DETERMINANTS OF LABOR MARKET PARTICIPATION IN SENEGAL

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ABSTRACT
Access to employment is one of the main challenges of inclusive growth for most African countries. While the sub-Saharan Africa labor market offers only 3 million jobs, 11 million young people enter the labor market each year, a gap of around 8 million jobs per year (AfDB, 2017). From this paper, we evaluate, using a multinomial logit model (MLM), the impact of human capital on the probability of access to employment in the Senegal labor market with data from Senegal Poverty Monitoring Survey (2010-2011). The results obtained show that a significant increase in human capital makes it possible to hold a skilled job in Senegal. The accumulation of vocational and/or technical training has led to a considerable increase in skilled employment in Senegal.

JEL Classification codes: E24, J23, J24, J4

KEYWORDS: Human capital; Employment; Labor market; MLM; Senegal.

INTRODUCTION
Access to employment is one of the main challenges of inclusive growth for most African countries. In sub-Saharan Africa, 60% of the population, or 200 million, are under 25 years old. Among them, 11 million enter the labor market each year, while the sub-Saharan Africa labor market offers only 3 million jobs, a gap of around 8 million jobs per year (AfDB, 2017). WAEMU countries’ GDP growth will be in real terms at 6.8% in 2018 (Central Bank of West African States, 2018). Despite sustained economic growth for years and progress in education and training, the issue of employment remains a major challenge for many countries in sub-Saharan Africa. Research on human capital theory has shown that education is an economic investment that increases the productivity skills of workers and, de facto, is a form of human capital (Becker 1964, Schultz 1963). Education and training can be likened to investments that, accumulating, form a stock of professional skills, called “human capital” (Pierre and André, 2004). The state of the labor market in the West African Economic and Monetary Union (WAEMU) countries has always been one of the major concerns of the authorities of the zone. Since 2012, WAEMU countries have obtained from the African Development Fund (ADF) a foreign exchange donation of 20 million units of account to finance the Higher Education Support Project...
(ASPP) of the WAEMU countries. One of the three components of this project is "Support for reforms and harmonization of higher education systems in the WAEMU area". According to the Central Bank of West African States (2016), investments in human capital made in WAEMU countries have positively affected the efficiency of investments in other sectors. Thus human capital can be seen as a factor of human development in the area by its contribution to the acquisition of knowledge useful for insertion and the active participation of the population in the labor market. Therefore, the countries of the union must increase their level of investment in education and vocational training to enable the population to access quality jobs and sufficiently high wages. In the four WAEMU countries, much effort has been made in the sectors of education and training. This, with the aim of fostering strong growth and creating quality jobs.

In Senegal, unemployment first affects the youngest segment of the labor force (aged 15 to 35), with an unemployment rate of 16.7% in 2016 (National Survey of Employment in Senegal, 2016). Education thus absorbs 40% of the national operating budget (GCPHAL1, 2013). In fact, the budget voted for education was estimated at 499.8 billion FCFA in 2014. In the continuity of the reform of the education system implemented through the Ten-year Education and Training Plan (TEFP) that has been completed (2012), the Senegal's commitment to the education sector is reaffirmed through the "Program for improving the quality, ethics and transparency of the Education and Training sector "(PIQET-EF, 2013-2025). Indeed, the fundamental objective of this program is the improvement of access to education for all and the quality of it (NSES, 2018). According to UIS data, public spending on education in Senegal has increased from $ 471 to $ 2517 PPP (millions) between 2000 and 2014 (UIS, 2017). As a result, the Gross Primary School Enrollment rate increased from 62.8% in 2001 to 80% in 2013, and the weight of the population with tertiary education compared to the working-age population increased from 2.4% in 2011 to 4.8% in 2013 (SPMS2, 2011, GCPHAL, 2013). The population aged 25 and over with at least completed primary education (ISCED 1 or above) increased from 10.85% in 2006 to 27.35% in 2013 (UIS, 2017). This growth in the strengthening of human capital, however, contrasts with the rise in unemployment among the school population. In fact, in Senegal, the unemployment rate for people aged 15 and over is estimated at 13.4%, reflecting low participation of assets in the production of goods and services (NSES, 2016). And the unemployment rate of tertiary-level graduates is high at 31% in 2011 compared with 16% in 2005 (CABRAL et al, 2014). Despite efforts to invest in education, the economic situation in the four WAEMU countries is characterized by very high unemployment rates.

