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EDUCATIONAL SUBSYSTEMS AND DISPARITIES IN SCHOOL PERFORMANCE IN PRIMARY EDUCATION IN CAMEROON

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Abstract:
The aim of this study is to identify the explanatory factors of the difference in school performance between pupils of the francophone and anglophone education subsystems at the primary school level in Cameroon. Using data from the Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (PASEC) collected in 2014, the study employs a two-stage modelling approach. First, the estimation of educational production functions by OLS shows that student characteristics, as well as the school context, are factors that determine the academic performance of students in the anglophone and francophone subsystems. Secondly, the comparison of students' academic performance between the educational subsystems using the Oaxaca-Blinder (1973) decomposition technique showed that at the end of the primary school year, more than 100% of this difference is explained by factors explained in both mathematics and language. The share of unexplained factors, however, does not suggest any discrimination in school performance against the anglophone sub-system. This calls for policy makers to consider their role in reducing the various sources of inequality among students of all kinds.

Keywords*: school performance gap, francophone subsystem, anglophone subsystem, primary, Cameroon, Oaxaca and Blinder.*

Résumé :
Cette étude a pour objectif d'identifier les facteurs explicatifs de la différence de performance scolaire entre les élèves des sous-systèmes éducatifs francophone et anglophone du niveau d'enseignement primaire au Cameroun. En prenant appui sur les données du Programme d'Analyse des Systèmes éducatifs de la CONFEMEN (PASEC) collectées en 2014, l'étude recourt à une modélisation en deux étapes. Premièrement, l'estimation des fonctions de production éducationnelles par les MCO montrent que les caractéristiques de l'élève, ainsi que le contexte scolaire sont des facteurs qui déterminent les résultats scolaires des élèves dans les sous-systèmes anglophone et francophone. Deuxièmement, la

comparaison des performances scolaires des élèves entre les sous-systèmes éducatifs à l'aide de la technique de décomposition d'Oaxaca-Blinder (1973) a montré qu'en fin d'année du niveau primaire, cette différence s'explique à plus de 100% par des facteurs expliqués autant en mathématiques qu'en langue. Tandis que, la part des facteurs inexpliqués ne laisse présager aucune existence d'une discrimination de performance scolaire à l'égard du sous-système anglophone. Cela interpelle les décideurs politiques quant à leur rôle de réduire les différentes sources d'inégalités entre les élèves de toutes sortes.

***Mots-clés** : écart de performance scolaire, sous-système francophone, sous-système anglophone, primaire, Cameroun, Oaxaca et Blinder.*

***Classification JEL** : I24.*

1. Introduction

Studies on the comparison of students' educational outcomes according to one criterion (gender, type of school, region, place of residence, etc.) are widespread in the field of economics of education (Sandy and Duncan, 2007; Duncan and Sandy, 2010; Barrera-Osorio, et al., 2011; Thapa, 2015; Contini et al., 2017; Furno, 2022). However, those that focus on language are little explored. Depending on the context or level of development, language issues are addressed according to the status of language in the country. Indeed, in developed countries, in this case those of Europe or America, the mother tongue is the one used in the educational system. But with the phenomenon of immigration that characterises most of these countries, migrants are forced to invest in the acquisition of the language of the host country in order to accumulate human capital. In other bi/multilingual countries such as Canada, Belgium and Switzerland, the cohabitation of different linguistic communities has given rise to several education systems in which the language of instruction is the element that distinguishes students. Thus, the work addressed in this horizon compares student outcomes according to ethnicity, community or language region (Ning et al., 2016; Sibano and Agasisti, 2013; Edgerton et al., 2008; Vandenberghe, 2011; Tomul, 2009; Hirt, 2008; Ukiwo, 2007). One of the issues addressed in this comparative universe is that of examining the factors that contribute to the difference in educational outcomes between students on any of the above criteria.

In the context of developing countries, particularly those in Sub-Saharan Africa, most of which have been marked by colonial history, the language of education is a criterion for differentiating pupils. Depending on the language of the colonising country, these countries have adopted foreign languages as a means of teaching and learning in their education systems. A distinction is made between countries that use a foreign language in parallel with a local language as a medium of instruction (the case of most East and West African countries) and countries that use only one or more foreign languages as a medium of instruction. In the light of these different classifications, countries with unilingual and bilingual education systems emerge.

Cameroon presents a rather particular context insofar as bilingualism refers to the coexistence of two distinct educational subsystems: one french-speaking and the other english-speaking. The Cameroonian education system is therefore the consequence of the dual French and British colonial heritage. Indeed, Cameroon has been under German protectorate since 1884

and its defeat in the First World War in 1916 led to the retrocession of Cameroon to the two victors of this war, thus causing a splitting of Cameroon into two territories, namely the eastern part, administered by France, and the western part, administered by Great Britain. The two powers had very disparate modes of management and their respective languages (french and english) were used in each of their territories.

After the proclamation of the independence of African countries in the 1960s, Cameroon was obliged to review its educational policy, and this change required both a new orientation in education and a reorganisation of the school system that had been put in place during the colonial era. Following the reunification of 1st October 1961, the country proposed a policy based on bilingualism in an effective way; and it was at this time that the problem of compatibility of the educational subsystems in the country arose.

During all the periods that the form of the state of Cameroon has gone through, starting with the federal period and moving on to the unitary state, the educational structures have been modified to adapt to the different realities of the country. For example, during the federal state, there were two ministries of basic education, one in each of the federated states (french-speaking Cameroon and english-speaking Cameroon), which were headed at the federal administration level by a ministry of national education. The federal law n°63/13 of 16 June 1963 which prefigured the structures of education at that time regulated primary and secondary education according to more or less different dimensions (e.g. the duration of schooling, its distribution according to cycles as well as the organisation of schooling[1] , etc.). This organisation is inspired by past experiences in each territory during the colonial period and also reflects the country's desire to preserve the national unity of each linguistic entity. Thus, structural unification with a view to identical primary education for all does not seem to be a priority insofar as French and English are adopted as languages of instruction (Njiale, 2006).

The proclamation of the unitary state in 1972 gave birth to a unique and particular education system composed of two education sub-systems, one francophone and the other anglophone. In relation to the various commitments that Cameroon has made at the international level through the declaration of the objectives of education for all (universal education for all, reduction of inequalities of all kinds), as well as the Sustainable Development Goals, the authorities in charge of steering the education sector are directing their actions in terms of education policy towards both improving the performance or efficiency of its education system and harmonisation of the two education sub-systems, the anglophone and francophone. Particular emphasis is placed on bilingualism, which is seen here as an optimal instrument for dealing with the dual choice of the Cameroonian education system through the creation of « bilingual schools ». However, it is important to note that these schools do not follow a common curriculum for all students. On the contrary, the Cameroonian education system is organised around an anglophone and a francophone sub-system, each of which has its own specificities that set it apart from the other (Atangana, 2009). Also, the school orientation law

[1] At the primary level, there were two parallel cycles of six and seven years for the Francophone and Anglophone subsystems respectively. The secondary level of general education lasted seven years in both states, but was distributed differently between the cycles. At secondary level, for example, in the Francophone subsystem, the duration of the first and second cycles was 4 years and 3 years respectively. In the Anglophone subsystem, the first cycle lasted 5 years and the second cycle 2 years.

of 15 April 1998, which definitively establishes the harmonisation of the two education subsystems, is quite explicit in its article 15, although it promotes the harmonisation of education cycles at the primary level, it establishes that harmonisation does not strictly mean unification.

