



Intergenerational transmission of human capital in Senegal

Latif Dramani^{1*}

¹UFR SES, CREFAT Université de Thiès

Email: dramaniarmel@yahoo.fr

ABSTRACT

The purpose of the study was to identify some global aspects of Senegalese education in a dynamic perspective on the period from 1950 to 2008, but also to identify the factors explaining access to education of parents and their Childs aged from 6 to 14 years using biographical survey over the period 1950 to 2008.

It emerged from this study that access to formal education is explained by gender, generation, place of residence and the environment in which the individual grew up. Women, rural residents, people born in 1954 ... are less likely to access the schools respectively compared to men, residents of Dakar, individuals born after 1978.

The occurrence of shocks or disaster in childhood reduces the chances of entering school. On another level, the estimates have shown that households poverty at childhood significantly act on the probability of entering school. Thus, chronic poverty for households at childhood erodes 64% chance of being educated compared to non-poverty in childhood, all things being equal.

The study also analyzed the factors that explain access to the education of children of parents surveyed who are aged between 6 and 14 years at the time of the survey in 2008. This analysis is performed using a multi-level model, and highlight the intrinsic characteristics of the parent to explain more than 21% variability of children access to school. In addition, estimates showed that the education level of the person who educated the child's parent (grand-parent) continues to significantly affect the level of education of the child, thus revealing the generational transmission of human capital.

The study also highlights a greater likelihood for boys to attend school compared to girls. In addition, the study found that characteristics such as parent education level, ethnicity, religion, and poverty dynamics of the parent have a significant influence on the probability of a child being educated.

Keywords: generation, poverty, human capital transmission, biographical data, gender, chronic poverty, vulnerability,

JEL: D30, D33, D63, C22, C25, I20, I22

INTRODUCTION

According to the Universal Declaration of Human Rights (1948), education is an end in itself in that it allows "the full development of human personality." Education is a necessary condition and a primary factor in sustainable development.

In Senegal, it is an important and strategic in the process of economic, political and social development. Its scope is well established in the state policy, given the fact that 40% of the budget goes to education and is a key sector of the PRSP (Poverty Reduction Strategy Paper) and MDGs (Millennium Development).

The school is the hub of expertise and know-being which was absolutely necessary to meet the demands of globalization. It plays a role in the competitiveness of economies, but also allows peoples and leaders become aware of the responsibilities assigned to them.

In this third millennium, the gross enrollment ratio (GER) of primary-Saharan African countries is only 81.2%, a rate lower than all other regions of the world. In Senegal, despite many efforts since the Jomtien Declaration in 1990 in Thailand, with a view to Education For All (EFA) in 2015, the gross enrollment at the elementary level is only 79.9% in 2004 against 40% in 1970. When the low enrollment in primary education is attributable to several factors to economic, social and cultural problem of the quality of education is among other things, a challenge to create conditions security and economic competitiveness.

The strong links between education and poverty is well documented. The famous American economist John Kenneth Galbraith says in this connection, that "there is not in this world of educated population that is poor and there is no illiterate population that is not poor." (Rwehera, 1999, p. 17). This interaction between education and poverty is usually included in the international strategies of poverty reduction. For example, among the eight Millennium Development Goals (MDGs), two relate to education: MDG 2 (Achieve universal primary education)

and MDG 3 (Eliminate disparities equality in primary and secondary). It follows that a study of poverty cannot do without aspects related to education.

In Senegal, the education system is composed of formal and informal education. The formal education sector is structured around early childhood (0-6 years), elementary education (7-12 years), middle school (13-15 years), education and technical secondary (16-18 years) and higher education (from 18). In this study, education refers to formal instruction in French or Arabic.

Education is at the heart of the concerns of Senegalese political authorities and the international community. This is manifested through international commitments on education in terms of quantity, quality but also parity between boys and girls. Thus, the MDGs and universal conventions on child rights are reference documents, including achieving universal education in the medium term is a goal for all countries.

International commitments made by Senegal in this area are found in national, local and sectoral development. These commitments combined with concern for development are translated into objectives in reference documents such as PDEF (Development of Education and Training), the PRSP (Poverty Reduction Strategy Paper), regional development plans, local development plans (LDP) and the municipal investment programs (CIPs). Despite all these efforts, we must recognize that the goals are not reached yet. Education in Senegal is not only faced with the shortage of supply relative to potential demand, but it is also characterized by low quality. This weakness manifested by high rates of repetition and dropout, especially in examination classes and transition classes from one cycle to another, can be explained by cyclical strikes of teachers, staff often overcrowded in classrooms and student strikes, reducing the annual number of hours required for a education quality. By using the power of biographical data, the paper focuses primarily on the determinants of schooling of children from multiple generations (1954-1978). Finally the paper examines the determinants of the descendants of the individuals studied previously.

the study consists of three main parts. The first part focuses on the evolution of schooling of the surveyed population from 1950 to 2008 while the second part outlines the determinants of access to formal education for this population. The last part, meanwhile, addresses the factors explaining the schooling of the descendants of those surveyed who were aged six to fourteen years of age at the time of the survey in 2008.

MATERIAL AND DATA

Study data

To define the issue of education, a descriptive study both static and dynamic is performed on the population surveyed. This allows to describe the enrollment, educational attainment, degrees earned, the number of years of study based on control variables such as gender, generation, place of residence ... Because descriptive statistics did not explanatory in nature, a logistic modeling is used to capture some explanatory factors of access to school. In addition to the education of people surveyed, this study examines the schooling of their offspring. The methodology of this final analysis is explained in Part III of the document.

The study data are from the biographical survey "vulnerability and chronic poverty in Senegal". This survey was conducted by the Laboratory for Research on Economics and Social Transformations (LARTES) over the period 2008-2009. The sampling frame for the Survey of Poverty Monitoring Program (ESP, 2006) was used to draw the sample of 75 census districts (CDs), 1200 households and 2400 biographies. All households in each enumeration district were identified prior to a random selection of 16 households to be surveyed. Within each sample household, two persons were interviewed: the head of household and another household member (usually the main breadwinner or secondary). Of clearance work performed on the data led to a sample of 2,048 biographies that were used to conduct this study.

The survey questionnaire consists of nine modules:

- demographics,
- housing history,
- studying history,
- Education and working life,
- married life,

- children born alive;
- the health history of influential people;
- the social network
- synthesis.

The module on children born alive of those surveyed consists of questions relating to demographic information (name, surname, gender, rank, date death ...), schooling (starting school, leaving school, the level reached ...), malnutrition in early childhood, contributions to household expenses, etc. using complex programs run under Stata under his version9, an original data file was created. This file contains all the characteristics of children born alive and those of their parents (the respondents). This merger took into account the date of events concerning parents and their offspring. This is the file that was used to study on the education of children of individuals surveyed.

