The determinants of the quality of primary education in Cameroon

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Abstract:

This paper investigates the determinants of school acquisition at the end of primary school in Cameroon. To do so, we use a two-level hierarchical linear modeling on data from the 2014 survey of the “Programme d'Analyse des Systèmes Éducatifs” of CONFEMEN (PASEC). We found that the socio-economic level of the student's families, the language spoken at home, the size of the school, the gender of the teachers, and the legal nature of the school explain significantly and positively the level of students' academic achievements. Recommendations for households and education stakeholders to improve the quality of primary education are discussed.

Keywords: Cameroon, primary education, reading, mathematics, hierarchical linear model, PASEC

Code Jels: H75, I21, C19, I23

1) Introduction

Access to primary education in sub-Saharan African countries, particularly in Cameroon, has improved significantly in the first cycle (Lee and Lee, 2016). The objective of the Cameroonian first cycle, which is compulsory, is to enable learners to acquire fundamental skills in reading and mathematics. Unfortunately, the situation remains worrying concerning the quality of learning in the basic subjects of reading and mathematics. Despite the many policies and measures taken by the government to improve the quality of education and reduce disparities between different students' profiles in the primary cycle, the results are not very encouraging.

The various standardized tests in French and mathematics conducted since 1995 agree on the poor performance of Cameroonian students (World Bank, 2018). At the end of the primary cycle, the percentage of pupils having difficulties remains above 50% (PASEC, 2016; PASEC, 2020). Of the ten countries that participated in the 2014 PASEC assessment, Cameroon has the most disparities in performance between the different students' profiles and a 34-point gap between the average reading and mathematics scores.

The human capital theory developed by Schultz (1961) and Becker (1964) states that the skills acquired in the education system improve the productivity of individuals and stimulate economic growth. The work of Hanushek & Woessmann in 2015 has shown the positive link between economic growth and the performance of education systems by relating the quality of education systems to countries' scores on standardized tests. The literature is much more conclusive on the contribution of education and learning outcomes to the economy through improved labor productivity (Dao, 2020). The low performance of students in mathematics and reading at the end of primary school on the PASEC achievement tests motivates this research.

The provision of quality primary education has remained at the heart of international goals since the Dakar Forum in 2000. In line with the Education 2030 plan for the international community, meeting the challenge of quality education means improving student learning and promoting lifelong learning opportunities. Pupils' achievements at the beginning and end of primary schooling in the basic subjects (language-reading and mathematics) concerning basic knowledge, reading, writing, and arithmetic, are now a determining indicator for the quality and equity of education systems (PASEC, 2020).

The main originality of this study is that it contributes to the empirical literature on the determinants of the quality of education, mainly in developing countries, specifically in Cameroon. Indeed, since Coleman's report in 1966, work on the determinants of the quality of education has developed in several African countries. But Cameroon remains one of the countries in sub-Saharan Africa where there is very little research on the economics of education (Evans and Mendez, 2021). Dieng and Ibrahima 2020 research considered five francophone African countries but not Cameroon; Michaelowa (2001) study did not consider the anglophone primary education subsystem in Cameroon. As a result, little is known about the determinants of primary school quality in Cameroon. This study therefore uses recent data from the PASEC survey and analyzes the main factors that policymakers should focus on to ensure the goal of learning for all and improving the quality of education in Cameroon.

The objective of this paper is to study the determining factors of the quality of primary education in Cameroon. More specifically, it is a question of determining the effect of certain variables on the performance of pupils by modeling the links between the characteristics of the students, classroom, and school characteristics and academic achievement in reading and mathematics.

This research uses data from the 2014 PASEC survey applied in Cameroon on a sample of 3881 students in 266 schools. A two-level hierarchical linear model is used to identify these determining factors. The results show that overall, the academic achievements in reading and mathematics of pupils at the end of primary school are mainly explained by; the characteristics of the school, the size of the school, the sex of the teacher, the locality where the school is located and the type of the school (public or private). However, the age of the teacher, the number of boys in the class, the gender of the pupil, and whether the pupil sometimes does housework do not have the same influence on reading or mathematics achievement. 37.07% of the total variance in student performance in reading and 37.68% in mathematics is at the student level. 62.92% of the total variance in student performance in reading and 62.31% in mathematics is at the school level. The gender of the student, the age of the teacher, and the number of boys in the class do not have the same effect on performance in reading and mathematics. Our results complement the literature on the determinants of school acquisition in Cameroon.

