if } \omega > \omega_r$$

According to this model, the criterion for labor market participation is the reservation wage  $\omega_r$ . Thus, to obtain an optimal level of satisfaction, the rational individual arbitrator between allocating his time to professional activity and allowing himself more leisure. The latter would only take part in the professional activity if the extra utility obtained by the consumer goods allowed by the last hour worked is equal to the increase in well-being that the same hour spent in leisure time would provide (Cadoret *et al.*, 2009).

#### 3.2. Employability model

Analyzing employability means determining the probability that a person will enter or not enter the labor market by mobilizing individual and structural variables. It's then a question of explaining whether or not the event "integration into the labor market" has occurred. For each individual in the sample, we observe whether or not he is employed and

we ask:

$$Y_i = \begin{cases} 1 & \text{if the individual is occupied} \\ 0 & \text{if the individual is not occupied} \end{cases} \quad (1)$$

Thus, the probability that an individual in the sample will be employed can be defined as the mathematical expectation of the variable  $Y_i$  since:

$$E[Y_i] = Pr(Y_i = 1) * 1 + Pr(Y_i = 0) * 0 = Pr(Y_i = 1) = p_i \quad (2)$$

The *logit* model defines the probability associated with the event  $Y_i = 1$  as the value of the distribution function of the logistics law considered in point  $X_i\beta$ :

$$p_i = \Lambda(X_i\beta) = \frac{1}{1 + e^{-(X_i\beta)}} \quad \forall i = 1, \dots, N \quad (3)$$

The model to be estimated is given by:

$$Y_i = X_i\beta + \mu_i \quad (4)$$

Where  $Y_i$  is the variable explained,  $X_i$  a vector of observable characteristics,  $\beta$  the vector of the parameters to be estimated and  $\mu_i$  the disturbance vector according to a standard logistics law.

The coefficients of the *Logit* models are defined to the nearest multiplicative constant, so they are not directly interpretable. The simplest method for obtaining directly interpretable coefficients is to calculate the impact of an explanatory variable directly on probability. The simplest case is when the explanatory variable is binary; it is sufficient to compare the two states  $\{0, 1\}$ . In the case of a quantitative explanatory variable, two reference points should be used; for example, by comparing the effect of the transition from the first to the third quartile. Two types of measures are used in the literature: on the one hand, the direct effect of the explanatory variable on the probability or incremental effect; on the other hand, the effect of an explanatory variable on the odds ratio that we will apply in this research.

Consider the case of a single binary explanatory variable,  $X \in \{0, 1\}$ . The following function gives the chances that event  $Y = 1$  will occur in relation to event  $Y = 0$ :

$$OR = \frac{\Pr(Y = \frac{1}{X})}{\Pr(Y = \frac{0}{X})} = \frac{F(\beta_0 + \beta_1 X)}{1 - F(\beta_0 + \beta_1 X)}$$

This is the probability ratio for the same value of  $X$  ("the odds function"). To see the effect of  $X$  on this ratio, we use the "odds ratio":

$$\psi_X = \frac{R(1)}{R(0)}$$

$$\text{Either } \psi_X = \frac{\frac{F(\beta_0 + \beta_1 X)}{1 - F(\beta_0 + \beta_1 X)}}{\frac{F(\beta_0)}{1 - F(\beta_0)}}$$

This ratio indicates the change in the chances of obtaining the event  $Y = 1$  when moving from sub-sample  $X = 0$  to sub-sample  $X = 1$ . The coefficient  $\beta = (\beta_0, \beta_1)'$  is generally estimated with many other variables so that it is an "all other things being equal" effect.

### 3.3. Occupation Choice Model

To characterize the choices for professional integration, it is necessary to have information on the different market segments. Mali presents data on the three sectors of activity: **Employees; Self-employed workers; Family helper.** These three types of orientation are the ones that make it possible to characterize the active population, and therefore the labor supply. The "two-step" *Tobit* is the method used to model women's labor supply. In fact, reducing the starting population by considering the actual labor supply could create a selection bias. This bias is taken into account by the Mills ratio ( $\lambda$ ).

