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Examining Effect of Family, School and Community Factors on Primary School Students' Attendance and Learning Achievements in Burkina Faso: Focused on Gold Mining Areas

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Examining Effect of Family, School and Community Factors on Primary School Students' Attendance and Learning Achievements in Burkina Faso: Focused on Gold Mining Areas

（ブルキナファソにおける家庭、学校、コミュニティの要因が初等学校児童の就学と学習成果に与える影響の検討－金鉱山地域を事例として－）

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ABSTRACT

Education has an important role in the world development agenda. The Millennium Development Goals (MDGs) between 2000 and 2015 aimed at Education for All (EFA) objectives. However, the EFA objectives were not achieved by many countries by the end of the MGDs era. Building from the efforts and gains of the MDGs, the international community embarked on a new global agenda for education from 2015: Sustainable Development Goal (SDG) 4- "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". This agenda is designed to be more inclusive, holistic and outcome-oriented. With the background efforts from MDGs period, many developing countries are investing many resources in order to achieve the goals of this new world education agenda. Around the world, through various policies and strategies, these efforts resulted in an increase in primary education enrolments. In Sub-Saharan Africa (SSA), Burkina Faso is among the countries that have engaged in pursuing the objectives of the world agenda for education. The country has made achievements in the expansion of basic education, by building more schools, recruiting more teachers, and making primary education free.

Despite the education access increase that can be observed in Burkina Faso and in many other developing countries, there are still disparities that affect education systems in many of these countries. These disparities that need to be addressed are mainly from gender, socio-economic, and also geographical perspectives. In addition to these education access disparities, good quality education is another challenge that many developing countries, including Burkina Faso, are currently facing. Many scholars and practitioners in the education sector refer to the situation as a learning crisis, given that many students in developing countries go to school but still do not learn. In other words, around the world, more students may be going to school, but many of them do not reach the learning objectives set by official teaching programs.

In this context of challenges in terms of education access and quality, there is a need for governments to take measures, especially from an approach that is not only from a supply-side, but also a demand-side approach. A demand-side approach may bring in the potential that demand-side inputs have to address educational issues, and complement the supply-side efforts

undertaken by governments. From this perspective, there seems to be a wide recognition and consistency among researchers and practitioners in education development that families and local communities have a potential to improve education access and quality. For instance, they can contribute to improve school attendance and students' learning achievements. The contribution of households and communities towards education is crucial, because education demand depends primarily on them. When education supply is high in an environment where demand is low, issues are very likely to arise from the mismatch. Therefore, governments make efforts from a supply side, while encouraging demand-side contributions as well. The interactions of demand-side and supply-side efforts will likely reduce issues that currently plague educational systems.

As such, encouraged by research findings from some specific contexts, many developing countries have developed some strategies that promote the participation of families and communities in children's schooling. Some research findings demonstrated that this participation can contribute to address some of the educational issues which countries face. In Burkina Faso, this trend was followed by a ministry of education's decision that was taken, encouraging and promoting the participation of families and communities in children's education. Recently, from a regional perspective, the country has been experiencing a gold mining boom. This has created a kind of gold rush that drive a large portion of the population into small-scale gold mining and related activities, neglecting the education of their children. Education indicators seem to indicate that the luring fast track of getting rich diverts the values and aspirations for education of many households and communities living in gold mining areas. Many of them seem to be more interested in getting rich at all cost than investing their efforts into the education of their children. Therefore, promoting the participation of families and communities to support efforts of the government for the improvement of attendance and learning achievements seems to be more crucial for Burkinabe gold mining areas. The government does not have a policy response for educational issues in these areas, but it seems to be getting more and more aware of the need to create one. A few forums were organized on student dropouts in gold mining areas, indicating an increasing awareness of the situation.

Despite their potential for the improvement of education, in crucial contexts like Burkinabe gold mining areas, there is a debate on the importance of family and community factors, relative to school ones, for students' learning and attendance. On the one hand, the importance of family factors for the improvement of learning achievements seems to be well recognized by some empirical evidence in many countries, given that some studies found that parental inputs have a positive effect on the learning of students. On the other hand, other empirical studies used international assessment data and argue that family factors are important in developed countries but there is little evidence that they are important in developing ones. The implication of these studies is that interventions targeting families may be ineffective for students' learning in developing countries; in other words, interventions should target only schools. Generalization of such findings may be problematic for policy development, due to differences of contexts of these researches and heterogeneity of student factors. Furthermore, regarding community involvement in education, the general tendency is to promote it. However, some studies show that not all forms of community involvement are efficient to address educational issues, so it is important to test what form of community involvement works and in what context it does.

In addition to the debate around the importance of family or school factors and the forms of effective community involvement in education, while some scholars support that low education participation and poor education quality are characteristics general to educational systems including Burkina Faso one, some others argue that these issues are worse in gold mining areas, as individuals from these areas are more interested in getting rich from gold money instead of participating in their children's schooling. With this as a background, the study explores three main research questions: 1) To what extent do home environment factors affect the likelihood of primary school attendance across socio-economic groups in gold mining areas in Burkina Faso's primary education? 2) What are the factors that determine students' learning achievements between high-performing students and low-performing ones in gold mining areas in Burkina Faso's primary education? 3) How does community involvement in school life influence students' learning achievements in gold mining areas in

Burkina Faso's primary education? The main purpose of the study was to analyze the influence of family, school and community factors on school attendance and learning achievements of students in Burkina Faso, with a focus on gold mining areas.

The overall method employed for the study is of a mixed-methods sequential explanatory design, as it involves a sequential linkage between a quantitative analysis and a qualitative one. From the perspective of the quantitative analysis, this study employed a probit model and a three-level Hierarchical Linear Modeling (HLM) to analyze the factors that affect school attendance and learning achievements. The probit regression was employed to examine the sub-research questions related research question 1, while HLM was employed to examine the sub-research questions related to research question 2 and research question 3. The clustering of the HLM model was child level (level 1), school level (level 2), and province level (level 3). Student level data are nested in schools, and school level data themselves nested in provinces. The quantitative analysis relied on cross-sectional data from the Program for the Analysis of Education Systems of CONFEMEN countries (PASEC) 2014 learning achievements survey and Burkina Faso 2014 household survey.

In addition to the quantitative approach, based on the results of the quantitative estimation analysis, primary qualitative data was collected and analyzed. Questionnaires for semi-structured interviews of different education stakeholders were then designed for the qualitative data collection. As a common technique for data collection in such a study, systematic sampling method was applied for the selection of participants for the interviews. In total, 18 education officials from the ministry and local levels, 8 school principals, 20 teachers, 40 parents including Parents Associations (PA) or Mothers Association (MAs) members, and 32 grade 6 students were interviewed. Since this study adopts a mixed method approach, the qualitative analysis served much to explain the findings of the quantitative one.

The analysis set out to test the hypotheses based on sub-research questions derived from the main research questions. The hypotheses related to the main research question 1 are as follows: (1-1) in gold mining areas in Burkina Faso, the effect of parental involvement on primary school attendance increases as socio-economic level increases; (1-2) the effect of

parental involvement on primary school attendance is higher for boys relative to girls, and also higher for working children relative to non-working ones. The set of hypotheses related to the second main research question are as follows: (2-1) in gold mining areas, parental involvement, the number of books at home and child labor increase learning achievements of high-performing students relative to low-performing ones; (2-2) in gold mining areas, teacher qualification, head teacher factors and school resources have a positive effect on learning achievements of high-performing students relative to low-performing ones. In terms of the third main research question, the hypotheses set out are: (3-1) in gold mining areas, parent's association support of students in need has a positive effect on students' learning achievements; (3-2) in gold mining areas, mothers' association involvement in school life affects students' learning achievements positively.

This study finds that in Burkina Faso's gold mining areas, family factors determine school attendance, as findings indicate that family involvement positively affects school attendance. Specifically, the voice of fathers appears to be very important for school attendance. This finding is unique for gold mining areas, as the study found no relationship between parental involvement and school attendance in non-mining areas. The effect of parental involvement on school attendance is higher for students from the higher socio-economic level, relative to those from lower socio-economic one. The study also reveals that in Burkina Faso's gold mining areas, the effect of parental involvement on school attendance is higher for girls relative to boys, and also higher for non-working children relative to working ones.

The estimation results on the effect of family and school factors on students' learning achievements in gold mining areas reveal that parental involvement is not statistically related to students' learning achievements, regardless of students' performance. In addition, the study finds that the number of books at home positively influences learning achievements of high-performing students. However, it finds that child labor is negatively associated with students' learning achievements, regardless of performance. What was found to be unique to gold mining areas is the positive influence of teacher professional training, school principal training and experience on students' learning achievements.

The estimation on the research question related to community involvement and students' learning achievements in gold mining areas reveals that PAs support of students in need has a positive effect on students' learning achievements, without any gender differences. However, MAs involvement in school life also has a positive effect on students' learning achievements, but with an effect which is higher for girls relative boys. The uniqueness of this finding is that it does not apply to non-gold mining areas, as the study finds that the involvement of MAs profits boys more in non-gold mining areas.

In Burkina Faso's gold mining areas, household status and practice factors play an important role for school attendance. Examining households allows then to understand more about the demand for education in gold mining areas. Furthermore, what is happening within households may be important children's learning achievements, by the creation of a home environment that promotes learning. The relatively common view of schools as agents that produce knowledge is supported by this study, and the actors within schools also play an important role in the process of knowledge production. As for communities, they can contribute to promote students' learning, mainly for girls, where they lag behind boys. However, some of the factors associated with students' achievements seem not to be important in the socio-economic context of non-gold mining areas, and this indicates that context in very important to understand the dynamics of education.

In conclusion, family factors are related with school attendance in gold mining areas in Burkina Faso, but socio-economic status, child gender, and child labor factors moderate this relation. Similarly, families can contribute to improve children's learning, when they create an appropriate learning environment for them at home. Moreover, schools and communities contribute to improve students' learning, provided they are able to know the learning needs of these students. In Burkina Faso in general and in gold mining areas in particular, this study reveals that determinant factors to improve the demand for education and improve education quality are not only in schools, but also within households and communities.

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LIST OF ACRONYMS AND ABBREVIATIONS

AME	Average Marginal Effect
AT	Assistant teachers
CAT	Certified Assistant Teachers
CDF	Cumulative Distribution Function
COFEMEN	Conférence Des Ministres De L'éducation Des États et Gouvernements De La Francophonie
CPA	Certificate of pedagogical ability
CRS	Catholic Relief Services
CT	Certified Teachers
EA	Enumeration Area
ECPA	Elementary Certificate of Pedagogical Ability Educational Quality
EFA	Education for All
GCSE	General Certificate of Secondary Education
GDP	Gross Domestic Product
GPS	Global Positioning System
HLM	Hierarchical Linear Modeling
ICC	Inter-Class Correlation
ILO	International Labor Organization
INSD	National Institute of Statistics and Demography
IRT	Item Response Theory
LDV	Limited Dependent Variable
LPM	Linear Probability Model
LR	Likelihood Ratio
LRT	Likelihood Ratio Test
MA	Mothers Association
MDG	Millennium Development Goals
MECV	Ministry of Environment and Living Conditions
MENA	Ministry of National Education and Literacy
ML	Maximum Likelihood
MSED	Mixed-methods Sequential Explanatory Design
NIS	National Institute of Statistics
OLS	Ordinary Least Square
PA	Parents Association
PASEC	Programme d'Analyse des Systèmes Éducatifs de la CONFEMEN
PDDEB	Basic Education Development 10-year Plan
PDSEB	Program for the Strategic Development of Basic Education]
PEA	Partial Effect at the Average
PEC	Primary Education Certificate
PPS	Probability Proportional to Size
PSLE	Primary School Leaving Examination
PTA	Parents Teacher Associations
SACMEQ	Southern and Eastern Africa Consortium for Monitoring
SBM	School-based Management
SDG	Sustainable Development Goal
SES	Socio-Economic Status

SSA	Sub-Saharan Africa
ST	Senior Teachers
TCSE	Technical Certificate of Secondary Education
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education
VPC	Variance Partition Coefficient

CHAPTER 1 : INTRODUCTION

1.1. Background of the Study

The importance of human capital development is widely recognized in the world by decision-makers, researchers, and practitioners. They are then making efforts to sustain human capital development, through various efforts such as appropriate investments in education. Empirical evidence has shown that human capital has benefits for the individual, the community and the country; these benefits can be monetary as well as non-monetary (Dziechciarz-Duda & Król, 2013). Moreover, evidence supports that human capital is important to sustain economic growth, as many studies found a positive relation between human capital and long-term economic growth (Kyophilavong & Ogawa, 2018; Pelinescu, 2015). Developing human capital is therefore critical for economic and social development of countries.

As a component of human capital, the international community has placed education at the center of development agenda. It has been making efforts for education development globally, for example through one of the eight Millennium Development Goals (MDGs) for the year 2015: To achieving Universal Primary Education (UPE). The MDGs agenda ended in 2015, but it was recognized that many countries were not able to achieve UPE as expected. Following this conclusion, the Sustainable Development Summit was held at the headquarters of the United Nations (UN) in New York in 2015. As an outcome of this summit, 193 countries adopted the 17 Sustainable Development Goals (SDGs) for the year 2030 as a new world development agenda[1].