The rest of the document is structured as follows: section 2 presents the process of teaching reading and mathematics in Cameroon; the literature review is in section 3. Section 4 presents the data and methodology. Section 5 presents the results, and section 6 concludes.

2) Review of the literature

Since the theory of human capital developed by Becker (1964), the economic analysis of education has become an important subject, particularly with the work that shows that the differences in economic growth between states are explained by the quality of education (Hanushek and Woessmann, 2008). The work of Coleman (1966) opened the way to the research stream known as *input-output* or production function in education. This stream studies the effect of student's classroom, and school characteristics on student learning. It is less interested in the processes that take place in school than in the effects produced in terms of school learning (*outputs)*, once the inputs have been controlled for (Bressoux, 1995).

There is no consensus on the results of research on the determinants of school performance. Factors specific to individual characteristics, the socio-economic environment of the pupil, the characteristics of the school, the class, and the teachers explain the heterogeneity of primary school achievements in various African countries and zones. the most used in the literature are the PASEC, TIMSS, and SACMEQ data and the multilevel methodology.

In the field of research on the individual characteristics of the student and his/her family, empirical studies that have already been carried out using these factors show that the family environment, the socioeconomic level, and parental involvement explain the variances in school performance in Africa (Dunga, 2013; Pangeni, 2014). Dieng and Ibrahima (2020) from PASEC data covering the period 2004 and 2010 show that the level of education of parents, combined with the availability of sufficient school materials and socio-economic status of the family promote the cognitive development of the pupil in 6 countries of Francophone West Africa[1]. While gender, age, and the number of remedial classes of the pupil negatively affect school acquisitions. Kasirye (2009) and Byamugisha (2010), using SACMEQ data collected in 2007 on a sample of 2452 Grade 6 students in Uganda, also found that student age was a key factor influencing student achievement.

Glick and Sahn (2000), Wamala et al, (2013) observed respectively that in Guinea and Uganda, the mother's education has a great influence on the educational performance of girls, while Tansel (1997) shows, in his study carried out jointly in Ghana and Côte d'Ivoire, a greater influence of the father on the performance of boys. However, some studies come up with more nuanced results regarding the parents' level of education on school achievements. This is the case, for example, of the work of Hijri et al (1995) for Morocco. According to them, the mother's education does not have explanatory power on the children's school performance. This result is explained by the fact that in the sample studied (in a large city, Rabat in 1993), women with a high level of education were more engaged in professional life and entrusted the monitoring and support of their children to household helpers, often illiterate (Mourji and Abbaia, 2013). Hungi and al (2017) show that the level of education of the mother influences the performance of students in mathematics, but not in English in Uganda.

Empirical results diverge about the influence of teacher characteristics on students' school performance. Bernard et al (2004), using PASEC data, carry out an individual analysis for the different countries where PASEC evaluations have been carried out. They found no systematic effect of different teacher characteristics on student achievement. Mingat and Suchaut (2000), using the results of 15 empirical studies carried out in French-speaking Africa, came to similar conclusions. Mokonzi et al (2019) find that in Congo, teacher's characteristics (professional experience, in-service training, and the learning opportunity they provide to the class) do not impact on mathematics learning of primary grade 4 pupils. Michaelowa et al (2006) based on PASEC data do not observe any significant differences in learning achievement according to the status of the teacher (civil servant or contractual), neither in 2nd year nor in 5th year. The teacher's academic training does not have a significant effect on learning achievement.

In his study Kasirye (2009) found that the performance of pupils taught by male teachers is better than that of female teachers. In Kenya, Ngware et al (2015) conclude that students' performance varies from one teacher to another or from one group of teachers to another. These differences in performance seem to be explained by the difference in the teacher's qualification level, the teaching method applied, and the teacher's experience.

