

Occupational choices in Senegalese labour market: a multinomial logit analysis

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Abstract

For more than ten years, Senegal's budget share allocated to education has increased regularly. Today, this share stands at 40%, yet the students who graduate from the education system face enormous difficulty finding jobs. In 2001, only 22.6% of the job applications from people who had graduated from middle-level education were successful; only 43% of those from secondary school leavers were, and only 27.5% from those who had graduated from higher education were successful. This state of affairs is an illustration not only of the inability of the education system to satisfy the needs of the labour market, but also of the inability of this market to identify the skills that it needs.

The present study analyzed the participation in the labour market in Senegal by paying special attention to variables such as level of education, gender, area of residence, and age. It used data from the Senegal Poverty Monitoring Survey (ESPS, 2005) which used a sample of 13,600 households drawn from the entire country: 8,640 of them were urban households and 4,960 rural. The database contained about 123,600 individuals.

The study examined the participation of the working-age population (between 15 and 65 years) in the labour market. To estimate this participation, the study first used a simple logit (whether there was participation or not), and then a multinomial logit for those who said they participated in the labour market (in the public and semi-public sectors, the private sector, or in self-employment). Regarding the choice of activity sector, the study's findings show a great diversity depending on situation.

Key words: participation, occupational choices, labour market, multinomial logit

JEL Classification: I 21, I 38, J21, J24, J64

AKNOWLEDGMENTS

I'm grateful to African Economic Research consortium (AERC) for the grant and very useful comments of the resource persons (group A).

1. Introduction

According to the Senegal Poverty Monitoring Survey (ESPS, 2005), the rate of invisible underemployment (corresponding to the insufficient income drawn from employment) was 22.5%. Insufficient income concerns people who sought to increase their income in the seven days preceding the survey and who stated that they were ready to take up employment in the four weeks following the survey interview. It is because those individuals judged their incomes to be insufficient that they were ready to work more to increase their income. The rate mentioned above does not take into account the other type of invisible underemployment, namely that of the mismatch between employment and professional qualifications.

In Senegal, the magnitude of the imbalance between the offer of employment and the demand for it varies according to level of education. In this respect, job applications from individuals aged above 15 who did not go beyond primary school were found to be less numerous than jobs offered in the market. Moreover, while 22.6% of applications from graduates of middle-level education were successful, 43% of those from secondary-school leavers, and only 27.5% of higher education graduates were (QUID, 2001).

Beyond this overall level of education, the extent to which the graduates' area of study is specialized plays an important role in their productivity and in the performance of certain sectors of the Senegalese economy (Mbaye, 2002). Overall, 59.4% of the demand for employment was absorbed by the market, but there was quite a long period between the time the applicant graduated and securing a first job. According to a study carried out by Pôle de Dakar (2007), the average period of unemployment was longer than 12 months for 40% of job-seeking graduates. Before this study, another, namely UEMOA's 2002 survey 1-2-3, had shown that the average unemployment period in Dakar was 46.9% months (almost 4 years), and that the percentage for long-term unemployment was 64.5%.

This situation in Senegal meant that the opportunity cost of studies was less high than what it seemed to be; it is the option cost that was very high. Opportunity cost answers the following question: "What is lost when one pursues studies instead of using that time to do something else (notably, work)?" For its part, option cost answers this question: "What will have been lost if the studies one chose to do did not lead to the expected qualification (or the employment hoped-for)?"

The structure of the labor supply by level of education can influence the demand for education. The labour market is characterized by an information-related problem comprising two aspects: first, there is lack of sufficient information in the sense that someone cannot tell what economic situation will prevail when he/she graduates from the educational system; second, the information that is given is inaccurate. For instance, an overestimation of the value of the qualification obtained for the labour market is inaccurate information. In the long term, the difficulties which young people encounter in securing a job can have an effect on the functioning of the education system, not in the sense of reducing the demand for it, but of changing its structure. This can lead to a given type of industry being seen as more or less attractive depending on whether it provides employment quickly or not.

On the one hand, better job prospects lead to higher expected returns of education and thus, stimulate an increase in individual educational investment. On the other hand, an increase in aggregate educational effort enhances the average productivity of the workforce and fosters the development and dissemination of technological progress, which in turn stimulates job creation. However, the speed of technological change is not as rapid as the trends in the offering of education would make one believe. On closer examination, this is not surprising because even though technical and vocational education in Senegal has been enhanced to a certain degree, it is still far from the desired level. For instance, in 2003 there were 40 students in technical education per 100,000 in Senegal, while the average for countries of the Economic Community of West African States (ECOWAS) was 317 per 100,000 people (UNESCO-Breda, 2005).

Before a proper analysis of participation in the labour market in Senegal, this paper will first review the existing literature on the issue to learn more about the standard results obtained in other countries. It will then analyze the results obtained using a simple logit model and a multinomial logit model on the choice of activity sector.

2. Literature Review on the participation in the labour market

Labour market participation decisions can be analyzed from the point of view of the traditional theory of labour supply, as well as the theory of job search. The latter theory introduces the notion of the imperfection of the information at the disposal of agents. The way of looking at labour market participation decisions will differ depending on which of the two theories one takes as the reference.

The labour supply theory envisages only two possible states: activity and inactivity. For its part, the job search theory presupposes from the onset that people participate in the job market and can be either unemployed or employed. It is, however, possible to envisage a hybrid model, one that takes into account decisions made between three situations: inactivity, unemployment and employment (Cahuc and Zylberberg, 2001).

Let us first briefly justify the choice of certain variables in the explanation of labour market participation before dealing with the two theories mentioned above. Then, the paper will touch on the intertemporal nature of the decision to participate in the labour market, before focusing what effect knowledge on the one hand, and education on the other, has on the likelihood of participation. Finally, the paper will offer an explanation for the maximizing behaviour underlying the choice of an activity sector.