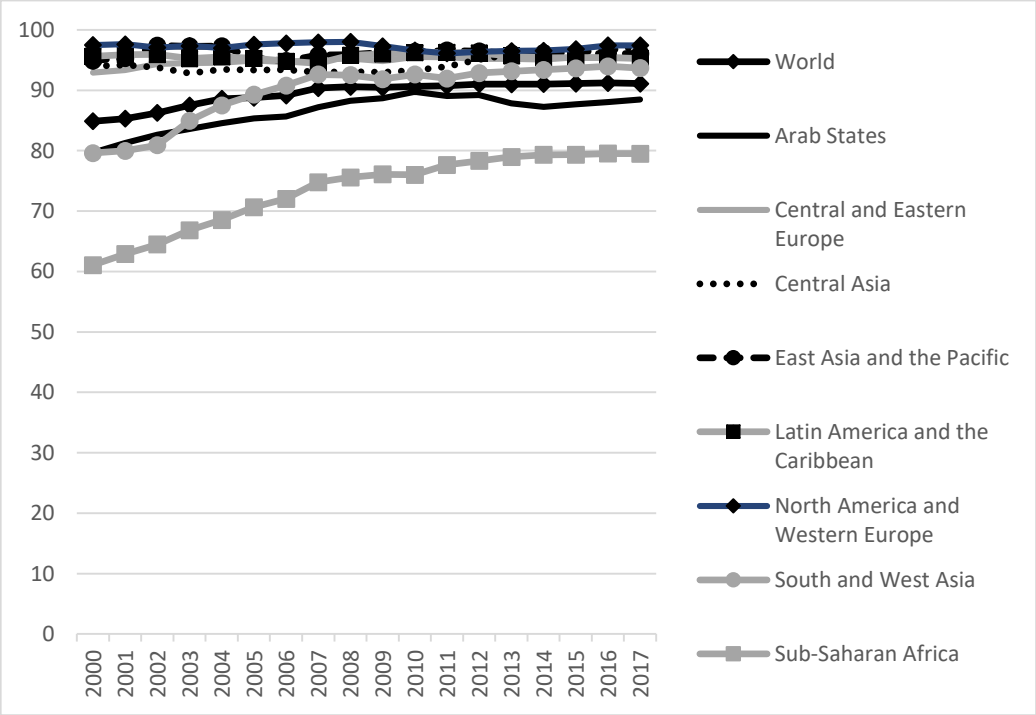
Building on the achievements of the MDGs, the international community embarked on a new global agenda for education from 2015: SDG 4- "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"[2], to be reached by 2030. Under

[1] The17 SDGs are goals which are broad and interconnected. Each goal has a number of targets that are measured or tracked with specific indicators.

[2] SDG 4 has 10 targets, and 11 indicators that come along with these targets.

the SDG4, the global targets for education have become much more holistic as well as much more oriented towards outcomes. Relative to the education goals in the time of MDGs, SGD 4 is more oriented towards the provision of quality education, with the premise that access does not always mean quality education. This switch took place because it was observed in many countries around the world that many children, even though they have access to school, still lack basic literacy and numeracy skills required by their level (World Bank, 2018).

Figure 1.1: Trends in Adjusted Net Enrolment Rate in Primary Education by Region (2000-2017)

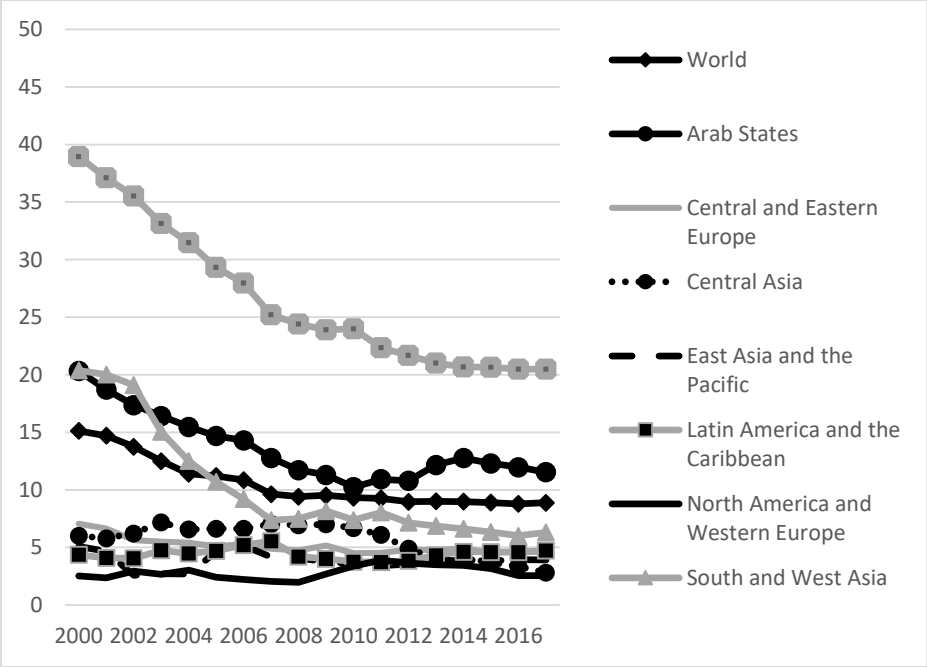


Source: Created by author based on UNESCO Institute of Statistics (2018).

Despite the international community having embarked on the ambitious education objectives to reach by 2030 and the efforts of local governments and practitioners, many countries are still lagging far behind the objectives they were or are expected to reach. Consequently, there is a certain pressure on governments to improve education indicators, as to justify the efforts so far put in the sector, and future ones as well. The national and international pressure led many governments to invest much public resources in order to align their education development to the objectives of the global agenda. One direct result of these commitments in education development is the global reduction of the number of out-of-school children of

primary school age from 100 million to 61 million between 2000 and 2015. However, data show that gains have remained stable since 2017 (UNESCO, 2017; UNESCO, 2018). Among regions, Sub-Saharan Africa (SSA) seems to be the most challenged to reach UPE. As figure 1.1 shows, it was estimated in 2017 that net enrolment rates in SSA were 79.51%. However, at the same period, net enrolment rates were 93.68% in South and West Asia and 95.27% in Latin America and the Caribbean. Furthermore, looking at the issue of out-of-school children, world data show that SSA has the highest percentage of out-of-school children of primary school age (figure 1.2).

Figure 1.2: Trends in the Rates of Out-Of-School Children of Primary School Age by Regions



Source: Created by author based on UNESCO Institute of Statistics (2018).

In order to identify and solve educational issues experienced, governments in many countries have made a lot of efforts from the supply side. For example, some actions taken were the building of more school facilities and the recruitment of more teachers to absorb the increasing number of students in education systems. In addition to supply-side efforts, many governments also made demand-side ones. For example, they introduced and promoted family and community participation in education, as a critical factor for the enhancement of the

educational situation in their countries.[3] These decisions were motivated by empirical research (mainly in developed countries) showing that the participation of family and community in education can have a positive impact of the schooling of children (Epstein, 1995).

In many countries, from the late 1980s, there has been an increasing amount of research on the significance and benefits of family and community participation in education. This was motivated by the necessity for an efficient and effective use of the scarce resources available to the education sector. Among studies that have been conducted on the topic, many scholars agree that getting children to school, ensuring that they complete it and also learn cannot be reached by only governments. These objectives can rather be achieved by a product of the interaction of policies, schools, families and communities (Tawil et al, 2012; Tikly & Barret, 2010; Kunje, Selemani & Ogawa, 2009; Wokadala, 2016; Krishnaratne et al, 2013). This view is also supported by many international organizations active in the educator sector in developing countries, for example the World Bank (Uemura, 1999).

In many SSA countries, factors that determine education were analyzed by many scholars. Evidence from such studies suggests that in addition to school factors, family and community participation have the potential of enhancing children's school participation and their learning achievements. For example, Ogawa & Wokadala (2013) who analyzed education determinants in Uganda found that school factors and parental participation in the education of their children explain the disparities in school access and learning achievements in the country. Furthermore, a study by Duflo, Dupas, & Kremer (2015) on the case of Kenya found that when parents were involved in the hiring of school teachers at the local level, it increased the test scores of students. The authors also found that the training of parents reduced rent seeking of teachers hired by the central government.

Recognizing the benefits of family and community participation for school efficiency, some practices such as School-based Management (SBM) approaches emerged in many developing countries. SBM is a form of decentralized school management where decision-

[3] In Burkina Faso, the government issued a 2008 decree that encourages and promotes the involvement and participation of families and local community members in school life

making authority does not depend on the central government but on school level agents. It promotes the participation of parents and community members in school life, giving them a decision-making power in the affairs of the school (Uemura, 1999; Kozuka, Sawada & Todo, 2016). Shaeffer (1994) points out that there are different degrees or levels of community participation. The author relates these levels to involvement in education (connotating a largely passive collaboration) and participation in education (connotating an active contribution). For a structured and systematic participation of parents and the community in school life, some organizations such of Parents Teacher Associations (PTA)[4] were created or revived.

From a supply-side perspective, achievement of universal good quality basic education is not possible without offering good quality schools. It is then important to know what characterizes effective schools, so as to improve educational quality in schools. Research on the topic of school effectiveness has been conducted, both in the context of developed countries and developing ones[5]. In the context of the former, researchers have found a number of characteristics which are essential for a better school effectiveness. Among these characteristics, those that can be mentioned are leadership in school administration, a good school environment, high expectations for students' achievements, regular monitoring of students' progress, and focus on teaching basic skills (Weber, 1971; Edmonds, 1979). Some other researchers proposed other factors, such as assistant principal factors, teacher quality, communication between teachers and students, and educational planning within schools (Mortimore et al., 1988; Rutter & Maughan, 2002).

School characteristics which improve educational effectiveness in the context of SSA have been explored by previous scholars. Lee, Zuze & Ross (2005) used the Southern African Consortium for Monitoring Educational Quality study (SACMEQ) data to analyze characteristics of effective schools in 14 SSA countries. The scholars found that students in schools in urban areas showed higher achievements, which is due to more school resources

[4] Even though the concept is the same, it may have different names depending on the country. For example, it is called School Support Committee in Cambodia.
[5] The number of reviews on the topic of school effectiveness surged when the Coleman report got published and showed that school factors explained only 5-9% of students' learning outcomes, and it was estimated that the number of reviews even exceeded the number of empirical studies on the topic (Sammons et al., 1995)

allocated to these urban schools. Furthermore, better teacher quality is also related to higher student achievement scores. In French-speaking SSA countries, there is the "Conférence des Ministres de l'Éducation des Pays ayant le Français en Partage (COFEMEN)" that manages the "Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (PASEC)" in English Program for the Analysis of CONFEMEN Education Systems. Michaelowa, (2001) analyzed the PASEC data of a few countries and found that effectiveness of schools depends on classroom and teacher characteristics.

Research on the factors that affect school attendance and learning suggests not to consider countries or contexts as homogeneous. In other words, findings in a given context may be irrelevant or meaningless in another one, due to uniqueness of contexts (Yu, 2007; Petrosino et al. 2012; Tickly, 2011). Local conditions are complex, and must be considered when interpreting and trying to understand factors of school effectiveness (Fertig, 2000). Just like many other SSA countries, Burkina Faso government has been putting a lot of efforts in educational development. Despite the governmental significant efforts and the support from other education stakeholders, Burkinabe education is still of very poor quality, and is mined by various disparities (Paré/Kaboré, 2012). Access to education is increasing, but there are still many children who cannot go to school, and when they have chance to, many do not complete even basic education (Kouraogo & Dianda, 2008).

Considering the low performance of schools, a regular monitoring is needed in order to grasp the factors needed for a readjustment of the educational system in Burkina Faso. The General State of Education (les États généraux de l'éducation) was held in 1994, bringing out among others that : a) parents are more and more withdrawing from their educational responsibilities, leaving the task of education to schools only, as if schools are supposed to replace families; b) parents are not involved in the schooling of their children, media and street education drive schooled children to inappropriate behaviors; and c) the relevance of the contribution of families and communities in children's schooling needs to be explored[6]. The context of government budget constraints and the situation of many households living under

[6] Report on the General State of Education (Les États Généraux de l'Education) held in 1994

the threshold of poverty are a drive for families, schools, and communities to work together for a better educational effectiveness in the country (Coulidiati-Kielem, 2016). An improved school effectiveness will contribute to reduce the current educational disparities observed in the country.

The low school efficiency contributed to create disparities in Burkina Faso educational system, for example from the perspectives of school attendance and learning achievements. However, these disparities and many other educational issues seem to be worsened by the spreading of small-scale gold mining activities resulting from the recent gold mining boom the country is undergoing[7]. Households living around gold mining areas seem to favor a faster engagement of their children in this "promising and fast" socioeconomic track, and it incentivizes parents not to enroll children or children to choose not to go to school but to gold mining sites (Sore & Maiga, 2015). Ahlerup et al. (2017) point out that in a socio-economic context of gold mining, there may be less education demand, because of the quick employment opportunities and financial inducement from gold that drive parents and communities to neglect the education of their children. Unfortunately, this seems to be the picture observed in Burkina Faso.

Survey studies of some organizations present educational issues in gold mining areas in many developing countries, including Burkina Faso, highlighting the negative effects of small-scale gold mining activities for education (Terre des hommes, 2012; UNICEF, 2014). A survey of the Ministry of Education on children's education in some regions of Burkina Faso revealed that children decide sometimes not to attend school even if they are enrolled, because they believe that education is a long and uncertain track to social success. This school absenteeism has subsequent impacts on their academic performance, sometimes leads to grade repetitions, and eventually dropouts. School environments may be encouraging school attendance and good academic performance, but factors like family and community ones may be what is hindering attendance and high learning achievements (Adu-Gyamfi, 2014). In order

[7] Burkina Faso has a long history of gold mining activities, but gold mining was insignificant to the economy of the country until its recent boom that started in the early 2000s.

to reach objectives of the national or international education agenda, the government of Burkina Faso needs to address disparity issues in general, and in gold mining areas specifically.