About classroom and school characteristics, studies have reported on their influence on school performance in Africa. Classroom characteristics (especially class size and intellectual level of the group) influence students' performance. Mokonzi et al (2019) obtain this result in the Democratic Republic of Congo. The result is the same in Bijou and Bennouna (2018) about the class size on students' learning in grade 4 of primary school in Morocco. However, Michaelowa (2001) found that class size does not affect, learning in 6 Francophone African countries. The experience of the headmaster in school management and school administration influences pupils' performance in primary school in Congo according to Mokonzi et al (2019) and in Uganda according to Nannyonjo (2007). The distance between the school and the teachers' residence the lack of basic classroom

1 Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mauritania and Senegal.

resources are barriers to learning, (Hungi et al., 2017). As for the location of the school (urban or rural area), Michaelowa (2001) found that this variable has no significant impact on learning.

If there is work on the determinants of the quality of education in several African countries, in Cameroon the literature on the question is limited. The study by Dieng and Ibrahima (2020) took into account 5 French-speaking African countries but not Cameroon; that of Michaelowa (2001) did not take into account the Anglophone primary education sub-system in Cameroon. The present study, therefore, aims to fill this gap in the literature.

3) Teaching processes for reading and mathematics in Cameroon

According to the official program which went operational in Cameroon in 2014, the pedagogical approaches adopted for reading and learning mathematics are; the objective-based pedagogy (OPP), the skills-based approach (SBA), the new pedagogical approach, the "Main à la pâte" (MAP) and the integration pedagogy.

The permanent education evaluation system in Cameroon does not explicitly provide for an evaluation of school achievements of a standardized type. However, it uses it on an ad hoc basis either by recruiting consultants or by attending international evaluations (for example the PASEC 2014) through its technical and financial partners. The PASEC 2014 end-of-primary-school assessment evaluates the knowledge and skill levels of pupils in reading and mathematics. These skills are useful for understanding, learning, and integrating into everyday situations. Mastery of these dimensions is crucial for successful schooling. The overall duration of the test was a maximum of two hours per subject. The test consists only of multiple-choice questions.

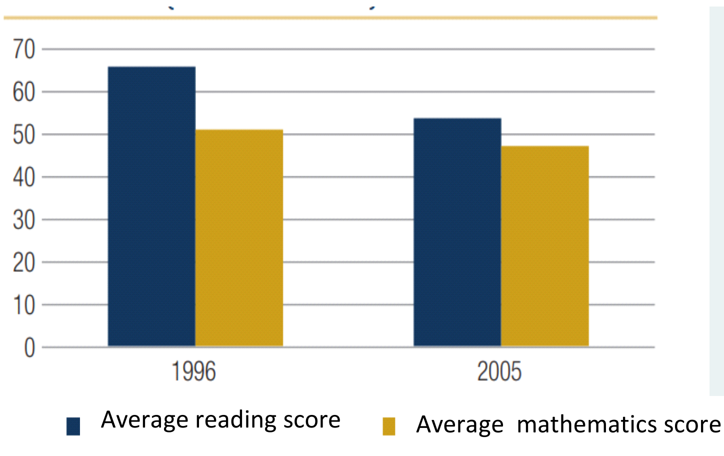
The academic achievement in reading and mathematics in Cameroon is as follow. In the primary cycle, quantitatively, the results observed are encouraging (Lee and Lee, 2016; MINDUB, 2017; World Bank, 2014). However, these advances do not seem to have gone hand in hand with better educational results in terms of quality. To measure the quality of education in the primary cycle, we rely on the PASEC evaluations (example of PASEC 1995, PASEC 2005, PASEC 2014, PASEC 2019). These different assessments all agree on the poor performance of students at the end of the primary cycle in reading and mathematics. Between 1995 and 2005, as shown in figure 1, there was a decrease in student performance and a 10% increase in the percentage of students facing difficulties in mathematics. While between the 2014 and 2019 surveys, there was a reduction in the percentage of students having difficulties in reading (from 57% to 45%), the percentage of students having difficulties in mathematics increased from 41% in 2014 to 67% in 2019 (PASEC, 2020). At the end of the primary cycle in Cameroon, the results of the 2014 PASEC survey are as follows:

