The Sibling Size Impact on the Investment in Child Quality : Evidence for France

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Abstract

This study explores the nexus between the family size and the child investment in the form of school expenditures. This work is based on the quantity-quality Becker's model who borrowed the neoclassic model of the individuel consumer choice. Using French crosssectional data, we estimate the child's school expenditures, initially by the ordinary least squares method. We follow, thereafter, the two stages Heckman's procedure in order to correct the selection bias. As previous studies, we underline on the one hand, that the impact of the size is negative. On the other hand, we show the incidence of other determinants that exert a stronger influence on the school expenditures devoted to the child.

Keywords : *family, sibling, school expenditures, child, Heckman.*

Jel classification : *D1, I2.*

Résumé

Cette étude souligne le lien entre la taille de la famille et les dépenses scolaires réservées à l'enfant. Ce travail est basé sur le model quantité quality *de Becker qui a emprunté le modèle néoclassique du choix individuel du consommateur. A l'aide des données transversales françaises, nous estimons les dépenses scolaires réservées à l'enfant, d'abord, par la méthode des moindres carrés ordinaires. Nous suivrons par la suite la procédure d'estimation de Heckman à deux étapes dont le but est de corriger le biais de sélection. En accord avec les études antérieures, nous soulignons, d'une part, que l'impact de la taille est négatif ; d'autre part, nous exhibons l'incidence d'autres facteurs qui entrent en jeu et exercent une influence plus forte sur les dépenses scolaires consacrées à l'enfant.*

Mots-clés : *famille, fratrie, dépenses scolaires, enfant, Heckman.*

Jel-classification : *D1, I2.*

Introduction

The family is a social institution characterized by its crucial role in the production and the children's education. This institution becomes a

fundamental entity able to take a major decisions which can influence the expected effects of public policies. The economic family analysis is made possible due to the developments of the concepts of human capital, human time allocation, household production function and the design of the family as a unit of decision-making. The multidisciplinary research has granted a particular role to the family background such as parents'education, parents' age, occupational category, fertility, type of neighborhood (Haverman and Wolfe, 1995), in child investment. The greatest investments in the human capital of child come from small families. Indeed, the households which project to invest strongly in their children have smaller families.

The theoretical works (Becker, 1960, 1965, 1974, 1977 ; Becker and Lewis, 1973) show an opposite relation between the number of children within the family and child investment. As regards use of resources, these two variables enter in conflict since the resources devoted to each child reduces when the number of children increases. Indeed, the parents carry out an arbitration in matter of fertility and efforts of education while determining the optimal allocation of their investments in human capital, i.e their children while hoping to increase their productivity and thus their future income.

Our analysis is interested in the investment in the human capital in terms of school expenditures devoted to the child. This analysis is interesting because of the importance of human capital in the economic growth in the long run : the future qualification of workers depends on the current investment in the children. In addition, the inheritance of poverty from one generation to another persists as long as the children's schooling is related negatively to the size of the family. Countries like France which want to maintain economic growth must bet on investment in human capital.

The objective of this paper is to examine the impact of sibling size on the investment in the children in the form of school expenditures. This study uses two different approaches. In the first approach, we present the various determinants of the school expenditures devoted to the child by using the ordinary least squares. In the second, we correct the bias of selection by the method of Heckman to show the effect of some factors on investment of the parents in terms of expenditures. This work is spread over three parts. The first part is reserved to the theoretical framework of Becker which is central to the economic theory of the family. The second part is devoted to the data used in our study. The last part is dedicated to the presentation of the results of the econometric study.

Theoretical Background

The micrœconomic theory of the consumer constitutes the conceptual origin and the result of the economic theory of the family. Becker (1960) is the first to use these economic analysis instruments in order to explain

demographic problems. His model is based on two principal assumptions. First, the parents are supposed to determine the number of children at the beginning without the possibility of modifying their choice. Second, the children are regarded as *durable economic goods*, able to increase the utility of the parents.

The basic model is based naturally on the assumption that the decisions taken in this field are rational. The analysis pursued by Becker (1960) is formulated in terms of the utility. He aims at explaining the variations of the behaviors following change in constraints. He dœs not resort to an explanation basing on modifications of tastes and preferences. Those are supposed to be stables.