Participation in the survey population from 1950 to 2008

Schooling at the time of the survey

The sample consists of 2048 individuals including 1015 women was 49.56% (Table 1). Figure 1 shows that men are generally better off than women in the field of access to school. Indeed, in women, it saves 56% of school while there are 53% within-school men.

Table 1: Sample distribution by sex and area of residence

Sex	Place of residence at time of survey			Total
	Dakar	Rural	Other urban	
Male	266	535	232	1033
Female	462	363	190	1015
Total	728	898	422	2048

Source: Authors' calculations LARTES-EVPC, 2008/2009

Level of education

a- Educational level and area of residence

The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines the level of education of a person as the one corresponding to "the last grade completed and / or the highest degree attained or followed to completion by such person in the regular education, special education or adult education in their state or another state "(UNESCO, 1978).

Table 2 shows the distribution of persons by level of education and place of residence at time of survey. It is found that 80% of people living in rural areas have no education. While within the population of Dakar, this proportion is 32%. Note also that for primary education, Dakar saves 35% against 30% and 14% for other cities and rural areas, respectively. Orders of vocational and higher education remain generally little frequented by this population. With 2% and 0.4%, respectively, these two levels of education are virtually absent in rural areas.

Table 2: Sample distribution by level of education and place of residence at time of survey

Maximum level of education	DAKAR		OTHER URBAN		RURAL		TOTAL	
	Effective	%	Effective	%	Effective	%	Effective	%
No	233		160		719		1112	
		32%		38%		80%		54%
Primary	255		125		125		505	
		35%		30%		14%		25%
Professional	56		45		14		115	
		8%		11%		2%		6%
Middle/Secondary	166		85		37		288	
		23%		16%		4%		14%
Higher	18		7		3		28	
		2,5%		1,7%		0,3%		1,4%
Total	728		422		898		2048	
		100%		100%		100%		100%

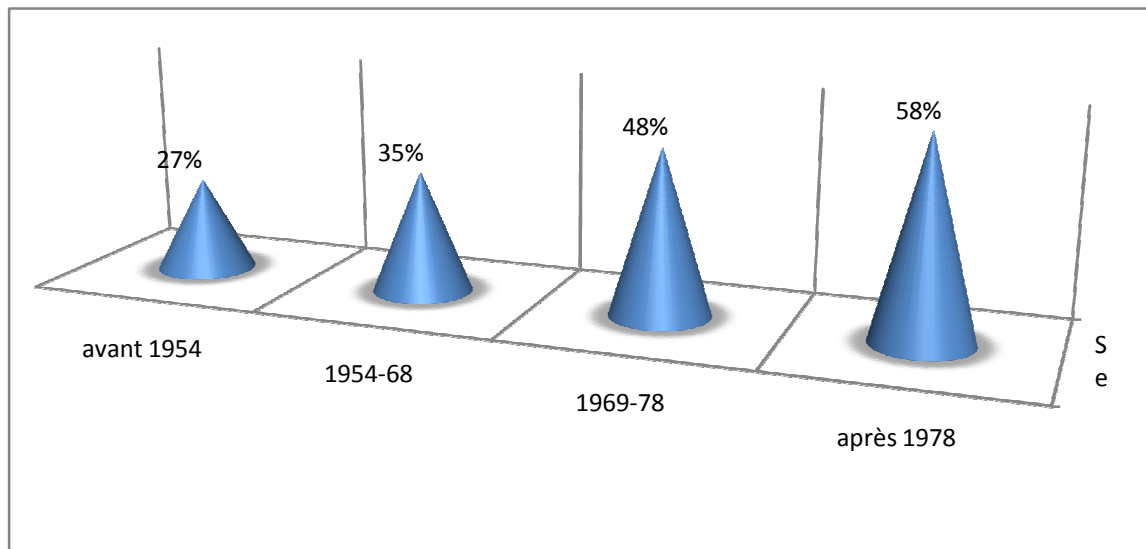
Source: Author's calculations from LARTES-EVPC, 2008/2009

b- Education, gender and generation

The 2048 individuals in the sample were divided into four generations: those born before 1954 (19%) between 1954 and 1968 (35%) between 1969 and 1978 (27%) and after 1978 (19%). To compare the generations with respect to education, the percentage of people who have reached at least the primary was calculated for each generation (Figure 1).

Unsurprisingly, there is an upward trend in the percentage of persons who have attained at least primary education starting from the old to new generations. Indeed, we observe that in the generation before 1954, 27% have achieved the level of primary education. Whereas among the younger generation (after 1978), this proportion is 58% (more than double).

Figure 1: Sample Distribution (in %) by the generation and the percentage of persons with at least reached the level of primary education.



Source: Authors' calculations LARTES-EVPC, 2008/2009

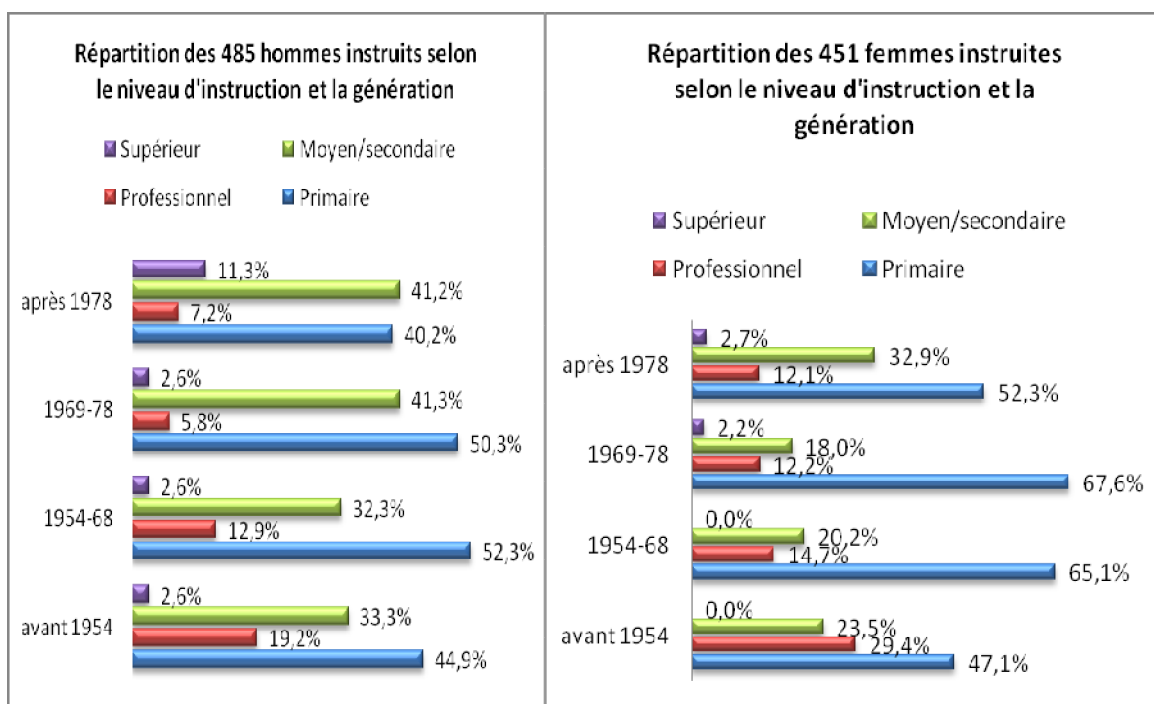
In this population, there are disparities between men and women in education, and that, whatever the cohort considered (Figure 4). In general, disparities are measured from the parity index is the ratio between the number of women and men for the same educational level. This indicator, while relevant is not used in this study. Suffice it to directly compare the percentages of individuals in each education taking into account gender and cohort.