- In reading, 42.7% of the learners are above the sufficient level of competence and are distributed as follows; 17.1% of the students are at level 4 of the proficiency scale defined by PASEC and have a score higher than or equal to 595.1 points. 25.6% are at level 3 and have a score equal to or higher than 518.4 points. 57.3% of the students are below the sufficient threshold, and among them, 22.7% have a score of 441.7 points, 21.2% have a score of 365 points and 8.4% have a score of 72 points.
- In mathematics, 41% of the pupils at the end of primary school are above the sufficient competence threshold. Among them, 14.7% have a score of 609 points and 26.3% have a

score of 521.5 points. 59% of the pupils are below the sufficient competence threshold, 31.8% have a mark of 433 points, and 27.2% have a mark of 68.1 points.

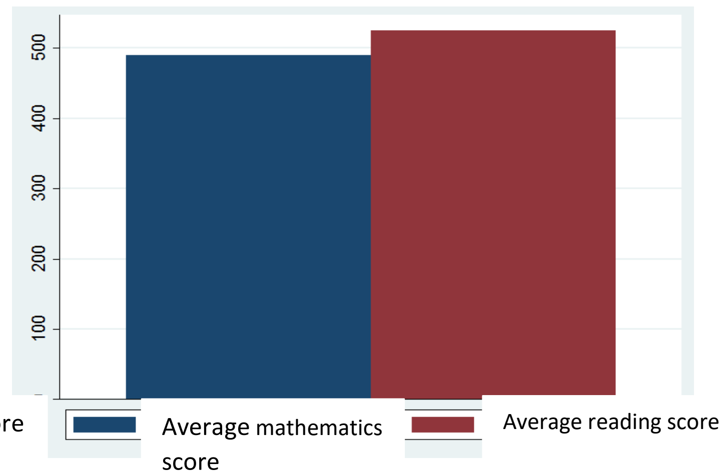
In terms of differences in performance, according to the result of the PASEC 2014 survey, students perform better in reading than in mathematics. There is a 34-point difference between the average scores in reading and mathematics, see Figure 2. Academic achievement at the end of studies varies according to the gender of the student, the socio-economic level of the family, the location of the school, the characteristics of the class, and the profiles of the teachers (PASEC, 2016).

Figure 1. Evolution of PASEC test results, Cameroon 1996-2005



Source: the authors.

Figure 2. Student performance in reading and mathematics for the year 2013/2014



Source: the authors.

4) Data and methodology

4.1) Data

The data used came from the national sample of the PASEC 2014 survey collected at the end of 2013/2014 in 10 sub-Saharan African countries (Benin, Burkina Faso, Burundi, Cameroon, Congo, Côte d'Ivoire, Niger, Senegal, Chad, and Togo). These programs collect information on the following various components: the origin of the pupil, his or her life context, on the one hand, and the characteristics of the teacher and the schools, on the other. These data have the advantage of putting into perspective the results of research on the determinants of school learning, which are mostly carried out in developed countries, with the specific problems of Cameroonian education systems. The PASEC survey does not evaluate cognitive abilities or skills using a single score, but each pupil receives five different scores. In Cameroon, the 2014 PASEC survey covered both educational subsystems (Francophone and Anglophone) in the public and private sectors, for a total of 266 schools (167 Francophone and 99 Anglophone) and 3881 students surveyed (1239 from the Anglophone subsystem and 2578 from the Francophone subsystem). For the Anglophone subsystem, the test was translated and adapted to the linguistic context while maintaining the same level of difficulty of the questions between the different versions of the test. The PASEC reading and mathematics performance scales were constructed to obtain an international mean of 500 and a standard deviation of 100.

Since we were interested in the determinants of both mathematics and reading achievement, we used the average reading score and the average mathematics score as dependent variables. Concerning the potential determinants, we retain, at the level of the pupil, the age of the pupil, remedial classes, pre-schooling, housework, language spoken at home, and finally the index of the socio-economic level of the pupil's family. At the school and the class level, the gender and age of the teacher, the number of pupils in the school, the number of boys in the class, the type of the school (public or private), and the locality where the school is located. These variables were chosen according to the literature covered and also the availability of data.