Each family seeks to obtain a maximum of wellbeing or utility, by using the resources of which it lays out while trying to distribute them in order to satisfy its various needs or desires. Formally, the function of utility family U_p is defined as follow :

$$U_p = U_p\,(N,\ Q,\ Z)$$

where
N : number of children,
Q : quality of each child,
Z : household consumption in other goods.

The educational load explicitly and implicitly incorporates the Becker [2] time allocation theory according to which *Z*, *N*, *Q* are not obtained directly by the means of purchase on a market but "are produced" by the family according to a homogeneous function of production of the form :

$$C = N.Q = f\,(t_c, x_c)$$

t_c indicates the total time devoted by the parents to their children ;
x_c represents the quantity of goods devoted to the children.

Since to educate a child is an intensive activity in time and money, Becker distinguishes the money-income from the real-income of the family (to take into account the resources of time).

The constraint of the total income is given by :

$$I = N.Q\,\pi c + Z\pi z$$

where *I* represents the full income of the household, πc indicates the cost of $C = N.Q$ and πz is the opportunity cost of *Z*.

The maximization of the utility function under constraint yields :

$$UM_N = \lambda Q\pi = \lambda P_n;\ UM_Q = \lambda N\pi = \lambda P_Q;\ UM_Z = \lambda\pi_Z = \lambda P_Z$$

where the *UM*'s are the marginal utilities and the *P* 's are marginal costs or *shadow prices* of respectively *N*, *Q* and *Z*, while λ is the marginal utility of the income.

These conditions imply that the *shadow price* of the number of children is a function of the quality and vice versa. Thus, the *shadow price* of the number of a child (i.e to have a child moreover, with a constant quality for each child) is all the more expensive since quality is higher. In the same way, the *shadow price* of quality (i.e the cost of a rise of a unit of quality, with constant quantities) is all the more important that the quantity is higher. In other words, the increase in the quality of each child supposes a proportional cost to the number of children in the family.

Becker emphasized that the increase in income is accompanied by a decrease in demand for children, and this for the following reasons :

• *A price effect :* as from the moment when the potential wages increase on the labour market, the cost of the child increases by generating "an opportunity cost" characterized by the renouncement of having a wage activity (i.e. the price of time that parents devote to rearing their children). Thus, a rise of the standard of living leads to a drop of the number of children.

• *A substitution effect of the quantity by quality :* when the wage increases, the parents make a choice between having more children (request correlated positively with the wages), or to have less children with a better quality.

As regards use of the family resources, both dimensions of the quality-quantity enter in conflict. The reason is that the reserved resources to each child decrease when the number of children increases for the total resources of a given household (Blake, 1981, in the United States ; Knodel and Wongsith, 1991, in Thailand ; Montgomery and *al.*, in Ghana and in Côte d'Ivoire ; Razafindratsima, 2000, in Antananarivo). However other factors influence the well-being of the children and exceed (or escape) control of the parents, such as the genetics endowment or subsidies of State. But the efforts carried out by the parents remain more important. Thus, children of a large family would undergo a cost of the sibling related to the dilution of the resources (monetary, temporal and material) of the household (Birdsall, 1980, in Colombia). In general, the arbitration between quality and quantity results from the parental choice of fertility and educational efforts.

However, the impact of the sibling size remains ambiguous. In Kenya, Gomes (1984) observed that family size is positively correlated with the number of years of the studies carried out. Recently, Buchmann (2000), on this same country, highlighted no negative impact of this variable on the probability of the schooling. Chernichovsky (1985) underlined that in the rural background of Botswana, the number of children aged between 7 and 14 years is correlated positively with school success. This empirical work diverges from those who corroborate the theory of Becker (Blake, 1981), Knodel and Wongsith (1991), Razafindratsima (2000) and those who lead to different results such a positive correlation or the absence of correlation (Gomes, 1981), Buchmann (2000), and Chernichovsky (1985).