1.2. Problem Statement

Research that examined factors which can contribute to improve access to and quality of education shows that family, school, and community factors are important predictors of children's school attendance and learning achievements (Xia, 2010; Obeta, 2014; Strand, 2014; Alam, 2015, Wokadala, 2016). In many developing countries like SSA ones, resource constraints create contexts of insufficient supply in resources necessary for educational development. This implies that it is crucial for governments to undertake measures to encourage the participation of households and communities, to complement governmental efforts, for a better educational development (Kozuka, Sawada & Todo, 2016).

The role of the partnership family-school-community to improve education seems to be very crucial, mostly in poor countries with very poor educational performances like Burkina Faso. The gold mining boom that the country is undergoing seems to incentivize parents and communities living around gold mining sites to be more in favor of "making themselves rich" than getting involved in the education of their children (Botchwey & Crawford, 2016). Some studies pointed out that in gold mining areas, some students are left behind as their parents work long hours on mines, and they seem to have no time to monitor the education of their children (Ouma, et al. 2017; UNICEF, 2017). Therefore, household and community engagement in education seems to be lower in mining context, but little is known on how this lower engagement to support schools affects the school attendance and learning of children; such evidence can provide directions to solve educational issues in gold mining context.

In relation to many countries, including Burkina Faso, some scholars support that low education participation and poor education quality are characteristics and issues general to educational systems. However, some others take a contextual socio-economic perspective, and argue that these issues are worse in gold mining areas (Sore & Maiga, 2015). The debate is that

many families from these areas are more interested in getting rich from gold than investing in their children's schooling, and this worsens educational issues or not. This debate implies that the gold mining context might explain why educational issues are worse in these areas. In order to contribute to solve the debate around the factors which are important in education participation and quality, providing empirical evidence is needed on the realities of family, school, community and context dynamics. Using gold mining areas in Burkina Faso could provide insights into the topic, and new evidence help close gaps in the debate.

Moreover, despite the potential benefits of inputs from parents and schools for children's educational opportunities, there is a debate on the importance of family and school factors for schooling in developed countries and developing ones. In terms of the importance of family factors, some studies found that they have a key role for the improvement of education access and quality in SSA countries (Kunje, Selemani & Ogawa, 2009; Coulidiati-Kielem, 2016; Nishimura & Ogawa, 2015). In addition, the importance of family factors for the improvement of children's performance seems to be well recognized, as some studies found in many countries that parental factors have a positive effect on the learning of students (Ishiguro, 2018). However, some empirical studies used international assessment data to investigate the topic, and support the studies of Heyneman & Loxley (1982) and Heyneman & Loxley (1983) which found that family factors are important in developed countries but the evidence is small in developing ones (Chudgar & Luschei, 2009; Chiu & Chow, 2010). In other words, for these scholars, family factors are more important than schools' ones in developed countries, but not in developing ones. Implications of these studies is that policies addressing families may be ineffective for learning in developing countries (Moroni et al, 2015; Wehrspann et al., 2016).

Generalizing the findings of these scholars may be problematic, mainly for countries like SSA ones. The sample they used involved mostly countries which were relatively rich, and it did not include African countries that took part in the survey the sample comes from (Yu, 2007). Moreover, what studies involved in the debate did not investigate is that there is a possibility that among all students, those with less abilities (e.g. showing learning difficulties),

are the ones that need more of either school or family inputs. Put in another way, family or school factors may appear not to matter for all students, but they may be especially important for some specific groups of students, for instance those with learning difficulties (Wilder, 2014). For students with learning difficulties, the inputs of teachers who are trained at handling students in such a situation may be more important than those of parents who are illiterate. There is a need then to address the debate around the importance of family and school factors for students' learning achievements, taking student heterogeneity into account.

The involvement of the community in local education affairs can contribute to improve school participation and education quality (Sore, 2015; Bojuwoye, 2009). Many developing countries, including Burkina Faso, understood it and have been promoting community participation in education. Some community characteristics, along with support and communication with schools, contribute to improve education demand and quality. Nyoni et al. (2017) and Beasley & Huillery (2015) examined forms of community involvement in education, such as school-community relations and involving community members in school management. The scholars found that these forms of community involvement in education are beneficial to the academic performance of students. With a good relationship, all school stakeholders are motivated to give the best of themselves, resulting in improved education quality. Also, community members could share issues with schools and together they can find solutions to these issues.

Despite these findings that show a positive relationship between community involvement and students' learning, Alam (2015) argues that there is no relationship between the two. However, this study conceptualizes community involvement as a form of "doing something for community children" in general. Furthermore, Kozuka, Sawada & Todo (2016) investigated community involvement in the form of supplementing school supplies and rehabilitation of schools in some villages, after a program was implemented in those villages. They found no relationship between community involvement and learning outcomes in these schools. Santibanez et al. (2014) also examined the involvement of communities in school life and they did not find a relationship between the two.

Studies on community involvement and students' learning have mixed findings, which indicates that community involvement in education might contribute to improve learning achievements, but the effect is not automatically positive. The impact of community involvement on learning achievements varies depending on the form, since some forms of involvement improve learning achievements while some do not (Menno et al., 2014; Swift-Morgan, 2006). Among all studies reviewed, none explored forms of involvement like community support targeting school staff, families, or community support directly targeting students themselves. Studies on different forms and functions of community involvement are needed then, to know more about how communities can affect students positively. Another form that has not been examined is the contribution of community women to learning outcomes. In Burkina Faso, some schools have what is called Association of Mothers for Education. Exploring their contribution to school life could yield new findings, with a potential to help improve education quality in Burkinabe and other countries' gold mining context.

1.3. Research Questions

Consistent with the above background, this study seeks to answer the following main research questions : (1) To what extent do home environment factors affect the likelihood of primary school attendance across socio-economic groups in gold mining areas in Burkina Faso's primary education ?; (2) What are the factors that determine students' learning achievements between high-performing students and low-performing ones in gold mining areas in Burkina Faso's primary education ?; (3) How does community involvement in school life influence students' learning achievements in gold mining areas in Burkina Faso's primary education. In relation to each main research question, sub-research questions were identified as shown below:

Research question 1: To what extent do home environment factors affect the likelihood of primary school attendance across socio-economic groups in gold mining areas in Burkina Faso's primary education?

1-1: To what extent does parental involvement increase the likelihood of primary school attendance across socio-economic groups in gold mining areas?

1-2: To what extent does the effect of parental involvement on the likelihood of primary school attendance differ depending on child gender and child labor status in gold mining areas?

Research question 2: What are the factors that determine students' learning achievements between high-performing students and low-performing ones in gold mining areas in Burkina Faso's primary education?

2-1: To what extent do the level of parental involvement, the number of books at home and child labor affect students' learning achievements between high-performing students and low-performing ones in gold mining areas?

2-2: To what extent do teacher qualification, head teacher factors and school resources influence students' learning achievements between high-performing students and low-performing ones in gold mining areas?

Research question 3: How does community involvement in school life influence students' learning achievements in gold mining areas in Burkina Faso's primary education?

3-1: How does support of students in need by school Parents Association (PA) affect learning achievements in gold mining areas?

3-2: How does Mothers Association (MA) involvement in school life affect learning achievements in gold mining areas?

1.4. Objectives of the Study

In answering the above research questions, the objectives of this study are the three that follow, each divided into sub-research objectives. First, objective one is to investigate the effect of home environment on the likelihood that students attend school in gold mining areas in Burkina Faso's primary education. Its sub research objectives are to analyze the extent to which parental involvement influences the likelihood of school attendance and to examine the extent to which gender and labor status of children influence the likelihood that they attend school. Second,

objective two is to investigate the factors that determine the learning achievements of students in gold mining areas in Burkina Faso between high-performing students and low-performing ones. This objective examines the extent to which parental involvement, the availability of books at home and child labor affect the learning of students. It also examines the extent to which school resources, teacher and head teacher impact students' learning achievements. And third, objective three of this study is to analyze how community factors influence students' learning achievements. It focuses on how support of the community (PA) for students in need affects learning achievements, and how community women (MA) involvement in school life influences the learning of students.

1.5. Significance of the Study

This study is significant, as it makes academic contributions in the following respects. First, it sheds light on what form of family inputs (practices or process ones) are needed to improve students' school attendance and improve their learning achievements in gold mining socioeconomic context. It reveals that family factors, mostly fathers, are important for school attendance in gold mining context, but not in non-gold mining one, a unique finding specific to gold mining areas. It also reveals that some factors (gender, child labor, SES) moderate the effectiveness of parental practices in relation to the education of their children. Some studies identified parental inputs in terms of parental status factors, for instance household income or parental education, in general context in developing countries (Kumari et al, 2017; Obeta, 2014; Strand, 2014; Emery et al, 2012; Morrissey et al, 2013). However, few studies empirically examined parental practice factors and children's schooling in gold mining context. This is what this study did, and found that fathers' involvement in children's education appears to be very important for school attendance of boys, but some parents are not able to control their sons. This study highlights that engagement of families in children's education can improve their school attendance in gold mining areas.

Second, this study is significant in that it comprehensively assesses the factors of learning that are subject of debate, and brings empirical evidence one the debated topic, from

different perspectives. Specifically, the study contributes academically by showing that family factors are more important for the learning of students in gold mining areas, for high-performing students relative to low-performing ones. Oppositely, school factors are more important than family ones for low-performing students for the same context. A number of studies have found that school factors (e.g. school resources) influence learning positively (Chudgar et al, 2015; Aztekin & Yilmaz, 2014; Leon & Valdiviab, 2015), while some argue that there is little of such evidence (Yasin et al, 2013; Tumen, 2013; Hedges et al, 2016). In the background of this debate, this study explored whether family or school factors are important, taking abilities of students into account, which revealed that family factors are more important for high-performing students, while schools are more important for low-performing ones.

Moreover, one of the notable contributions of this study is that it revealed that family factors are relatively less important for learning in gold mining areas compared to non-gold mining ones. Previous studies identified some factors of importance for students' learning, but they failed to show which factors are more important for the learning of students based on heterogeneous context factors (Adu-Gyamfi, 2014; Oginni et al., 2013; Bartilol & Ng‟eno, 2016; Ishiguro, 2018). Some scholars support that school factors are more important for students' learning in developing countries (Chudgar & Luschei, 2009; Chiu & Chow, 2010). However, this study brings empirical evidence to show that schools are important, but they may not matter per se. What may also matter for the improvement of the learning of students are the facilitating factors related to the quality of the agents (teachers and principals) in them. The behavior of students affects themselves, and even the whole class or school, when teachers sometimes do not complete curricula due to some students' absenteeism in gold mining contexts. Some factors related to these school actors were found to be uniquely improving learning achievements in gold mining areas.

Third, this study identifies community contribution forms that improve learning achievements, to better understand and integrate community connections that encourage learning and success. Alam (2015) found that "doing something for community children" does not affect students' learning. Other previous studies found that communities can affect students'

learning by helping to create a school environment that better support the inclusion of students with risk of marginalization or exclusion, for instance students with disabilities (Ainscow & Sandill, 2010; Gross et al., 2015). Literature shows then that not all forms of community involvement are beneficial for the learning of students, but this study contributes by demonstrating what form of community involvement is beneficial for students' learning in Burkina Faso and by extension other developing countries. This form of community involvement is meeting the direct academic and non-academic needs of students.

Fourth, one of the main contributions of this study is the gender perspective that it shows in the effect of community (as MAs) involvement in school life. Though MAs involvement in school life benefits all students whether in gold mining areas or non-gold mining ones, the study finds that the benefit is higher for girls in gold mining areas while it is the opposite for non-gold mining areas. Previous studies showed a gender perspective in community involvement and education demand, precisely enrolment or attendance (Kozuka, Sawada & Todo, 2016), but no previous studies revealed a gender perspective in learning on the topic. This study demonstrates that socio-economic context or environment may be important to understand some gender disparities in the effect of the actions of local communities to improve education quality.

This study can contribute in terms of educational policy to reduce education access inequalities and improve the learning of students in general, and in particular in Burkina Faso. Some scholars argue that gold mining exploitation constitutes a "curse" for education of communities living around gold mining activities, though the curse can be turned into a blessing (Gylfason, 2001; Kouankap et al., 2017). Investment of revenues from gold mining activities into education, by starting from priority determining factors, may help in this sense. This study highlights these priorities, hopefully a contribution to "turn the resource curse into a blessing for education", if there is a curse of course.

CHAPTER 2: DEVELOPMENT OF PRIMARY EDUCATION SUB-SECTOR IN BURKINA FASO

2.1. Background of Burkina Faso Formal Education Development

An educational system is better understood when its history and background is known. In order to understand the educational system of Burkina Faso, it is better to go back to is origins then. The educational system of Burkina Faso, just like the one of many African countries, has its origins from the colonial penetration. It evolved then from that period based on the views of the colonizer, until the independence of the country, giving place to the different independent administrations to frame it based on their own views.

French troops installed the first schools in Upper Volta (current Burkina Faso), and they were attached to the French military (Lewandowski, 2007). The objective of this colonial school was to train interpreters that would facilitate the contact with indigenous populations, but also train the personnel to supplement the lack of colonial personnel. Important instruments used to reach these objectives were the catholic and protestant missionaries. However, "collaboration" between the colonial administration and the missionaries around schools did not last for a long time. In the early 1900, there was an anti-clergy group that fought for the separation of the State and the Church, leading indeed to the separation of the two, with a law adopted in 1903 (Coulibaly, 1997). As an application of this law in the colonies, all schools changed from a private status to secular ones, with secular teachers too. The separation of the State from the church that lead to schools becoming secular was the foundation for the reorganization of education, and mostly public education.