Table 1 Descriptive statistics for categorical variables

Qualitative variables	Modality	Number	Proportion
Student level			
Type	0 Boys	2006	52,55
	1 Girl	1,811	47,45
Having repeated a year	1 yes	55,10	2103
	0 no	44,90	1714
Preschool	0 yes	1833	48,02
	1 no	1984	51,98
Housework	1 Always	1954	51,19
	2 Often	834	21,85
	3 Sometimes a little	801	20,99
Spoken language	1 Always French	573	15,01
	2 sometimes French, sometimes another language	2750	72,05
	3 Never French	494	12,94
School-level			
Gender of the teacher	0 Men	2785	72,96
	1 woman	1032	27,04
Type of school	1 Private	1392	63,53
	2 Public	2425	36,47
Location	1 Rural	2421	63,43
	0 Urban	1396	36,57

Source: the authors.

Table 2: Descriptive statistics of variables

Variables	N	Average	Standard deviation	Min	Max
Reading score	3817	524,380	101,203	229,044	820,465
Math score	3817	489,920	92,870	216,482	789.636
At the student level					

Age of the student	3817	11.910	1.544	8	20
Socio-economic	3817	52.536	10.036	17.544	88.340
At the classroom/school level					
Age of the teacher	3817	38.9426	7.535436	21	60
Number of boys	3817	16,94734	12,2953	2	83
Number of students in the school	3817	374.1078	368.4194	30	2556

Source: the authors.

4.2) Methodology

The methodological approach is the hierarchical linear or multilevel model, one of the most widely used in the analysis of the determinants of social phenomena. This method is recommended when the data have a hierarchical structure. Bernard (2007) and Michaelowa (2000) recognize that school survey data such as PASEC is precisely a typical example of hierarchical data, structured at several levels: students belong to the class group, the class belongs to the school, the school belongs to a school district, etc. Given the hierarchical nature of the PASEC 2014 data, a multilevel approach is appropriate for assessing the impact of school and student characteristics on school performance.

The PASEC sample design does not allow for differentiation of between-school variance from between-class variance within schools when the latter has several classes of the same level. The data in this 2014 PASEC survey are therefore structured at two levels: student, class, and school.

The phenomenon of school performance is broken down into subsystems that are temporarily autonomous and simpler to analyze. At level (1), we find the individual variables: these are the variables specific to the individual characteristics of students, which constitute the fixed part and level 1 of the model. At level (2) we find the context variables: these are the variables specific to schools and teachers, which constitute the random part and level 2 of the model. Let us consider the following model:

$$Y_{ij} = \beta_0 + \beta_1 X_{ij} + \varepsilon_{ij} \tag{1}$$

Where Y_{ij} represent academic performance in mathematics and reading, X_{ij} a vector of variables characterizing the student studying in the school j, β_0 represents the constant, β_1 is the vector of coefficients of the various exogenous variables and ε_{ij} represents a random error associated with individual i in the school, j assumed to have zero mean and variance σ^2 (constant).

However, the relationship between Y_{ij} and X_{ij} may vary from one school to another. In fact, individual or family environment variables do not play out in the same way in different schools. Subtle interferences must exist; for example, the involvement of parents in monitoring students certainly differs according to the characteristics of the schools. To take this into account, an index j must be assigned to β_0 and to β_1.

Since the variables Y_{ij} and X_{ij} are measured at level 1, the model becomes:

Level (1) $\quad Y_{ij} = \beta_{0j} + \beta_{1j} X_{ij} + \varepsilon_{ij} \qquad (2)$

Being random, β_{0j} and β_{1j} are assumed to be distributed according to a probability function (KreftandDe Leeuw, 1998).

Thus, we can write: $\begin{cases} \beta_{0j} = \gamma_{00} + \mu_{0j} \\ \beta_{1j} = \gamma_{10} + \mu_{1j} \end{cases}$

Where γ_{00} is the average constant for all schools; γ_{10} the average slope for all schools; μ_{0j} is the deviation of each school from the constant (it is a random variable with mean zero and variance $\sigma_{\mu_{0j}}$); μ_{1j} represents the deviation of each school from the mean relationship (it is a random variable with zero mean and variance $\sigma_{\mu_{1j}}$).