In this model, an individual could work as a self-employed, family helper or employee. In any case, its decision on the direction of its activity always depends on maximizing its usefulness. Indeed, the choice of a professional position is made in comparison with its usefulness in relation to other alternatives simultaneously. The individual will therefore have to choose from a list of  $K$  ( $K = 1, \dots, 3$ ) possibilities knowing the current state of his human capital level (Age, Literacy, Education level, etc.), the conditions in which he evolves (Household size, Religion etc.). Therefore, three dichotomous variables should be used in the labor supply model: Self-employed ( $Y_1^*$ ), Employee ( $Y_2^*$ ) and Family Assistance ( $Y_3^*$ ).

The labor supply model can be summarized through the following formalism:

$$\begin{pmatrix} Y_{ij}^* = \alpha_j' X_{ij} + \psi_j \hat{\lambda}_i + \eta_{ij} \\ Y_{ij} = 1, \quad Y_{ij}^* > 0, \\ 0 \text{ sinon} \end{pmatrix}$$

With the  $Y_{ij}^*$  representing the different occupations ( $j$ ) for the individual ( $i$ ),  $X_i$  his individual and social characteristics, the  $\alpha_j = (\alpha_j', \psi_j)$  are the parameters of the model and  $j \in \{1, \dots, 3\}$ .

This formalization presupposes that individuals decide to position themselves on the labor market, such as an employee, by having made a simultaneous choice between the proposed alternative career paths. Estimates of women's labor supply patterns would thus make it possible to determine the factors that are more decisive in their choice of orientation.

As in the dichotomous case, the coefficients cannot be interpreted directly, it can only be argued that a positive coefficient increases the probability of being in a category (compared to the reference category) and vice versa for a negative coefficient. The interpretation of the coefficients is therefore more difficult here than in the binary models because they relate to the category referred to. For an easier interpretation, the model can be transformed into relative risks, that is to say, by looking at how a variable modifies the ratio of the probability studied to the base probability.

The data for this study come from the EMOP 2017 of the National Institute of Statistic of Mali (INSTAT).

**Table 1: Description of the variables:**

<b>Variables</b>	<b>Descriptions</b>
<b>Age women</b>	Age of the women surveyed
<b>Age square women</b>	Age squared of women surveyed
<b>Gender of the head of household</b>	Dichotomous variable: 1=Woman, 0=Male.
<b>Age of head of household</b>	Age of heads of households
<b>Age squared head of household</b>	Age squared of heads of households
<b>Relationship to the head of household</b>	Category variable: Chief's child, Head of household, Chief Wife, Chief's mother or wife and others
<b>Marital status</b>	Category variable: Monogamous married, Polygamous married, Single, Divorced/widowed
<b>Nationality</b>	Dichotomous variable: 0 = Other, 1=.Malian
<b>Religion</b>	Category variable: Muslim, Christian, Other
<b>Place of birth</b>	Category variable: location, other location
<b>Women's educational level</b>	Category variable: No level, Fundamental 1 or Basic 1, Fundamental 2 or Basic 2, Secondary school, Superior
<b>Education level of the head of household</b>	Category variable: No level, Primary school, Secondary school, Superior
<b>Household size</b>	Category variable: 1 - 3 people, 4-7 people, 8-10 people, 11-15 people and more than 15 people
<b>Literacy</b>	Dichotomous variable: 0=No, 1=Yes.
<b>Poor</b>	Dichotomous variable: 0=No, 1=Yes.
<b>Choice of occupation</b>	Dependent variable with 3 modalities: Self-employed worker; Employee; Family helper
<b>Activity status</b>	Dependent variable with 2 modalities: Unemployed, employed

*Source: Authors based on EMOP 2017 data*

#### **4. Presentation and analysis of the results**

##### **4.1. Employability of rural/urban women: results and discussions**

The results of the estimates from the *Logit* model relating to the probability that a woman can enter the labor market according to her place of residence (rural/urban) are presented in table 2.