Regardless of gender and cohort, there was the size of individuals not having topped the elementary school. This predominance of the number of people who reached primary level is more pronounced at intermediate generations (1954 -1978).

Regarding vocational training, it is more prevalent in women before 1954 (29.4%). Among men of the same generation, we note that 19.2% had a vocational training (Figure 4).

Within the female population, higher education is almost absent up to the cohorts 1969-1978. The proportion of women born after 1968 who have reached higher level of education does not reach the 3% mark. At men, there are 2.6% of individuals who have reached the higher levels of education at the generations before 1978. By cons, the percentage of individuals who have attained higher education level is 11, 3% (Figure 2).

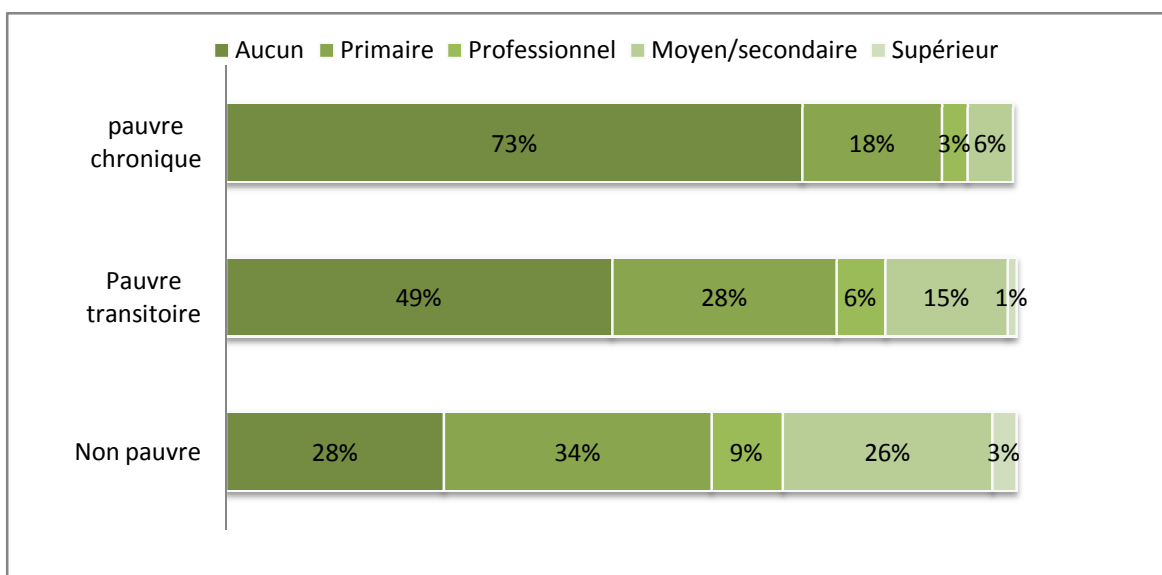
Figure 2: Comparison of educational attainment by gender and generation
 Source: Authors' calculations LARTES-EVPC, 2008/2009



Level of education and poverty

Figure 3 shows that among people who are chronically poor in their childhood (0-14 years), the rate of non-attendance is at 73%. This proportion is 2.5 times higher than that observed in people who are not poor in childhood (28%). Concomitantly, there is the low rate of all educational levels in the group of victims of chronic poverty in childhood.

Figure 3: Comparison of the maximum level of education according to the poverty of individual children's



Source: Authors' calculations LARTES-EVPC, 2008/2009

c- Diplomas obtained

Overall, Table 3 shows that a large proportion of the population enters school spring but without parchment (48%). Individuals without degrees are within 56% of the female population as against

41% among the male population. Whatever the categories of diplomas, men are favored compared to women.

Table 3: Distribution of educated sample by sex and degree (485 men and 451 women)

Diplômas	Males	Females	Total
No	41,0%	56,1%	48,3%
CEPE	19,8%	18,6%	19,2%
BEPC_BFM	12,2%	6,9%	9,6%
BAC	6,4%	2,9%	4,7%
Higher diplomas	7,2%	2,4%	4,9%
CAP	2,1%	3,3%	2,7%
BEP	1,4%	0,9%	1,2%
BTS	3,3%	1,6%	2,5%
Others	6,6%	7,3%	6,9%
Total	100,0%	100,0%	100,0%

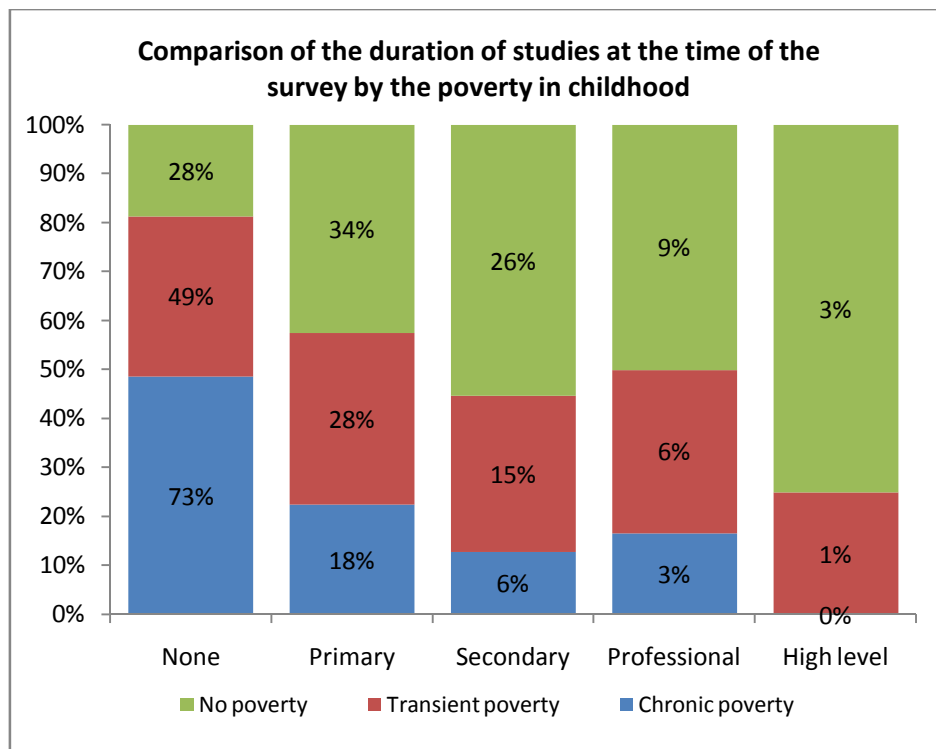
Source: Authors' calculations LARTES-EVPC, 2008/2009