With the integration of school characteristics (vector W)

$$\text{Level (2): } \begin{cases} \beta_{0j} = \gamma_{00} + \gamma_{01} w_j + \mu_{0j} \\ \beta_{1j} = \gamma_{10} + \gamma_{11} w_j + \mu_{1j} \end{cases}$$

By replacing the random coefficients β_{0j} and β_{1j} by their values and developing the factorization, we obtain:

$$Y_{ij} = \gamma_{00} + \gamma_{01} w_j + \gamma_{10} X_{ij} + \gamma_{11} X_{ij} w_j + \left(\mu_{0j} + \mu_{1j} X_{ij} + \varepsilon_{ij}\right) \quad (3)$$

5) Results

The presentation of the results will be done in two steps as follows: first the results of the empty model, second the results of the complete model.

5.1 The variability of scores at the global level: the empty model

The results of the empty model presented in table 3 show the share of variance attributable to each of the two levels (pupil, class and school) on reading and mathematics performance. Overall, the performance of pupils at the end of the primary cycle is mainly explained by the characteristics of the school. The results of the empty model indicate that 37.07% of the total variance in student performance in reading and 37.68% in mathematics are found at the student level. Similarly, 62.92% of the total variance in student performance in reading and 62.31% in mathematics is at the school level. Intra-group (between schools) variability remains the dominant explanation in both subjects. There is more homogeneity between students than between schools. This result is close to that of Dieng and Ibrahima (2020) where intra-group variability remains the dominant explanation. They found out that the school explains 52% of the variance and the pupil 48% in 5 Francophone African countries. On the other hand, our results are far from those of Mokonzi et al, (2019) who found out that 71%, 16% and 13% of the total variance are located at the stude nt, class and school levels respectively. Also, the work of Thuku and Hungi (2013) who found out that 61.1%, 5.1% and 33.8% of the variance in mathematics achievement of Kenyan primary 6 students is at the pupil, class and school levels respectively.

Table 3 Distribution of performance variance

Zone	Share of variability	Students	Classes/Schools	Deviance
Reading score	Variance	3752,628	6369,537	43088,726

	Proportion	37,07	62,92	
Mathematics score	Variance	3186,278	5268,864	42457,63
	Proportion	37,68	62,31	

Source: the authors.

4.2 Estimation of the complete model

In order to examine the role of the above-mentioned characteristics in explaining the differences in performance between pupils in reading and mathematics, we introduced the characteristics of the pupil in the class and the school. The analysis is carried out according to the decomposition of the performance (i) into fixed effects which translate the specific impact of each explanatory variable on the performance of the pupil, (ii) into random effects, which make it possible to decompose the global variance of the phenomenon and to give for each individual and contextual level a random coefficient representing the share of variance attached to it, (iii) the shares of variance explained at each of the levels, which are an indicator of the global relevance of the model tested. Table 4 presents the estimation results.

Table 4: Estimation results

	(1)	(2)	(3)	(4)
VARIABLE	Reading	Mathematics	Reading	Mathematics
Cons	516.7***	546.7***	638.5***	628.4***
Fixed effects				
Age of the student	-9.104*** (0.761)	-7.529*** (0.708)	-8.550*** (0.759)	-7.024*** (0.705)
Socio-economic	0.814*** (0.145)	0.291** (0.135)	0.680*** (0.144)	0.169 (0.134)
Student's gender	2.853 (1.994)	-8.434*** (1.853)	2.878 (1.990)	-8.349*** (1.849)
Duplication	-21.65*** (2.280)	-18.75*** (2.119)	-21.04*** (2.270)	-18.30*** (2.110)
Preschool	-1.176 (2.400)	2.174 (2.232)	-0.214 (2.392)	3.103 (2.224)
Work (always)	13.61*** (4.467)	13.73*** (4.152)	12.79*** (4.448)	13.18*** (4.135)
Work (often)	10.00** (4.815)	19.52*** (4.476)	10.41** (4.792)	19.93*** (4.455)
Work (sometimes)	4.203 (4.645)	10.39** (4.317)	4.276 (4.632)	10.57** (4.304)
Language (always)	13.63*** (4.279)	7.074* (3.979)	13.22*** (4.247)	6.627* (3.951)
Language (sometimes)	20.06*** (3.523)	12.96*** (3.278)	20.19*** (3.483)	12.94*** (3.242)
School and class level				
Age of the teacher			-0.570 (0.419)	-1.128*** (0.405)