Table 2: Employability results of women in rural/urban areas with the odds ratio

Variables	Rural area		Urban area	
	Coef	Odds Ratio	Coef	Odds Ratio
	P>  z	P>  z	P>  z	P>  z
<b>Age women</b>	-0.154***	0.857***	0.0338	1.0344
<b>Age square women</b>	0.003***	1.003***	0.0008	1.0008
<b>Gender of the head of household</b>				
Male	Ref.	Ref.	Ref.	Ref.
Female	-0.552	0.576	-0.1884	0.8283
Age of head of household	-0.069*	0.933*	-0.0076	0.9924
<b>Relationship to the head of household</b>				
Head of household	Ref.	Ref.	Ref.	Ref.
Chief Wife	0.328	1.389	-0.021	0.980
Chief's child	-1.121	0.326	-0.505	0.604
Chief's mother or wife	-1.833	0.160	-0.733	0.481
Other members	-0.096	0.908	-0.291	0.747
<b>Marital status</b>				
Monogamous married	Ref.	Ref.	Ref.	Ref.
Polygamous married	0.388*	1.474*	0.309	1.362
Single	-1.823***	0.162***	-0.906***	0.404***
Divorced/widowed	-0.162	0.851	-0.848**	0.428**
<b>Religions</b>				
Muslim	Ref.	Ref.	Ref.	Ref.
Christian	-0.291	0.748	0.360	1.433
Other religions	0.558	1.748	-0.750	0.473
<b>Place of birth</b>				
Location	Ref.	Ref.	Ref.	Ref.
Other location	0.457	1.579	0.088	1.092
<b>Women's educational level</b>				
No level	Ref.	Ref.	Ref.	Ref.
Fundamental 1	-0.124	0.883	-0.092	0.912
Fundamental 2	-0.412	0.662	-0.587**	0.556**
Secondary school	-0.475	0.622	-1.339***	0.262***
Superior	-2.956***	0.052***	-1.805***	0.164***
<b>Education level of the head of household</b>				
No level	Ref.	Ref.	Ref.	Ref.
Primary school	0.032	1.033	0.280	1.323
Secondary school	-0.509	0.601	0.208	1.232
Superior	-1.193	0.303	0.320	1.377
<b>Household size</b>				
1 - 3 people	Ref.	Ref.	Ref.	Ref.
4 - 7 people	0.046	1.047	-0.221	0.802
8 - 10 people	-0.535	0.586	-0.463	0.629
11 - 15 people	-0.493	0.611	-0.197	0.821
More than 15 people	-0.170	0.844	0.214	1.238
<b>Literacy</b>				
No	Ref.	Ref.	Ref.	Ref.
Yes	0.470*	1.600*	0.088	1.092
<b>Poor</b>				
No	Ref.	Ref.	Ref.	Ref.
Yes	0.407**	1.503**	-0.163	0.850
Constant	6.376***	587.3***	1.113	3.044
	Number of obs = 3839		Number of obs = 2142	
	LR chi2(28) = 787.34		LR chi2 (28) = 433.70	
	Prob > chi2 = 0.0000		Prob > chi2 = 0.0000	

Note: \*significant at the 10 percent level, \*\* significant at the 5 percent level, \*\*\* significant at the 1 percent level, Ref = reference mode, **Reference alternative: Unemployed**

Source: Authors based on EMOP 2017 data

In rural area, age has a negative and significant impact on the probability of a woman entering the labor market at the 1 percent level. The age square is also positive and significant at the same threshold. This situation shows that access to employment is a decreasing function of women's age up to a certain range where the relationship is reversed. In other words, an additional year reduces a woman's employability probability by 14.3 percent, up to a certain level above which she increases the probability. On the other hand, in urban area, the results show that women's age does not have a significant impact on women's employability. These results invalidate Ejaz's (2011) results on Pakistan and Mba Eyene (2012) on Cameroon and Mali. He finds that the probability of being employed increases with age up to a certain level.