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1 General Census of Population, Housing, Agriculture and Livestock
2 Senegal Poverty Monitoring Survey
and a very low employment offer, implying the failure of the education system to respond at the request of the labor market. And yet, according to Becker and Schultz (1964), the more educated individuals are, the more likely they are in the labor market.

Faced with this paradoxical situation, the following question should be asked: does the accumulation of human capital enable individuals to access employment in the Senegal labor market?

The relationship between education and the labor market has attracted a lot of attention since Mincer’s study showed a correlation between income and the level of education attained (Mincer, 1958). In theory, education decisions are motivated by two aspects. First, education makes workers more productive and increases their earnings in accordance with human capital theory (Becker 1964, Schultz 1961). Secondly, education increases the duration of individual employability, and thus is a protection against exclusion. This is because more educated workers are also more productive, so firms agree to train them for longer. According to this vision, individuals and employers invest in training when they can expect a profit that exceeds the costs incurred. These include the direct costs of training but also the opportunity costs of the gains that we did not have because we were in training.

The objective of this paper is to evaluate the impact of human capital on the probability of access to employment in the Senegal labor market. The rest of the article is organized as follows. The first section presents stylized facts. Section 2 describes the state of the issue in the literature and Section 3 develops the Multinomial Logit Model (MLM) specification. The last section presents the results and discussion.

1. HETEROGENEITY OF PUBLIC EDUCATION EXPENDITURE AND EMPLOYMENT IN SENEGAL

Table 1 highlights public expenditures on education (% GDP) in the WAEMU zone and in Senegal particularly. The share of public expenditure as a percentage of GDP is 7.4% in Senegal against 4.5% in Sub-Saharan Africa. This table also highlights the share of public expenditure on education in the total expenditure of the States. In fact, education expenditures (% total expenditure) in Senegal has exceeded the average education expenditure of Sub-Saharan Africa (24.76% in Senegal versus 16.62% in Sub-Saharan Africa).
Table 1. Education Expenditures (% GDP) and (% Total Expenditures) in WAEMU

<table>
<thead>
<tr>
<th>WAEMU countries</th>
<th>Year</th>
<th>Education expenditure (% Pib)</th>
<th>Education expenditure (% total expenditures)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>2015</td>
<td>4,36</td>
<td>17,48</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>2015</td>
<td>4,06</td>
<td>18,03</td>
</tr>
<tr>
<td>Cote d'Ivoire</td>
<td>2015</td>
<td>5,03</td>
<td>21,17</td>
</tr>
<tr>
<td>Guinée-Bissau</td>
<td>2013</td>
<td>2,17</td>
<td>16,19</td>
</tr>
<tr>
<td>Mali</td>
<td>2014</td>
<td>3,74</td>
<td>18,22</td>
</tr>
<tr>
<td>Niger</td>
<td>2014</td>
<td>6,71</td>
<td>21,66</td>
</tr>
<tr>
<td>Sénégal</td>
<td>2014</td>
<td>7,40</td>
<td>24,76</td>
</tr>
<tr>
<td>Togo</td>
<td>2015</td>
<td>5,22</td>
<td>17,99</td>
</tr>
</tbody>
</table>

Sub-Saharan Africa | 2013 | 4,5 | 16,62

**Source:** WDI, UNESCO 2017

Table 2 shows the distribution of employment by sector in the WAEMU countries and in Senegal particularly. In Senegal, the level of employment is below the average for sub-Saharan Africa (5.494 in Senegal versus 7.153 million).