Access to independence in the 1960s is one of the turning points of the history of many African countries, including Burkina Faso. Following independences, many African intellectuals showed their opposition to the educational system of the former colonizer. In Burkina Faso for example, Ki Zerbo (1990) and Moumouni (1964) were calling African leaders for educational reforms, to get rid of the de-valorizing and alienating education of the former colonizer. Just as to implement the suggestions of critiques, new political leaders made some

reforms to education in Burkina Faso. These reforms wanted to Africanize the populations and step away from the previous colonizer. From this perspective, the "new" education policies stepped away from those of the objectives of the colonial period. Specifically, there was a change of the teaching content and an objective of mass schooling. The first concrete step is observed in 1962 when the government of Upper Volta adopted the "voltaic programs".

This reform focused on teaching and learning of the past of Burkina Faso and other African countries, their economies and their peoples (Compaoré, 2003). Furthermore, the law Décret n°237/PRES/EN of 14th June 1961 established rural schooling and created rural education centers, seeking to give very basic education to children between 12 and 14 who were not attending school. Unfortunately, this reform was not able to reach its objectives, due to issues of external efficiency that education was facing. From an overall perspective, the results of the reforms are mixed. For Ilboudo (1982), these reforms were only at the level of the education higher administration, and no real reforms were made at the lower levels of education, precisely in terms of school programs and access to education. Access to education remained low in the 1960s, with an elitist education system run by new elite African leaders (Sanou & Charmillot, 2010).

Burkina Faso was characterized by a political instability in the early 1980s, the country having gone through multiple coups. On October 2nd, 1983, the revolutionary regime of Thomas Sankara came to power and called for the building of a new society, and this comes through a new type of education, one which is relevant for present and future generations. The vision of the new regime is that education should not only be for the elite minority, but for everyone, thus it needs to be democratized. It encouraged enrolment of children to school through populist campaigns with slogans such as "one village, one school; one department, one junior high school; one province, one high school" (Compaoré & Ouédraogo, 2007). These campaigns increased enrolments from 17% to 29% between 1983 and 1990.

Actions of the revolutionary regime had a strong positive impact on access to education, as within 4 years the revolutionary regime was able to reach the same results that took others the period of more than 20 years (between 1960 to 1983). Pilon and Wayack (2003) referred

then to this revolutionary period as the "golden age" of Burkina Faso's education. Examples of actions of the golden age are the law Arrêté n°001294/MCAP/MEN of October 11th, 1984 that reduced private school fees by 50% while obliging private school owners to keep the level of teacher salaries to a level decided by the government. Structurally, the education system got divided into three cycles: a preschool cycle (for children from age 3 to 6), a professionally-oriented cycle (comprised of a fundamental level, a vocational level, and a specialization level), and a cycle of research and innovation.

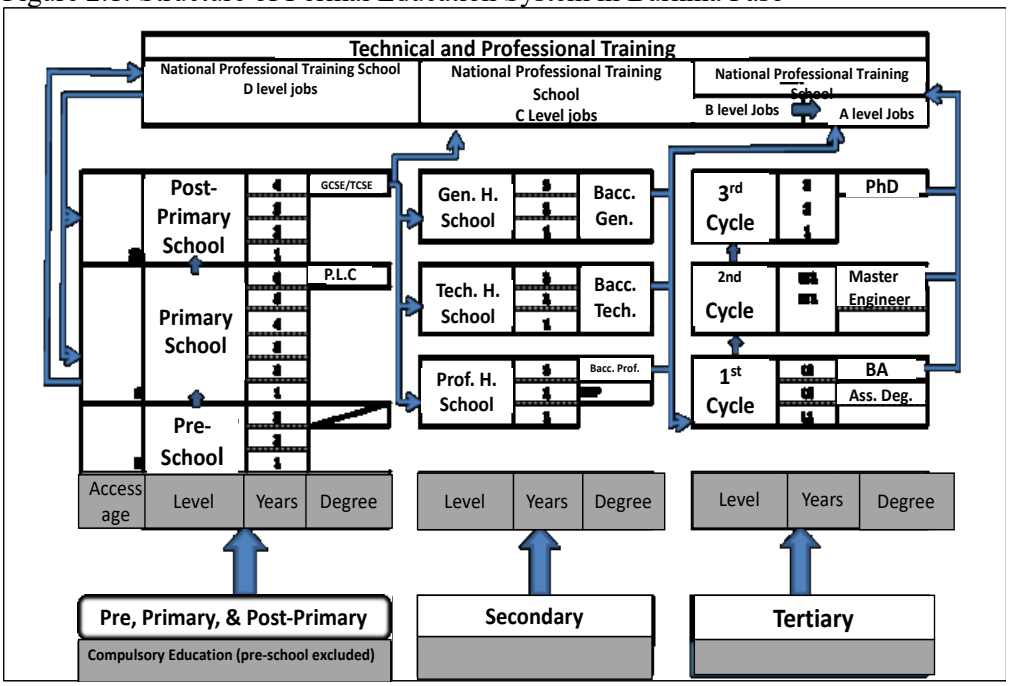
2.2. Primary Education Sub-Sector in the National Education System of Burkina Faso

The 1991 constitution of Burkina Faso in its article 18 recognizes education as a social and cultural right, thus expressing the need to promote it. In its article 27, the constitution pronounces that (a) all citizens have a right to instruction. (b) Public education is secular, that is not mixed with any religious aspects. (c) Private education is recognized, and individuals or organizations are free to create private educational institutions and operate them according to the conditions set by law. The Ministry of National Education and Literacy (French MENA) is in charge of providing education to all citizens. Based on the constitution, law 013-2007/AN July 30th, 2007 establishes what is referred to in Burkina Faso as "Education Orientation Law", the reference in terms of legal framework of education. This law puts it clearly in article 3 that education is a national priority, and anyone living in the country has a right to education without any type of discrimination.

The right to education must be applied based on equity and equality of chances to everyone. A very important point of this law is making primary education mandatory and free for all children between 6 to 16 years old, and no child should be expelled for not giving a contribution of any sort to the school. However, in Burkina Faso, the aspect of free primary education the law ensures is only limited to school fees, i.e. parents do not have to be charged any school fees. Parents still have to provide children with school materials and also bear the cost of other schooling-related charges. Moreover, this education law states that the local community is free to structure itself and participate in education affairs, in partnership with the

government or the local government representatives. Law 013-2007/AN July 30th, 2007 also gives the structure of education in Burkina Faso. This structure is composed of a) formal education (formal basic education, secondary education, higher education, and technical vocational education and training); b) non-formal education (non-formal education of youth and adults over fifteen years old, non-formal education of teenagers from nine to fifteen years old, and non-formal childhood education); c) informal education (education acquired through channels like the family, traditional or religious communities, daily experience, social groups etc.); d) specialized education (education of individuals with special needs etc.).

Figure 2.1: Structure of Formal Education System in Burkina Faso



Source: Created by Author based on Burkina Faso Education Sector Plan 2014-2023

Figure 2.1 presents an overview of the current structure of formal education system in Burkina Faso. This structure has been created within the framework of Burkina Faso education reform. It links the different levels of education with technical vocational and training education. It starts from pre-primary education, optional in Burkina Faso, which is provided by both public and private sectors. Private pre-primary schools surpass public ones, as they account for 56.71% of pre-primary institutions. Pre-primary education covers children from 3 to 5 years old. After pre-primary education, children enter primary education, which takes six years.

Primary education entry age in Burkina Faso is six years old. An aspect that is not presented in the figure is the division of primary education into three cycles: preparatory primary (from primary 1 [CP1] to primary 2[CP2]), lower primary (from primary 3 [CE1] to primary 4[CE2]), and upper primary (from primary 5 [CM1] to primary 6 [CM2]).

Unlike some other African countries, Burkina Faso does not have a fully automatic promotion policy, but a partial one. Precisely, under this partial automatic promotion system, public schools are obliged to allow students within the different cycles of primary education to go to the higher grade, regardless of their performance. In other words, automatic promotion applies only to students from the first years of preparatory primary, lower primary, and upper primary. Promotion from a lower cycle to a higher one is not automatic. On the sixth year of primary education, children have to take the Primary Education Certificate (PEC) examination, and passing it is a requirement to access post-primary education. Children who fail the PEC examination have to take it again the following year and so on until they pass it. At age 12, under the condition of having passed the PEC examination, children have to enter either a general post-primary school or a technical and vocational post-primary one. The choice into the type of post-primary education mostly depends on many criteria, such as their PEC score, students' age, and availability of seats in post-primary institutions. Post-primary education takes four years, and on the fourth year, students take the General Certificate of Secondary Education (GCSE) or the Technical Certificate of Secondary Education (TCSE), depending on whether they are in a general post-primary school or a technical and vocational one.

Students who successfully complete post-primary education enter secondary education, which consists of general secondary education (general high schools) and technical vocational and professional training education (technical high school and professional high schools). Secondary education takes three years, and leads to the French system Baccalaureate (general, technical, or professional, based on the type of high school attended). Obtaining a Baccalaureate opens to doors to tertiary education, which is divided into three cycles. The first cycle consists of three years that lead to a Bachelor's Degree (an option of two years gives an associate degree), the second cycle two to three years that lead to a Master Degree, and the

third cycle three years that lead to a Doctorate/PhD. The objective of tertiary education is to produce high-level executives that will contribute to the social and economic development of the country.

2.3. Overview of Primary School Expansion Programs (PDDEB & PDSEB)

Burkina Faso was among the countries that adopted the Education for All (EFA) agenda after the March 1990 conference held in Jomtien, Thailand. In order to implement this agenda and to confirm the priority given to primary education, the government adopted Plan Décennal de Développement de l'Enseignement de Base (PDDEB) [Basic Education 10-year plan] through Décret n°99-245/PRES/PM/MEBA of July, 20th 1999. PDDEB was to be implemented from 2000 to 2009, and its main objectives were : a) to accelerate the quantitative development of education offer and reduce any sorts of disparities, precisely geographical and socio-economic ones; b) improve quality and efficiency of basic education, develop coherence and integration among the different levels of basic education c) promote literacy and new forms of alternative education; d) develop and strengthen education administration and management, and evaluation of local or central institutions in charge of education sector.

PDDEB set some specific objectives to be reached, based on each main objective given above. The strategy to implement PDDEB was to divide it into three phases (phase I 2000-2002, phase II 2003-2005, and phase III 2006-2009) and create programs with actions assigned to each phase. For example, a program 1 was created and was aiming at the "expansion of basic education". Some concrete actions of this program were the construction and equipment of classrooms and the recruitment and training of new teachers. In 2010, the overall evaluation of PDDEB was satisfactory in terms of access for formal education, because there was a considerable increase in enrolments. Moreover, many schools and classrooms were built and equipment also offered, and many teachers were also recruited.

Despite these achievements, there were still many challenges that the country faced, as there were still many geographical disparities of enrolments. In addition, in terms of indicators of education quality, results were far from expectations (Sore, 2015). The country was still

facing many quality education issues. As a general evaluation of PDDEB, according to MoE, results of the program were encouraging and the involvement of all education actors help achieve them. These results were showing that the country was on the right track to reaching its objectives for education access and quality, and what was encouraging is that remaining challenges could be met with. However, this evaluation may have been very optimistic, because the system still had a long way to go than it had; at least, this is the other type of evaluation that other actors in the education sector gave related to the program. With this as background, at the end of PDDEB, the government decided to develop the Programme de Développement Stratégique de l'Education de Base (PDSEB) [Program for the Strategic Development of Basic Education] to be implemented from 2012 to 2021.

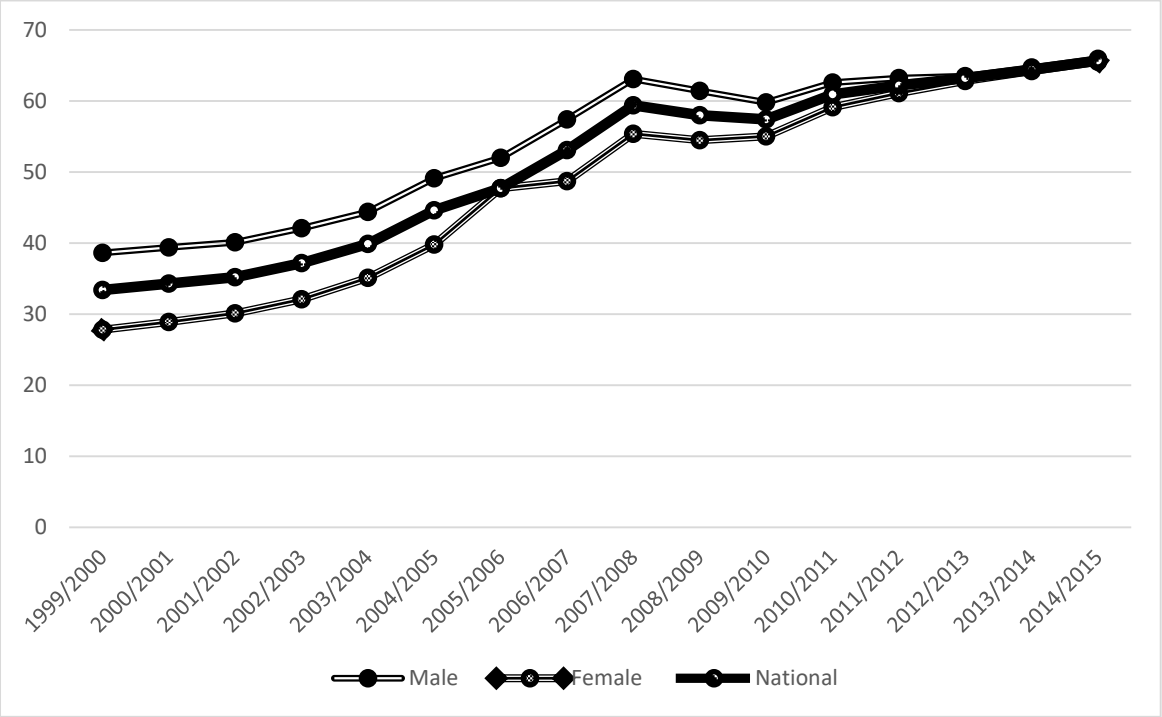
Created after PDDEB, PDSEB aims is to address challenges that its predecessor was not able to address. Its objectives are: (1) to increase formal education offer so as to reach 100% Universal Primary Education rate by 2020; (2) improve education quality and its relevance for the country's economy; (3) strengthen social services provided to students; and (4) improve management of the educational system. In order to achieve these objectives, Burkina Faso government created principles for the PDSEB. These principles are: free primary education and compulsory from ages 6 to 16; holistic, integrated and multi-sector approach of education; and enhancement of decentralization in the education system. Just like in the case of PDDEB, the government is implementing PDSEB through strategies and programs. For instance, the first two programs are the development of access to formal basic education and the improvement of formal basic education.