2.1: The determinants of labour market participation

The analyses of the process of integrating people into the labour market have traditionally been based on their individual characteristics as the explanatory factors, such as age, gender, initial education, and experience gained in the job market. Based on the distinction made by Eckert and Hanchane (1997), Gasquet (2002) distinguishes between two big groups of individual determinants depending on whether they were related to an archaeological temporality or a process one.

Archaeological determinants are related to the characteristics that are definitively acquired by an individual, namely the initial demographic characteristics such as gender and geographical and family origin, as well as the socioeconomic

characteristics acquired during initial education. The difficulties that certain populations encounter in the labour market can be interpreted by referring to the theory of human capital (Becker, 1964). They originate from lack of adequate education: such as general education that is inadequate for people with lower qualifications, specialized education that is obsolete for older people, and lack of experience in the job market for the younger.

A higher level of education enables people to increase their chances of having access to employment by enhancing the quality of their job search, by placing them in labour market segments where the tension between the supply of labour and the demand for it is lower, by reducing the risk of being downgraded, i.e the probability of having a job that requires a lower level of education than their educational level. (Balsan, 1999). However, it is not only a person's absolute level of education that matters; his/her relative position can also be of relevance.

Those difficulties can also be interpreted by referring to Arrow's filter theory, Spence's signalling theory, and Thurow's job-competition models. These theories enable the interpretation of people's characteristics as selection criteria during recruitment. The point here is that some people encounter difficulties with being integrated or re-integrated into the labour market, not necessarily because the level of their employability is really low, but because it is perceived to be low by employers. However, people with the same sociodemographic and socioeconomic characteristics can find themselves in different situations in the labour market.

2.2: Labour supply theory

This theory presupposes that agents possess perfect information of the labour market. As Cahuc and Zylberberg (2001) maintain, the core of the theory lies in the model of a consumer choosing between his/her consumption of goods and his/her consumption of leisure activities. The two authors believe that this model enables one to understand the form of the function of labour supply and constitutes the first step in understanding the conditions for labour market participation. However, the model has been the subject of numerous extensions which have analyzed the labour supply theory and often modified it in depth. These extensions were mainly related to the possibility of domestic productions; taking into account the collective dimension of making decisions (most often within the household), and the intertemporal aspect of these decisions (Cahuc and Zylberberg, 2001). This last aspect is very interesting because, since the work of Lucas and Rapping (1969), numerous authors have studied the modifications in labour supply in relation to changes in real wages. These studies were an attempt at explaining a very widespread stylized fact, namely that aggregate employment fluctuates widely during a given cycle while the transitory component of the variations in the real wages is small. For the theory of "real cycles", a favourable shock, and one perceived to be transitory, would encourage agents to increase their labour supply today and reduce it tomorrow when the shock has disappeared.

2.3: Job search theory

This theory was constructed from a basic model based on perfect information. This basic model does not take into account the fact that someone in employment can look for another job and neither does it take into account the interdependence of agents; it is a model of partial equilibrium. That is why the processes of job searching were introduced into the equilibrium models of the entire labour market. By relaxing the hypothesis of perfect information, the job search theory succeeds in explaining the

simultaneous presence of both the people out of work and the inactive population to the extent that the former have no reason to be in a situation of perfect information (Cahuc and Zylberberg, 2001).

The standard model that serves as a reference in job searching is the gain model. In order to analyze the theoretical framework of the decision to participate in the labour market, the standard approach must be extended. The basic idea can be presented as has been proposed by Moller and Aldashev (2005); they consider that in a framework of dynamic optimization, a person determines the value of active participation in the labour market, a value that comprises the cost of job searching, the loss of leisure time, and the possibility of not being employed. This value must be compared with that of remaining outside the labour market while receiving an alternative income such as social aid.

The value of participation in the labour market is determined by assuming optimal job-search behaviour. As in the gain model, the worker receives the job offers obtained in a random manner from the distribution. Each offer of employment is characterized by specific wages, and the worker will decide whether to accept the offer or to continue searching. The model's solution gives the optimal reservation wage; a rational person will decide to accept the offer if it is higher than the reservation wage, or reject it. For a given distribution of wages and other parameters, the comparative value of active or passive behaviour in the labour market can be determined for each individual. In this respect, Moller and Aldashev (2005) suggest that the theory can predict if the individual will participate in the labour market or not.

In the basic model, the employers' behaviour is considered as given. Diamond (1971) was the first author to point out that taking into account that employers' reaction to the basic model of job search necessarily translated into a labour market equilibrium where the distribution of wages was concentrated in a single point. Indeed, he argued that if one assumed that employers were identical, and that firms were as well, and that employees indiscriminately accepted all offers that were equal to the reservation wage (that is the minimal wage which people are ready to accept), firms would have no interest in offering remuneration that was higher than that wage.

2.4: Introducing a “memory effect”: State dependency

In the previous section the decision to participate in the labour market was analyzed within the framework of a model of intertemporal maximization of people's wealth maximization. In this model, the participation behaviour can be described in relation to the distribution of the wages offered and in relation to a certain number of parameters and the value of the distribution of leisure opportunities within the population. Clark and Summers (1982) had already explained the intertemporal and spatial variations in the participation rates of apparently identical situations (where the same participation rates would normally be expected) by referring to the impact of wages and anticipated prices on the current offer of employment through an intertemporal substitution effect and an income effect.

The robustness of the hypothesis of an intertemporal substitution of labour supply depends on conditions that are difficult to achieve in reality. For instance, instead of them being free to choose their hours of work, people are constrained by the demands of their employers (Euwals, Melenberg and Van Soest, 1998). Even if in the intertemporal approach to optimization state dependency is not very common, the analysis by Clark and Summers (1982) seems to suggest that a person's previous professional experience influences his or her decision to participate.