Boy in the class			-0.663** (0.325)	-0.361 (0.315)
Student in the school			0.0286** (0.0123)	0.0329*** (0.0119)
Gender of the teacher			19.44** (7.590)	14.64** (7.345)
Location			-83.78*** (8.846)	-76.31*** (8.559)
Type of school			15.29* (8.092)	17.02** (7.831)
Random effects				
Student variance	3434,268 43,12%	2964,497 59,07%	3429,725 58,37%	2959,717 56,17%
School/classroom variance	4529,679 56,87%	4279,761 40,92%	2446,075 41,62%	2309,192 43,82%
Deviance	42686,72	42147,946	42530,884	41989,864

Standard deviation in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: the authors

The decrease of the deviance[2] (it informs us about the significance of the model) allows us to judge the interest of the passage from the "empty" model to the complete model Bressoux (2010)[3].

- **At the level of the student and his/her family**

The negative effect of student age on reading and mathematics performance is very clear, with the youngest students recording the best academic performance. This result is in line with some works in this direction (Agasisti and Cordero-Ferrera, 2013; Dunga, 2013). Studies by the World Bank point to "learning poverty". According to the report "Ending Learning Poverty: What will it take?" Inadequate basic learning affects 53% of students in low- and middle-income countries. The index of a student's socio-eco nomic level, constructed on the basis of the family's possession of a set of assets, is statistically positively associated with student performance. In reading, the threshold is 1%; in mathematics, it is 5%. The higher the socio-economic level of students' families, the better their children perform at school.

Gender is not statistically associated with reading performance, which means that there are no gender differences in reading achievement at the end of the primary cycle in Cameroon. In terms of mathematics performance, gender is negatively associated with performance at the 1% level. Girls perform less well in mathematics than boys. This situation is worrying in view of the measures taken by the Cameroonian government for gender equality in learning. The issue of gender, therefore, occupies an important place in the quest for inclusive education, since in most countries

[2] -2 Log L, where L is the maximum likelihood statistic.
[3] The deviance statistic is interpretable in a relative way, when compared to one or more other -2logL values under certain conditions: i.e. when the explanatory variables of a model considered as initial are a subset of those of a model considered more complete.

and particularly in developing countries, access to education and the continuation of studies are often to the detriment of girls.

The number of remedial classes classically has a significantly negative effect on student performance. The negative impact of remedial classes can be attributed largely to the low level of students. This result is similar to those of (Dieng and Ibrahima, 2020). The variable having attended preschool has no significant effect on performance in reading and mathematics. This result is contrary to that of Dieng and Ibrahima (2020) who found out that prerequisites have a major influence on school performance in six countries in Francophone West Africa. No doubt the many efforts made by the government to improve the pre-schooling rate in Cameroon.

The variable "doing homework" had a positive effect on students' performance in reading and mathematics when it took the "always" and "often" modalities. The "sometimes" modality had a significant effect only on performance in mathematics. It had no effect on mathematics performance. The language spoken at home variable had a positive effect on reading and mathematics performance when it took the 'always' and 'sometimes' modalities. This result is in line with the work of Laitin and al., 2019 who find that in Cameroon teaching children to read in a language they speak at home increases the speed at which they learn. The national linguistic context and the status of the language of instruction are particular dimensions to be considered in order to identify the learning context of pupils in sub-Saharan African countries, particularly because of the significant diversity of languages and their use in everyday life. Even though Cameroon is marked by a multilingual national context, it remains a country where, for the French-speaking subsystem, the language of instruction is fairly practiced at home. Cameroonian students thus have the opportunity to develop their language skills through the practice of the language of instruction at home.