There is a significant reduction at the 10 percent level the probability of a woman having work in the market, in rural area, by the age of the head of household. In other words, the probability of having a job decreases with the age of the head of the household up to a certain level above which an additional year increases it. The square of the age of the head of household is positive and significant. With regard to the urban environment, the effect of the age of the head of household on women's employability is not significant. The risk of a rural woman entering the labor market increases significantly with the polygamous regime. Women involved in polygamy are 1.47 times more likely to be employable than married monogamous women. This result is generally explained by the fact that polygamous women often play the role of households heads, it is they themselves who bear the family's expenses, which makes them more active in the labor market than monogamous women. These results are in contradiction with those of Ejaz (2011) on Pakistan.

Compared to single women, the probability of their employability decreases by 83.8 percent compared to married monogamous women. Unemployment among single rural women may be due to the fact that they do not have enough expenses compared to those under monogamous regimes. We also note that in urban area single women are less likely to be employable compared to married monogamous women. This situation can be described by the fact that single women are dependent on their parents for support, which leads them not to engage in some activity compared to married monogamous women.

The results show that divorced and widowed women are less likely to have a job compared to monogamous married women, having divorced or widowed status decreases the probability of having a job by 57.2 percent. We find that rural women with higher education are less likely to be employable compared to women with no education, with an OR of 0.05, which means that the probability of having a job decreases by 94.8 percent compared to women with no education. In the urban area, the analysis shows that women who have reached fundamental 2, secondary and superior levels are less likely to be employable compared to those without. These results lead us to ask ourselves the question about the quality of the Malian education system. These results confirm those of Ejaz (2011) on Pakistan, on the other hand, contradict those of Mba Eyene (2012) on Cameroon and Paterno *&al.* (2006) on Morocco. This situation can be explained by a mismatch between the labor market and the education system, in addition to the fact that women with no level of education are willing to engage in precarious activities.

The employability risk of rural women increases significantly with literacy. Women who can read and write are 1.6 times more likely to be employed than those who are not literate. This result contradicts that of Gakou and Kuépié (2008) on Mali. On the other hand, in urban area, the literacy factor has no impact on women's employability.

In rural area, women's standard of living has an impact on the employability of rural women, the poorer they are, the more likely they are to be employed 1.5 times compared to non-poor women. These results are confirmed by those of Mba Eyene (2012) and Gakou and Kuépié (2008) on Mali. In the urban area, poor women are less likely to be employed, but the impact is not significant.

#### **4.2. Occupation choices of rural/urban women: results and discussions**

The results of the *Tobit* model's estimates of rural and urban women's choice of occupation are presented in Tables 3, 4, 5, 6.