Some studies have also analyzed the links between employment and labour market participation within the framework of models in which unemployment results from labour market tensions. The articles by Garibaldi and Wasmer (2005) and Engström, Holmlund and Kolm (2001) present approaches that are complementary to the one being used; in these approaches labour market participation is determined by factors related to the offer of employment. This means that people have a reservation wage that is determined by taking into account the opportunity cost caused by non-market activities (leisure or domestic production) and below which they choose, in an endogenous way, inactivity.

2.5: Process determinants and choice of activity sector

Process determinants comprise the totality of the successive activities known in the labour market. The modifier “process” refers to the fact that integrating people into the job market is a process, that is, it is done over time. For instance, when an employment policy measure (for example the Senegalese government has decided to hire 5,500 persons as civil servant in 2013 and to support private sector for hiring young people) is taken, this will have an impact on the career path of job seekers. Likewise, this career path is linked to things such as the jobs done before being unemployed, the reasons for becoming unemployed, and the time spent in employment. But more than anything else, the modalities of being integrated or re-integrated into the job market strongly depend on the previous situations of employment or non-employment. In this respect, vicious cycles can arise: insecure jobs can lead to insecure jobs, and unemployment can lead to unemployment. This type of vicious cycle can be explained by the segmentation theory, proposed by Gasquet (2002). People with insecure jobs are employed in the secondary sector. Since no link exists at all between this sector and the primary sector, these people cannot hope to find stable jobs that are characteristic of the latter sector. For their part, situations of unemployment can repeat themselves because the people concerned have a low level of employability, given their personal characteristics. Unemployment is also a source of unemployment to the extent that it contributes to reducing people’s employability by discouraging and demotivating them, and rendering their human capital obsolete (Gasquet, 2002).

The notion of segmentation refers to the division of the labour market into several parts following a geographic or occupational logic. It refers to the fact that certain people cannot work in the sector that would be the most profitable (in terms of utility) for them (Barlet and De Vreyer, 2007). In other words, it is possible that certain people, because of the nature of their qualifications, are not able to enter a given segment of the market. This constitutes a break from the classical standard model where agents function in an anonymous and indistinct market. Segmentation rests on the occupational heterogeneity of the workforce (Zenou, 1997).

2.6: Channels of enabling people to get into employment: Importance of social capital

A number of studies, like that by Granovetter (1974), have shown that most qualified people regularly make use of their personal connections to get a job. Economic and sociological analyses have shown that there are three channels through which connections can be used in the labour market: the market (e.g. spontaneous applications), institutions (or mediation systems), and the activation of social connections (such as networks of family members, friends, and colleagues).

The first two channels constitute what in proximity economy is called proximity mediation. People who, to find a job, for example use newspaper or Internet advertisements, business magazines, employment or recruitment agencies, temping agencies, and structures for integrating people in the job market such as those implemented by the government, mobilize a set of mediation resources which, taken together, constitute mediation proximity (Bouba-Olga and Grossetti, 2008).

The third channel is related to the chain of personal connections to which people looking for a job belong; this is referred to as relational proximity. While it can be assumed that every person belongs to one or many social networks, when it comes to job searching not all networks enable finding a job or to be put in touch with employers: indeed, the people most on the sidelines of the job market often have difficulty making recourse to their social networks because they usually have few social connections. In addition, these do not lead, directly or indirectly, to job offers or to employers; in other words, they have weak relational proximity.

2.7: Labour market participation in developing countries

Participation in economic activity usually depends on two types of variables: human capital variables and environmental ones (Mincer, 1974). Several studies conducted in African countries and other developing (non-African) countries have confirmed the relevance of these variables.

Atangana Mebara et al. (1981) investigated the relationship between education and employment in Cameroon using multiple regression. They found that there were complex relationships between education, employment and wages, depending on the level of education attained, the nature of the job in a given firm, and the level of wages.

Another study on Cameroon was done by Fozing (2009). This showed that labour market participation depended on variables such as level of education, age, gender, area of residence, and family environment. The study found that in 1983–1984 people who had primary school and lower-secondary school levels of education had less chances of getting a job. The situation improved significantly when someone had obtained the certificate of general secondary education. Those who had finished upper-secondary school had 7% more chance of getting a job than those “without a level of education”. This rate of chance was multiplied by almost two (to rise to 13.4%) when one had attained a higher education level. However, as the years went by, the situation deteriorated: the accumulation of human capital through education is no longer a guarantee of getting a job (Fozing, 2009).

In relation to gender-related inequalities, Fozing found that the participation in economic activity in Cameroon increased with age and that this effect increased even more in 2001 than in 2005. This finding, which the author referred to as classical, could still, according to him, lead to two complementary situations: first, the fact that, as the years go by, unemployed people lower their wage expectations, thus becoming less demanding in the labour market in view of their family responsibilities that increase with age; second, the fact that adults are often well connected to professional networks to obtain information and the necessary recommendations from friends.

In a study on Morocco, El Aynaoui (1996) found that, overall, women’s participation in the labour market was largely influenced by education-related parameters. The probit coefficients related to these parameters were all significant and positive. Thus, having a primary school or post-primary school level of education, or having done vocational training, significantly increased the probability to participate in the labour market.

A woman who had at least a primary school level of education, and whose other characteristics were those of the average of the sample, had a predicted probability of participating in the labour market that was 51% higher than that of a woman without any level of formal education. Similarly, a woman with a primary or post-primary school level of education had a predicted probability of participation that was 60% higher than that of woman who had done only Koranic school¹.

Focusing specifically on the effect of gender in labour market participation, El Aynaoui asserted that numerous studies had shown the importance of the impact of the family environment and the structure of the household on women's participation in the labour market. In the analysis that the author did on data from Morocco, the variables that were aimed at measuring the effect of the number of young children and the women in the household were not found to be significant for the female members of the household; however, for male members the number of children was found to have a strong positive effect of the increasing size of the household on participation. On the other hand, the effect of the type of education that the father had received had a notable impact on the probability of women's participation.