- **At the classroom and school level**

The gender of the teacher is positively associated with school performance in reading and mathematics at the 5% level. Women teach best at the primary level than men. Gender is another important aspect of teacher recruitment. Some studies have found that the presence of female teachers is associated with better student performance (Elley, 1993; Makuwa, 2005). School size, captured here by the number of students in the school, has a significant and positive effect on reading and mathematics performance. This could be explained by the fact that schools with large enrolments receive more attention and funding from public and private authorities. The schools with the highest enrolment are those located in urban areas. This result is contrary to those of (Gershenson and Langbein, 2015; Jones et al., 2011) who found out that it does not have a significant effect on performance and those of (Mokonzi, 2019), who found a negative influence of class size on student performance in the Democratic Republic of Congo.

The location of the school has a negative effect at the 1% level on the performance of students at the end of primary school in mathematics and reading. Students attending schools in rural areas performed less well in reading and mathematics than those attending schools in urban areas. A result that sounds like a failure, given the definition and focus of the Cameroonian government on priority education zones (ZEP). Several factors may attempt to explain this fact: in urban areas, schools are better equipped, better organized, and better managed at the pedagogical level compared to schools located in rural areas. In the latter, teacher’s absenteeism is more frequent and their living conditions less favorable; they often commute between their urban homes and the school.

The type of the school (public or private) has a positive effect on end-of-primary performance in reading and mathematics. Pupils who attend private schools perform better in reading and mathematics than those who attend public schools. This result confirms the widely held view in Cameroon that private schools are better than public schools and proven by studies of (Gershenson and Langbein, 2015; Jones et al., 2011). In Cameroon, there is a particular situation at the primary level, where public schools are free of charge, and private schools have to pay.

The variables gender of the student, age of the teacher and number of boys in the class do not have the same effect on reading and mathematics scores. It should be noted that alternative estimates were carried out to test the stability of the coefficients of the specification used. The overall quality of the adjustment is stable, since the significance of the inter-school and inter-individual variances remains high. For the exogenous variables taken in isolation, the level of the coefficients and their sign do not change, nor do their statistical significance

6) Conclusion

The objective of this paper was to find the determinants of the quality of education at the end of the primary cycle in Cameroon by questioning the characteristics of the students in the class and in the school. To achieve this objective, using a two-level linear hierarchical modeling and relying on data from the PASEC 2014 survey, we modeled the relationships between individual student characteristics namely student's age, remedial classes, preschool, housework, language spoken at home, index of the socioeconomic level of the student's family and Classroom and school characteristics namely gender and age of the teacher, number of students in the school, number of boys in the class, type of the school (public or private), locality where the school is located and reading and mathematics performance. The pursuit of these objectives led us to present the following highlights: Within-group (between-school) variability remains the dominant explanation in both subjects (reading and mathematics). 37.07% of the total variance in student performance in reading and 37.68% in mathematics is at the student level. 62.92% of the total variance in student performance in reading and 62.31% in mathematics is at the school level. Age, gender, socio-economic level of the pupil's family, remedial classes, the language they speak at home, homework, age of the teacher, gender, number of pupils in the school, number of pupils in the class, locality, and type of school are the determinants of learning achievement at the end of primary school in Cameroon. However, the gender of the pupil, the age of the teacher and the number of boys in the class explain the differences in pupils' performance in reading and mathematics.

In view of the results obtained, we recommend that economic policy makers generalize specific collective spaces (libraries, study rooms...) within schools and equip them with school goods and materials. Stimulate girls' interest in mathematics. To set up measures to accompany pupils in great difficulty. The results show that particular attention should be paid to the characteristics of the school and the classroom, since these remain the major explanatory factors of pupils' academic achievements. We believe that inspectors should play a role in accompanying, guiding and supporting schools in the provision of infrastructure, the elaboration of needs, and the choice of investments in the school.

Moreover, at the methodological level, this work confirms the interest of using the use of multilevel models to answer comparable questions and with similar data.

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