Statistics on the academic performance indicators of pupils in the two education subsystems suggest differences in performance. For example, if we look at the success rate in the end-of-primary cycle exams, it appears that pupils in the anglophone education subsystem obtain, on average, success rates for the First School Certificate (FSLC) that are always higher than the success rate for the Primary School Certificate (CEP) for pupils in the francophone subsystem (MINEDUB, 2012, 2013, 2014, 2015, 2016)[1] . Even though this type of certification is not based on standardised assessment criteria, PASEC assessments that take these elements into account have also revealed a gap in academic achievement between pupils in the Anglophone subsystem and those in the Francophone subsystem. Indeed, according to PASEC (2007), at the end of schooling, standardised scores on the basis of 100 show that in mathematics, pupils in the francophone subsystem had an average overall score of 49.2 points, whereas those in the anglophone subsystem obtained an average score of 46.2 points in 2004/2005. However, although the trend has reversed in 2014/2015[2] between students, giving a comparative advantage to students from the anglophone subsystem in terms of test scores, the difference in test scores still remains between students. Thus, statistics from the same programme during the same year and at the end of the primary school year showed that in language, pupils from the francophone subsystem recorded an overall average score of 516.96 points, while these average scores amounted to 534 points for pupils from the anglophone subsystem (PASEC, 2016), i.e. a difference of 17.04 points. In mathematics, although the average test scores in both subsystems are below the minimum threshold of 500 points, it should be noted that the average test score of students in the anglophone subsystem remains higher than that of the francophone subsystem (498.1 points compared to 483.80 points), resulting in a test score differential of 14.3 points. In 2018, the test score gaps persist between students in the francophone and anglophone subsystems, rising to 34.94 points in language and 27.71 points in mathematics in favour of students in the anglophone subsystem (PASEC, 2019). From these statistics, it should be noted that at the end of the primary cycle, both in language and in mathematics, the differences in school results between pupils depending on the educational system (anglophone or francophone) have evolved over time.

Despite the considerable attention given to the factors that contribute to school success, little work has been done to clarify the factors that explain differences in school performance along linguistic lines in sub-Saharan Africa in general and Cameroon in particular. Most of the studies that have been done focus on developed countries. This study therefore aims to fill the gap in the literature concerning the factors that explain the difference in school results of pupils at the end of primary school in Cameroon according to a comparison criterion that has been least discussed.

[1] We stopped in 2016, because the Anglophone crisis started in that year and this disrupted the continuity of school activities in the Anglophone zone of the country.

[2] The evaluation standards of the PASEC survey carried out in 2014 were different from the 2005 survey.

The remainder of this paper is organised as follows: section 1 presents the contextual framework of the education system in Cameroon, section 2 reviews the literature, section 3 presents the methodology, section 4 presents the variables and their statistical description, section 5 discusses the results and section 6 concludes.

2. Contextual framework of the anglophone and francophone education subsystems in Cameroon in primary education: interferences and differences

Elements of convergence as well as divergence characterise the educational sub-systems in Cameroon. These aspects tend to be maintained, rather than reduced over time, and concern the organisation of schooling, the duration of teaching, the content of school programmes, pedagogical practices, etc.

After the 2002 ministerial reshuffle, the Ministry of Basic Education is now responsible for the administrative and pedagogical management of public and private primary schools in the two education subsystems at primary and nursery levels. As a result, the state provides funding for public schools, while public schools are financed from the promoter's own funds. The francophone subsystem is applied in the predominantly francophone area[1] , but the policy of promoting bilingualism throughout the country means that some schools apply the anglophone educational model in the same area. Similarly, the Anglophone sub-system applies in the predominantly anglophone area[2] ; and also some schools apply the francophone educational model.

From the point of view of structure, primary education in the two linguistic-educational subsystems caters for children aged 6 to 11 and is divided into three levels, namely level one, which includes the language initiation section (SIL)/Class One, the Cours préparatoire (CP)/Class two. The second level is also spread over two years and includes Cours élémentaire un/class three; and Cours élémentaire deux/class four. The final level consists of Cours moyen un/class five and Cours moyen deux/class six. At the end of primary school, pupils take the Certificat d'Etude Primaire (CEP) for the francophone subsystem and the First School Living Certificate (FSLC) for the anglophone subsystem.

As far as the curriculum is concerned, the subjects taught are specific to each sub-system and the teaching contents are more or less the same in the two educational sub-systems. Table A1 in the appendix gives a detailed view of the school content of the 2ème grade of the primary cycle according to the two educational subsystems in mathematics.

3. Review of the literature

As Hanushek (2002) points out in his comparative study of the performance of private and public schools, there are two basic questions that can be asked: first, is the academic performance of students in the anglophone subsystem superior to that of students in the francophone subsystem, all other things being equal? Secondly, if this is the case, is it due to the better schools or the better students? Firstly, before knowing the factors that explain the

[1] These are eight regions of Cameroon, namely Adamaoua, Centre, South, East, West, Littoral, North and Extreme North.

[2] It comprises two regions and are in the minority, namely the South West and North West

differences in school performance between pupils of the linguistic-educational subsystems, it would be interesting to first question the literature on the factors of school performance. To this end, there are groups of factors in the literature which explain school performance and which can be grouped into two main groups of factors, namely school-based factors and non-school-based factors. It is from the pioneering work of Coleman et al (1966) that a vast field of research on the determinants of school performance has been deeply enriched. The authors concluded that factors related to student characteristics are more important in explaining differences in student performance than school-related factors (Hijri et al., 1995; Hanuskek, 1986, 1989). In contrast to the studies found by Coleman (1966), a body of work has suggested that it is the resources available to schools that are more important to a child's academic success than the characteristics of the student or the family environment (Cherkaoui, 1979; Gustafsson, 2003; Woessmann and West, 2006; Hanushek and Woessmann, 2016). Also, not all research findings from each group of factors are unanimous in their influence on student academic performance.

In addition to research on factors traditionally recognised as determinants of school performance, a vast field of research on comparative education has developed, the aim of which is to compare the performance of pupils according to specific criteria, both at the level of the pupil (e.g. the pupil's gender) and at the level of the school (public/private), while identifying the contribution of each factor in explaining the gap in school achievement. As regards the language criterion, a small body of literature has been developed in bi/multilingual countries. In industrialised countries, the education system is highly decentralised, granting management of the education sector to each language community. The languages of schooling are used as mother tongues within the community by native speakers, and for migrants the mother tongue is different from the language of education. In contrast, in developing countries in general and in Africa in particular, comparative education research focuses on education systems where the criterion for differentiating pupils is the language used as a medium of learning/teaching (language of instruction). It is in this logic that the performance of students is compared according to the language subsystem of attendance chosen.

In countries characterised by linguistic diversity resulting in a multitude of education systems, comparative research on student performance according to linguistic or ethnic community or language of instruction is not only under-documented, but also not consensual. Indeed, Hirtt (2008), using the 2006 PISA school data for Belgium, examines the contribution of both in-school and out-of-school factors in explaining the differential in school performance between students from the two language communities, Flemish and French. The author concludes that although there is a difference in educational outcomes between pupils of the two language communities, part of the performance differential remains unexplained. The explained part of the difference is attributable to both school and non-school variables such as social origin, migration, school delay and stream dispersion.

Tood and Wolpin (2003) compared the educational achievements of pupils taking into account the specificities of each ethnicity in terms of Italian, German and French speakers. Their analyses lead to the results that socio-economic and cultural status together explain 60% of the variation in performance between schools, and that headmaster and teacher autonomy explain a large part of the differences in effectiveness between the language communities.

In the same vein, Perelman et al (2009), following a comparison of flemish, french-speaking students, find that the factors that contribute to the explanation of performance between students from these three communities are attributable to personal characteristics and family environment. However, much of the unexplained gap persists between students.