Some studies have analyzed the links between employment and labour market participation within the framework of models in which unemployment results from labour market tensions. The articles by Garibaldi and Wasmer (2005) and Engström, Holmlund and Kolm (2001) present approaches that are complementary to the one being used here; in these approaches labour market participation is determined by factors related to the offer of employment. This means that people have a reservation wage that is determined by taking into account the opportunity cost caused by non-market activities (leisure or domestic production) and below which they choose, in an endogenous way, inactivity (Charlot, 2005).

Moen (1999) proposed an analysis where the increase in unemployment leads to an increased competition for jobs, which, in turn, engenders increased motivation for better education in order to enhance one's position in the hierarchy of educational investments and thus to quickly get out of unemployment. For their part, Charlot, Decreuse and Granier (2004) proposed a model where education increases the range of individual skills and thus enables the more educated workers to apply for a greater number of positions or activity areas. In this model, one of the benefits of education lies in a higher rate of people getting out of unemployment. So, when unemployment rises, it becomes more important to invest in education in order to extend the spectrum of job opportunities so as to increase the chances of getting a job.

Duval-Hernandez and Romano (2009), in article on Mexico, reported that many studies had examined the participation in the informal sector in the course of the life cycle. For these two authors, the principal finding of those studies was that young people had a higher rate of participation in the informal sector, while their older counterparts showed a greater propensity to be self-employed. These conclusions led the two researchers to hypothesize that many workers would want to start their employment in the private sector in order to gain some experience before they get employed in the formal sector, and after accumulating a lot of experience they turn to self-employment (Duval-Hernandez and Romano, 2009).

In a study on Zambia, Anderson (1993) used a double-hurdle model, which is a generalization of the tobit model. Not only does this model solve the problem of the selection bias of people who choose not to participate in the labour market, but it also makes it possible to envisage the existence of involuntary unemployment. In this

¹ Most of muslims in Senegal prefer to send their children to koranic school (where they learn the Coran) before sending them to french school. The koranic school is like a "religious" school

model, those who look for employment but do not get it are considered to be participants in the labour market. Anderson found relatively interesting results in relation to market labour participation: there was a higher probability of participation by heads of households than by migrants. The variable “experience”, which was used as a proxy for income, was found to be significant in the case of participation by female heads of households than in that of male heads of households. The opposite was found for the other members of the household. This could mean that the male members who, generally, take care of household expenses, participate more in the labour market but that the pressure on them decreases when other members of the household have a high income. On the other hand, women’s participation depends more on the remuneration that they are likely to get in the labour market (Fosu, Mwabu, and Thorbecke, 2009).

The job-search model, as viewed by Kingdon and Knight (2001) in the context of underdeveloped economies, explains the attitude of people who do not have a job and who are not looking for one in a different way. First, there are remittances between households which play an important role to the extent that nothing is required (in terms of contribution) from a member who does not have a job and to whom money is remitted according to his/her needs. This state of affairs is likely to encourage such people to remain in a state of need, especially in high-income households. But the same people can also be discouraged if the unemployment rate is very high in the area and if they live in poverty, knowing that it may be impossible to meet the job-searching costs. This situation is partly explained by the non-dissemination of information, because labour markets in Africa are less transparent than those in developed countries. There is also the strong market segmentation of the labour market in developing countries. Kingdon and Knight (2004) have demonstrated that in South Africa unemployment could be voluntary in view of the trade-off between work and leisure which job seekers engage in before making a decision about a job in the informal sector.

3. Objectives of the study

The main objective of this study is to identify the determinants of labour market participation in Senegal, particularly in relation to variables such as education, gender, area of residence, and age. To achieve this objective, the study will first describe the labour market in Senegal and determine the characteristics of the people who participate in it. Then it will determine the effect of those variables on this participation.

4. Methodology

4.1: Theoretical framework

The present study follows a model of unordered choices where the individual “*i*” will compare the different levels of utility associated with various choices and then choose the one that maximizes his or her utility U_{ij} among the utilities j (Combarous 1999).

For the individual “*i*”, the utility of choice j is:

$$U_{ij} = \beta' X_j + \varepsilon_j$$

where X_i is the vector of observed individual characteristics, β' is the vector of unknown parameters, and ε_{ij} a random term of error. The utility function is composed of a stochastic component – which is a function of the observed individual characteristics and a non-stochastic component – which is a linear function of the observed variables. The probability that the individual “ i ” will participate in labour sector j is the probability that the utility of the sector j is higher than that associated with the other segments:

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

This means that the probability that the individual “ i ” will participate in the labour sector j is the probability that the differential between the random components is higher than the difference between the non-random components:

$$Prob(X\beta_j - X\beta_k) > \varepsilon_k - \varepsilon_j \text{ for } k \neq j; j, k = 0, 1, 2$$

The maximization of the underlying utility function produces individual decisions as a function of an average reservation wage and an average disutility of labour. It can be assumed that people weigh the costs and the pecuniary and non-pecuniary benefits associated with the different segments of the labour market before choosing the segment that offers the greatest utility (Al Aynaoui, 1996).

Thus, the desired wage and the disutility of labour vary according to the choices made. A person can choose a specific job even if the benefits that it offers are less advantageous than those offered by another job. So, if one assumes the lack of entry barriers, people will choose jobs on the basis of the respective comparative advantages, whether these are pecuniary or non-pecuniary.

4.2: The model

The present study used two types of model: a simple logit model to study the chances of participation in the labour market and a multinomial logit model to determine the choice of activity sector for people who have decided to participate.

The use of the multinomial logit model can be justified by the fact that people must choose between several alternatives that are mutually exclusive. In other words, choosing one activity sector excludes the possibility of being in another activity sector at the same time.