This empirical study allows us to emphasize that this relation is negative in France. Moreover we introduce several explanatory variables describing the family environment to identify the effect of the size on child investment. The use of these qualitative variables enables us to better determine this effect by the means of the OLS model and the Heckman model.

Data Description

The data used in this study are the outcome of national survey "Efforts of education of the families in Metropolitan France (1991-1992)" (in abbreviated "éducation"), financed by INSEE (National Institute of Statistics and Economic Studies) and conceived in collaboration with the INED (National Institute of Demographic Studies). The survey was carried out among 5266 households, having for the base of the survey the Census of population of 1990. This survey describes the set of expenditures and investments granted by the households for the education of their children. The households concerned had at least one child aged between 2 and 25 years for whom they were providing an education whether or not they were living at home. The data collection took place in May-June 1992, in order to draw up an assessment of the school year 1991-1992.

This "education" survey is a completely new operation in France, it is the first time we have had essential information on the educational behavior of families. This survey seeks to answer two objectives :

1. To describe the whole efforts granted by the families for the education of their children. The survey provides detailed information on the expenditures, the time spent to follow the schooling of the children, the relationships with establishments and teachers, the choice of the establishments and its motivations, the attitude with respect to the extracurricular activities, the sharing of education tasks among fathers and mothers, the comparable efforts between girls and boys, the elder and the junior, and the families expectation with respect to teaching.

2. To compare the educational behaviors of the foreign families or of foreign origin with those of the families of French origin. From this point of view, the sample of the foreign families or of foreign origin was over represented in order to bring answers the following questions :

• What are the attitudes of families of foreign origin regarding the educational system ?

• Do they remain in isolation or have they integrated ?

The richness of this data obliges us to select among these various variables those which appear relevant to us for our econometric study. One also has other significant information, such as the activity carried on by the members of the household. One of the strong points of this investigation is the availability of information of an economic nature which constitutes a major tool for an improved empirical analysis.

Econometric Approach

The empirical study uses two different approaches. The first approach studies the various determinants of the school expenditures devoted to the child by using the ordinary least squares.

Then, we correct the bias of selection by the method of Heckman to show the effect of some factors on the investment of the parents in terms of school expenditures.

The Ordinary Least Squares

This section presents the various determinants of expenditure devoted to child A by specifying the relationship between family size and school expenditures reserved to child A (1), as well as other factors which could exert an influence on the expenditures in a general way. The estimation technique taken into account until now is the ordinary least squares. To simplify, let us take the linear model of regression for a sample of size N = 4937 which is written in the following way :

(1) Child A is the pilot child.

$$Idescola = \beta_0 + \beta_1 CycEtEnf + \beta_2 TypResid + \beta_3 TypHabita + \beta_4 ordA + \beta_5 age + \beta_6 DipElvs + \beta_7 cspat + \beta_8 csmat + \beta_9 Nenf + \beta_{10} NenfScol + \beta_{11} niscola + \beta_{12} detota + \beta_{13} origine + \beta_{14} sex + \beta_{15} \text{couple} + \varepsilon$$

With $\varepsilon \sim N(0, \sum = \sigma I)$

where I is the unit matrix.

We explain the dependent variable Idescola, logarithm of the school expenditures devoted to child A, by a linear model, according to the explanatory variables (CycEtEnf,..., sex) and of a random error ε supposed IID normal.

In the model, β_0 corresponds to the constant. In spite of the consideration of several explanatory variables, the model remains a reducing approximation because of the ignorance of the totaly of the determining causes.

The estimated equation gives :

$$\widehat{Idescola} = 6.005 + 0.437\,CycEtEnf + 0.034\,TypResid - 0.041\,TypHabita - 0.024\,ordA - 0.078\,Nenf - 0.010\,NenfScol + 0.011\,age + 0.000\,DipElvs - 0.004\,cspat - 0.004\,csmat - 0.008\,niscola + 0.000\,detota - 0.003\,origine - 0.021\,sex - 0.061\,couple$$

The principal problem consists in :

– estimate the cœffcients by using the survey Effort of Education ;
– evaluate the precision and the goodness of these estimators ;
– measure the explanatory power of the model ;
– evaluate globally and individually the influence of the explanatory variables in the model ;
– evaluate the quality of the model (confidence interval).