2.4. Access to Primary Education in Burkina Faso

As mentioned above, Burkina Faso adopted the EFA agenda and implemented it through the PDDEB. One of the main focus of this plan was to increase access to education, while considering disparities related to geography, income, disabilities, gender, and ethnic groups. It can be said that this 10-year plan resulted in a rapid expansion of access to primary education in Burkina Faso. Figure 2.2 shows that primary school net enrolments rates increased from

33.4% in 1999/2000 to 44.6% in 2004/2005. By the end of the PDDEB in 2010, the net enrolment rates in the country were estimated to be 57.4%. After the end of PDDEB, PDSEB also continued with the efforts to expand primary education access, and in 2014/2015, net enrolment rates were 65.7% in Burkina Faso.

Figure 2.2: Trends in Net Enrollment Rates in Primary Education (2000-2015)



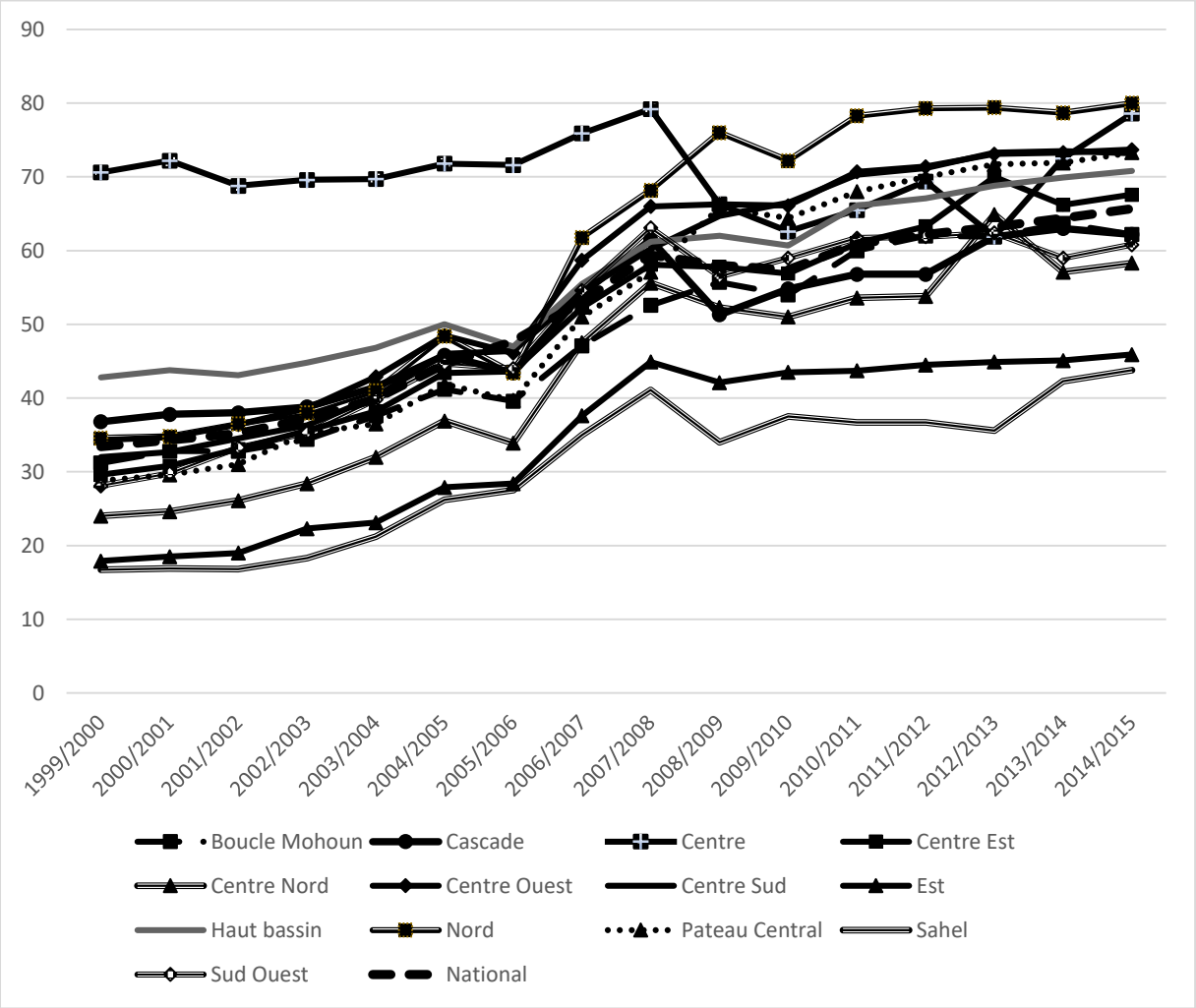
Source: created by Author based on MoE Statistics

Moreover, equity in relation to access to primary improved from different perspectives, and the most mentioned one was gender equity. As the same figure 2.2 indicates it, the gender gap in enrolment rates was wide in 1999/2000 (38.6 for males versus 27.8 for females), but efforts contributed to reduce this gap. By the school year 2014/2015, gender disparities in terms of access to primary education were almost eliminated in Burkina Faso education system (males 65.9% and females 65.5%). These results are explained by the efforts of the government to promote girls' education, through campaigns promoting the benefits of educating girls.

Even though access to education has tremendously improved and enrolment gender disparities almost eliminated, a further examination of the educational system from other perspectives shows that there are still some disparities that remain. Administratively, Burkina Faso is divided into 13 regions, composed of 302 rural communes and 49 urban communes.

The country contains more rural areas than urban ones, with most of the population living in rural areas. Indicators of access to education by regions do not show the same pace of increase in terms of rates of net enrolments. Therefore, geographical disparities in access to education are still challenges to the educational system of the country.

Figure 2.3: Trends in Primary School Net Enrollments Rates by Region, 1999/2000-2014/2015

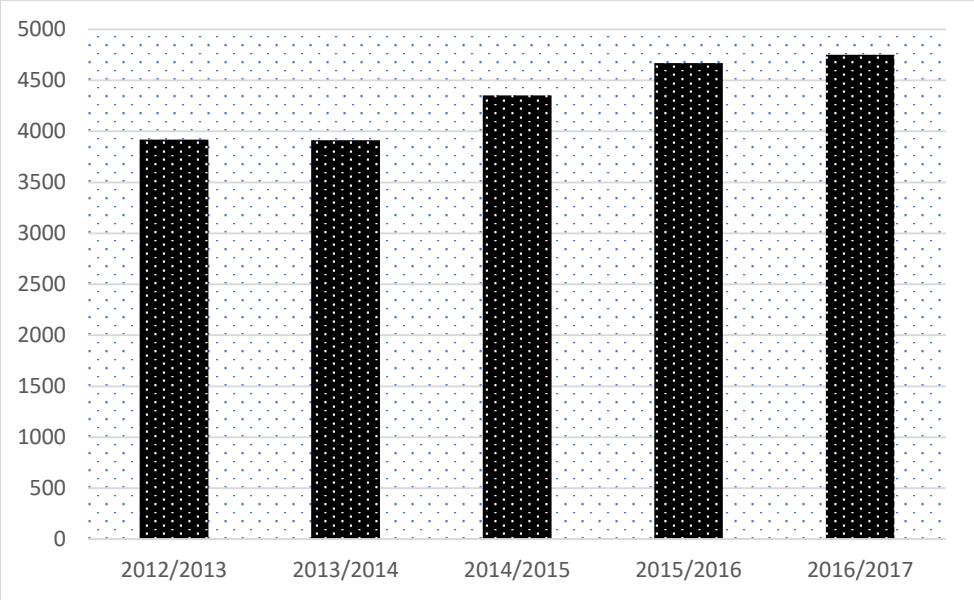


Created by Author based on MoE Statistics

Figure 2.3 presents primary school net enrolment rates from school years 1999/2000 to 2014/2015 by regions. It indicates that the three lowest net enrolment rates are observed in the Sahel, the Est, and Centre Nord regions. Surprisingly, even with the efforts of PDDEB and PDSEB, these three regions have consistently remained the lowest ones in terms of net

enrolment rates[8] for more than a decade. In school year 20014/2015, net enrolment rates were 43.8% for Sahel region, 45.9% for Est region, 58.3% for Centre Nord region, while the national rate was 65.7%. In terms of high performing regions, from 1999/2000 to 2007/2008, the Centre region (involving the capital city) had the highest net enrolment rates (70.6% and 79.2% for 1999/2000 and 2007/2008, respectively), but they started decreasing around the end of PDDEB, though not consistently. In 2014/2015, the Nord region had the highest net enrolment rates, estimated to be 80%, a high increase from a rate of 34.6% in 1999/2000. With regard to the high geographic disparities observed throughout the country, Burkina Faso MoE identified some "priority communes" based on education indicators, and more efforts are put in these priority communes in order for them to achieve a rapid increase relative to other communes.

Figure 2.4: Trends in Public School Classroom under Thatched Tents



Source: Created by Author based on MoE

In addition to the access disparities observed, there are still issues of educational offer in education that the government is facing. The demography of Burkina Faso is increasing at a fast pace, with every woman having on average 5 children as of 2017 estimations (World Bank, 2017). Burkina Faso ranks 6th in terms of the fertility rate in the world. The government does not have enough capacity in terms of education offer (infrastructures) for this rapidly increasing

[8] Burkina government has been putting a lot of efforts to close the gap between these regions and other ones, but what remains to be done is more than what is already done.

population. One of the consequences is the lack of schools for all children. Figure 2.4 displays the number of public-school classrooms under thatched tent in Burkina Faso. The overall trend shows an increase from 3910 in 2012/2013 to 4753 in 2016/2017. This increase seems to indicate a demand in education that is still not met by the offer from the government. However, the increase in establishment of classrooms under thatched tends is usually carried out by local communities, while waiting for the building of a permanent school in the community. For some reasons, each community wants a school in their vicinity, even though there is possibility of having access to one at a reasonable distance.

2.5. Quality of Primary Education in Burkina Faso

The implementation of PDDEB brought about a turning point into some of the indicators of quality education in Burkina Faso. As enrolments tremendously increased and education infrastructures were also built to contain the flow of students, efforts were also put in terms of recruitment and training of teachers. Without a massive recruitment of teachers, it was estimated internationally that the goals of the EFA could not be met. Countries were urged then to put efforts in recruiting teachers. Because of this pressure that Burkina Faso was also undergoing, there was a need to change teacher recruitment procedures and regulations that were prevailing before the adoption of the EFA agenda.

Another issue that the need for a massive recruitment of teachers was implying is the finances needed for salaries of these teachers, in a background of insufficient public finances. The “solution” found was to lower the salaries of primary school teachers, which at the same time implies different qualification requirements for teaching jobs. Precisely, primary education teachers started to be recruited among junior high school graduates, and the teacher training period that was two years got decreased to one year. Though the duration of teacher training was later brought back to its initial two years, the academic credentials required to become a primary school teacher remained the same until today.

The lowest teacher qualification is Burkina Faso is Assistant teacher (AT). AT is a qualification that the government created to increase the availability of teachers so as to boost

primary education offer in the country, due to the rapid increase of enrolments rates. ATs were recruited by the government as volunteer teachers, and assigned to schools without any initial training. They could also be found in private schools. However, this system of recruitment of assistant teachers stopped in early 2010, leading to a decrease of the number of assistant teachers in the educational system. Currently, it is estimated that there are not many of such teachers anymore in the educational system of Burkina Faso. The requirement to be accepted as an assistant teacher was junior high school graduation. AT could take a professional examination after five years of experience, to be promoted to the qualification of certified assistant teacher (CAT).