If we consider those who take part in the labour market, it can be assumed that each individual “ i ” will have to choose between three alternatives ($j = 0$ to 2 : namely, to work in the public/semi-public sector, to work in the private sector, or to be self-employed). In this regard, people working for embassies or international organizations were classified as working in the public/semi-public sector, while those working for non-governmental organizations were classified as working in the private sector.

What the present study sought to determine is how a person would make one choice between several unordered choices.

The form of the participation equation will depend on the assumption made in relation to the distribution of errors. If it is assumed that these are distributed in an independent and identical manner according to the Weibull distribution, then the difference between the errors will follow a logistical distribution. The following equation gives the probabilities for the different situations.

$$\text{Pr ob} (y = j) = \frac{e^{\beta_j x_i}}{\sum_{k=0}^2 e^{\beta_k x_i}} \quad \text{for } j=0, 1, 2.$$

The dependent variable was coded according to the situations described above. With regard to the explanatory variables, individual people's characteristics (such as level of education, gender, age, and area of residence) as well as the characteristics of the households which they belonged to, were considered. Age classes were constructed in order to see if, outside a person's schooling path, there was no generation effect on labour market participation.

By choosing one of the three values of the dependent variable as the reference, we get two ratios of the type:

$$\ln \left[\frac{\text{Pr ob}(Y_i = j)}{\text{prob}(Y_i = 0)} \right] = \beta_j x'_i$$

By standardizing all the other probabilities, we get:

$$\ln \left[\frac{\text{Pr ob}(Y_i = j)}{\text{prob}(Y_i = k)} \right] = x'_i (\beta_j - \beta_k)$$

The likelihood of the model can be obtained by defining each individual: $d_{ij} = 1$ if the individual is in situation j , and 0 otherwise, for all the three possible situations. Thus, for each i , one and only one of the d_{ij} is equal to 1.

The likelihood log of the model is:

$$\ln L = \sum_{i=1}^n \sum_{j=0}^J d_{ij} \ln \text{Pr ob}(Y = j)$$

The derivatives have the following form:

$$\frac{\partial \ln L}{\partial \ln \beta_j} = \sum_i (d_{ij} - P_{ij}) x_i$$

It should be noted that the coefficients of the model are difficult to interpret. It is tempting to associate β_j with the j -th situation, but it would not be correct to do so.

By deriving the first equation of the model, we get the real marginal effect:

$$\delta_i = \frac{\partial P_j}{\partial x_i} = P_j (\beta_j - \sum_{k=0}^J P_k \beta_k) = P_j (\beta_j - \bar{\beta})$$

Thus, each sub-vector of β finds its way into each marginal effect both through probability and through the average weight that appears in the d_j . The latter can be computed from the estimated coefficients. Moreover, the equation above suggests that there can be confusion in the interpretation of the estimated coefficients. For instance,

for a particular x_k , $\frac{\partial P_j}{\partial x_k}$ does not necessarily have the same sign as β_{ij} . As a result, it is

particularly important to compute the marginal effects of each explanatory variable on the different probabilities.

As a second step, the same multinomial logit was used to identify the determinants of the choice of an activity sector.

The present study used data obtained from the Senegal Poverty Monitoring Survey which was conducted in 2005/06 by the National Bureau for Statistics and Demography (ANSD). The questionnaire used for this survey had, among others, sections on education, health, employment, and household expenses. Regarding employment, information was gathered on each individual's job-searching activity, occupation, number of jobs he/she had had, his/her activity sector, and his/her main activity. The survey used a sample of 13,600 households drawn from the entire country: 8,640 of them urban and 4,960 rural. The database contained about 123,600 individuals.

Given the fact that the survey aimed at collecting comparable data across the (administrative) *départements*, each of these was considered a stratum or area of its own. So, a sub-sample of a statistically significant size was drawn from each *département*.

Sampling was done in two stages: at the first stage, 25 clusters (or census districts) were selected from each *département*, with each cluster comprising 16 households. In order to take into account the greatest variability (heterogeneity) in the urban clusters in relation to the observed phenomena, the urban component of the *département* sub-sample was given a greater weighting: 15 clusters (i.e. 240 households) were selected from urban areas, while 10 clusters (i.e. 160 households) were selected from rural areas.

Usually, rural households tend to resemble each other in many respects, which means that they offer little variability in terms of the phenomena to be studied. This, in turn, means that information gains are almost nil beyond a certain number of observations.

5. Labour market participation and analysis of results

5.1: Labour market participation in the context of present study

In most analyses reported in the literature, labour market participation is estimated by the proportion of the population of working age who are employed and those who are unemployed. The present study did not follow this procedure in view of the difficulty in measuring unemployment in developing countries like Senegal. Indeed, unemployment in the sense in which this term is used by the International Labour Organization (ILO) is not adequately measured and, as a consequence, there is an evident underestimation of the rate of unemployment. The present study chose to measure labour participation with reference to occupation. In this respect, people who are "employed" in the labour market are considered to participate in it. When referring to labour market participation, one will generally refer to the entire population of working age (15 to 65 years); this is the assumption made in the present study. To analyze labour market participation in Senegal, the study used data collected as part of the 2005/06 ESPS.

5.2: Labour market participation in Senegal

To analyze people's occupational choices, the study used data from the 2006 ESPS, which is the last of the four surveys used to construct the study's pseudo panel. The study took into account the entire population of working age (from 15 to 65 years) in order to produce descriptive statistics. The study could have chosen a different lower age limit, but officially this is 15 years of age. This issue is being raised here in relation to the trends in the educational system in Senegal in the last decade, in particular the ever growing tendency to pursue higher education studies (which is evident from the setting up of new public universities and, mostly, private institutes and universities). What this translates into is the fact that before the age of 20, many young people are still in the education system and, thus, are not yet part of the population in productive employment. Yet, since labour market participation is analyzed overall, the situation is different from one setting to another. This is the reason why the present study maintained the official age bracket for working age, especially in view of the fact that there are many young people who drop out of the school system (or who never go to school in the first place) and who are employed in the informal sector.