Estimation of the Child's School Expenditures

The results were obtained by the ordinary least squares regression, controlling a number of factors which can influence school expenditures devoted to child A. Table 1 (see appendices) indicates the estimates obtained with one regression by OLS on the French data. When they have a significant influence, cycle of study of the children (CycEtFnf), age (age), type of residence (TypResid), total expenditures for child A (detota), school level of child A (niscola), occupational category of the father (scpat), of the mother (csmat) affect positively the school expenditures of child A. The number of children (Nenf), type of habitat (TypHabita) and the order of child A (ordA) have a negative influence on the schooling expenditures of child A.

The examination of the estimates shows that the most of the cœffcients of regression are statistically significant and have the expected effect, which leads us to conclude the following findings :

• The results of regression tend to confirm the existence of a cost related to family size which is reflected by the fact that the number of children is related negatively to school expenditures of the child. We can observe that the effect of size is more significant that the effect of birth order.

• We observe here the negative role of child's birth order on school expenditures. Similarly, the expenditures are higher as the birth order is less important (to be the eldest one is better than to be the youngest).

• The higher the school level is, the more the school expenditures are greater. It is possible that this effect reflects a phenomenon of increasing the cost of superior studies.

• The positive cœffcient of the occupational category of the mother and father makes it possible to think that the membership of an occupational category of the parents exerts an important positive effect on their decisions on school expenditures. The expenditures are even higher if the home is economically well-endowed. That means that the membership of social and economic category explains the levels of the school expenditures. We observe that father's occupational category has an impact more marked than that of the mother.

• Concerning the positive role of the household education (DipElvs), this result indicates that the best educated households do not devote more financial resources.

• The positive cœffcient of age makes it possible to think that the household age exerts a positive influence on the decisions of expenditures. The more the household advances in the age, the more it decides to devote more financial means.

• Similar results are observed when one considers the variable of the children's education level of the sibling (cycEtEnf). The cœffcient is better, and indicates that the school levels have a significant positive impact on the expenditures of child A. In other words, the cycle of studies of the children gives an idea on the school expenditures of child A.

• We were also interested in the type of residence (rural or urban). The results of the model of OLS show clearly the positive effect that exerts this variable on the expenditures. That enables us to reveal the existence of a positive relation to the type of residence : to reside in Paris generates school expenditures greater than to reside in a rural zone.

• Our statistical analysis allows us to understand the effect of the taking into account of type of habitat (TypHabita) on expenditures. The negative cœffcient of the habitat type means that housing influences the evolution of school expenditures. We can conclude that to live in a house generates greater expenditures for the households.

These results accredit the idea according to which the decisions of school expenditures are influenced by different factors and confirm certain aspects of reality. Nevertheless, these results must be interpreted carefully. On the one hand, certain significant variables which affect the decisions of school expenditures are excluded from the analysis. On the other hand, the impact of public policies was not taken into account for lack of information.

Heckman Procedure and Bias Correction

Not taken into account of the bias selection results in a biased estimate of the parameters of interest. This bias results from the use of the selected samples in a non random way during the estimate of the behavioral relationships, like bias due to "omitted variables". To correct the bias, Heckman proposes a simple and consistent method to estimate these models, by using a bivariate model for the selection equation and a OLS to estimate the behavior equation with the selected sample. The procedure proceeds in two-step :

$$Y_{1\,i} = X_{1\,i}\beta_1 + U_{1\,i} \qquad (1a)$$

$$Y_{2\mathbf{i}} = \mathrm{X}_{2\,i}\beta_2 + U_{2\,i} \qquad (1b)$$

where $\begin{pmatrix} U_{1i} \\ U_{2i} \end{pmatrix} \sim N_2\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}\begin{pmatrix} \sigma_{11} & \rho\sqrt{\rho_{11}\rho_{12}} \\ \rho\sqrt{\sigma_{11}\sigma_{12}} & \sigma_{22} \end{pmatrix}\right)$

with $\mathrm{X}_{1\,i}$ the vector of explanatory variables (csmat, cspat,. . .) and β_1 the vector of cœffcients to be estimated. $\mathrm{U}_{1\,i}$ represents the residues. The first equation (or substantial equation) models the school expenditures devoted to the child, and the second equation (or selection equation) models the matrimonial situation of the family. $\mathrm{X}_{2\,i}$ is a vector of exogenous variables, β_2 a vector of parameters to be estimated by the ordinary least square, and $\mathrm{U}_{2\,i}$ the term of error.