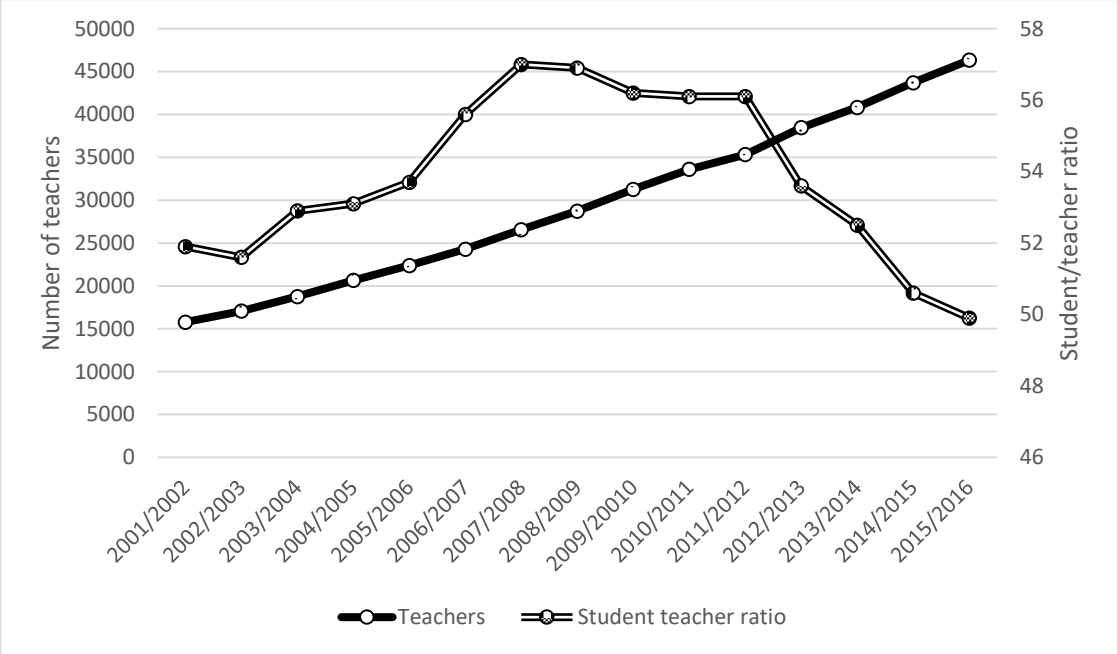
Junior high school graduates can enter teacher training schools, and upon completion, they are awarded the first primary school teaching certificate, the Elementary Certificate of Pedagogical Ability (ECPA) [Certificat Elémentaire d'Aptitude Pédagogique]. The government recruits junior high school graduates every year and sends them to teacher training schools to seek the ECPA, which qualifies them to be appointed to public schools as CAT. After three years of teaching experience, CATs can take the certificate of pedagogical ability examination to be promoted as certified teachers (CT).

CT is the qualification obtained by ACTs who have passed the certificate of pedagogical ability (CPA) examination. Therefore, unlike ACT, CT is a professional qualification acquired by climbing the teacher ladder, as eligibility to the examination requires to be an ACT with a certain number of years of teaching experience. In other words, to become a CT requires only passing an examination, and there is no training that comes with it. Within the education system, this category of teachers is one of the two that comprise the highest number of teachers. After three years of teaching experience, CTs can take a competitive examination to be promoted to the rank of senior teachers (ST), the highest level of qualification among teachers.

STs are recruited among CTs who have at least three years of teaching experience after becoming a CT. By way of competition, CTs eligible to ST are recruited and sent to be trained at "Ecole Normal Superieure " of Koudougou University. STs are in charge of education

administration activities, either within primary schools or local education administration offices. Though they are engaged in school administration, STs appointed in schools as head teachers may still need to teach in classes when there is a lack of teaching personnel, and they also serve as the first trainers of teachers within their respective schools. By education law, primary school head teachers are appointed among STs by the inspector of the education district. However, CTs can also be appointed as school head teachers when there are not enough STs to be appointed.

Figure 2.5: Evolution of the Number of Teachers and the Student/Teacher Ratio



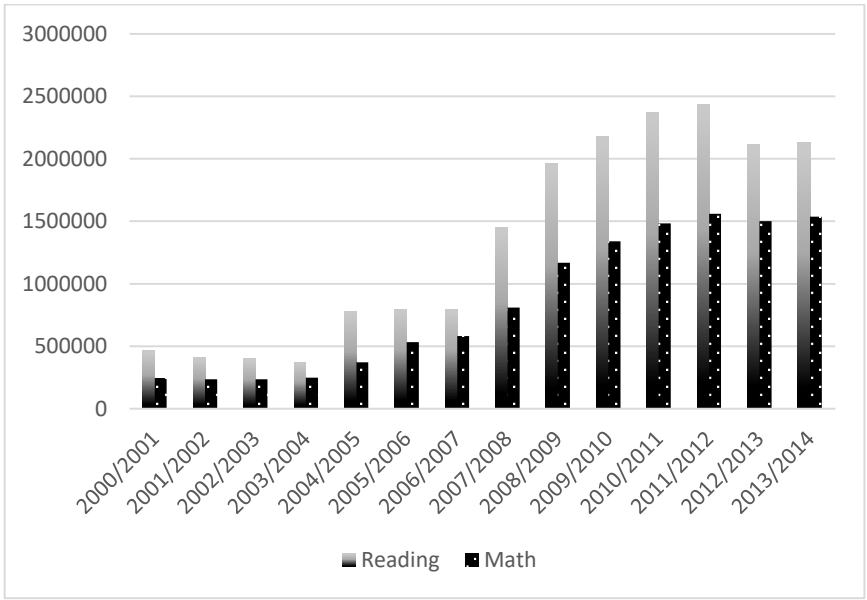
Source: created by Author based on MoE Statistics

Figure 2.5 presents the evolution of the number of teachers in public schools and the student teacher ratio from 2001/2002 to 2015/2016. It indicates that the number of teachers surged from around 15000 in 2001/2002 to almost 35000 in 2010/2011, the period around the end of PDDEB. This represents an increase of more than 100% in the number of teachers recruited by the government within 10 years. The number of teachers has kept its consistent increase after 2010/2011. However, despite this surge in the number of teachers recruited in primary education, figure 2.5 shows that the student/teacher ratio consistently increased from 51.9 in 2001/2002 to 56.1 in 2010/2011. This student/teacher ratio has remained higher than the objective set by PDDEB, which is 50 students per teacher. Therefore, the pace of increase in

number of students within the concerned period was higher than that of teachers. As teachers have more and more students to manage within one classroom setting, there are some implications in terms of the workload of teachers and in terms of number of students one teacher has to manage in a single classroom (class-size). Subsequently, this has a relationship with students' learning achievements and the quality of education offered in general.

In addition to the increase in terms of number of teachers, the government put efforts to increase the number of textbooks for students, with the hope that this will help in terms of their learning achievements. Figure 2.6 shows that the number of reading textbooks for students that was below 500 000 in 2000/2001 increased to more than 2 000 000 by 2013/2014. Within the same period, the number of mathematics textbooks for students increased from around 200 000 to more than 1 500 000. Despite this increase in number of textbooks for students, there are some areas which do not receive enough books, due to issues of logistics. The books arrive late after the beginning of the school year. Furthermore, there are difficulties in terms of conservation of textbooks, as they are sometimes eaten by termites or destroyed by flooding during the rainy seasons, because there are not appropriate facilities to keep school materials in many areas of the country.

Figure 2.6: Evolution of the Number of Textbooks for Students



Source: Created by Author based on MoE Statistics

The government made a lot of efforts in addressing issues that may hinder education quality, to improve students' learning achievements. However, results of evaluations of students' learning achievements reveal that learning is still low throughout the country. Burkina Faso introduced a system of national evaluation of learning achievements, and comparisons year by year can serve as references as to whether there are improvements in students' learning achievements or not. Results can also serve for evaluations of policies and also decision-making. The implementation of the national system of evaluation started in 2005.

Table 2.1 Results of National Evaluation of Learning Achievements.

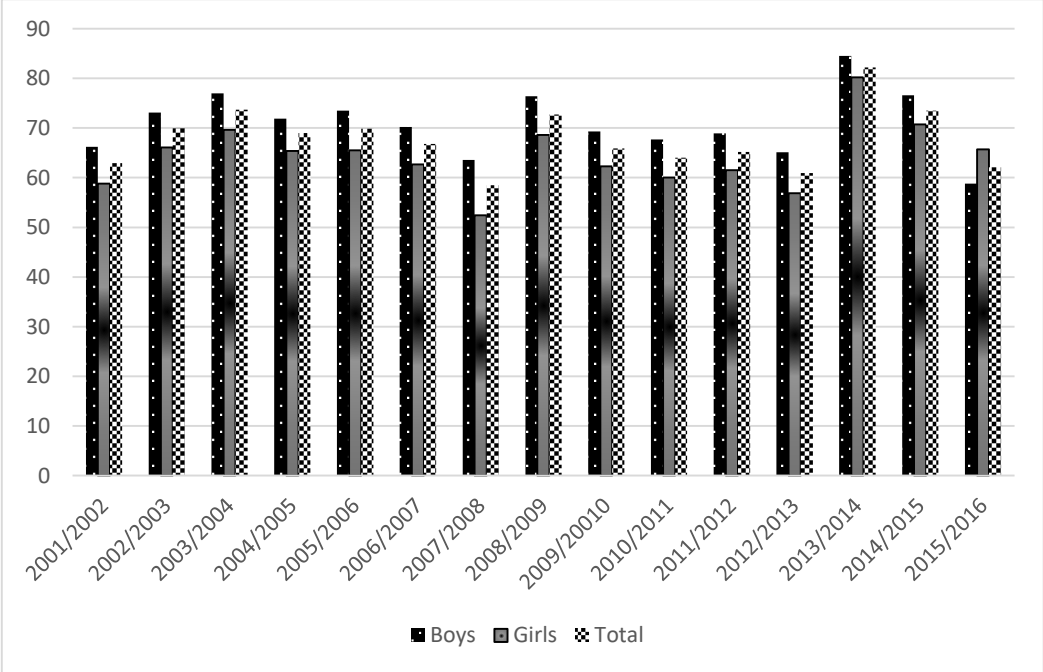
		Achievements score (100)	
	Grade	Literacy	Numeracy
2005	Grade 1	41.4	34.8
	Grade 4	39.9	38.1
2006	Grade 2	50.4	44.9
	Grade 5	45.3	43.9
2007	Grade 3	46.1	46.8
	Grade 6	53.7	49.8
2008	Grade 1	39.3	40.4
	Grade 4	50.5	37.6
2010	Grade 2	51.1	43
	Grade 5	43.2	41.2
2011	Grade 3	50.1	48.7
	Grade6	50	50.3

Source: created by Author based on MoE National Assessment of Learning Achievements Report

A summary results of national assessments are presented in table 2.1. It appears that from an overall perspective, the learning achievements of students is below average, only the highest ones are around 50/100. A passing score for national evaluations is at least 50/100, while the highest score observed was in 2007, among students from grade 6 (53.7). Therefore, it can be said that most students still do not reach the minimum literacy or numeracy score that students

of their level are supposed to have reached. Even though the decrease in learning achievements is not consistent over time, it can be observed through these results that these low achievements of students are getting even lower and lower. MoE estimated that there are many disparities of learning achievements, and these disparities are geographical, gender and socioeconomic ones. Despite efforts, good quality education still seems to be far from the reality in Burkinabe education system. According to Ouattara & Sore (2016), education quality in Burkina Faso is highly criticized for its very low level, and actors are accusing each other for this low quality.

Figure 2.7 Trends in success at Primary School Leaving Certificate Success



Source: Created by Author based on MoE Statistics

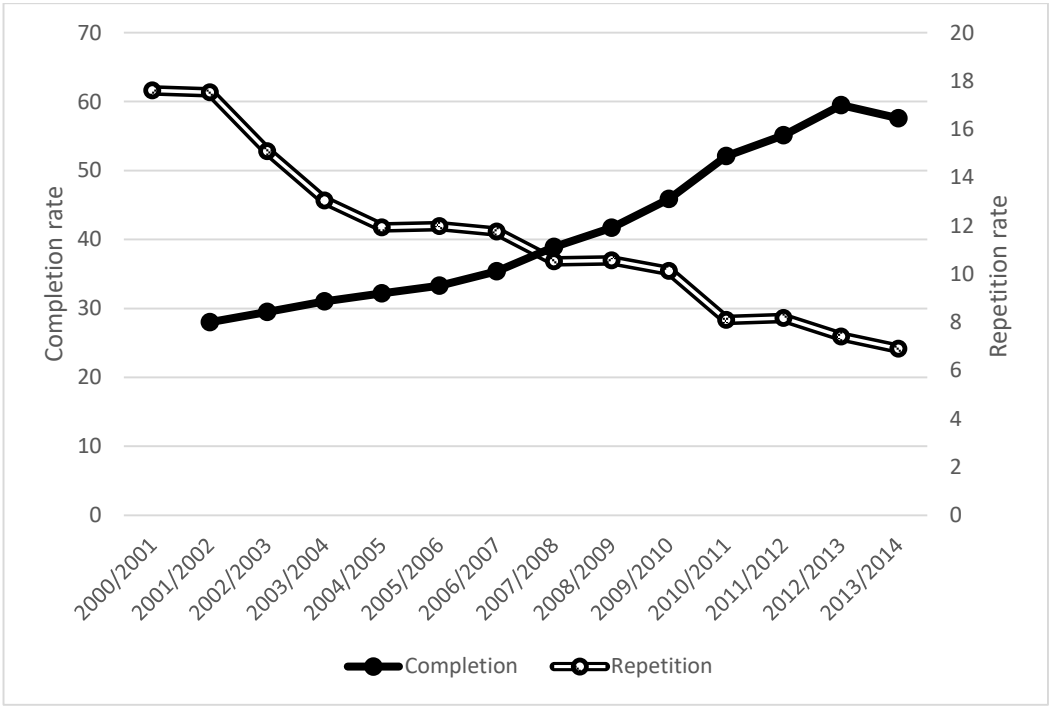
In grade 6, the final year of primary education, students have to take the Primary School Leaving Examination (PSLE). PSLE is also an indicator of learning achievements within the system, since it assesses what students have been able to acquire during the whole period that they spent in primary education. Just like the results of national learning achievements evaluations, the results of successes to PSLE started relatively low, but later slightly increased over time (see figure 2.7). The Figure shows that 62.9% of students passed the exam in 2001/2002, and pass rates peaked to 82.2% in 2013/2014. Despite this overall increase, from 2014/2015, a decline started to be observed. Examinations by the governments shows that this

decline can be explained by factors such as children lacking interest in education, parents do not get involved in their children's schooling, and many other issues.

2.6. Internal Efficiency in Primary Education

The low level of students' learning achievement leads to a crucial issue that Burkina Faso's educational system is facing: grade repetitions. Promotion to higher grades are based on achievement of the minimum score for passing, therefore repetition rates are also indicators that some students still do not achieve this minimum learning achievements levels to go to higher grades. Figure 2.8 shows that repetition rates were as high as 17% in 2000/2001, but the overall trend shows a consistent decrease of these rates. In 2013/2014, repetition rates were estimated to be 6.9%. Repetition is a crucial issue that the country has been facing. In the context of scare resources, repetitions incur at least two-year expenses from families and the educational system for only one grade completed by the student.