d- Duration of study and poverty

The survey "vulnerability and chronic poverty in Senegal" had allowed the team LARTES to construct an indicator of multidimensional poverty. This indicator was used to develop a proxy for poverty containing three terms: chronic poor, transient poor and non-poor. The chronically poor are those who spent almost all their lives in poverty. The non-poor are those who have almost never experienced an episode of poverty in their lives. Between these two categories are transient poor individuals.

The mustache graph (Figure 6) compares the time spent on studies of the chronic poor, transient poor and non-poor children.

Figure 6: Comparison of the duration of studies at the time of the survey by the poverty in childhood



Source: Authors' calculations LARTES-EVPC, 2008/2009

Figure 6 is composed of three boxes for each category of persons. For each box, the lower horizontal bar represents the minimum and the upper horizontal bar is the maximum. The underside of a box represents the first quartile while the top is the third quartile. The horizontal line dividing each box is the median.

Examination of this graph 6 can see that over half of the non-poor spend an average of more than ten years in school (median around 120 months). Among the chronic poor and transient, the median is below the 100-month study.

METHOD

The theoretical model

Analysis of the demand function for educational services by households is conducted through a model where the household members' access to education both primary, secondary and tertiary is integrated into a utility function. The model was first proposed by Rosenzweig and Schultz (1982). This research models the household demand for education. Based on the traditional models of education (Becker, 1964, 1975 and 1993), we assume that each individual household member has an individual utility function is written:

$$U_m = U_m(X, l, \theta, \mu, \omega)$$

where X_m represents the goods purchased and consumed by the individual, the consumption of leisure, θ , consumer prices produced by the household including elements such as education, health, μ is a set of characteristics that can affect taste of the individual and ω a heterogeneous set of variables unobserved. Function of household welfare W depends on the utility of each household member. If the household member M , then the function of welfare is:

$$W = W[U_1(X, l, \theta, \mu, \omega), \dots, U_M(X, l, \theta, \mu, \omega)]$$

The objective of the household is to maximize this function and the maximization is done under the constraint of production and the household's budget constraint. It is assumed that the household product according to the following technology:

$$\theta = (K, \mu, V)$$

where K represents the inputs, μ or individual characteristics of the household and V captures heterogeneous unobserved variables that may influence the production process.

The available time is divided between household work time (T) and leisure, the household's budget constraint is:

$$pX_m = \sum_m [w_m(T - l) + y_m]$$

with p the price of goods X_m , w_m the wage rate (or the price of time of each individual in the household), y_m is the non-work income. The total household income λ is the sum of income and non-work income earned from work $w_m(Tl)$. Solving the problem gives the household demand functions of the form:

$$\Omega_i = f(p, w, y, \mu, \epsilon)$$

The demand for a good such as education or food depends on all prices p , w wage rates, μ of household characteristics, including income and unobserved variables ϵ .

The household makes a choice between present consumption (the child to work) and future consumption (the part of the education system to improve its abilities). We assume that the decision of a household or not to enroll a child is the result of an expected benefit H^* which is only known to the household, which determines the probability that the household educates its children. The demand for education of children can be represented by a binary variable H defined as follows:

$$H = \begin{cases} 1 \rightarrow si H^* > 0 \\ 0 \rightarrow si H^* < 0 \end{cases}$$

The hidden variable H^* is defined as profit or utility derived from children's education. It is assumed that gain or utility is linked to household characteristics and social conditions in which the household faces. Akabayashi and Psacharopoulos (1999) have shown that these conditions have an impact on decisions of schooling for children in developing countries. We have:

$$H^* = f(R_h, \Theta_h)$$

R_h takes into account household income and Θ_h the sociodemographic characteristics of the household. The binary choice equation can be written compactly as follows:

$$Y^* = V\theta + \varepsilon$$

V represents household characteristics thought to affect the household decision to enroll a child in the formal education system, θ is a vector of parameters to be estimated and ε is the error term assumed normally distributed with unit variance, this which is a prerequisite for identifying the parameter vector θ and also ensures efficient estimators for θ (Savado et al., 1998).

The estimated logit model is made by the method of maximum likelihood. Indeed, the problem structure is such that the dependent variable is limited. In this case, the least squares are not suitable because the null hypothesis of the mathematical expectation of the error is no longer valid, the expected error increases with increasing values of the explanatory variables (Maddala, 1983; Gourieroux, 1986). In this situation, the method of maximum likelihood is indicated.

The empirical models

This section focuses on the education of offspring born alive of those surveyed. As in the first part of this study, schooling refers to formal instruction in French or Arabic. The Koranic school is not considered. In the sample of live-born descendants of the respondents there were a total of 2309 living children aged 6 to 14 years in August 2008 (time of the survey). It is found that over a third of this population is not going to school (35.69%). It should then determine the factors that explain the access of a child of this sample at school.

In this section, the methodology is to perform a classification of factors of children. As its name suggests, the "classification of factors" is based on factors derived from factor analysis (here, the Multiple Correspondence Analysis (MCA)). This typology will partition the 2309 children in homogeneous groups with respect to the terms of the variables selected. The typology is used to summarize information in ways that a factor analysis. With the typology, the children will be grouped automatically by a reduced number of classes. Children who are similar with respect to active variables share the same class. Thus, each class will include Does a different category of children. Classes formed will be described later.