Felouzis et al (2011) show from Belgian data that the most structuring principle of educational inequalities is the socio-economic background of pupils and that these inequalities do not have the same magnitude in each linguistic educational community. Moreover, the differences in average scores between pupils from different language communities are largely related to the age of the pupils. In addition, educational inequalities are strongly correlated with the extent of social segregation in the streams of each language educational community.

Ning et al (2016), recently in the context of Belgium, used PISA data to show that the difference in school performance in reading between the flemish and french communities was largely attributable to both student and school characteristics. The authors explained these differences by the policies and practices within schools of granting greater autonomy to schools in allocating resources, promoting good student behaviour and reducing student retention.

4. Methodology

4.1. The educational production function

In line with the work of Ning et al, (2016), this study uses in a first step the educational production function to estimate for each subject the test scores of students. This model postulates that a student's performance i is dependent on a set of factors and can be formalised as follows:

$$S_i = \beta X_i + \varepsilon_i \qquad (1)$$

Where S_i is the student's average score and X_i is the set of variables that affect the student's test score. It includes two types of variables, namely the variable of interest, which is a binary variable reflecting the choice of schooling in an educational subsystem, and the set of control variables related to the characteristics of the student and his/her family, as well as those related to the characteristics of the school. ε_i represents the error term to be estimated.

If one wishes to test the hypothesis that the two educational subsystems are assessed differently, it is necessary to make separate estimates of equation (1) for each subsystem group: i.e. one school performance equation for pupils in the francophone subsystem and another for pupils in the anglophone subsystem such as :

$$\begin{cases} S_i^F = \beta^F X_i^F + \varepsilon^F & (2) \\ S_i^A = \beta^A X_i^A + \varepsilon^A & (3) \end{cases}$$

Where the exponents F and A represent the francophone and anglophone subsystems respectively. By estimating equations (2) and (3) using the ordinary least squares method, it is possible to identify the determinants of students' academic performance for each educational subsystem.

4.2. Decomposition of the difference in school performance between students: Oaxaca and Blinder's method (1973)

The Blinder-Oaxaca (1973) decomposition technique is one of many techniques used to study wage differences by gender, race, ethnicity. Although most applications of this method are in the labour market, the technique has also been studied in the field of educational economics (Luo et al., 2021; Contini et al., 2017; Ning et al., 2016; Thapa, 2015). This method is therefore used to examine the differential in educational outcomes between two groups. Group 1 consists of students from the anglophone education subsystem and group 2 consists of students from the francophone education subsystem. The equation for decomposing the average achievement gap formulated from the perspective of group F is such that :

$$R = \overline{S}_F - \overline{S}_A \tag{4}$$

Where R is the difference in estimated score means between each group, captured from the predicted variables of the different groups from the linear models (2) and (3). To determine the contribution of group differences in predicted values to the total difference in scores from equation (4) such that :

$$R = \left(\overline{X}_F - \overline{X}_A\right)\hat{\beta}_F + \overline{X}_A\left(\hat{\beta}_F - \hat{\beta}_A\right) \tag{5}$$

Where $\hat{\beta}_F$ and $\hat{\beta}_A$ are estimated parameters obtained from the previously specified test score equations. $\overline{X}_F$ and $\overline{X}_A$ are the average characteristics of groups F and A respectively. This equation corresponds to a two-term decomposition. The first term is generally referred to as the explained effect or the characteristic effect and captures the difference in test scores that would disappear if students in the francophone subsystem, given their performance on the average characteristics, had the same characteristics as students in the anglophone educational subsystem. In other words, it measures the difference in test scores that would exist if students from both subsystems were assessed by schools in the francophone subsystem. The second term is called the unexplained effect of the gap or the effect of the returns to characteristics, in the context of this study, this term reflects the « education subsystem specific part ». When positive, it indicates the extent to which students in the francophone subsystem would on average perform better if, taking into account the characteristics of the Anglophone group, they were to perform better.

In the specification of equation (5), group F is considered as the reference group. However, there is no consensus on the choice of the reference group in the literature, since the decomposition proposed by Oaxaca and Blinder (1973) considered that any group could be targeted in the discrimination, hence the index problem that arises. Thus, the results of the decomposition vary depending on the technique used to determine the non-discriminant coefficient. Alternative decompositions are proposed in the discrimination literature (Reimers, 1983; Cotton, 1988; Neumark, 1988; Oaxaca and Ransom, 1994). This technique results from the notion of the existence of a non-discriminatory coefficient vector, the use of which makes

it possible to determine the contribution of the differences in the predicted values. In this study, we will therefore use this method taking into account the suggestions of Jann (2008). Considering β^* as this vector, the difference in results can then be written as follows:

$$R = \beta^* \left(\bar{X}_F - \bar{X}_A \right) + \left[\left(\beta_F - \beta^* \right) \bar{X}_A + \left(\beta^* - \beta_A \right) \bar{X}_F \right] \quad (6)$$

The first component measures the part of the differential due to the group prediction variables. The second component measures the part of the differential that is not explained, also called the coefficient component. The latter is usually attributed to discrimination, but it is important to recognise that it also captures any potential difference effects in the unobserved variables.

5. Data and descriptive statistics

5.1 Data and variables

The data for this study come from the Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (PASEC) survey collected in 2014. This survey aims to evaluate the performance of education systems in French-speaking sub-Saharan African countries by testing the skills of primary school pupils in two areas, namely language and mathematics (PASEC, 2016). This programme covers ten sub-Saharan African countries, including Benin, Burundi, Burkina Faso, Cameroon, Chad, Congo, Côte d'Ivoire, Gabon, Senegal, Togo and the Central African Republic. To obtain quality data for each country, PASEC2014 uses a two-stage stratified sampling method. At the first stage or level, schools are sampled with a probability proportional to the number of eligible pupils based on school mapping data for the primary education level in each country. In the second stratification stage, pupils are selected with equal probabilities from each school according to levels. In the second grade, 10 pupils are randomly selected from schools with more than 20 pupils and in schools with exactly 10 pupils, all pupils are automatically sampled. This same procedure was also applied in grade 6, with the only difference that the number of students was doubled.

Since the ultimate aim of the survey is to assess the level of learning achievement of the pupils, tests are administered to them, after which a score is assigned to each pupil. This survey implements a new methodology called « plausible values[1] » in the calculation of scores that is different from those used in previous surveys (in 1996 and 2005), in order to comply with other international programmes such as PISA. Interpretation of scores was facilitated by the introduction of proficiency scales of scores by reporting students' results on a scale of mean 500 and standard deviation 100. In addition to testing students, PASEC also collected information on the characteristics of students, teachers, classes, and schools that allowed for an assessment of the level of resource allocation, an understanding of school practices, and a

[1] They were drawn for each subdomain of the different subjects (language and mathematics). Based on the students' scores, the difficulty of the items and the ability of the students were calculated simultaneously using a method called the Rasch model or item response model. As only an incomplete item subsample is administered, scores were calculated with relative uncertainty. For this reason, PASEC did not provide a single estimate of student performance, but five plausible values for each of the subjects (language and mathematics), which represent the different abilities a student might have. For more details see Wu (2005).

link to student' academic performance. In the end, a total of 280 schools were selected in each country, but this sample is context sensitive.