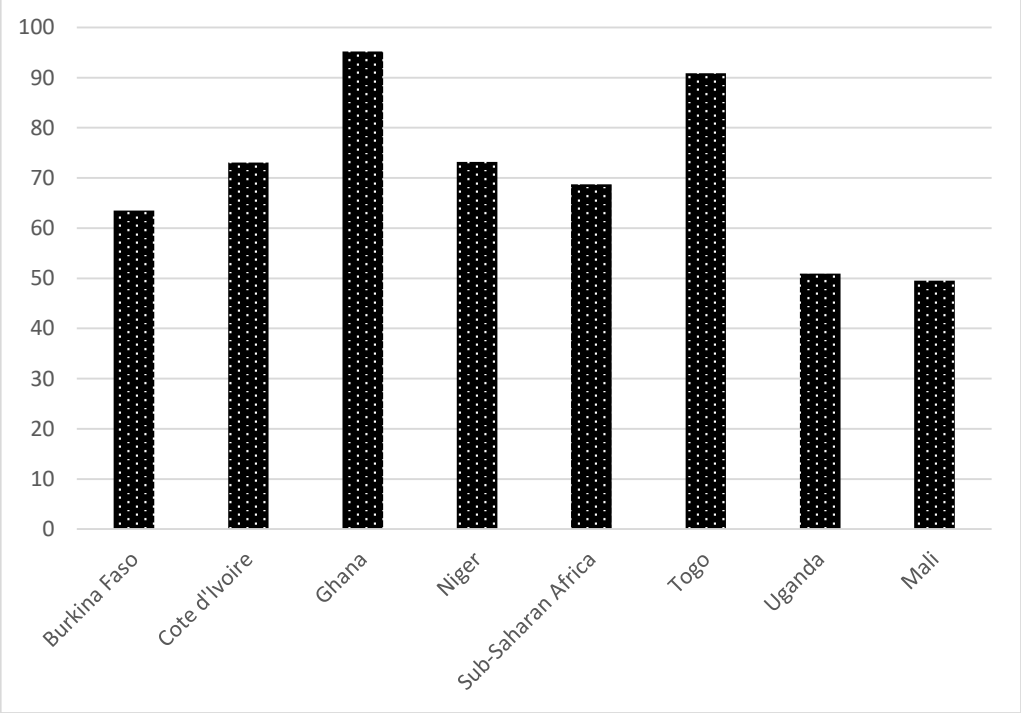
Figure 2.8 Evolution of Completion and Repetition Rates in Primary Education,2000/2001-2013/2014



Source: Created by Author based on MoE Statistics

A measure that was introduced by the system to reduce repetitions is the partial automatic promotion system. It consists of allowing children to go to the higher grade within each cycle of the primary education system (preparatory, lower primary, and upper primary) regardless of their academic performance, but this automatic promotion does not apply when moving from one cycle to another. Unfortunately, as students repeat one or multiple grades due to poor academic performance and mixed with other issues, some may end up completely dropping out of school. Even though they are still allowed to remain in school, due to various reasons, they prefer to drop out and look for something else to do in society. This causes issues of retention of students within the educational system. Retention of students within the system is also another measure of internal efficiency of education.

Figure 2.9: Primary School Completion Rates in Seven Sub-Saharan Countries in 2017



Source: Created by Author based on Worldbank Microdata

Primary school completion is an indicator that shows the ability of an educational system to retain students until their completion of primary education. Figure 2.8 also shows Burkina Faso primary education completion rates from 2000/2001 to 2013/2014. From an overall perspective, it indicates a consistent increase of completion rates throughout the concerned period, starting from 28% in 2001/2002. Rates peaked to 59.5% in 2012/1013, point from which a slight

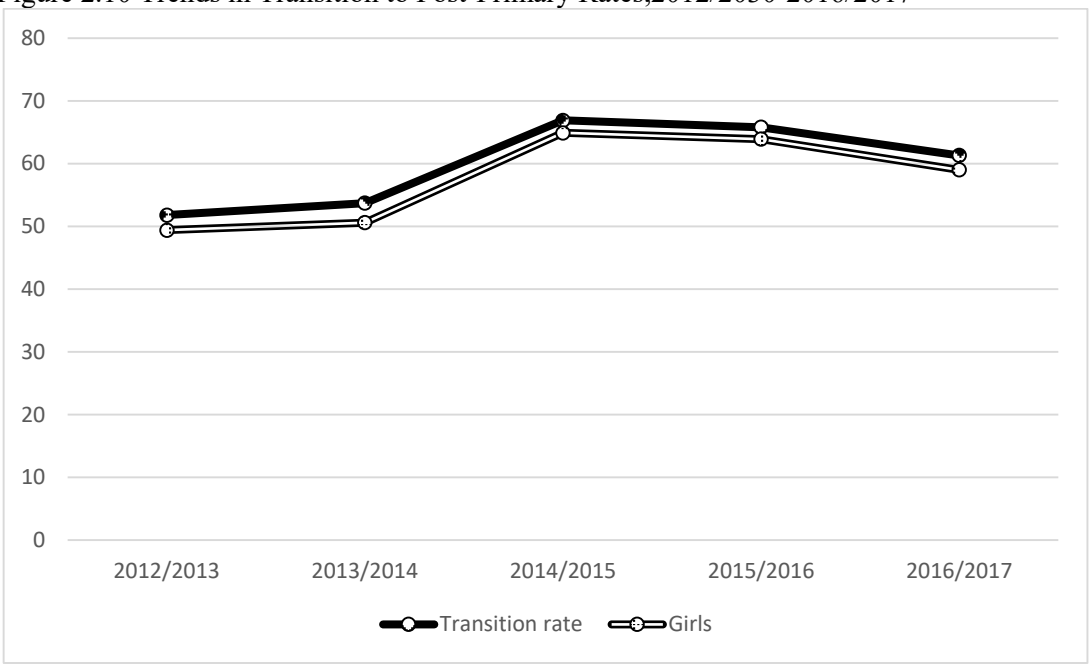
decrease started to be observed. From this perspective, about 40% of students in Burkina Faso do not complete primary education, which means that the country is still struggling to keep students in the school system until the end of primary education. From a gender perspective, in Burkina Faso, girls tend to have higher completion rates relative to boys. Completion rates of girls were 64.3%, and parity 1.14. The country has established some policies in favor of girls, and this higher completion rates of girls can explain these policies implemented.

According to Global Economy, the average primary school completion rate for 2016 is 91.94% for the world, and 75.37% in Africa. Among all African countries, Burkina Faso is one of the bottom ten countries in terms of primary school completion rates. Figure 2.9 compares the primary school completion rates in Burkina Faso to some in a few Sub-Saharan countries in 2017. It indicates that completion rates for Sub-Saharan Africa as whole is 68.74%. Burkina Faso, Mali, and Uganda have the lowest completion rates among represented countries. In these countries, completion rates are 63.51% for Burkina Faso, 49.55% for Mali, and 50.95% for Uganda. The figure also shows that Ghana and Togo are high performers, with completion rates of 95.20% and 90.88%, respectively. Completion rates are often used to analyze the internal efficiency of educational systems, but there are also some other ones, among which transition rates to a higher cycle or level in the educational system.

All students who complete the final grade of primary school do not go to post-primary school. Transition rates have been introduced then to know the proportion of students who completed the final grade of elementary school and continue to the higher cycle, i.e. post-secondary school for the case of Burkina Faso. Consequently, transition rate from primary school to post-primary school is the proportion of students who are enrolled in the first grade of post-primary school, expressed as a percentage of the number of students who were enrolled in primary school the previous year. Figure 2.10 presents the trends of transition rates over a period of five years in Burkina Faso. Transition rates increased from 51.8% in 2012/2013 to 66.9% in 2014/2015. However, from 2015/2017, transition rates from primary to post-primary school started declining. This decline can be explained by the results from the primary school leaving certificate exams. Passing this exam is a requirement for students to progress from

primary school to post-primary school, but recent results of this examination have shown a decreasing trend (see figure 2.7 above), affecting transition rates as well. Transition rates from primary to post-primary school from a gender perspective shows that girls are located lower than the national rates, but they follow the same trends still compared to the national one. Results from the primary school leaving certificate examination also explain this trend.

Figure 2.10 Trends in Transition to Post-Primary Rates,2012/2030-2016/2017



Source: Created by Author based on MoE Statistics

2.7. Educational Issues and Challenges in Gold Mining Areas in Burkina Faso

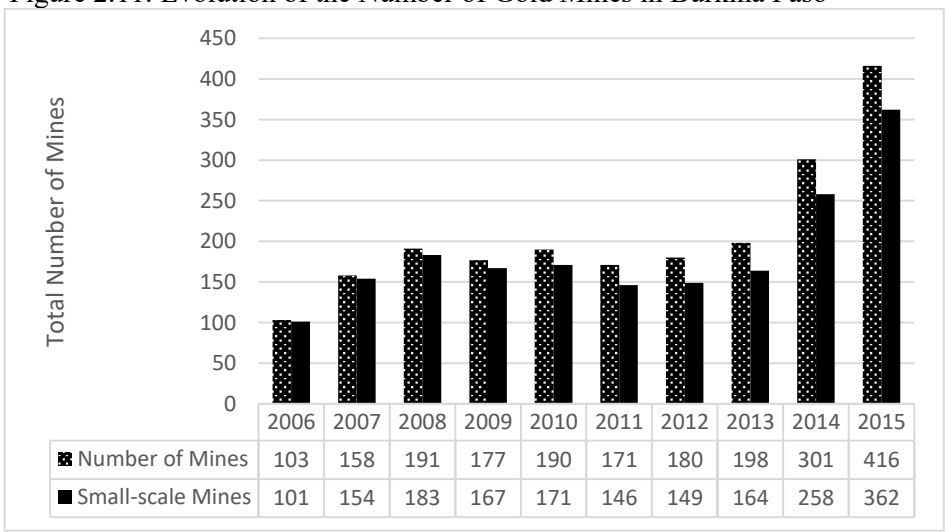
Burkina Faso has a relatively long history of gold mining activities, but insignificant to the economy of the country, until its recent gold mining boom. For example, gold mining represented 0.3% of the gross domestic product (GDP) in early 2000s, but this number increased to 5% of the GDP of the country by 2009 (MECV, 2011)[9]. Furthermore, the recent gold mining boom has placed Burkina Faso among the highest producers of gold in Africa and even in the world. Figure 2.11 highlights the evolution of the number of gold mines in the country. It indicates a consistent increase in the number of gold mines over about a decade.

[9] Ministère de l'Environnement et du Cadre de Vie (the equivalent of Burkina Faso Ministry of Environment)

The number of gold mines in the country was 103 in 2006, but increased to 416 by the year 2016. This represents a four-fold increase of gold mines in only about 10 years. Currently, gold mines are found in almost all the 13 regions of the country.

Like in many countries, gold mining sector in Burkina Faso is divided into industrial gold mining and artisanal/small-scale gold mining. The former consists of industrial complexes of minerals extraction and involves a skilled management. However, the latter consists of non-mechanized or semi-mechanized mineral extraction methods, practiced by local communities. As figure 2.11 indicates, the number of small-scale mines largely surpasses that of industrial mines. These small-scale mines at the same time attract many people from local communities or neighboring ones around them. Small-scale gold mining communities rely on gold mining and related activities as the main source of livelihood, as farming yields less and less harvest for their subsistence (Sore & Maiga, 2015). It is estimated in general that Burkina Faso people live with less than $1.90 a day (World Bank, 2018); consequently, small-scale mining and related activities are seen by many people as a way to get out of poverty, attracting a large portion of the population from regions into provinces.

Figure 2.11: Evolution of the Number of Gold Mines in Burkina Faso



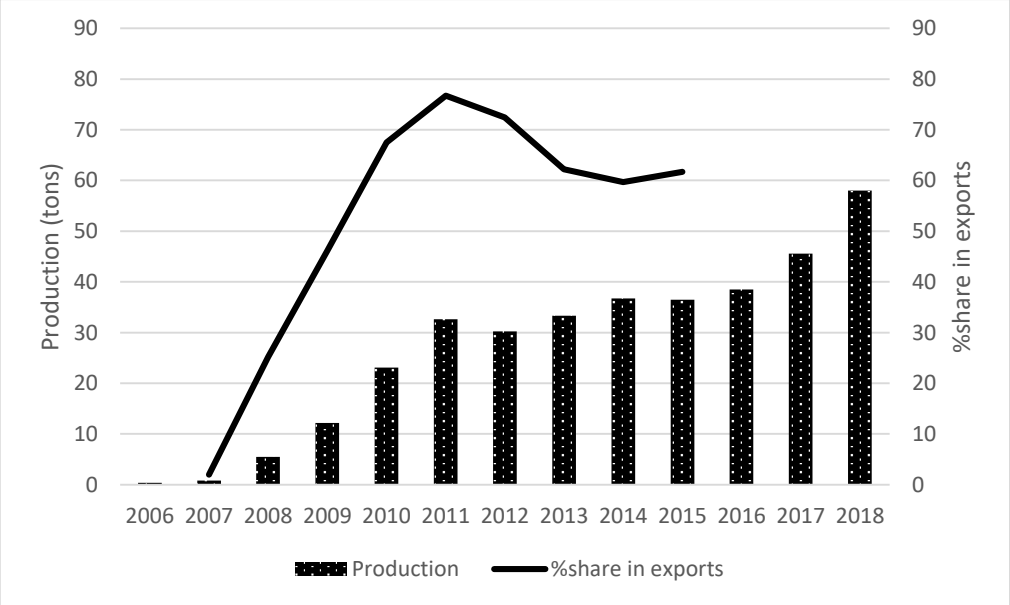
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Mines	103	158	191	177	190	171	180	198	301	416
Small-scale Mines	101	154	183	167	171	146	149	164	258	362

Source: Created by Author, based on Ministry of Energy and Mines (2017)

Small-scale gold mining activities are very dynamic and unstable, due to the gold mining boom that the country is undergoing. Small-scale gold mines open and some close very quickly,

driving people to look for another mine when one is closed. Because of that migration that follows the trends of gold mine opening and closing, it is difficult to know exactly the number of active small-scale gold mines in the country. The government controls and gives exploitation permits to companies or individuals that want to exploit whether an industrial mine or a small-scale one. Despite efforts of the government to control the sector, many small-scale mines are operating "illegally", and child labor is higher in small-scale gold mining communities compared to non-mining ones, which has potential negative implications for the school attendance and learning achievements of working children (Zabsonré et al., 2016). The nomadic gold mining activity has a strong negative environmental impact. Mining sites are usually environmentally destroyed and left empty after exploitation, and the use of mercury in the exploitation process affects underground water, with negative societal implications too.