The main purpose of classification techniques is limited to factors highlight the data structure to make assumptions to be verified in a later stage. This is what justifies the use of multilevel logistic regression to understand the factors explaining access to school. It is the nature of the data imposes the choice of multilevel modeling. Indeed, to avoid duplicates in the database, information about the men on child characteristics were preferred. We are left with two levels of analysis that justifies the use of multilevel modeling: a parent level (low) level and a child (descendant). Thus, data on the offspring are nested in those built by the parents. This brings up a systematic correlation violates the assumption of independent observations on children from the same ascendancy. Under these conditions, estimates by the method of Ordinary Least Squares (OLS) become inappropriate and variances are biased. The factors listed above bias inferences mathematics (Hox, 2002).

The variables of the first level (children) were sex, birth order, or that living with a parent and not being educated or not. The second level variables (parents) are: sex, age of the parent when the child's birth, poverty status, area of residence, ethnicity, religion, marital status and instruction of the person who raised the ascendancy. The first type multilevel regression appeared in the 1980s (Bressoux, 2008). They are used to study the links between individuals and their group membership. In other words, multilevel regressions used to analyze the influence of the

environment of the individual irrespective of characteristics of this individual. In general, multilevel regressions are performed once one wishes to model a phenomenon observed at the primary statistical units taking into account certain context variables.

Implementation of the multilevel model

With multilevel modeling, one assumes that all children in the sample have the same probability of being enrolled at school. And this probability depends on certain characteristics of the child and parents. Modeling and will follow two main phases.

Y is the dichotomous variable "schooling". Y_{ij} is the observed value of Y for child i (i = 1 to 2309) of the parent j.

$$y_{ij} = \begin{cases} 1, & \text{if the child is enrolled} \\ 0, & \text{if not} \end{cases}$$

The vector of explanatory variables is denoted by X. The probability that the child (ij) is denoted p_{ij} is enrolled. It is assumed a function of X.

$$P(y_{ij} = 1) = F(Xb) = p_{ij}$$

Where b is a real parameter and F is the distribution function of the logistic with:

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

Combining the two relationships and passing to the logarithm (log), we obtain the following relation:

$$\text{Log} \left(\frac{p_{ij}}{1-p_{ij}} \right) = Xb$$

The report $\frac{p_{ij}}{1-p_{ij}}$ is called the odds ratio or odds ratio. Its meaning is explained later.

Phase 1: the empty model

This is a model that does not include any explanatory variable. The empty model is unconditional (any variable) and is to explain the child's education from the constant of the parent level. This model allows us to appreciate the contribution of variation in the relative level of access to school.

At the individual level model is:

$$\text{Log} \left(\frac{p_{ij}}{1-p_{ij}} \right) = \alpha_{0j} + \varepsilon_{ij}$$

where:

The term ε_{ij} is the random error associated with the child ij;

The term α_{0j} is constant for children from the same parent but j varies from child to child when the parents are different. We therefore

$$\alpha_{0j} = \beta_0 + \varepsilon_{0j}$$

The term ε_{0j} is the random error associated with household j in explaining α_{0j} ;

The term β_0 is the average of the logarithm of the odds for all children, regardless of the characteristics of the parent.

Finally the model is written empty $\text{Log} \left(\frac{p_{ij}}{1-p_{ij}} \right) = \beta_0 + \varepsilon_{0j} + \varepsilon_{ij}$

In this model vacuum, there are two hazards: ε_{0j} and ε_{ij} . ε_{0j} . The error is related to the parent level and the error associated with level ε_{ij} child.

The assumptions of normality and autocorrelation of these errors are issued. This gives:

The assumptions of normality and autocorrelation of these errors are issued. Which gives:

$$V(Y) = V(\varepsilon_{0j}) + V(\varepsilon_{ij})$$

Variance of access to school is the sum of the variance of inter-parent and inter-variance children.

Phase 2: the complete model

This is the model that contains all the explanatory variables.

$$\text{Log} \left(\frac{p_{ij}}{1-p_{ij}} \right) = \beta_0 + \sum \beta_k X_k + \varepsilon_{0j} + \varepsilon_{ij}$$

The X_k are the terms of the explanatory variables (terms of reference are excluded).

K varies from 1 to 24 (total number of terms included in the model)

The complete model could be complicated by including interaction terms between the different

variables. But given the large number of categories of explanatory variables, the combined model may be difficult to implement.

REVIEW OF LITERATURE ON THE DETERMINANTS OF EDUCATION

Some authors as Berthelemy et al (1997) rated the quality of education in Senegal failed, posing in their view, two problems: its relevance and its ability to help the Senegalese economy to achieve the objectives of sustainable growth and development but also and especially the MDGs in education.

To solve these problems, it seems necessary to know first of all the causes of this failure, which was not, according to our understanding, the concern of these authors.

In its design, Top (2000) defined the quality of the education system as the system's ability to produce a marginal unit of production of human capital. Thus, the quality of education depends on educational infrastructure, the initial endowments of human capital and the system's ability to equitably distribute educational services among potential beneficiaries.

Psacharopoulos (1994) reviewed and summarized texts written on the subject of education and its importance in economic growth. While education is essential to economic growth, but would it even know the type and level of education in question. The author also studied the benefits that can be drawn from an investment in human resources in comparison with other investments. His study allowed him to draw lessons for Schultz (1961), studying the relationship between education and economic growth, has identified the social forces influencing American education, both in terms of quantity than quality. His study is not sufficient to describe reality Senegalese if we know that American culture is very different from that of our country: the same remark may be illustrated by the fact that in our education system, we prefer to know while in the American system, it is especially the know-how and operational capability of the individual in the productive system of higher concern, which therefore requires more rigor and pragmatism in the pursuit of quality education.

Anderson et al (1967) studied the theoretical considerations in educational planning. Although the study is important, but the problem is that often, the reality on the ground away from the theory. For example, teachers who theoretically have the same levels of academic and pedagogical training are expected to provide similar performance to the student and yet it is not always the case since many practical considerations are very determinative of the quality of education.

Bellat (2003) considers that, in explaining differences in efficiency between the masters, it is not their personal characteristics such as age, sex, education that count but what they do day after days, that is to say that it is the teaching practices that make the difference on the quality of education. We believe that this approach cannot be generalized because the cultural realities in Senegal differ greatly from those of the author.

Studies of Graff et al (2000) and those of Sullivan (2001), show that there is a causal chain, linking education level of father and mother, cultural practices and cultural practices of parents of children. More specifically, the influence of educational level of parents through the transmission of a "cultural heritage". Indeed, cultural practices in question relate to concerts, theater, arts and classical music.