In Cameroon, based on a sample of schools and pupils in the francophone and anglophone education subsystems during the 2014/2015 school year, about 140 schools were surveyed in grade 2 and 180 schools were surveyed in grade 6. The tests in French and English (the two languages of instruction) and in mathematics were administered to a maximum of 10 and 20 pupils per primary school class in grades 2 and 6 respectively. In the end, in grade 2, the survey resulted in a total of 1071 pupils in 134 schools. In the francophone system, there were 614 pupils in 84 schools, and in the Anglophone sub-system, there were 457 pupils in 50 schools. In grade 6, the survey led to a total of 3817 pupils in 266 schools such as 167 schools and 2186 pupils for the francophone subsystem; 99 schools and 1631 pupils for the anglophone subsystem.

The variables used in this study are of two types, namely the explanatory variables and the dependent variable. The choice of variables was inspired by the work of Ning et al, (2016) and Thapa (2015). The dependent variable corresponds to the level of acquisition of the pupil captured by the average of the five plausible values of the pupil in each subject at the end of the primary school (grade 6).

For the purpose of comparison, the test scores of the student in each francophone and anglophone subsystem will be explained according to a set of explanatory variables classified into individual and family characteristics, school characteristics (class/school) and geographical characteristics. As personal characteristics of the student, gender is taken into account as families have more ambition for boys than for girls and this gender differentiation in developing countries is due to socio-cultural considerations (Luo et al., 2021), which consequently predisposes boys to obtain better scores than girls. For this purpose, a positive sign is expected. Age is also important, as it has been shown in the literature that academic delay, caused by late entry into school, could be attributed to a greater maturity of older students compared to younger ones (Schwille, 1991). A positive sign is therefore expected. Pre-school attendance guarantees a better continuation of primary schooling and improves the child's school performance. A positive sign would be expected. Repetition is a factor in poor performance and pupil progression. A positive sign is expected.

With regard to characteristics related to the child's family environment, having at least one literate parent makes it easier for pupils to do their homework (Meunier, 2005). A positive sign is also expected. A high household standard of living can provide the pupil with a favourable environment for learning at home in view of the various resources provided by the household. A positive sign is expected.

Variables specific to school characteristics such as the teacher's level of education are important in that teachers who have not attained a certain level of education or training will find it difficult to make progress with their students (Thapa, 2015). Also, the introduction of class size is justified by the fact that small classes are easier to manage and more suitable for students (Kohler, 2020). The use of teacher age is explained by the fact that older teachers have more experience in pedagogy and teaching practices than younger teachers (Khum et al., 2018). Teachers who have more experience in terms of years of teaching have good techniques to impart knowledge to their students; a positive sign is expected in this regard

(Chowa et al., 2015). The high level of equipment in the classroom is a predictor of the student's level of academic performance. The type of school is ultimate for this work because public schools are characterised by school conditions (better resources in terms of multiform school equipment) that predispose the student to better learning than public schools (Thapa, 2015). Finally, children who attend schools in urban areas have all the necessary equipment to facilitate their learning compared to students who attend schools in rural areas; thus a positive sign would be expected (Mourji and Abbaia, 2013).

5.2. Descriptive statistics

Table 1 below shows the statistics of the different variables that predict student academic performance by language subsystem. It can be seen that the average test score for students in the anglophone subsystem is 598.11 points and 483.807 points for those in the francophone subsystem in mathematics. In language, the average test score was 534.316 points for students in the anglophone subsystem and 516.96 points for students in the francophone subsystem. The difference between the two groups is 14.307 points in mathematics and 17.348 points in language. These differences are statistically different at the 1% level. It also shows that the average age of students in the francophone subsystem is higher than that of students in the Anglophone subsystem (12 years, compared to 11 years). Also, the proportion of girls is greater than that of boys in the anglophone subsystem. In addition, our sample shows that 53.79% of students in the francophone subsystem are exposed to repetition, compared to 44.55% for their anglophone counterpart. Also, 55.05% of students in the anglophone subsystem attended preschool and 42.77% did so in the francophone subsystem.

With regard to variables related to the family environment, the statistics show that most children in the Anglophone subsystem come from households with an average standard of living (52.42%), while 51.69% of children live in a family with a comparable standard of living in the francophone education subsystem. On the other hand, 16.67% of children live in a household with a low standard of living, while 31.47% of students in the francophone subsystem live in a family with a similar standard of living.

With regard to the variables relating to school characteristics, the analyses show that in both the anglophone and francophone subsystems, the average age of teachers is 38 years. In addition, the proportion of teachers is higher in the francophone subsystem at 79.68%, while it is 63.94% in the anglophone subsystem. 75.29% of teachers have at least a bachelor's degree in the anglophone subsystem compared to 52% in the francophone subsystem. The statistics further show that less than half of the schools in each subsystem are private, but that there are more public schools in the anglophone subsystem (45.55%) than in the francophone (31%). Also, the geographical distribution of schools shows that 41.38% of schools in the anglophone subsystem are located in urban areas, compared to 32.98% of schools in the francophone subsystem in the same area.

Table 1: *Statistical description of the study variables by educational sub-system*

	Education subsystem	
Independent variables	**Anglophone**	**Francophone**
Mathematics score	498.114 (86.114)	483.807 (96.774)

Language score	534.316 (94.964)	516.968 (105.029)
Individual student characteristics		
Student age	11.49 (1.29)	12.25 (1.6865)
Gender of the student	0.5027 (0.0130)	0.5425 (0.0106)
Preschool	0.5505 (0.0129)	0.4277 (0.0110)
Repetition	0.4555 (0.0130)	0 .5379 (0.0110)
Student's family characteristics		
Low household standard of living	0.1667 (0.0097)	0.3147 (0.0104)
Average household standard of living	0.5242 (0.0130)	0.5169 (0.0111)
High household standard of living	0.3090 (0.0121)	0.1683 (0.0085)
At least one literate parent	0.7798 (0.0124)	0.8010 (0.0091)
Characteristics of the school		
Age of teacher	38.92 (7.2497)	38.85 (7.5958)
Gender of teacher	0.6394 (0.0124)	0.7968 (0.0088)
Experience of the teacher	11.07 (7.5117)	11.20 (7.8443)
At least baccalaureate	0.7529 (0.0112)	0.5200 (0.0111)
Professional training	0.8873 (0.0082)	0.7699 (0.0093)
Low level of equipment in the class	0.2188 (0.0110)	0.2021 (0.0089)
Level of equipment in the middle class	0.4972 (0.0130)	0.5489 (0.0110)
High level of equipment in the class	0.2838 (0.0120)	0.2488 (0.0097)
Private school	0.4555 (0.0130)	0.3000 (0.0102)
Urban school	0.4138 (0.0129)	0.3298 (0.0104)
Number of observations	1631	2186

Source: *Authors, based on PASEC 2014 data.* ***Note:*** *Values in brackets represent standard deviations.*

6. Econometric results

The presentation of the econometric results will focus on two points. The first point will highlight the results of the estimation of student performance in each of the educational subsystems and the second point will present the results of the decomposition of the school performance differential.

6.1. Results of the estimation of students'school performance in the francophone and anglophone sub-systems

Table 2 summarises the results based on the regression model of student academic performance in each subsystem by OLS in mathematics (columns 1 and 2) and language (columns 3 and 4).

6.1.1. In mathematics

According to the results recorded in columns (1) and (2) of the table below, it appears that the majority of the variables show expected signs in the equations of pupils'school performance for both the anglophone and francophone education subsystems, with the exception of variables such as the age of the pupil and gender in the anglophone subsystem. Specifically, it appears that in the francophone subsystem, variables such as gender, pre-school attendance,

repetition, low household standard of living, high household standard of living, teacher having at least a bachelor's degree, teacher's professional training, high level of classroom equipment, urban setting and type of public school are variables that predict students' test scores. While in the anglophone subsystem, pre-school attendance, repetition, low household standard of living, high household standard of living, teacher gender, teacher education level, teacher professional training, and urban location of the school are variables that are determinants of student attainment.