Table 1: Rate of labour market participation by population of working age

Age group	Employed	Non-employed
15–25	77,724 28.51%	19,373 71.49%
25–35	7,824 50.20%	7,817 49.98%
35–45	6,464 58.96%	4,500 41.04%
45–55	4,952 62.21%	3,008 37.79%
55–65	2,321 47.70%	2,545 52.30%
Total	29,285 44.02%	37,243 55.98%

Source: ESPS (2006)

Several observations can be made from Table 1: the overall rate of labour market participation was 44.02%; the group in the age bracket 45 to 55 years had the highest rate at, 62.21%; followed by the group in the age bracket 35 to 45, with a rate of about 59%; the youngest group (in the age bracket 15 to 25) had the lowest rate, 28.51%.

Table 2 gives the statistics of labour market participation by gender, area of residence and level of education. In this connection, it can be seen that males participate in the labour market more than females: the rate was found to be 61.9% for the former and 28.56% for the latter. The stronger presence of males on the labour market can be explained by the following reasons: first, in general there are more educated males than females; second, there are sociological factors that confine certain women from certain backgrounds to domestic chores.

Table 2: Labour market participation: gender, area of residence, level of education

	Variable	Rate of participation
Gender	Males	61.90%
	Females	28.56%
Area of residence	Urban	42.16%
	Rural	47.05%
Level of instruction	No formal education	43.58%
	Primary school	44.82%
	Secondary school	30%
	Higher education	65.89%

Source: ESPS (2006)

With regard to the area of residence, there was a higher rate of participation in the labour market in the rural than in the urban area: 47.05% for the former against 42.16% for the latter. This finding corroborates that of all the “household” surveys conducted in Senegal.²

Labour market participation can be dependent upon the level of education. The well-known situation where graduates are unemployed still prevails in Senegal. This means that the opportunity cost for studies is less high than it seems. Indeed, it is the option cost that is very high. The opportunity cost answers the following question: “What is lost when one pursues studies instead of using the time to do something else (notably, work)?” For its part, the option cost answers this question: “What will have been lost if the studies one chose did not lead to the expected qualification (or the employment hoped for)?”

The figures in Table 2 show that those who had a higher education level had the highest participation rate, 65.89%. However, those without any level of formal education had a relatively high rate as well (43.58%), higher than the rate for those with a secondary school education (30%). This finding can be explained by the structure of the demand for labour, which is characterized by a significant share of job applicants without any particular qualification. In turn, this has to be seen from the perspective of the low level of development and formalization of the Senegalese economy.

For people with only a primary school level of education, the participation rate was 44.82%, compared to 30% for those with secondary education. This suggests that stopping at secondary school education reduces the chances of getting a job. Setting aside his specificity related to secondary education, it can be seen that in spite of the higher rate of participation by people without formal education, the level of education was found to have an impact on labour market participation.

5.3: Probability of participating in labour market

The age brackets used in the present study have a ten-year span: [15;25[, [25;35[, [35; 45[, [45; 55[, and [55 65[. The study used the [55-65[years age bracket as the reference group to which the others would be compared, since there had to be one. Regarding level of education, people without any level of formal education were used as the reference.

The results in Table 3 show that, on the one hand, there are variables that increased the probability of market labour participation while, on the other hand,

² See the various survey reports , Visit the website www.ansd.sn (national statistic agency)

some variables reduced it. Those that increased it included having a higher education level; belonging to the age group 25 to 35 years, or 35 to 45 years, or 45 to 65 years; and being male. The variables that reduced it were having a primary school level of education; having a secondary school level education; living in an urban area; and being in the age group 15 to 25 years.

Table 3: Effect of certain variables on labour market participation

Participation	logit	Marginal effects
Ref = no formal education		
Primary school level	-0.058** (0.012)	-0.014** (0.012)
Secondary school level	-0.913*** (0.000)	-0.206*** (0.000)
Higher education level	0.174*** (0.004)	0.043** (0.004)
Ref = [55-65]-		
Age bracket: 15-25	-0.710*** (0.000)	-0.170*** (0.000)
Age bracket: 25-35	0.309*** (0.000)	0.076*** (0.000)
Age bracket: 35-45	0.720*** (0.000)	0.178*** (0.000)
Age bracket: 45-55	0.840*** (0.000)	0.207*** (0.000)
Urban	-0.083*** (0.000)	-0.020*** (0.000)
Male	1.705*** (0.000)	0.397*** (0.000)
Constant	-0.868*** (0.000)	-- --
Obs	67181	67181
LR chi2 (9)	15243.98	--
Prob > chi2	0.000	--
Pseudo R2	0.165	--

(...): P-value.

*Coefficient significant at 10%; ** coefficient significant at 5%;***coefficient significant at 1%.

The chances of participating in the labour market were found to vary according to area of residence, gender, level of education, and age bracket. In relation to urban areas, one could suspect that there was a certain labour market saturation which reduced the chances of people living in towns getting a job. All coefficients were found to be significant.

For people in the 15-25-year age bracket, the probability of participating in the labour market was noticeably reduced due to the existence of an alternative, namely training. Besides, in the Senegalese context, young people in this age bracket can still benefit from money transfers within their households. This means that they are not in

a situation where the efforts to be made to search for a job are not so big. In addition, it takes a long time for young people to get a job.

Taking the marginal effects into account, one can see that labour market participation was more sensitive to gender and age, especially the 45-55-year age bracket. In this respect, this participation was found to have increased by 39.7% for males compared to females. With regard to urban versus rural areas, the chances of participation fell by 2%, while they fell by 20% for those who had a secondary school education compared to those without formal education.