Table 2. Distribution of employment by sector in the four WAEMU countries

<table>
<thead>
<tr>
<th>Countries</th>
<th>Employment (%)</th>
<th>Total employment (milliers) (ages 15+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAEMU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benin</td>
<td>2013 42.7</td>
<td>47.8 47.8</td>
</tr>
<tr>
<td></td>
<td>9.5 12.2</td>
<td>4260</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>2013 84.7</td>
<td>12.2 31.1</td>
</tr>
<tr>
<td></td>
<td>3.1 5.5</td>
<td>7455</td>
</tr>
<tr>
<td>Niger</td>
<td>2013 56.9</td>
<td>31.1 31.1</td>
</tr>
<tr>
<td></td>
<td>11.1 31.1</td>
<td>5598</td>
</tr>
<tr>
<td>Senegal</td>
<td>2013 49.1</td>
<td>36.1 36.1</td>
</tr>
<tr>
<td></td>
<td>14.8 54.9</td>
<td>5494</td>
</tr>
</tbody>
</table>

**Reference**

Sub-Saharan Africa | 2013 | .. | .. | 7153

**Source:** WDI, ILO, 2017

2. LITERATURE REVIEW

Empirically, a 1% increase in the GDP of public investment in France would generate in the short term a GDP increase of 1.1% at three years and a reduction of 245 000 unemployed if it is financed by debt (OFCE, 2016). As a primary source of human capital, education increases the productivity of the workforce, improves and promotes growth (Dissou et al., 2016). Boutin (2010) conducts a study...
in Cameroon with data from ECAM 3 conducted in 2007 where she analyzes the determinants of access to employment using a probit model. The results reveal that the probability of accessing employment is higher for individuals with a primary or secondary education compared to individuals with no education or those with a higher level of education. In parallel, Nordman and Doumer (2012) find opposite results to those of Boutin on the link between level of education and access to employment. From the data of the 1-2-3 survey carried out between 2001 and 2003 in seven capitals of the WAEMU zone (all capitals except Bissau), the authors find with the help of a logit model that in Lomé, Cotonou and Abidjan, there is a positive correlation between unemployment and educational level, the chances of unemployment increase with the level of education. In other cities, however, unemployment and educational attainment form a bell curve. Individuals without a level of education have a lower probability of being unemployed. Their results show a positive impact of the diploma on remuneration with more pronounced effects for secondary and higher education diplomas. According to Chirache (2014), the unemployment rate in France of recent workers, with at most a college diploma, is 4.5 times higher than that of higher education graduates. Further, Nordman and Doumer (2012) show a clear correlation between level of education and quality of employment in WAEMU capitals, applying the segmentation “public, private formal, informal”. In the seven cities studied, 91% of those who did not complete primary education work in the informal sector. This proportion is 75% for those with a primary level, and only 19% for individuals who have completed higher education. Using a multinomial logit model, the authors show that an additional year of study increases the odds to integrate the public and the formal private sector than to work in the informal sector. However, Camara and Benjamin (2011) did a study in Ivory Coast and found a contradictory result to the human capital theory. Their results reveal that the higher the level of education, the lower the employability of young people. As for the formation of incomes, the level of education acts positively.

In Senegal, Cabral et al (2014) find the following results: (i) the socio-professional categories of the "low-skilled" are those where there is a shortage of manpower; then (ii) there is an excess of labor supply in the "unskilled" segment and in the "highly skilled" segment; and finally (iii) in the "highly skilled" labor market, supply is dominated by the non-youth segment. On the other hand, in all other segments of the market, young people account for most of the labor supply. These studies show us that human capital, measured by level of education, plays a predominant role in access to employment, even if qualification adequacy problems are noted.
3. METHODOLOGY

3.1. Classification of skilled employment and unskilled employment

With regard to the qualification of professions (skilled, unskilled), we have relied on the International Classification of Occupations- ISCO08, adapted to developing countries.