Table 3: Analysis of rural women's choices of occupation

Variables	Rural area		
	Employee	Independent	Family helper
	Coef P>  z	Coef P>  z	Coef P>  z
<b>Age women</b>	-0.169	-0.215*	-0.179*
<b>Age square women</b>	0.005***	0.005***	0.004***
<b>Gender of the head of household</b>			
Male	Ref.	Ref.	Ref.
Female	-0.516	0.348	-1.140***
Age of head of household	-0.031	-0.085	-0.008
Age square head of household	0.000	0.001	0.000
<b>Relationship to the head of household</b>			
Head of household	Ref.	Ref.	Ref.
Chief Wife	-0.665	0.791	1.704
Chief's child	-2.814*	-2.266	-0.939
Chief's mother or wife	6.773	8.387	9.358
Other member	-1.054	-0.026	1.172
<b>Marital status</b>			
Monogamous married	Ref.	Ref.	Ref.
Polygamous married	-0.004	0.061	0.181
Single	-1.288	-2.796***	0.661
Divorced/widowed	-0.868	0.032	0.134
<b>Nationality</b>			
Malian	Ref.	Ref.	Ref.
Other country	13.227	12.150	13.718
<b>Religions</b>			
Muslim	Ref.	Ref.	Ref.
Christian	-0.175	0.501	2.127***
Other religions	-2.678**	-0.449	1.468**
<b>Place of birth</b>			
Location	Ref.	Ref.	Ref.
Other location	-0.915**	0.279	0.519
<b>Women's educational level</b>			
No level	Ref.	Ref.	Ref.
Fundamental 1	-0.873**	0.081	-0.271
Fundamental 2	-0.353	0.098	-1.009*
Secondary/Superior	-1.602	-4.216***	-3.836***
<b>Education level of the head of household</b>			
No level	Ref.	Ref.	Ref.
Primary school	0.334	0.198	-0.381
Secondary school	1.332	-0.732	-2.463**
Superior	-0.675	-1.034	-3.432**
<b>Household size</b>			
1 - 3 people	Ref.	Ref.	Ref.
4 - 7 people	0.780	0.249	-0.126
8 - 10 people	0.428	0.043	-0.175
11 - 15 people	0.384	0.099	-0.281
More than 15 people	1.664**	1.385**	0.665
<b>Literacy</b>			
No	Ref.	Ref.	Ref.
Yes	1.818***	0.513	0.296
<b>Poor</b>			
No	Ref.	Ref.	Ref.
Yes	0.467	-0.696*	0.157
IMR2	-1.780	-0.706	4.068
Constant	3.116	7.451***	2.076

Number of obs = 3784

LR chi2(87) = 1397.12

Prob &gt; chi2 = 0.0000

Note: \*significant at the 10 percent level, \*\* significant at the 5 percent level, \*\*\* significant at the 1 percent level, Ref = reference mode, **Reference alternative: Unemployed**

Source: Authors based on EMOP 2017 data

**Table 4: Analysis of rural women's occupational choice with the relative risk model**

<b>Rural area</b>			
	<b>Employee</b>	<b>Independent</b>	<b>Family helper</b>
	RRR	RRR	RRR
<b>Variables</b>	P>  z	P>  z	P>  z
<b>Age women</b>	0.845	0.807*	0.837*
<b>Age square women</b>	1.005**	1.005***	1.004**
<b>Gender of the head of household</b>			
Male	Ref.	Ref.	Ref.
Female	0.597	1.417	0.320*
<b>Age of head of household</b>	0.969	0.918	0.992
<b>Age square head of household</b>	1.000	1.001	1.000
<b>Relationship to the head of household</b>			
Head of household	Ref.	Ref.	Ref.
Chief Wife	0.514	2.205	5.499
Chief's child	0.060*	0.104	0.391
Chief's mother or wife	873.603	4388.484	11596.780
Other members	0.349	0.975	3.227
<b>Marital status</b>			
Monogamous married	Ref.	Ref.	Ref.
Polygamous married	0.996	1.063	1.199
Single	0.276	0.061***	1.937
Divorced/widowed	0.420	1.032	1.143
<b>Nationality</b>			
Malian	Ref.	Ref.	Ref.
Other	555199	189065	906926
<b>Religions</b>			
Muslim	Ref.	Ref.	Ref.
Christian	0.840	1.651	8.387***
Other religions	0.069**	0.638	4.342**
<b>Place of birth</b>			
Location	Ref.	Ref.	Ref.
Other location	0.401	1.321	1.681
<b>Women's educational level</b>			
No level	Ref.	Ref.	Ref.
Fundamental 1	0.418**	1.085	0.762
Fundamental 2	0.703	1.103	0.365*
Secondary/Superior	0.202	0.015***	0.022***
<b>Education level of the head of household</b>			
No level	Ref.	Ref.	Ref.
Primary school	1.397	1.219	0.683
Secondary school	3.789	0.481	0.085**