With regard to the child's individual characteristics, the related factors explain to different degrees the child's level of school performance according to the school attendance sub-system. In particular, while the child's gender has no effect on the academic performance of pupils in the anglophone subsystem, it is associated with a gain in scores for pupils in the francophone subsystem. In other words, compared to girls, being a boy increases the mathematics test score by 1.025[1] points in the francophone subsystem. Attending preschool rather than not attending preschool makes the student perform better in the francophone subsystem, while their peers in the anglophone subsystem are rather disadvantaged and see their score decrease by 2.101 percentage points. Repetition was a factor in the underperformance of students in both the anglophone and francophone subsystems, and compared to students who had repeated at least one grade, those who had repeated saw their scores drop by 3.42 percentage points and 4.47 percentage points respectively.

It also emerges from the analyses in the same table that the family characteristics of the pupil, such as the standard of living of the pupil's household, is a factor in the academic performance of pupils in the francophone and anglophone sub-systems. In particular, compared to students from families with an average standard of living, children from households with a low standard of living saw their performance decrease by 7.59 percentage points and 5.27 percentage points respectively in the anglophone and Francophone subsystems. Also, in both the anglophone and francophone sub-systems, children's school performance increases by 2.27% and 2.10% respectively when they live in a household with a high standard of living, compared to pupils from families with a low standard of living.

With regard to the characteristics specific to school conditions, the table reveals that a class taught by a teacher who has at least the baccalaureate increases the academic success of pupils by 3.90% and 3.98% in the anglophone and francophone subsystems respectively. While the teacher's professional training has no effect on the level of student achievement in the Anglophone subsystem, it is associated with an academic performance advantage for students in the Francophone subsystem and increases the latter's level of achievement by 5.65%. Also, a classroom with a low level of equipment significantly decreases the child's academic performance only in the two subsystems. However, a high-equipped classroom increases the academic achievement of pupils in both systems, by 14.3% in the anglophone subsystem and up to 23.9% in the francophone subsystem. In the francophone subsystem, students attending private schools show gains in mathematics scores of 6.52 percentage points, compared to their peers in public schools. Compared to schools located in rural areas, schools located in urban

[1] The school performance equation of the form $S = X\beta + \varepsilon$ has been linearised such that $Ln(S) = X\beta + \varepsilon$, then a change of one unit X is associated with a change of $\left(\exp(\beta) - 1\right) * 100\%$. For example $1.025 = (e^{0.0254} - 1) * 100$

areas increase students' performance in mathematics by 10.84% and 12.08% in the Anglophone and Francophone sub-systems respectively.

6.1.2. In language

Columns (3) and (4) of Table 3 highlight the results of the OLS estimation of school performance by language education subsystem. It appears that student characteristics, household environment and school conditions influence the academic achievement of students from each educational subsystem. In relation to the characteristics of the pupil and his or her family environment, the results for the English-speaking sub-system show that factors such as age, sex of the pupil, low household standard of living and high household standard of living play a major role in the academic success of children at the end of the primary language cycle. While among these variables, pre-school attendance and having a literate parent, low household standard of living and high household standard of living are the variables with more weight in determining students' test scores in language. For example, low household standard of living in both the Anglophone and Francophone subsystems is associated with a loss of school performance of 8.50% and 5.07% respectively in the anglophone and francophone subsystems. In contrast, when the child lives in a household with a high standard of living, the score increases by 4.68% and 2% for a pupil attending the anglophone and francophone subsystems respectively.

Concerning the characteristics of the schools, it appears that in the Anglophone sub-system, all the variables show expected signs except for the professional training of the teacher. Pupils taught by a teacher with at least the baccalaureate have an academic performance premium of 4.77% in the francophone subsystem. Also, compared to a student taught by a teacher who has a professional degree (CAPI, PENI, etc.), those taught by teachers who do not have a professional degree increase the test score of their students by 3.41%. Vocational training has a differentiated effect on the level of students' achievements according to the subsystem, while it has no effect on the performance of students in the anglophone subsystem, it rather increases this same score by 4.41% when it is in the Francophone education system. The academic performance of students attending schools in urban areas increases by 10.85% and 15.37% respectively in the Anglophone and Francophone subsystems, compared to students attending in rural areas.

Table 2: *Estimates of the determinants of students' school performance according to the anglophone and francophone subsystems*

	(1)	(2)	(3)	(4)
Variables	Anglophone	Francophone	Anglophone	Francophone
Personal characteristics of the student				
Age of the student	-0.00748	-0.000990	-0.0545**	0.0125
	(0.0246)	(0.0222)	(0.0224)	(0.0222)
Age of the student^2 /100	-0.0458	-0.0507	0.127	-0.116
	(0.102)	(0.0876)	(0.0922)	(0.0878)
Gender of the student	-0.00289	0.0250***	-0.0180**	0.00195
	(0.00736)	(0.00659)	(0.00735)	(0.00649)
Pre-school attendance	-0.0213***	0.0200**	-0.00365	0.0285***
	(0.00803)	(0.00790)	(0.00809)	(0.00775)

Repetition	-0.0348***	-0.0458***	-0.0435***	-0.0304***
	(0.00850)	(0.00722)	(0.00848)	(0.00722)
Student's family characteristics				
Low household standard of living	-0.0790***	-0.0542***	-0.0889***	-0.0521***
	(0.0111)	(0.00867)	(0.0113)	(0.00873)
High household standard of living	0.0225***	0.0208**	0.0458***	0.0198**
	(0.00846)	(0.00921)	(0.00845)	(0.00862)
At least one literate parent	-0.00878	0.0113	-0.00585	0.0445***
	(0.00882)	(0.00908)	(0.00909)	(0.00900)
School characteristics				
Gender of teacher	-0.0129	-0.0164*	-0.0118	-0.0312***
	(0.00888)	(0.00922)	(0.00905)	(0.00867)
Age of teacher	0.000901	0.00329	0.00732*	0.00259
	(0.00468)	(0.00357)	(0.00430)	(0.00327)
Age of teacher^2 /100	-0.00979*	-0.00725	-0.0155***	-0.00462
	(0.00591)	(0.00471)	(0.00537)	(0.00428)
At least the baccalaureate	0.0383***	0.0391***	0.0180	0.0466***
	(0.0102)	(0.00741)	(0.0111)	(0.00727)
Professional training	-0.0447***	0.0550***	-0.00883	0.0335***
	(0.0120)	(0.0116)	(0.0122)	(0.0123)
Professional experience	0.00344***	0.00178**	0.00177**	0.00110
	(0.000798)	(0.000846)	(0.000734)	(0.000841)
Low class equipment	-0.0231**	-0.0435***	-0.0130	-0.0506***
	(0.0103)	(0.0102)	(0.0105)	(0.0102)
High class equipment	0.0222**	0.0382***	0.0208**	0.0208***
	(0.00926)	(0.00810)	(0.00912)	(0.00770)
Class size	-0.000667***	0.000678***	-0.000710***	-4.07e-06
	(0.000194)	(0.000143)	(0.000205)	(0.000146)
Private school	-0.0222**	0.0632***	-0.0256**	0.0517***
	(0.0103)	(0.0120)	(0.0104)	(0.0124)
Urban school	0.103***	0.114***	0.103***	0.143***
	(0.00873)	(0.0104)	(0.00914)	(0.0103)
Constant	6.474***	6.096***	6.689***	6.110***
	(0.170)	(0.159)	(0.159)	(0.156)
N (Observations)	1512	2158	1512	2158
R-squared	0.380	0.444	0.402	0.493

Source: *Authors, based on PASEC2014 data.* ***Note****: Values in brackets correspond to standard deviations. *** p<0.01, ** p<0.05, * p<0.1*

6.2. Results of the decomposition of differences in school performance between pupils

The aim here is to identify the factors that explain the difference in children's school performance according to whether they belong to the anglophone or francophone education system in mathematics and language. The results obtained from the decomposition are

summarised in Table 3 below. Since not all variables are significant, it seems appropriate to limit the analysis to those that are.