In Senegal, as elsewhere in Africa in general, not only the educational level of parents is very low or even nonexistent for some, but also cultural practices are quite different. This is why one can understand that the conclusions from these studies cannot serve as a reference for the results of students. Moreover, these same authors acknowledge that in the Netherlands or the UK, the most traditional cultural practices have a lower specific impact on the success of the child as opposed to reading practices. Although the studies by Hanushek (1997) show that reducing class size is not very effective, experiments Anglo-Saxon on the other hand show that this is not a general rule because, in contexts very popular, a very small class size may well have positive effects on student achievement. Clearly, this means that the larger the size of the class is smaller, the effects on students' results are positive, from a certain threshold. International surveys on student learning, organized by the IEA (International Association for the Evaluation of Educational Achievement in French) have shown that there is always a relationship between these achievements and social origin, a relationship that seems even grow since the 1970s (Keeves, 1995). In the latest PISA

(Program for International Student Assessment), the skills displayed by students 15 years vary systematically with their social environment in all countries (OECD, 2001 and 2003), this applies both to what is the reading literacy, mathematical literacy than or scientific culture. We also find that relationship between family background and performance of children in less developed countries such as Latin America (Willms and Somers, 2001).

The work of BIH and Goze (1996) in Ivory Coast reveal that there are three major obstacles must be overcome to facilitate the enrollment of women: it is socio-cultural barriers, economic and institutional. For this study, therefore, universal education necessarily requires removal of those obstacles.

This study is not only restrictive, because it only concerns the girls in Ivory Coast, but it ignores the quality of education.

Diagne and Dovoedo (2003) have identified following their work, factors that influence households in their decisions to enroll their children. These factors relate to demographic characteristics, level of education of household head, availability of education provision, the standard of living of households, child gender, area of residence, the views of the child. Research conducted by AERC (2004) have revealed that the education of children depends both on factors related to supply and demand for education: what are, for example the location of the household, the phenomenon of emigration, low external efficiency of education, types of education offered, the availability and quality of infrastructure, the fit between parental expectations and the nature of the available supply, unemployment and the failure of school leavers.

Today it is more than important to identify school variables (characteristics of the original family of the student, socio-cultural characteristics of the surrounding environment, individual characteristics specific to the student on education policy which could act indirectly to stimulate the demand for education, fight against inequalities in access to school and against the deteriorating quality of education. Vespoor (1989), Moulton et al (2000), based on the results of their research on the consistency of the triptych - student learning / learning and teacher training / capacity of the school - have argued for a model implementing a system which provides experiential learning; which should lead to several innovations including the main obstacle to their real significance lies in the ability of teachers to change their teaching practices. From this study, one may ask what the determinants of education in Senegal are in a dynamic pattern of transmission of poverty. Verschueren (2004) has identified in its study the factors affecting the quality of education. These factors are mainly related to the context (household maintainer, the Commonwealth and State), at school, the teacher and the student and his success. Following this study fairly comprehensive, we need further analysis to ascertain more precisely the impact of some of these factors is under the control of the state.

RESULTS

In this sub-section is to try to study the determinants of schooling. In other words we try to analyze the factors behind an individual of that population is educated. The method adopted is to perform a logistic regression. For the dependent variable (schooling) is qualitative and it is dichotomous. The explanatory variables are gender, ethnicity, religion, generation, place of residence, type and level of education of the person who raised the respondent, the type of household breadwinner residence between 5 and 7 years, poverty in childhood, knowledge of a loss between 5 and 7 years, access to social services district of residence of the individual between 5 and 7 years.

Table 4 : Regression statistics

Pseudo R ²	29%
chi ²	817,97
Probability	0,00

Source: Authors' calculations LARTES-EVPC, 2008/2009

The modeling results are presented in Tables 6 and 7. The interpretation will be using odds ratios or "odds ratios". The hypothesis "all things being equal" is used in each interpretation of the influence of a term or a variable in the probability that the individual enters school.

According to Table 6, the model is globally significant (Pr (Fischer) = 0.00). In other words, the characteristics of the individual selected explain its overall enrollment.

Influence of socio-demographic characteristics

Gender, generation and place of residence have a significant influence on the probability that the individual goes to school. Indeed, the risk of 1%, and rural women are less likely to attend school compared to men and Dakar, respectively. However, there is no significant difference between the Dakar and other urban dwellers in terms of opportunity for access to school. In addition, over the individual belongs to the new generation it is likely to enter school. For example, individuals born after 1978 were three times more likely to attend school compared to persons born before 1954.

Ethnicity does not play a significant role in the probability of entering school. Serer, Wolof and Pulaar have virtually the same opportunities to access school. By cons, people of other ethnic group (Diola, mandiak, etc.) Appear more likely to attend school compared to the Wolof.

Regarding religion, it is noted that Christians are twice as likely to attend school compared to Tidianes and other Muslims.

Table 5: Regression results on determinants of schooling

Variables	Terms	Parameters
Sex (reference : male)	Female	0,38***
	Rural	0,20***
Place (reference : Dakar)	Other city	0,97
	Pular	0,80
	Serer	0,97
Ethnic group (reference : wolof)	Other ethnic group	1,48*
	Mouride	0,79
	Other Muslim	0,89
Religion (reference : tidiane)	Christian	2,32**
	One parent	1,09
	Other person	0,80
Person who raised the respondent (reference : parents)		
Educational level of the person who raised the respondent (reference: educated)	No level	0,17***
Knowledge loss in 5 to 7 years (reference : not damaged)	Damaged	0,89
	Generation 54_68	1,85***
	Generation 69_78	2,65***
Generation (reference : generation after 1954)	generation after 1978	2,92***
	Transient poor	0,60***
	Chronic poor	0,36***
Poverty at childhood (reference : no poor)		
Breadwinner of the household to children (reference : head of household)	Other provider	0,98
	No acces	0,69***
Neighborhood access to social services for children (reference : yes)		
Constant	Constant	15,94***

Source: Authors' calculations LARTES-EVPC, 2008/2009

¹ The symbols (***) (** and (*)) represent significance at the risk of 1%, 5% and 10%, respectively.

Environmental influence of the individual at childhood

The environment of the individual returns to the living conditions of the individual. These are mainly the characteristics of its neighborhood, the general living conditions in childhood.

Individuals living in areas without social service have 31% less likely to go to school compared to others that are in neighborhoods with access to these services. Social services refer to all quality services related to health, education, drinking water and sanitation.

The person who raised the respondent and the household resource provider where the individual lived as a child does not exert a significant influence on the probability that the respondent enters

school. However, the educational level of the individual is significant at 1%. Indeed, individuals reared by an educated person has 83% chance of being educated than those raised by people with no education.

Knowledge of a loss between 5 and 7 years is not a significant factor in the probability of entering school. Per claim, means the knowledge of a fire, natural disaster, etc.

Child poverty is significantly on the probability of entering school. Chronic poverty in childhood reduced by 64% chance of being educated compared to non-poverty for children.