<b>Household size</b>			
1 - 3 people	Ref.	Ref.	Ref.
4 - 7 people	2.181	1.283	0.882
8 - 10 people	1.534	1.044	0.839
11 - 15 people	1.468	1.104	0.755
More than 15 people	5.278**	3.997**	1.944
<b>Literacy</b>			
No	Ref.	Ref.	Ref.
Yes	6.161***	1.670	1.344
<b>Poor</b>			
No	Ref.	Ref.	Ref.
Yes	1.595	0.146**	1.170
<b>IMR2</b>			
Constant	22.548	0.493***	7.976
Number of obs = 3784			
LR chi2(87) = 1397.12			
Prob > chi2 = 0.0000			
Note: *significant at the 10 percent level, ** significant at the 5 percent level, *** significant at the 1 percent level, Ref = reference mode, <b>Reference alternative: Unemployed</b>			

Source: Authors based on EMOP 2017 data

**Table 5: Analysis of urban women's tenure choice**

Urban area			
	Employee	Independent	Family helper
	Coefficients	Coefficients	Coefficients
Variables	P>  z	P>  z	P>  z
<b>Age women</b>	-0.071	0.114	-0.387**
<b>Age square women</b>	0.003	0.000	0.006***
<b>Gender of the head of household</b>			
Male	Ref.	Ref.	Ref.
Female	0.215	-0.226	0.418
<b>Age of head of household</b>	-0.021	-0.014	0.111
<b>Age square head of household</b>	0.000	0.000	-0.001*
<b>Relationship to the head of household</b>			
Head of household	Ref.	Ref.	Ref.
Chief Wife	-0.216	-0.158	0.160
Chief's child	-0.321	-0.662	0.062
Chief's mother or wife	-1.353	-3.169**	0.136
Other member	-0.200	-1.067*	0.700
<b>Marital status</b>			
Monogamous married	Ref.	Ref.	Ref.
Polygamous married	-0.385	-0.146	0.655*
Single	-0.937	-0.687	-1.675
Divorced/widowed	-1.026	-0.095	-2.035**
<b>Religions</b>			
Muslim	Ref.	Ref.	Ref.
Christian	0.704	0.013	1.035
Other religion	-15.769	-0.658	0.654
<b>Place of birth</b>			
Location			
Other location	-0.025	0.849**	-0.698
<b>Women's educational level</b>			
No level	Ref.	Ref.	Ref.
Fundamental 1	-0.173	0.140	-0.464
Fundamental 2	-0.066	-0.861	-0.584
Secondary school	0.072	-3.279***	-16.195
Superior	-0.346	-4.160***	-17.548

<b>Education level of the head of household</b>			
No level	Ref.	Ref.	Ref.
Primary school	0.552*	0.461*	-0.266
Secondary school	0.100	0.433	-1.140
Superior	0.655	0.034	0.671
<b>Household size</b>			
1 - 3 people	Ref.	Ref.	Ref.
4 - 7 people	-0.376	-0.391	-0.041
8 - 10 people	-0.711	-0.380	-0.504
11 - 15 people	-0.094	-0.057	0.332
More than 15 people	-0.297	0.627	0.462
<b>Literacy</b>			
No	Ref.	Ref.	Ref.
Yes	0.643**	-0.293	-0.105
<b>Poor</b>			
No	Ref.	Ref.	Ref.
Yes	0.329	-0.481**	0.399
IMR2	1.061	5.517	-5.708
Constant	0.918	-1.888	3.765

Number of obs = 2142

LR chi2(87) = 1285.52

Prob > chi2 = 0.0000

Note: \*significant at the 10 percent level, \*\* significant at the 5 percent level, \*\*\* significant at the 1 percent level, Ref = reference mode, **Reference alternative: Unemployed**