6.2.1. In mathematics

Separate estimates for the Anglophone and Francophone subsystems are used to decompose the differential in test scores. Differences in test scores, measured in points, that can be attributed to differences in average characteristics are shown in column (1) and (3) of Table 3. Similarly, the differences in academic performance in points attributed to differences in coefficients are shown in columns (2) and (4) of the same table. The differences in scores for each subgroup of variables including student personal characteristics, family characteristics and school characteristics as well as each variable individually in both mathematics and language are also highlighted. Mathematically, the average total score difference in logarithm is 0.0319 points, or 3.241[1] points in normal value. It corresponds to the sum of the part explained by the differences in average characteristics (4.81 points) and the part not explained due to the differences in coefficients (-1.57 points).

The decomposition implies that more than 100% of the gap (4.81 points) is explained by differences in the averages of students who attended the anglophone or francophone subsystems. Approximately 31.80% of the difference in test scores is due to differences in individual child characteristics; 25.15% is due to differences in family characteristics and 24.90% of the difference is attributed to differences in the means of school characteristics (teacher, class and school). The difference due to the coefficients is negative (-1.57) because, overall, the estimated coefficients for students who attended the anglophone subsystem are relatively larger. This suggests that children who attended schools in the anglophone subsystem are better able to convert changes in a given attribute into better test scores. This explanation is also supported by the subtotals for intrinsic child characteristics (-11.83), family environment (-2.75) and school conditions (-14.03). The subtotals are negative because the anglophone coefficients are higher than the francophone coefficients in these categories.

6.2.2. In language

In contrast to the gap in academic performance that exists between primary school leavers in mathematics, the gap in language is greater between the Anglophone and Francophone subsystem students and averages 3.810 points. The decomposition of the difference in mean test score in language shows that more than 100% of the gap (153.64%) is attributable to the mean characteristics between the students of the two groups. In more detail, almost 34.67% of this gap is due to the individual characteristics of the student; 23.55% of this difference is due to the family characteristics of the child and 37.73% is attributable to the school context. This implies that the difference in average score between students in the Francophone subsystem and those in the Anglophone subsystem is mostly attributable to school characteristics. As for the unexplained part of the factors, we observe from the same table that the difference in test scores due to the coefficients is also negative (-1.931), i.e. -50.68% of the gap explanation. Variables such as the child's sex, pre-school attendance, low household standard of living,

[1] The values are given in logarithmic form, as the scores have been linearised. The values are obtained by the following calculation: $(e^{\beta} - 1) * 100$. Example $3.241 = (e^{(0.0319)} - 1) * 100$

having at least one literate parent, type of school and school location further widen the gap in school performance between the pupils of the two groups.

The share of unobservable factors due to discrimination reduces the differential in language test scores. While variables such as child age, gender, pre-school attendance, low household standards of living, teacher education, teacher professional training, class size, type of public school and urban location of the school contribute to the reduction of this difference, factors such as high household standard of living, gender, age and experience of the teacher as well as low and high class equipment increase the achievement gap.

Table 3: *Results of the decomposition of school test scores in mathematics and language*

Variables	**Mathematics**			**Language**		
		(1)	(2)		(3)	(3)
	T	***E***	***U***	***T***	***E***	***U***
Difference	0.0319***	0.0470***	-0.0151***	0.0374***	0.0569***	-0.0195***
	(0.00650)	(0.00516)	(0.00574)	(0.00665)	(0.00539)	(0.00571)
	100%	148.44%	48.44%	100%	153,64%	-53,64%
Personal characteristics		0.0152***	-0.126		0.0201***	-0.490**
		(0.00192)	(0.211)		(0.00207)	(0.203)
		31.80%			34.67%	
Family characteristics		0.0121***	-0.0279***		0.0137***	-0.0486***
		(0.00167)	(0.0108)		(0.00180)	(0.0110)
		25.15%			23.55%	
School characteristics		0.0197***	-0.151		0.0230***	0.0234
		(0.00398)	(0.119)		(0.00394)	(0.108)
		24.90%			39.73%	
Constant			0.290			0.495**
			(0.239)			(0.229)
N (observations)		3817	3817	3817	3817	3817

Source*: Authors, based on PASEC2014 data.* ***Note****: Values in brackets correspond to standard deviations. *** p<0.01, ** p<0.05, * p<0.1. T=total difference, E=explained difference, U=unexplained difference.*

7. Conclusion

The reunification of Cameroon in 1961 brought about profound reforms within its school system, the most striking of which is the organisation of the latter according to two educational subsystems which coexist despite their specificities. Attempts to harmonise these two educational subsystems have always ended in failure, and this has had repercussions on the performance of the education system in general and on pupils in particular. In this context, this study set out to compare the academic performance of students in the francophone and anglophone education sub-systems and to identify the factors that may explain this gap in academic performance.

Using data from Confemen's 2014 Educational Systems Analysis Programme, the two-step econometric strategy first shed light on the factors that determine students' school performance according to language attendance subsystems; and secondly, decompose the school performance gap by the Oaxaca (1973) and Blinder (1973) decomposition method.

With regard to the estimation of the educational production function, the results show that at the end of primary schooling in mathematics, factors relating to the personal characteristics of the pupil, the environmental characteristics of the household in which the child lives as well as those relating to school conditions are important factors in the prediction of pupils' academic performance at the end of primary schooling.

Subsequently, the decomposition technique allowed us to identify the factors that are at the origin of the gap in academic performance between students according to the educational sub-system. The results showed that in both mathematics and language, more than 100% of this gap is due to observable factors attributable to both the out-of-school and school environment. However, while in mathematics, it is the students' intrinsic factors that contribute most to the difference in academic results, school characteristics explain the majority of the differential between students in the two groups in language.

Policy recommendations can be made to education policy makers in view of the results obtained. Emphasise the policy of distributing school equipment both at the level of classes and at the level of geographical areas of schools by providing schools located in rural areas with various and multiform school materials to guarantee an equitable and favourable school learning environment for pupils. Also, strategies to combat inequalities should be based on the policy of improving household living conditions, for example by providing support to households living in the worst conditions in order to reduce socio-economic inequalities between pupils according to the socio-economic status of the household.