INTERPRETATION RULE

The results of the full model are confined to the table 11. The interpretation of regression results is based on the "odds ratio". This is the ratio between the probability that a child goes to school and that he not to go. If the odds ratio is equal to a number k for a child, it means that yak times more likely that this child is enrolled. Usually, we write "against a k '(Hurlin, 2003). For each variable, a reference category is selected and interpretations are made relative to the latter.

Furthermore, the interpretation of results will be in the underlying assumption: ceteris paribus (all else being equal). In other words, the interpretation of the influence of a variable in the probability that a child goes to school is assuming that the influence of other variables is zero.

The significance of the estimates is tested using the Wald test statistic is the square of the Student t (ratio between the parameter and the estimated standard deviation). At the table 11, the estimates are statistically significant at 1%, 5% and 10% are followed by (***) (** and (*), respectively.

THE EMPTY MODEL

The blank template or model without explanatory variables has a double interest. First, it allows to estimate the constant (0.588 with a standard deviation estimated at 0.051). It is statistically significant. The meaning of this result is that regardless of any variable, any child is likely nonzero going to school. Moreover, by $\exp(0.588) / (\exp(0.588) + 1)$, found that 64.3% is the proportion of children enrolled in the sample.

Figure 4: Model or empty model without explanatory variables

$$\begin{aligned} \text{scolar}_{ij} &\sim \text{Binomial}(\text{denom}_{ij}, \pi_{ij}) \\ \text{logit}(\pi_{ij}) &= \beta_{0j} \text{cons} \\ \beta_{0j} &= 0.588(0.051) + u_{0j} \\ [u_{0j}] &\sim N(0, \Omega_u) : \Omega_u = [0.891(0.135)] \\ \text{var}(\text{scolar}_{ij} | \pi_{ij}) &= \pi_{ij}(1 - \pi_{ij}) / \text{denom}_{ij} \end{aligned}$$

Source: Authors' calculations LARTES-EVPC, 2008/2009

The second interest of this model is that it allows vacuum to conduct an analysis of variance. Indeed, the variance of the parent level is estimated at 0.891 with a standard deviation estimated at 0.135 (Figure 4). This value is significant at 1%. As we are dealing with a logistic distribution, the variance in children is $2/3 \approx 3.289$. Consequently, the total variance is equal to 4.18. This means that 21.3% ($0.891 / 4.18$) of the variability of educating a child is due to factors related to the characteristics of his ascendancy.

THE RESULTS OF THE FULL MODEL

The full model shows that variables such as sex and birth order of children have no statistically significant influence on the probability that the child goes to school. Girls and boys in this sample have an equal chance to go to school. Do not live with her parents for a child 6 to 15 years in this sample of 44% would reduce the chances of being educated. The "foster care" of children is

widespread in West Africa (Pilon, 2003), in general and Senegal in particular. The motivations of parents who entrust their offspring are multiple order and are not dictated by logic that is in the interest of that one. Often it is to help a parent who does not have the chance to procreate. But the most common reason is to learn the Koran. Indeed, from an early age, many children are entrusted to marabouts to learn to memorize the Quran. This removes them permanently from formal instruction.

GENDER, AGE, PLACE OF RESIDENCE AND ETHNICITY OF THE PARENT

Sex, age of the parent when the child was old enough to go to school (6 -7 years) and area of residence of the parent have a significant influence in the likelihood that the child is educated. Indeed, in this sample, children raised in households headed by women as having had 21% more likely to attend school compared to those reported by men. The results showed that if the parent is aged 55 or older, the child is more likely to attend school compared to another child whose parent is under age 55 at the time the child should attend school. This difference from the parent generation is not significant. This result finds its explanation in the fact that most parents aged over 55 is removed from the workforce and therefore have more time to devote to the education of their young offspring. As for the ethnicity of the parent, it is found that children Serer are more likely to enter school than children Wolof while children of other ethnic groups are less likely to attend school compared to children Wolof.

RELIGION, EDUCATION AND LIVING CONDITIONS

Religion is a factor in the likelihood that children in this sample goes to school. The child of a murid or another Muslim obedience is less likely to attend school compared to the child of a tidiane. The Christian child is slightly less favored than the tidiane though the result was not statistically significant.

Table 6: Results of multilevel logistic regression

	Variables (term of reference)	caractéristiques	Estimated parameters	Odds ratio
Child level	Child Sex (Male)	filles	0,02	1,02
	Birth Rank of the child (Firts)	cadet	-0,118	0,89
		3 ^e or More	0,19	1,21
	Live with parents or not (live with parent)	Live without parent	-0,588***	0,56
Parent level	Sex parent (male)	Women	0,192*	1,21
	Parent residence (Dakar)	Other urban	0,388*	1,47
		Rural	-0,613***	0,54
	Parent damaged parent (not damaged)	Damaged	-0,071	0,93
	Educational level of the person who raised the parent (educated)	No educated	-0,742***	0,48
	Parent matrimonial status (monogame)	Not married	0,321	1,38
		polygamous	-0,127	0,88
	Parent Ethnic group (wolof)	pular	-0,171	0,84
		serer	0,372**	1,45
		Other ethnic	-0,411*	0,66
		manding_diola	0,213	1,24
	Parent Religion (tidiane)	Mouride	-0,77***	0,46
		other muslims	-0,364*	0,69
		Christian	-0,027	0,97
	Parent education level (secondary+)	Primary level	-0,781***	0,46
		None	-1,106***	0,33
	age* parent time of child birth (55ans+)	35-54 year	-0,915***	0,40
15-35 year		-0,835***	0,43	
Parent poverty (chronic poverty)	Chronic poverty	-0,88***	0,41	
	Transient Poverty	-0,811***	0,44	

Source: Authors' calculations LARTES-EVPC, 2008/2009

(*) La variable "âge du parent" n'est autre que la "génération de l'âge du parent" utilisée dans le modèle 1.

The parent's education and those who raised the parent have a significant influence on the probability that a child goes to school. If the parent has no education, the chances of her child to go to school fell by 69% compared to a child whose ascendancy has reached secondary school. Moreover, if the person who raised the parent is not educated, the chances that the child goes to school dwindle by 55%. Poverty does not favor the access of children to school. Indeed, the offspring of a poor person is 56% less likely to attend school compared to that of a non-chronic poor. The child of an individual who is chronically poor has 59% less likely to go to school.

CONCLUSION

According to the Document Economic and Social Policy (SED), in Senegal's efforts to develop education and training were not sufficient because they are constraints that make it less effective education system. This finding highlights the need to conduct more activities, especially for the rural to the achievement of the PDEF.

Strategy Paper for Growth and Poverty Reduction Strategy Paper (PRSP) reported the rate of population growth (2.5%) which exerts great pressure on the national education system and requiring a yearly increase in school inputs in very high proportions, to maintain performance which the education system has succeeded in access.