Having a primary school level of education was found to reduce the probability of labour market participation by 1.4%. On the other hand, having reached a higher education level increased it by 4.3%. In connection with this, the 2002 National Population and Housing Census had shown that there was a lower level of unemployment (4.4%) among people with a primary school level than among those with a secondary school (8.2%) and a higher education level (8%).

In relation to age, belonging to the 15-25-year bracket reduced the probability of participation by 16.9%, while belonging to the 25-35-year bracket increased it by 7.6%. It rose by 17.8% in the 35-45-year bracket, and by 20.7% in the 45-55-year bracket.

In the next section, we turn to the long-term determinants of labour market participation.

5.4: Choice of activity sector: relative risk ratios

Using a multinomial logit model, the choice of activity sector was examined using conditional probabilities.

The relative risk ratios (RRRs) indicate the risk for a person to work in a given sector relative to the risk for him/her to work in the private sector (which is the reference option). This means comparing the relative risk of working in a given sector rather than another. One can also refer to the “chance” to work in a given sector rather than another; this is also referred to as the conditional probability.

In this study, the private sector was taken as the reference option because there was a large number of people working in this sector. Indeed, while any option could have been taken as the reference, the common practice is to choose the one that offers the greatest number of observations.

Therefore, all analyses in this study were done with reference to the private sector. A person was considered to remain in his/her activity sector if $RRR > 1$, and to have moved to the private sector if $RRR < 1$. The multinomial logit model was first used on all individuals, irrespective of gender and area of residence, before it was used separately for males vs. females, and urban vs. rural areas. The results of the five models are presented in Table 4.

Table 4: Activity sector choices by total population of working age (reference option: private company)

	Overall	Males	Females	Urban	Rural
Public/semi-public sector	RRR	RRR	RRR	RRR	RRR
Ref = Without formal education					
Primary	1.5779** (0.000)	1.5633*** (0.000)	1.5342 (0.051)	1.5560*** (0.000)	1.6357** (0.030)

Secondary	3.9512 ^{***} (0.000)	3.8954 ^{***} (0.000)	3.6617 ^{***} (0.000)	3.6677 ^{***} (0.000)	4.6313 ^{***} (0.000)
Higher	7.4675 ^{***} (0.000)	8.6712 ^{**} (0.000)	3.3711 ^{***} (0.000)	7.1605 ^{***} (0.000)	12.8267 ^{***} (0.000)
Ref = 55-65-year age group					
Age: 15–25	0.2252 ^{***} (0.000)	0.2359 ^{***} (0.000)	0.1773 ^{***} (0.000)	0.2414 ^{***} (0.000)	0.2231 ^{***} (0.000)
Age: 25–35	0.4219 ^{***} (0.000)	0.3850 ^{***} (0.000)	0.4813 [*] (0.078)	0.4435 ^{***} (0.000)	0.4305 ^{**} (0.034)
Age: 35–45	0.4935 ^{***} (0.000)	0.5314 ^{***} (0.000)	0.3492 ^{**} (0.012)	0.5264 ^{***} (0.000)	0.5725 (0.165)
Age: 45–55	0.6120 ^{***} (0.001)	0.6728 ^{**} (0.011)	0.3668 ^{**} (0.019)	0.6273 ^{***} (0.004)	0.6954 (0.376)
Urban	1.7709 ^{***} (0.000)	1.5815 ^{***} (0.000)	2.3908 ^{***} (0.000)	----- -----	---- ----
Male	0.9047 (0.186)	---- ----	---- ----	0.6901 ^{***} (0.000)	0.9835 (0.933)
Self-employed					
	RRR	RRR	RRR	RRR	RRR
Ref = Without formal education					
Primary	0.4339 ^{***} (0.000)	0.4888 ^{***} (0.000)	0.3175 ^{***} (0.000)	0.4558 ^{***} (0.000)	0.3552 ^{***} (0.000)
Secondary	0.1305 ^{***} (0.000)	0.1629 ^{***} (0.000)	0.0660 ^{***} (0.000)	0.1291 ^{***} (0.000)	0.1497 ^{***} (0.000)
Higher	0.0966 ^{***} (0.000)	0.1274 ^{***} (0.000)	0.0379 ^{***} (0.000)	0.0647 ^{***} (0.000)	0.6049 (0.201)
Ref = 55-65-year age group					
Age: 15–25	1.1502 (0.266)	1.6577 ^{***} (0.000)	0.3277 ^{***} (0.002)	1.3413 ^{**} (0.049)	0.6793 (0.204)
Age: 25–35	0.7110 ^{***} (0.005)	0.8602 (0.245)	0.3490 ^{***} (0.003)	0.8389 (0.217)	0.4719 ^{**} (0.012)
Age: 35–45	0.6386 ^{***} (0.000)	0.7098 ^{***} (0.009)	0.3776 ^{***} (0.006)	0.7410 ^{**} (0.038)	0.5016 ^{**} (0.024)
Age: 45–55	0.5128 ^{***} (0.000)	0.5354 ^{***} (0.000)	0.3316 ^{***} (0.002)	0.5587 ^{***} (0.000)	0.4770 ^{**} (0.018)
Urban	0.4979 ^{***} (0.000)	0.4258 ^{***} (0.000)	0.7868 [*] (0.059)	---- ----	---- ----
Male	0.5770 (0.000)	---- ----	---- ----	0.4706 ^{***} (0.000)	---- ----

Obs	30,115	19,551	10,564	18,374	11,514
LR chi2 (18) ^a or (16) ^b	7,817.62 ^a	5,573.57 ^b	2,116.71 ^b	5,627.26 ^b	715.59 ^b
Prob > chi2	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.2539	0.2476	0.2672	0.2399	0.1288

In the first model, which brought together all individuals, it appears that for all the individuals who worked in the public or semi-public sector, the preferences vis-à-vis the private sector changed according to the variables considered. The same was observed in the case of self-employed individuals.