References

- Barrera-Osorio, F., Garcia-Moreno, V. A., Patrinos, H. A., & Porta, E. E. (2011). Using the Oaxaca-Blinder decomposition technique to analyze learning outcomes changes over time: An application to Indonesia's results in PISA mathematics. World Bank Policy Research Working Paper, 5584.
- BENARAB, A. (1998). Evaluation of effectiveness in education and higher education. Scope and limits, 7-17.
- Bernstein, B. (1959). A public language: Some sociological implications of a linguistic form. The British Journal of Sociology, 10(4), 311-326.
- Botezat, A. (2012). DECOMPOSING THE GAP IN SCHOOL ACHIEVEMENT BETWEEN FINLAND AND ROMANIA-SOME METHODOLOGICAL ASPECTS. Annals of the University of Oradea, Economic Science Series, 21(2).
- Cherkaoui, M. (1979). Les effets sociaux de l'école selon Paul Lapie. Revue française de sociologie, 239-255.
- Chinapah, V., H'ddigui, E. M., Kanjee, A., Falayajo, W., Fomba, C. O., Hamissou, O., Rafalimanana, A., & Byomugisha, A. (2000) With Africa for Africa. Towards Quality Education for All. 1999 MLA Project. ERIC.
- Coleman, J. S. (1966). Equal schools or equal students? The Public Interest, 4, 70.
- Contini, D., Di Tommaso, M. L., & Mendolia, S. (2017). The gender gap in mathematics

achievement: Evidence from Italian data. Economics of Education Review, 58, 32-42.
- Cotton, J. (1988). On the decomposition of wage differentials. The review of economics and statistics, 236-243.
- Danhier, J., & Martin, E. (2014). Comparing compositional effects in two education systems: The case of the Belgian communities. British Journal of Educational Studies, 62(2), 171-189.
- Dicklitch, S. (2011). The Southern Cameroons and minority rights in Cameroon. Journal of Contemporary African Studies, 29(1), 49-62.
- Duncan, K. C., & Sandy, J. (2007). Explaining the performance gap between public and private school students. Eastern Economic Journal, 33(2), 177-191.
- Dupraz, Y. (2019). French and british colonial legacies in education: Evidence from the partition of cameroon. The Journal of Economic History, 79(3), 628-668.
- Fasih, T. (2008). Linking education policy to labor market outcomes. World Bank Publications.
- Felouzis, G., Charmillot, S., & Fouquet-Chauprade, B. (2011). School inequalities in Switzerland and their cantonal variations: The contribution of the Pisa 2003 survey. Swiss Journal of Sociology, 37(1).
- Fonlon, B. (1969). The language problem in Cameroon (an historical perspective). Comparative Education, 5(1), 25-49.
- Fozing, I. (2009). Gratuité de l'enseignement fondamental au Cameroun: Réalité, implication budgétaire et impact sur le développement de l'éducation. Educational Research, 2, 3-20.
- Frenette, M., & Chan, P. C. W. (2015). Academic Outcomes of Public and Private High School Students: What Lies Behind the Differences? Analytical Studies Branch Research Paper Series. ERIC.
- Furno, M. (2022). Italian students' performance and regional decomposition. Educational Research for Policy and Practice, 21(1), 69-84.
- Gustafsson, F., & Gunnarsson, F. (2003). Positioning using time-difference of arrival measurements. 2003 IEEE International Conference on Acoustics, Speech, and Signal Processing, 2003. Proceedings (ICASSP'03). , 6, VI-553.
- Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. Journal of economic literature, 24(3), 1141-1177.
- Heyneman, S. P., & Loxley, W. A. (1983). The distribution of primary school quality within high- and low-income countries. Comparative Education Review, 27(1), 108-118.
- Hijri, N. E., Montmarquette, C., & Mourji, F. (1995). Determinants of school performance: An econometric study based on surveys in Morocco. Revue d'économie du développement, 3(1), 53-76.
- Hindriks, J., & Verschelde, M. (2010). The school of opportunity. Regards économiques, 77, 1-27.
- Hindriks, J., & Verschelde, M. (2011). Examining the educational gap between Flemish and French-speaking schools. In Educational divergence: Why do pupils do better in Flanders than in the French community? Re-Bel.
- Jacobs, D., Rea, A., Teney, C., Callier, L., & Lothaire, S. (2009). L'ascenseur social reste en panne: Les performances des élèves issus de l'immigration en Communauté française et en Communauté flamande.
- Jencks, C. (1972). Inequality: A reassessment of the effect of family and schooling in America.
- Kim, K. R., & Seo, E. H. (2018). The relationship between teacher efficacy and students' academic achievement: A meta-analysis. Social Behavior and Personality: an international journal, 46(4), 529-540.
- Köhler, T. (2022). Class size and learner outcomes in South African schools: The role of school socioeconomic status. Development Southern Africa, 39(2), 126-150.
- Konings, P., & Nyamnjoh, F. B. (1997). The anglophone problem in Cameroon. The Journal

of Modern African Studies, 35(2), 207-229.
- Kuchah, K. (2016). English-medium instruction in an English-French bilingual setting: Issues of quality and equity in Cameroon. Comparative Education, 52(3), 311-327.
- Lockheed, M. E., Fuller, B., & Nyirongo, R. (1989). Family effects on students' achievement in Thailand and Malawi. Sociology of Education, 239-256.
- Luo, R., Teng, K., Xu, L., & Zhu, Y. (2021). A decomposition of student achievement gap by gender in China: Evidence from random class assignment. International Journal of Educational Research, 106, 101721.
- MINEDUB (2012). Statistics on the success rates in the end of primary cycle examinations in Cameroon 2011-2012 school year.
- MNEDUB (2014). Statistics of success rates in primary school leaving examinations in Cameroon school year 2012-2013.
- MINEDUB (2015). Statistics of success rates in primary school leaving examinations in Cameroon school year 2013-2014.
- MINEDUB (2016). Statistics of success rates in primary school leaving examinations in Cameroon school year 2014-2015.
- Michaelowa, K. (2001). Primary education quality in francophone Sub-Saharan Africa: Determinants of learning achievement and efficiency considerations. World Development, 29(10), 1699-1716.
- Neumark, D. (2004). Employers' discriminatory behavior and the estimation of wage discrimination. In Sex Differences in Labor Markets (pp. 163-177). Routledge.
- Ning, B., Van Damme, J., Van Den Noortgate, W., Gielen, S., Bellens, K., Dupriez, V., & Dumay, X. (2016). Regional inequality in reading performance: An exploration in Belgium. School Effectiveness and School Improvement, 27(4), 642-668.
- Njiale, P. M. (2006). Crisis of the society, crisis of the school. Le cas du Cameroun. Revue internationale d'éducation de Sèvres, 41, 53-63.
- Oaxaca, R. L., & Ransom, M. R. (1994). On discrimination and the decomposition of wage differentials. Journal of econometrics, 61(1), 5-21.
- Ondoa, H. A. (2011). Efficiency factors of secondary schools in Cameroon. Les cahiers du cread, 96, 71-105.
- Pangeni, K. P. (2014). Factors determining educational quality: student mathematics achievement in Nepal. International Journal of Educational Development, 34, 30-41.
- PASEC (2007). The challenge of universal quality schooling. PASEC Cameroon Report 2004/2005. PASEC, Dakar.
- PASEC (2016). PASEC2014-Performances du système éducatif camerounais : Compétences et facteurs de réussite au primaire. PASEC, CONFEMEN, Dakar.
- PASEC (2019). PASEC2019-Quality of education systems in Francophone sub-Saharan Africa: Performance and teaching-learning environment in primary education. CONFEMEN, Dakar.
- Perelman, S., Pestieau, P., & Santin, D. (2009). Centre for Research in Public and Population Economics.
- Perelman, S., Pestieau, P., & Santin, D. (2011). Why is the performance of Flemish and French speaking students so different? A stochastic frontier approach. EDUCATIONAL DIVERGENCE, 27.
- Perelman, S., & Santin, D. (2011). Measuring educational efficiency at student level with parametric stochastic distance functions: An application to Spanish PISA results. Education Economics, 19(1), 29-49. https://doi.org/10.1080/09645290802470475
- Reimers, C. W. (1983). Labor market discrimination against Hispanic and black men. The review of economics and statistics, 570-579.
- Sandy, J., & Duncan, K. (2010). Examining the achievement test score gap between urban and suburban students. Education Economics, 18(3), 297-315.