There are therefore two processes which can be described by these two connected equations. This relation will be explained by a non-null correlation between the error terms of the two equations. If such a correlation exists, we cannot consider the substantial equation without taking into account the selection process.

The general idea is to eliminate selection bias for individuals having the same selection effect for two consecutive periods. The main objective consists of demonstrating the incidence of selection effect on the parameters estimated in the school expenditures equation of the child. Insofar as only school expenditures were reserved for the child care are observed, that introduced a selection bias into the available observations for the second equation. This one is due to the existence of differences between the single-parent families and the families made up of two parents : the family type affects the school expenditures devoted to the child. It is therefore necessary to compare these groups in order to highlight these differences. Generally, one uses a probit model, because the normality of the errors is a fundamental assumption in the procedure of Heckman.

In this case the dependent variable is a dummy variable indicating the matrimonial situation (1 for the families with two parents and 0 for the single-parent families). In the Probit model, we estimate the effects of these variables on the decision to be in state 1. However, these effects do not even have any interest for themselves, because these variables are present in the sample, and consequently the control of their effects in the analysis of the school expenditures does not cause any problem. What we wish to know, is the effect of the non measurable individual characteristics and impact of the matrimonial status. But information on the effect of these not measured characteristics is not available in the cœffcients of the explanatory variables. However, this information is available in the residuals of the Probit analysis. If one removes the effects of the known factors on the dependent variable, the variation of it will be due, only, with the influence of the unknown factors.

In the Heckman procedure, the residuals of the selection equation are used in order to build a factor of control of the selection bias noted λ. This last is a measurement which summarizes, condenses and reflects all the not measured characteristics of the matrimonial status. The value of λ is calculated for each individual, then added to the whole of data like an additional variable. In the second step of the procedure, we carry out an analysis in which the effect of the matrimonial status on school expenditures devoted to the child is estimated by an OLS regression. In this substantial analysis, we use λ, like a factor control of selection bias. The factor λ is also employed like additional independent variable in the regression. Its cœffcient estimated in the substantial equation, captures the share of the effects of non measurable characteristics and thus reflects their impact on the dependent variable. The other predictors in the equation are exempted from these effects, consequently, the analysis of regression produces unbiased cœffcients.

Results and Discussion

After this brief overview on the modeling of the school expenditures by using the Heckman procedure to correct the selection bias, we present now the results of our model.

Firstly, we underline that the degree of significance of the inverse of Mills ratio indicates that the substantial equation is not independent on the selection equation. The school expenditures devoted to the child is related to the matrimonial status. Table 3 (see appendices) is the transcription of the results found by the procedure of Heckman carried out on the sample of 4937 individuals.

The analysis of the determinants of school expenditures has interesting results. We note that the children's number in the sibling affects the level of investment expenditures. The estimated cœffcient is negative and significant, which indicates the existence of a cost related to the family size. This result clearly illustrates the dilution of the resources among a large number of children.

With regard to the child's birth order, we want to highlight its negative impact on investment expenditures devoted to the child. The birth rank is also discriminant with a stronger probability of receiving less pecuniary investment when one is the youngest. In this case, it is better to be older than youngest. This effect is negligible, but it remains less significant than the impact of the size.

Our statistical and econometric analysis allows us to understand the incidence of the occupational category of the mother and father on the evolution of the school expenditures. The positive cœffcient indicates that the membership at the occupational category of the parents influences in a positive way their decisions of expenditures. We also note that the occupational category of the mother has an impact less marked than that of the father. The decision-making process of each of the parents as regards school expenditures is not the same. Mothers and the fathers invest differently in the school expenditures reserved for the child. We observe as well that the investment in terms of school expenditures is more significant when the household is well endowed economically.