Table 3 presents the employment classification (skilled employed, unskilled employed) using ISCO-adjusted to developing countries and applied to Senegal. The skilled employed includes senior managers, engineers and related professionals, middle managers and supervisors, skilled employees and workers, semi-skilled employees and manual workers. Finally non-skilled employed includes informal self-employed persons, laborers, caregivers and apprentices.

<table>
<thead>
<tr>
<th>ISCO groups</th>
<th>Employment classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Senior manager, engineer and related</td>
<td>Skilled segment</td>
</tr>
<tr>
<td>2- Middle manager, master agent</td>
<td></td>
</tr>
<tr>
<td>3- Employee / skilled worker</td>
<td></td>
</tr>
<tr>
<td>4- Employee/ semi-skilled worker</td>
<td></td>
</tr>
<tr>
<td>5- Independent (seller, grower, tailor)</td>
<td></td>
</tr>
<tr>
<td>6- Maneuver</td>
<td></td>
</tr>
<tr>
<td>7- Help family</td>
<td>Unskilled segment</td>
</tr>
<tr>
<td>8- Apprentice paid or unpaid</td>
<td></td>
</tr>
</tbody>
</table>

Source: author, ILO (2013)

3.2. Model

The multinomial logit model (MLM) is our analytical model. This model is an extension of the simple logistic regression model. It was introduced by McFadden in 1968 and it allows to study situations where the individual must make a choice among several modalities. In unordered models, the variable to be explained represents the possibilities of choice of an individual among M + 1 possibilities and therefore his preferences. This is why they are also called random utility models.

The decision \( Y_i = j \) is retained if \( U_{ij} = Max (U_{i0}, U_{i1}, ... , U_{iM}) \)

Suppose that each individual has to choose between the three alternatives (j = 0 to 2) more precisely (unemployed, skilled employment and unskilled employment). What we seek to study is the unique decision of an individual among a number of unordered alternatives. In a model of unordered choices, the individual we will compare the different levels of utility associated to the various states,
and then we will opt for the one that maximizes its utility $U_{ij}$ among the $J$ states. For the individual $i$, the utility of the state $j$ is given by:

$$U_{ij} = \beta' Z_{ij} + \epsilon_{ij}$$

Where $Z_{ij}$ is a vector of individual characteristics (education level, vocational and/or technical training, age group, gender, residence place, etc.), $\beta$ is a vector of unknown parameters and $\epsilon_{ij}$ is a random error term. If the individual $i$ is in the state $j$, we shall consider that $U_{ij}$ is the greatest utility among the utilities considered by the individual $i$. In fact, the probability that the individual $i$ participates in sector $j$ corresponds to the probability that the utility of sector $j$ is greater than that associated with all other sectors:

$$P(U_{ij} > U_{ik}), \text{ with } k \neq j; j, k = 0, 1, 2$$

In many studies, the estimation of the reduced equation of labor force participation is done from this point using a multinomial logistic model. In this model, the probability that the individual $i$ is in the state $j$ is expressed by:

$$\text{Prob} \left( Y_i = j \right) = \frac{e^{\beta_j' Z_{ij}}}{\sum_{k=0}^{2} e^{\beta_k' Z_{ij}}}, \text{ with } j = 0, 1, 2 \text{ et } \beta_0 = 0$$

The estimation of the parameters will be done by the likelihood maximum method. The maximum likelihood estimators are obtained once again by canceling the partial derivatives with respect to the different parameters of the likelihood of the sample. We will admit the classical results on the asymptotic behavior of the estimators: asymptotic variance deduced from the Fisher information matrix, asymptotic normality of the maximum likelihood estimator, Wald tests, likelihood ratio etc. The odds ratio appear directly in the software outputs for the multinomial model.

3.3. Data and study area

Senegal

Senegal Poverty Monitoring Survey (2010-2011) of the National Agency for Statistics and Demography (ANSD) is used. Here. We focus on the active population and the final sample contains 12662 subjects.