Source: Authors based on EMOP 2017 data

**Table 6: Analysis of urban women's choice of occupation with the relative risk model**

Variables	Employee	Independent	Family helper
	RRR	RRR	RRR
	P>  z	P>  z	P>  z
<b>Age women</b>	0.931	1.120	0.679
<b>Age square women</b>	1.003	1.000	1.006***
<b>Gender of the head of household</b>			
Male	Ref.	Ref.	Ref.
Female	1.240	0.798	1.520
<b>Age of head of household</b>	0.980	0.986	1.118**
<b>Age square head of household</b>	1.000	1.000	0.999*
<b>Relationship to the head of household</b>			
Head of household	Ref.	Ref.	Ref.
Chief Wife	0.806	0.853	1.174
Chief's child	0.726	0.516	1.064
Chief's mother or wife	0.258	0.042**	1.146
Other member	0.819	0.344*	2.014
<b>Marital status</b>			
Monogamous married	Ref.	Ref.	Ref.
Polygamous married	0.680	0.864	1.925*
Single	0.392	0.503	0.187
Divorced/widowed	0.358	0.909	0.131**
<b>Religions</b>			
Muslim	Ref.	Ref.	Ref.
Christian	2.022	1.013	2.815
Other religion	0.000	0.518	1.923

<b>Place of birth</b>			
Location	Ref.	Ref.	Ref.
Other location	0.975	2.337**	0.498
<b>Women's educational level</b>			
No level	Ref.	Ref.	Ref.
Fundamental 1	0.842	1.150	0.629
Fundamental 2	0.936	0.423	0.558
Secondary school	1.075	0.038***	0.000
Superior	0,708	0.016***	0.000
<b>Education level of the head of household</b>			
No level	Ref.	Ref.	Ref.
Primary school	1.736*	1.585*	0.766
Secondary school	1.105	1.542	0.320
Superior	1.925	1.035	1.956
<b>Household size</b>			
1 - 3 people	Ref.	Ref.	Ref.
4 - 7 people	0.686	0.677	0.960
8 - 10 people	0.491	0.684	0.604
11 - 15 people	0.910	0.945	1.394
More than 15 people	0.743	1.872	1.586
<b>Literacy</b>			
No	Ref.	Ref.	Ref.
Yes	1.901**	0.746	0.900
<b>Poor</b>			
No	Ref.	Ref.	Ref.
Yes	1.390	0.618**	1.490
IMR2	0.346	248.818	0.003
Constant	2.504	0.151	43.142

Number of obs = 2142

LR chi2(87) = 1285.52

Prob > chi2 = 0.0000

Note: \*significant at the 10 percent level, \*\* significant at the 5 percent level, \*\*\* significant at the 1 percent level, Ref = reference mode, **Reference alternative: Unemployed**

Source: Authors based on EMOP 2017 data

Analysis of the effect of age on rural women's occupational choice shows that age is negative and the square is positive regardless of women's occupational choice. This means that the chance of being employable as an Employee, Self-employed or Family helper decreases with age to a threshold above which it begins to increase. In other words, an additional year decreases the chance of being employed as an employee by 1.18 times to a certain level where it increases the chance of occupancy by 0.99 times. Compared to Self-employed workers, an additional year reduces the risk of working as a Self-employed person by 1.24 times to a threshold before increasing the chance by 0.99 times. For Family helper, an additional year of rural women's age reduces the probability of being employed as a Family helper by 1.19 times to a threshold above which it increases the probability of entering the labor market by one time.

Regarding the choice of occupation of women in the urban area, the results show that women's age has an effect on the choice of occupation "Family helper", an additional year of women's age decreases by 1.47 the probability of working as a Family helper up to a certain threshold above which it increases the probability of working as a Family Caregiver.

We find that the gender of the head of household has an effect on the choice of employment. When the household is headed by a woman, the chance of rural women decreases by 3.12 times the risk of working as a Family Helper compared to male-headed households. Compared to women in urban area, we note that the gender of the household head has no impact on women's choice of occupation. The age of the household head influences the choice of occupation as a family helper for urban women, an additional year of the head of household increases the probability of working as a family helper up to a threshold above which it reduces the choice of occupation as a family helper. On the other hand, in rural area the age of the household head has no impact on the choice of occupation.