The analysis conducted here confirms that the school expenditures devoted to the child grow with the children's education level of the sibling (cycEtEnf). The child's school level seems therefore to play specifically an important role in the school expenditures reserved for the child. This link reveals that school expenditures are relatively higher when the educational achievement is more significant. It is possible that this effect reflects a phenomenon of increasing the superior studies which require more financial means.

As envisaged, we note that the total expenditure reserved for the child is positively correlated with the total investment intended for them. We

can conclude that a considerable part of the total expenditure is devoted to the children's school.

We are also interested in the type of habitat. OLS results shows a significant and negative effect whereas the estimate results after the correction of bias shows clearly the null impact that this variable exerts on the school expenditures reserved to the child. This brings us to reveal that the habitat type has a null influence on the evolution of the school expenditures. Living in a house does not generate school expenditures greater than living in an apartment.

Table 2 clearly illustrates the assumption of the dilution of the resources since the number of children in school is related in a negative way to the school expenditures of child A. The impact of the variable (NenfScol) was null by the OLS while in the Heckmam model becomes negative and significant at level of 10 %. Thus, there is an implicit advantage to have few brothers and sisters with provided education for better success.

The influence of the ethnic origin has no significant effect on the school expenditures for the child by OLS method. The absence of significance of the variable "origine" results to selection bais. The Heckman estimates are statistically significant where the latter show that from foreign origin has an impact on school expenditures, which constitute a handicap in itself for the school achievement. That means to say that the child from a French family will have more success than a child of foreign origin.

The positif cœffcient of the variable "niscola" makes it possible to think that the higher the school level is, the more school expenditures are significant. That probably reflects a phenomenon of increase in higher studies which require more financial resources.

We discuss now the variable "age" of the household members. The cœffcient is significant, and indicates that age has a positive and significant impact on schooling of the children. This leads us to deduce that the more we advance in the age, the more we attach great importance to school success. In other words, children who have the older parents benefit from them.

The examination of the cœffcient relating to the place of residence shows globally positive impact on the child's school expenditures. This indicator highlights the fact that living in an urban zone or in a rural zone does count for much in school expenditures. We can deduce that a living in an urban environment generates more school expenditures than one living in a rural environment.

We are also interested in the incidence of the level of the household education on the child investment. The cœffcients of the parameters corresponding to the school expenditures are nonsignificant, the educated households exert no influence on child investment. We can note also that the variable (sex) does not have any influence on the school expenditures. The parents do not make a discrimination between girl and boy.

Conclusion

This study is made possible by the availability of the survey "Effort of Education of the families" which is suffciently rich to allow reliable estimates. The objective of this study is twofold. The first goal consists in presenting the different determinants which affect school expenditures devoted to the child, by employing the Ordinary Least Squares. The second goal consists in correcting the selection bias, by using the Heckman model. The results of the regression analysis based on data by cross-section relating to 4937 households in order to verify the robustness of the principal results. The results of this analysis confirm that a series of factors affect the school expenditures decisions. These factors include the effects of the family size, which contribute to reduce the child's school expenditures. The membership in a social category, more educated parents help to maintain the expenditures devoted to the child. We focused on the relationship between the explanatory variables (place of residence and habitat type) and the expenditures for the child which plays a major role in the explanation of the expenditures.

The results of the selection bias find an the impact of some factors on the parents total investment in terms of expenditure. Our analysis highlights the cost of siblings related to the opposite relation between the expenditures and the family size. Just as the impact of the birth rank on the total expenditures, which is in favor of the elder child compared to the younger. Moreover, the membership in a favored occupational category helps to maintain expenditures devoted to the child. Other determinants play a significant role in the explanation of the expenditure such as the type of habitat or the expenditure reserved for children's education.