According to this document, the budget allocations to the sector increasing from year to year and fell by 32% of the operating budget in 2002 to nearly 40% in 2005. This increase reflects the overwhelming desire of the authorities to strengthen the education system. However, the results are mixed. Overall, nearly 80% of children attending primary school live within 30 minutes of their schools.

Statistics show that in urban areas (87.3%) and Dakar (92.9%), schools are more accessible than in rural areas, or the proportion of pupils living less than 30 minutes institutions primary is 69.5%. Approximately 56% of people are satisfied with the quality of educational services and that is urban and the satisfaction level is higher.

The gross primary school enrollment increased between 2001 and 2005 but there is not enough since being below the average for Africa south of Sahara. It went from 69.4% to 82.5%.

This is the same observation for the number of students per teacher in Senegal is 51 against 44 on average in Africa south of Sahara. It is 95% in urban areas and 70% in rural areas. Despite this progress, nearly 300,000 children going age in primary schools in rural areas and 36 000 children in urban areas are not in school. Moreover they are inequalities between rich and poor. Between the first and fifth quintiles of expenditure per capita, the difference in gross enrollment rates stood at 32.4 with 30.8 and 55.9 in urban Dakar.

Despite the reduction of gender inequality, girls' enrollment in elementary still relatively low. Enrollment rates are 84.4% for males and 80.6% for girls in 2005. However, female-headed households enroll more children and the difference in gross enrollment with households headed by men is 13 percentage points. However, inequalities in terms of enrollment of boys and girls are more pronounced among female-headed households (13.9 points) than male-headed households (8.6 points).

The completion rate of primary school is 53.9% (2005) against an average of 66% for countries accessing IDA window while the share of primary education spending in GDP of 2.08% against an average of 1.84% for these countries. It is noted in 10 children aged 7 to 14 years nearly a has already dropped out, and this phenomenon is more common in girls than boys. Dakar (9.7%) is more affected than other cities (8.4%) and rural (7.1%). Over 30% of dropouts are explained by an early entry in the professional and / or economic problems, 18.9% for school failure, 12.2% for lack of opportunities offered by the school and 9% for reasons of marriage / pregnancy / sickness. Resources allocated to education are inequitably distributed between rural and urban areas. According to estimates by the World Bank, the cost per pupil in rural areas is about 28,000 CFA per year, against 47,000 CFA spent by the Government by urban students. The Government has made considerable efforts to increase the supply of primary education in

rural areas. In the period 2000 to 2004, 7,109 new primary classrooms were built and 930 rehabilitated.

In the wake of the above listed level of education, history survey conducted by the LARTES brings a fresh perspective in analyzing the dynamics of basic education.

This study uses data from the biographical survey "Vulnerability and Chronic Poverty in Senegal", performed by the Laboratory for Research on Economics and Social Transformations (LARTES) over the period 2008-2009. The purpose of this study was to identify some global aspects of the Senegalese education in a dynamic perspective on the period from 1950 to 2008 but also to identify the factors explaining access to education of respondents and their children aged 6 to 14 years.

It emerged from this study that access to formal education is explained by gender, generation, place of residence and the environment in which the individual grew up. Women, rural residents, persons born in 1954 ... are less likely to access the school respectively compared to men, residents of Dakar, individuals born after 1978, etc., Ceteris elsewhere. Knowledge of a loss in childhood reduces the chances of entering school, ceteris paribus. Moreover, poverty in childhood is significantly on the probability of entering school chronic poverty in childhood shrinks 64% chance of being educated compared to non-poverty in childhood, all else equal.

REFERENCES

1. Akabayashi, H. and G. Psacharopoulos (1999), The Trade-Off between Child labour and Human Capital Formation: A Tanzanian Case Study, *The Journal of Development Studies*, Vol.35, June pp.120-140
2. Becker, G. S. (1965), A theory of allocation of time, *Economic Journal*, numéro 75.
3. Becker, G.S. (1993), *Human Capital : A Theoretical and Empirical Analysis with Special Reference to Education*, The University of Chicago Press, Third Edition
4. Gourieroux, C. (1986), *Econométrie des variables qualitatives*, Economica
5. Ha nushek, E.A. (1997). "Assessing the effects of school resources on student performance: An update". *Ed-ucational Evaluation and Policy Analysis* 19 (2), 141-164.
6. Keeves, J. P. (1995) *The World of School Learning: Selected Key Findings from 35 Years of IEA Research..* The Hague: IEA.
7. Maddala, G. S. (1983), *Limited-dependent and Qualitative Variables in Econometrics*, Cambridge University Press
8. MINEDU/CREA (2004), *Analyse du secteur de l'éducation*, Dakar, DPREE.
9. Rosenzweig, Mark R., and Schultz, T. Paul (1982), "The Behavior of Mothers as Inputs to Child Health: The Determinants of Birth Weight, Gestation, and the Rate of Fetal Growth", pp. 53-92, in: Fuchs, Victor R., ed., *Economic Aspects of Health*, Chicago: The University of Chicago Press.
10. Rosenzweig, Mark R., and T. Paul Schultz (1983). "Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight." *Journal of Political Economy*, 91(5): 723-746.
11. Rosenzweig, Mark R., and T. Paul Schultz (1987). "Fertility and Investments in Human Capital: Estimates of the Consequences of Imperfect Fertility Control in Malaysia." *Journal of Econometrics*, 36: 163-184.
12. Rwehera, M. (1999). *L'éducation dans les "pays les moins avancés" : quelle marge de manœuvre?* L'Harmattan.
13. Savadogo, K., T. Reardon and K. Pietola (1998), *Adoption of Improved Land use technologies to Increase Food Security in Burkina Faso : Relating Animal Traction, Productivity, and Non-Farm Income*, Agricultural Systems, 58 (3), pp. 441-464.
14. Schultz, T. Paul and John Strauss (2007), eds, *Handbook of Development Economics*, Volume 4, Amsterdam: Elsevier Science, North-Holland, forthcoming. TAPE G., BIH E. Etude sur les opportunités et les freins à la bonne performance des filles à l'école primaire. UNICEF/ROCARE, 1996, 122p.
15. UNESCO, O. d. (1978). 20ème session de la Conférence Générale de l'UNESCO. Paris.
16. Vespoor (1989) Lockheed M. and Vespoor A. (1989) Improving primary education in developing countries: a review of policy options (Education and Employment Division, Population and Human Resources Department, World Bank, Washington) *Education* 34 (1988) pp 17-45.
17. Willms, J. D., et M.-A. Somers. (2001). Family, classroom, and school effects on children's educational outcomes in Latin America », *International Journal of School Effectiveness and Improvement*, vol. 12, n o 4:409-445.