4. RESULTS

Table 4 presents the results of the multinomial logit model (MLM) estimation for access to employment where the dependent variable is the employment state (described in Table 4) and for which the base is the alternative 0 (unemployed).

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3 Nerlove et Press [1973]
The overall significance test of the model shows that the model is globally significant. We then did the independence tests of the variables (likelihood ratio test, wald test) to check the partial significance of these variables. The LR test of alternative combinations, another test that we performed to check whether it makes sense to combine certain categories of the dependent variable - for example: whether it makes sense to combine "unemployed" and "skilled occupation". Finally, the independence test for irrelevant alternatives (IIA) has been validated for this model.

To clarify the effect of human capital, Table 4 gives the results of a simulation of the probability of being in a skilled job or an unskilled job using odds ratios.

In Senegal, an increase in the level of education significantly increases the probability of being in a skilled job. A one-point increase in the level of higher education leads to an increase in the probability of having a skilled job of 5.24 points in Senegal. In this country, the accumulation of vocational and/or technical training leads to a rise in skilled employment of 6.46 points. This finding is consistent with the work of the OECD (2012), which shows that people with the highest levels of education have the best job prospects.

In Senegal, the more educated the individual, the less likely he is to belong to the unskilled segment. Compared with the non-educated, a rise in higher-level human capital in the country significantly reduces the probability of entering an unskilled occupation. The chances of belonging to the unskilled segment decrease by 0.19 points for Senegal. In Senegal, the accumulation of vocational and/or technical training has led to a considerable increase in skilled employment.

Table 4: Effect of variables on the probability of access to employment in the four WAEMU countries (odds ration)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled employment</td>
<td></td>
</tr>
<tr>
<td>primary</td>
<td>1.49***</td>
</tr>
<tr>
<td>middle</td>
<td>1.64***</td>
</tr>
<tr>
<td>general secondary</td>
<td>2.17***</td>
</tr>
<tr>
<td>general high educ</td>
<td>5.24***</td>
</tr>
<tr>
<td>technic secondary</td>
<td>6.29***</td>
</tr>
<tr>
<td>technic high edu</td>
<td>6.46***</td>
</tr>
<tr>
<td>women</td>
<td>0.32***</td>
</tr>
<tr>
<td>rural</td>
<td>0.55***</td>
</tr>
<tr>
<td>AGE24_35</td>
<td>2.20***</td>
</tr>
<tr>
<td>AGE236_59</td>
<td>4.42***</td>
</tr>
</tbody>
</table>
Other individual characteristics that significantly affected the probability of belonging to the employment state are: gender, residence place, youth (AGE24_35), adults (AGE236_59), olders (AGE60_plus). Compared to men, women are at a disadvantage in all segments and in Senegal. In rural area, access to skilled employment is very limited in this country. However, the results reveal a strong presence of unskilled employment in Senegal in rural area. Compared to youths (AGE_15_24), the results reveal that age significantly increases the probability of belonging to the skilled segment in Senegal.

5. DISCUSSION

According to the results, an increase in the education level increases the probability of having a skilled job in the Senegal labor market. So education and skilled employment are positively correlated in Senegal.

CONCLUSION AND POLICY LESSONS

In this paper, we study, using a multinomial logit model, the impact of human capital on the probability of access to employment in Senegal. Empirical analysis reveals that:
A significant increase in human capital makes it possible to hold a skilled job in Senegal.

In Senegal, the accumulation of vocational and/or technical training has led to a considerable increase in skilled employment.

Compared to rural people who are mainly immersed in unskilled employment, urban households are more likely to be in a skilled job.

The results have important implications for serving education, vocational and technical training policies and labor market policies in the Senegal labor market:

- An education policy focused on the correction of imbalance between supply and demand for qualification in the Senegal labor market.
- An employment policy based on promoting access to decent and sustainable jobs and reducing unemployment;
- A technical and professional training policy of the workforce to increase the employability of it.

The extension of the study area and the consideration of the matching issue between labor market supply and demand for qualification seems original for future research.
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