Appendix

Table 1

Estimation Results : OLS

Variable	Cœfficient	(Std. Err.)
Nenf	– 0.08018**	(0.02025)
TypResid	0.03326**	(0.01070)
DipElvS	0.00016	(0.00075)
OrdA	– 0.02438**	(0.00550)
TypHabita	– 0.04072**	(0.01415)
Detota	0.00015**	(0.00000)
NenfScol	– 0.01045	(0.02366)
Niscola	– 0.00855**	(0.00185)
Sex	– 0.02145	(0.04503)
CycEtEnf	0.43753**	(0.02035)
Cspat	– 0.00365**	(0.00102)
Csmat	– 0.00362**	(0.00080)
Origine	– 0.00268	(0.00174)
Age	0.01070**	(0.00208)
Couple	– 0.06109	(0.04478)
Intercept	6.00480**	(0.11015)
N	4937	
R^2	0.53507	
F (15,4921)	377.55779	

Significance levels : * : 10 % ** : 5 % *** : 1 %

Table 2

Estimation Results : Heckman

Variable	Cœfficient	(Std. Err.)
Equation 1 : ldescola		
Nenf	– 0.06263***	(0.02356)
TypResid	0.04702***	(0.01308)
DipElvS	– 0.00054	(0.00086)
OrdA	– 0.03272***	(0.00705)
Niscola	– 0.00798	(0.00214)
TypHabita	0.02017	(0.02597)
detota	0.00014***	(0.00000)
NenfScol	– 0.06285*	(0.03208)
Sex	– 0.02586	(0.05100)
CycEtEnf	0.52315***	(0.03181)
Csmat	– 0.00396***	(0.00090)
Cspat	– 0.00619***	(0.00137)
Origine	– 0.00366*	(0.00200)
Age	0.00672**	(0.00272)
Intercept	6.13673***	(0.13782)
Equation 2 : couple		
Nenf	– 0.06011	(0.03707)
DipElvS	0.00144	(0.00136)
OrdA	– 0.05158***	(0.01530)
TypHabita	– 0.24528***	(0.02455)
Detota	0.00002**	(0.00001)
NenfScol	0.32025***	(0.04692)
Sex	– 0.07225	(0.08683)
CycEtEnf	– 0.29201***	(0.03854)
Csmat	0.00200	(0.00156)
Cspat	0.01024***	(0.00200)
Origine	0.00371	(0.00322)
Niscola	– 0.00163	(0.00325)
age	0.01658***	(0.00395)
TypResid	– 0.07401***	(0.02043)
OrdEnf	0.17806***	(0.02127)
Intercept	0.70470***	(0.20478)
Equation 3 : mills		
Lambda	– 0.77308***	(0.28036)
N	4937	
Log-likelihood	.	
$\chi^2(28)$	4685.09108	

Significance levels : * : 10 % ** : 5 % *** : 1 %

Table 3

Description of the Variables

Variable	Description
Nenf	Children's number from 2 to 25
Csmat	Mother's socioprofessional category
Cspat	Father's socioprofessional category
NenfScol	Number of children from 2 to 25 in the school system
OrdA	Individual sequence number of child A
Typhabita	Type of habitat in the vicinity of housing
TypResid	Type of urban unit
CycEtEnf	Cycle of studies of the children in the field of the investigation
DipElvS	The highest diploma obtained by the various members of the household (Ens. Sup.)
Sex	Sex of the various members of the household
Couple	Type of family
Descola	Expenses connected to the schooling of the child A
Idescola	Logarithm of the expenses connected to the schooling of the child A
Detota	Dépense totale pour l'enfant A
Idetota	logarithm of the total expenditure for child A
Niscola	School level of child A
OrdEnf	Individual sequence number of the children
Age	Age of the various members of the household
Origine	Nationality of the various members of the household

Table 4

The School Expenditures Devoted to Child A (Idescola) According to the Matrimonial Situation

Idescola / Couple	Freq	Percent	Cum	Min	Max	Mean	σ
0 single-parent	4395	89.02	89.02	2.70805	10.46596	7.439705	1.240234
1 biparental	542	10.98	100.00	2.302585	11.54346	7.271862	1.406939
Total	4395	100.00					

The single-parent families devote more school expenditures to the child A than some biparental families.

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