In rural area, girls' chances of being employed as wage earners are 16.67 times lower than women heads of households. In the urban area, we find that mothers of heads of households or wives and other family members are less likely to be self-employed. The results on the effect of marital status show that single rural women are less likely to work as self-employed than monogamous married women. Otherwise, the 1.16 times lower probability of working as a self-employed person when rural women are single. In urban area, it is divorced or widowed women who are less likely to work as family helper than monogamous married women. Women's marital status has a negative impact on the probability of taking up employment.

Regarding the effect of religion on choice of occupation, we note that rural women practicing the Christian religion or other religions are more likely to evolve as Family Helpers than those practicing the Muslim religion. On the other hand, we note that rural women who do not belong to the Muslim and Christian religions are less likely to be employed as wage earners than those who do not belong to the Muslim religion. In urban area, the religion factor has no effect on women's choice of occupation.

The impact of place of birth on rural women's choice of occupation is perceived when they choose to be employed. We note that women who were born in another locality are less likely to be employed than those who were born in their locality of residence. The chance of being employed as a wage earner decreases by 2.49 times when rural women are born in their locality of residence compared to those born in another locality. Compared to the urban area, the results show that women who were born in another locality are more likely to work as self-employed than those who were born in their locality of residence.

Rural women with fundamental level 1, their chances of working as wage earners decrease by 2.38 compared to women without a level. We note that having a secondary/superior level of education reduces the probability of working as a self-employed person by 66.67 compared to women without a level of education. Compared to family helper status, rural women with fundamental 2 and secondary/superior level education are less likely to be employable as family caregivers.

In urban area we find that women with secondary and superior level education are less likely to work as self-employed compared to women with no education. Women's education has a negative impact on their choice to take up employment. The education of women has a negative impact on their choice to work independently. The results confirm this assertion by Mba Eyene (2012) about Cameroon. Analysis of the effect of the head of household's level of education on women's choice of occupation shows that the risks of rural women under the supervision of heads of household who have secondary and superior education levels decrease by 45.45 and 2.74 respectively to work as Family Helpers compared to those who are under the supervision of heads of households without education levels. In urban area, the results show that, when a household head has the primary level, women are more likely to work as employees and are more likely to be self-employed than women under the supervision of heads with no education.

We also note that, when the size of the household exceeds 15 people, rural women are 0.19 times more likely to work as employees and 0.25 times more likely to work as self-employed than those with between 1 and 3 people. On the other hand, in urban area, the size of the household has no impact on women's choice of occupation. Women's literacy has a positive effect on being employed. The chance of literate women in rural and urban areas to work as wage earners increases by 0.16 and 1.34 times respectively compared to non-literate women.

Finally, the econometric study shows that, when rural women are poor, their chances of working as self-employed compared to non-poor women decrease by 2. In urban area we note the same results, women from poor families are less likely to work as self-employed.

## 5. Conclusion

The objective of this article is to analyze the effects of education on women's employability in Mali and their choice of jobs, by making a comparison between urban and rural areas, based on EMOP 2017 data. The results show that women's educational level has a negative effect on the probability of their integration into the labor market and their choice to take up employment regardless of their background. Education reduces women's employability opportunities. In rural area, literacy increases the risk of women's integration into the labor market. The risk of women taking up employment is assessed with literacy. The analysis also indicates that the level of education of the head of household has a positive and significant effect on women's choice of occupation in urban areas, but negatively significant in rural areas. We believe that there is a mismatch between the quality of the Malian education system and the labor market. Therefore, any educational policy must be accompanied by a reorganization of the Malian education system in general, a strengthening of the literacy of women in rural area to increase their access to the labor market and an encouragement of the access of girls to scientific fields in particular.

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