- Thapa, A. (2013). Does private school competition improve public school performance? The case of Nepal. International Journal of Educational Development, 33(4), 358-366.
- Todd, P. E., & Wolpin, K. I. (2003). On the specification and estimation of the production function for cognitive achievement. The Economic Journal, 113(485), F3-F33.
- Ukiwo, U. (2007). Education, horizontal inequalities and ethnic relations in Nigeria. International Journal of Educational Development, 27(3), 266-281.
- Vandenberghe, V. (2011). Inter-regional educational discrepancies in Belgium. How to combat them? EDUCATIONAL DIVERGENCE, 6.
- Woessmann, L., & West, M. (2006). Class-size effects in school systems around the world: Evidence from between-grade variation in TIMSS. European Economic Review, 50(3), 695-736.

Annexes

Annex 1: Curriculum content in mathematics by learning area for grade 2 (CP/Class 2).

Francophone subsystem	English-speaking sub-system
CP	Class 2
- Preliminaries: comparison of quantities (more than...than and as many...as; etc.) - Numbers and numbering: numbers from 10 to 20; ordering numbers (ascending and descending); - Operation: practice of addition and subtraction (with and without a carry) and multiplication operations, numerical operators, mental calculations; etc. - Measurement: telling the time of day and half-hour; use of the calendar; comparison of quantities (length, mass and time measurements) - Geometry: identification of simple geometric solids; the square, the rectangle, the triangle; the circle; folding, overlapping, moving, superimposing; etc. - Problems: problems involving the sum of one or more numbers (result less than 100) or the difference of two numbers; problems involving a quantity; activities related to rhythm and periodicity.	- Preliminaries: review of the previous class (class one) - Numbers and numbering: counting, reading and writing numbers from 0-100: decomposing numbers from hundreds, tens and units; comparing numbers (with symbols .....); etc. - Operation: practice of addition and subtraction operations (with and without a carry); recognition and illustration of the commutative properties of addition and multiplication; division without remainder of numbers less than 100 by 2, 5 and 10; etc. - Measurement: drawing and labelling of the clock; use of the calendar; recognition and use of coins under 100fr; use of quantities (length, capacity and mass measurements) - Geometry: identification of geometric figures (circle, square, rectangle, triangle) - Problems: formulate real-life problems in mathematical form; problems involving addition, subtraction, multiplication and division - Logic and sets: use of 'union' and 'inter' symbols to combine two sets; identify common objects in two sets - Graphs and statistics: locating points on the line in relation to the reference point; drawing line segments to scale; etc.

Source: authors, based on official primary school curricula/national syllabuses for English speaking primary schools in Cameroon, MINEDUB, 2014.

Annex 2: Definition of study variables

Variables	Definition of variables
Mathematics score	A continuous variable that measures a student's test score in mathematics in grade 6.
Language score	A continuous variable that measures a student's test score in language in grade 6.
Education subsystem	Dummy which takes the value 1 if the pupil is enrolled in the English-speaking education subsystem and 0 otherwise (French-speaking education subsystem).
Student age	Continuous variable indicating the number of full years the student has been alive since birth
Student gender	Dummy that takes that takes 1 if the student is a boy and 0 otherwise
Preschool	Dummy which indicates whether the child attended nursery school (1) or not (0).
Repetition	Binary variable that indicates whether the student has repeated at least one grade or not
Alpha p	Dummy taking 1 if at least one parent is literate and 0 otherwise
Low household standard of living	A dichotomous variable that indicates whether the household's standard of living is low (1) or not (0)
Average household standard of living	A dichotomous variable that indicates whether the household's standard of living is average (1) or not (0)
High household standard of living	A dichotomous variable that indicates whether the household's standard of living is high (1) or low (0)
Gender of teacher	A dummy variable that takes 0 if the teacher is male and 1 if he is female.
Age of teacher	Continuous variable that counts the number of years of the teacher
Experience	A continuous variable that measures the number of years the teacher has been teaching
High class equipment	Dummy which informs about the level of equipment of the room of lass. It takes the value 0 if the equipment level is low and 0 otherwise.
Medium class equipment	Dummy which informs about the level of equipment of the room of lass. It takes the value 0 if the equipment level is low and 0 otherwise.
High class equipment	Dummy which informs about the level of equipment of the room of lass. It takes the value 0 if the equipment level is low and 0 otherwise.
Class size	Continuous variable that is equal to the total number of students in the class
Private school	Dummy which provides information on whether the school's network is private (0) or public (1).
Urban school	Dummy which indicates whether the school is located in an urban area (1) or not (0).

Source: authors, based on PASEC2014 data.

Annex 3: Results of the detailed decomposition of the difference in school results in mathematics and language

	Maths		Language	
	(1)	(2)	(3)	(4)
Variables	E	U	E	U
Individual characteristics				

Student age	-0.00946	0.165	-0.0149	0.842**
	(0.0121)	(0.407)	(0.0120)	(0.387)
Student age^2 /100	-0.00219	-0.0657	0.000497	-0.382**
	(0.0122)	(0.198)	(0.0120)	(0.186)
Student gender	0.000508*	0.0154***	-0.000396	0.0119**
	(0.000296)	(0.00515)	(0.000263)	(0.00513)
Preschool	-0.00148*	0.0176***	-0.00317***	0.0124**
	(0.000772)	(0.00568)	(0.000852)	(0.00565)
Repetition	-0.00261***	-0.00652	-0.00215***	0.00531
	(0.000754)	(0.00553)	(0.000659)	(0.00554)
Family characteristics				
Low standard of living	-0.00992***	0.00649**	-0.0102***	0.00865***
	(0.00140)	(0.00310)	(0.00143)	(0.00315)
High household standard of living	-0.00230**	-0.000543	-0.00395***	-0.00662**
	(0.000925)	(0.00306)	(0.000957)	(0.00296)
Literate parent	0.000131	0.0219**	0.000469	0.0466***
	(0.000155)	(0.00998)	(0.000390)	(0.0101)
School characteristics				
Gender of teacher	-0.00147*	-0.0174*	-0.00284***	-0.0268***
	(0.000817)	(0.00946)	(0.000853)	(0.00929)
Age of teacher	-0.00113	-0.179	-0.00148	-0.408*
	(0.00146)	(0.235)	(0.00182)	(0.212)
Age teacher^2 /100	0.00189	0.213*	0.00178	0.316***
	(0.00259)	(0.122)	(0.00244)	(0.109)
At least baccalaureate	-0.00954***	0.0127	-0.00974***	0.0294***
	(0.00154)	(0.00859)	(0.00156)	(0.00916)
Professional training	0.000508	0.0733***	0.000331	0.0274*
	(0.000790)	(0.0136)	(0.000802)	(0.0142)
Experience	0.000721	-0.0368***	0.000451	-0.0242*
	(0.000959)	(0.0138)	(0.000605)	(0.0129)
Low class equipment	0.00137**	-0.00294	0.00164***	-0.00762**
	(0.000540)	(0.00341)	(0.000604)	(0.00346)
High class equipment	-0.00151***	-0.00309	-0.00108**	-0.00697**
	(0.000555)	(0.00367)	(0.000443)	(0.00355)
Class size	0.000399	0.0520***	-0.000629*	0.0293***
	(0.000338)	(0.00806)	(0.000366)	(0.00843)
Private school	-0.000794	0.0413***	-0.000638	0.0387***
	(0.00122)	(0.00621)	(0.00120)	(0.00626)
Urban school	-0.0101***	-0.00188	-0.0108***	0.00944*
	(0.00221)	(0.00514)	(0.00236)	(0.00521)
Constant		-0.290		-0.495**
		(0.239)		(0.229)
N (observations)	3817		3817	

Source: authors, based on PASEC2014 data. Note: Standard deviations in parentheses. *** p<0.01, ** p<0.05, * p<0.1. E=explained difference. U=unexplained difference.