A variable such as wages could have been significant, but no data about it were entered in the database upon which the present study was based. Nonetheless, it should be pointed out that against a backdrop of massive unemployment, as is the case in Senegal, people can choose low-wage jobs when competition is tough in the well-paying sectors.

5.5: Preference for private sector diminished as workers in public and semi-public sectors aged

The study found that people working in the public or semi-public sector (whether they had primary, secondary or higher education), preferred to stay in these sectors rather than moving to the private sector. The same situation was found for those living in urban areas.

With regard to gender, the ratio was not found to be significant. This means that there was no difference in behaviour vis-à-vis the private sector between males and females working in the public or semi-public sector.

Age was found to be a determining factor in choosing to participate in a given sector: the higher the workers' age, the lower their preference for the private sector. This transpired from the increase in the relative risk ratio for the different age groups, even though this ratio remained less than 1. In other words, while young people might have wanted to move to the private sector, the longer they had worked in the public or semi-public sector, the more they wanted to stay there.

5.6: for private sector stronger among self-employed workers

Whatever their level of education, self-employed workers preferred to work in the private sector. The higher the level of education, the higher this preference. This can be explained by the fact that the more educated they were, the more likely they were to get jobs in the private sector, a sector where competition for jobs is tougher than in the public sector.

It was further observed that only young people in the 15-25-year age bracket preferred to stay self-employed. Those in higher age groups wanted to be employed in the private sector, and this preference was stronger among older people (with the relevant ratios getting closer to zero).

5.7: Graduate males working in public sector risk-averse

Male workers in public or semi-public sectors preferred to stay there irrespective of their level of education. This preference was even stronger among the more highly educated. This is a kind of risk aversion since the public sector offers more job security. However, there was radically different behaviour among male workers who

were self-employed: they wanted to move to the private sector. And the more educated they were, the more they wanted to move.

Self-employed young people in the 15-25-year bracket tended to stay in this type of employment while their counterparts (in the same age group) working in the public or semi-public sector preferred to move to the private sector. As for the other age groups, the sector in which the male workers were employed mattered little; they had a preference for the private sector.

The perception that male workers living in urban areas had of the private sector changed according to their activity sector: those in the public or semi-public sector wanted to stay there, while those in self-employment wanted to move to the private sector.

5.8: Private sector: Dream for self-employed females

Self-employed females were all found to have a preference for the private sector irrespective of their level of education, age bracket or area of residence. For their part, the females working in the public or semi-public sector preferred to stay there rather than moving to the private sector.

It was further found that urban females had a different perception of the private sector depending on whether they worked in the public sector or were self-employed. Indeed, in the latter case they tended to look for employment in the private sector, almost certainly because it could offer them more secure jobs than being self-employed.

5.9: Age only variable that differentiated choices of urban and rural workers

Irrespective of their level of education, urban self-employed workers preferred jobs in the private sector to being self-employed. However, if age is taken into account, those among them aged between 15 and 25 really wanted to stay in self-employment. In other words, in this case age was more of a determinant than level of education.

As for their counterparts employed in the public or semi-public sector, in general they wanted to stay in this sector, even though the older among them were more inclined to move to the private sector. The explanation for this is that the younger ones first wanted to gain enough experience that they could later sell to the private sector.

In relation to area of residence, people living in rural areas and who were self-employed preferred working in the private sector to being self-employed, irrespective of their age. This is the only difference that was observed between them and their counterparts living in urban areas; among the latter, only the youngest age group (15 to 25 years) preferred to work in the private sector.

With regard to level of education, the same trend was observed as with those of living in an urban area: irrespective of their level of education, people working in the public or semi-public sector preferred to continue working there. On the other hand, those who were self-employed preferred working in the private sector.

In urban areas, young people engaged in self-employment as a survival strategy at the beginning of their “career”. In reality, young people took up employment in the first sector that offered them an opportunity; this excludes any idea of “choice”. If the relatively higher wages in the private sector are added to this, one can easily understand the behaviour of the youngest age group living in urban areas. On the other hand, in rural areas job opportunities were not as attractive. This means that self-employment was often a real option (after reflection), at least in terms of type of activity. In other words, in urban areas people of working age in the youngest age

group were ready to undertake various activities to avoid being unemployed. It could thus be argued that these were not activities of choice but a shield against inactivity.

6. Conclusion

This study found that labour market participation was dependent upon variables such as economic environment, level of education, age, gender and area of residence.

The participation rate was found to be higher for people with a higher education level. The lowest level was recorded for people with only a secondary school level, so even those with just a primary school level recorded a higher rate of participation. All this means that the Senegalese economy does not offer many jobs to people with an intermediate level of education; yet, that is what all the emerging economies offer and that is what those on the way to becoming emerging economies are doing.

The case of the Senegalese economy explains why the positive contribution of higher education to the chances of securing a job is not surprising. Indeed, people at this level found a salaried job more easily and were more readily able to develop entrepreneurial strategies that enabled them to get an alternative job should they not get the one they had hoped for.

From the point of view of activity sectors, the results of the present study showed that, in general, people who had high qualifications and who were working in the public or semi-public sector did not want to leave it for the private sector. However, it was just the reverse for self-employed people, especially those in urban areas: they wanted to move to the private sector.

Area of residence was found to be a significant variable only in the case of people in the 15-25-year age bracket: not only was there the alternative of them continuing their studies (an alternative that was more available to those living in urban areas), but there was also the lack of security of self-employment jobs, which young people undertook as they first entered the labour market. That is why they were attracted by the private sector which, it is assumed, is considered to be a sector that pays well.

Considering the growing urbanization which Senegal is experiencing, policies aimed at giving a new boost to the private sector should be encouraged in order to enable the country to absorb the workforce (often very young) engaged in self-employment for want of something better. Indeed, the present study found that while self-employed, they would prefer to work in the private sector.

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