Figure 2.12: Gold Production (in Tons) and Share in National Exports of Burkina Faso



Source: Created by Author, based on Ministry of Energy and Mines

Mining is one of the most important sectors in the socio-economic development of the country and it plays an important role in the national economy. Therefore, mining sector is given an important place by Burkina Faso government. In terms of its contribution to the socio-economic development of Burkina Faso, mining (mostly gold mining) has contributed to the construction of many public infrastructures such as roads and also schools, in areas that were

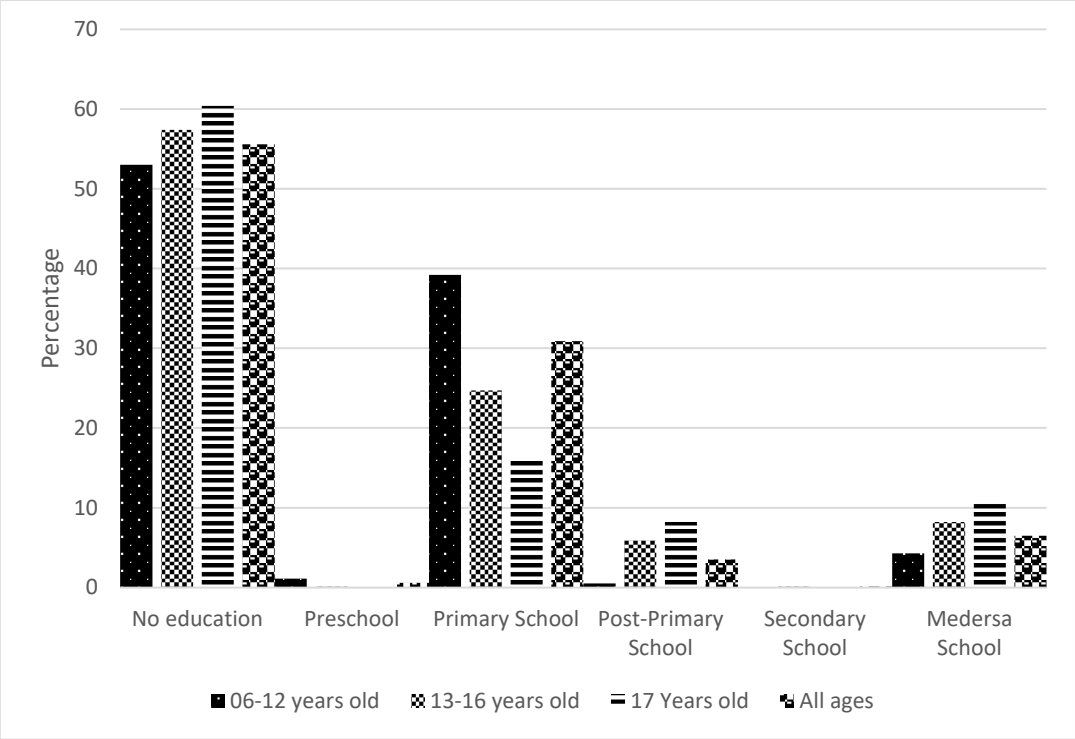
not easily accessible. From a perspective of the national economy, it was estimated that the mining sector accounts for 7.5% if the GDP of the country and 12.8% of its revenues, both for the year 2014. Figure 2.12 presents the production of gold and its share in the exports of Burkina Faso. It indicates that gold production was 0.4 tons in 2006, and surged to 36.7 tons in 2014, and did not increase much the following year 2015. However, it increased to 38.5 tons in 2016, to leap up to 58 tons in 2018. This fast increase gives gold the highest share in products exported by Burkina Faso.

As figure 2.12 also indicates, the share of gold in the exports of the country had a steep increase from 2007 to 2011, precisely from 2% to 76.7%. This share observed a decrease then from 2012 to 2014, but from 2015 an increase can be observed. This performance can be explained by the reforms that the government implemented in the mining sector, namely the revision of mining law, and also the commitment of all the actors involved in the mining sector. From a production perspective between small-scale gold mining and industrial gold mining, it is important to mention that gold production of small-scale gold mines is very low relative to industrial gold mines; for example, small-scale gold production was only 3% of the total gold production of the country in 2012. However, more people are involved in small-scale gold mining and related activities. This large-scale involvement of populations is what seems to have a direct link with education.

As mentioned in sub-section 2.4, efforts of the government of Burkina Faso have helped boost education access indicators from an overall perspective, but there are still many disparities throughout the country. One of those challenges are the low demand of education in small-scale gold mining areas, among various educational issues that are met in these areas. A joint report commissioned by ministries in the country reveal that these areas are negatively affected in terms of its education, and the issues may need to be addressed as soon as possible, before they worsen. Figure 2.13 shows the level of education of children surveyed in 5 gold producing regions of Burkina Faso. It indicates that 53% of children of primary school age have never been to school, and only 39.2% are enrolled in school. The Ministry of Welfare and National Solidarity estimated that most of these children who are not in school would work on

gold mining sites for many days a week, and those who are in school would work when they have no classes, for instance on weekends. This shows the extent to which the mining activities have some implications for the education system in the context of Burkina Faso. The situation is widespread, since there are many gold mining activities going on throughout the country.

Figure 2.13: Education Level of Surveyed 13294 Children in Burkina Faso (5 Mining Regions)

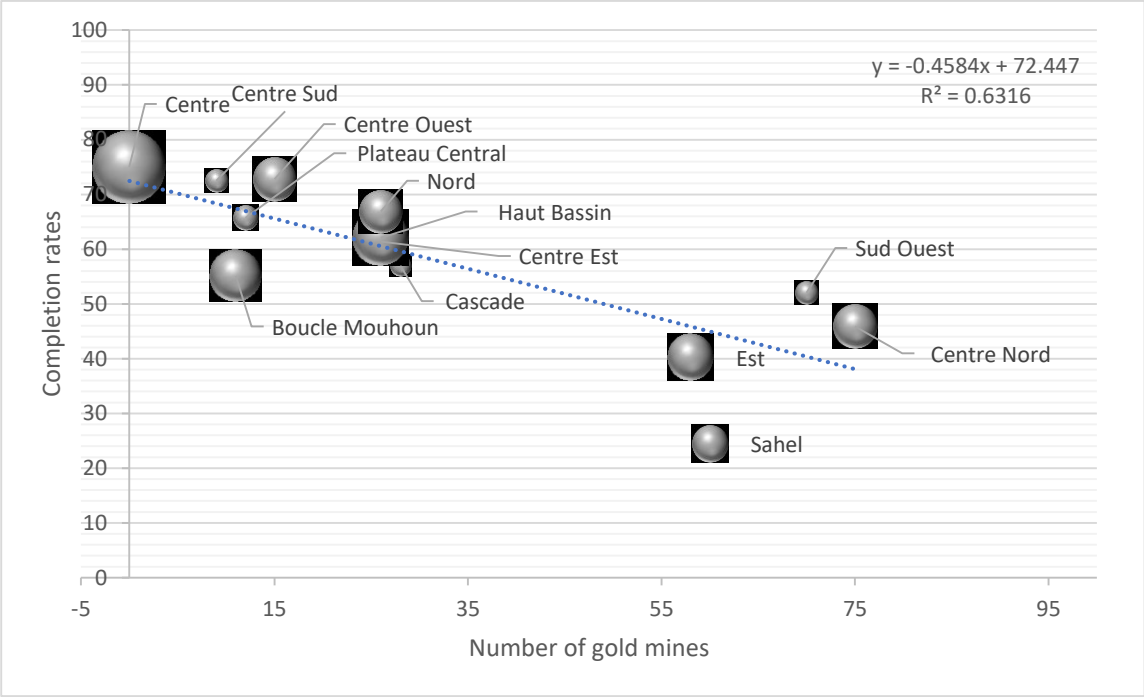


Source: Created by Author based on Ministry of Welfare and National Solidarity 2011

The study above is not the first survey in relation is education in gold mining areas that was carried in Burkina Faso. A study of UNICEF (2012) reported that about 20,000 children in five of Burkina Faso's 13 regions are working in small-scale gold mines, and adds that 86% of them do not want to attend school for these labor reasons. Kanazoe (2013) also reported that in the Central North region alone, during 2012-2013, more than 1000 children left school for mining sites. According to a survey on child labor by Burkina Faso National Institute of Statistics and Demography in partnership with International Labor Bureau, 88.4% of children in gold mines work more than 20 hours a week and are not enrolled in schools, and only the 11.6% of children work on mines while still going to school (INSD & BIT, 2008). That is why the Ministry of Welfare and National Solidarity (2011) recommended policymakers that in gold mining areas,

"it is an imperative to increase access to and help maintain children in schools", or else there will still be many of them found on gold mining sites.

Figure 2.14: Regional Primary School Completion Rates in Relation to Number of Gold Mines in The Region (2015)



Source: Created by author based on data from MoE and Ministry of Energy and Mines
Note: Region population used as weight

There seems to be a low education demand in gold mining areas, and when children go to school, they do not stay there until the completion of at least primary education. Figure 2.14 displays the relationship between regional primary school completion rates and the number of gold mines (artisanal and industrial) within their regions[10]. It indicates that as the number of gold mines in the region increases, primary school completion rates tend to decrease. The relationship seems to be strong (the number of gold mines explain about 63% of completion rates) and linear. Among all regions, the Est and Sahel regions are among the regions with the highest number of gold mines and show the lowest levels of completion rates at the same time. This relationship between the number of gold mines and primary school completion rates can be explained by the fact that most gold mines are small-scale ones, and they attract populations

[10] In Burkina Faso, there are 13 regions and 45 provinces. Provinces are composed of 2 urban special status communes (Ouagadougou and Bobo Dioulasso), 47 urban communes, and 302 rural communes.

within provinces that have mines. This gold rush makes populations demand less education, since artisanal gold mining does not require any level of education.

As families move to other places, their children are obliged to drop out of school, but getting another school in the destination place is not always obvious. Besides, according to Sore & Maiga (2015), completion rates are lower in gold mining areas because small-scale gold mining activities are attracting more and more children of school age who would drop out of school to be fully involved in these activities. In such a context, the educational efforts of the government are negatively impacted by gold mining activities, mainly small-scale ones. A feature of natural resources (gold mining) for local communities is that they create a "spillover" that affects communities to a certain scale. There are mainly three channels through which this takes place, and each channel has a certain link with education (Aragon & Rud, 2013; Santos, 2014). Specifically, these channels are the environmental channel, the local market economy channel and the fiscal channel. For example, the local market economy channel determines education demand, because it has direct links with an important factor of education demand, that is the labor market. The labor multiplier effect of gold mining makes unskilled labor abundant and usually well-paid (Moritz et al., 2017), a disincentive for individuals to seek education, since the return on the investment in education is low in such an environment (Marchand & Weber, 2018).

CHAPTER 3: LITERATURE REVIEW

3.1. The Effect of Home Environment Factors on Students' School Attendance

Economists have been interested in factors that influence education. Consequently, there is much attention given to the family, school, and communities factors in the education literature, because they are very important inputs that determine education production function (Avvisati et al., 2010). Family, school and community factors are in different forms in education literature, and while some are conceptualized, some are not. This research focuses on some of these factors, specifically those which are of importance for the research questions. However, before going deep into the literature that link family, school, and community factors to school attendance and students' learning achievements, it is important to present the different forms or concepts related to family, school, and community factors, as well as the theoretical background about their importance and relevance for education.

Many studies have examined family factors in developing countries and in developed ones. A family, though its definition depends on country or local context, is understood as a small social entity that is composed on two or more individuals living together, who are bound by ties of a given sort, and share many things, for example cooperate economically (Odo, 1990). No matter the context of study, the literature distinguishes two groups of family factors, which are family status factors and family process factors. Family status factors refer to those characteristics that define who families are, for instance their income, parental education, social class, ethnic group, etc. (Amadi, & Segun, 2018; Ghazi et al., 2017). These two groups of family factors are referred to by some scholars as physical home environment and social home environment (Veldhuis et al., 2014).

Most of the components of family status factors are sometimes conceptualized as family socio-economic status (SES). Family SES is therefore a broad concept that is used to refer to families' economic and social standing, and includes many factors such as income, educational attainment, wealth, and occupation (Andrew, 2010; Winters-Miner et al., 2016). Family SES

factors are important to the education of children, because families differ and these factors will affect the education of children: for example, time and money that families can or do invest in children's education vary, then they are important predictors of children's education (Li & Qiu, 2018).

Previous empirical studies identify family process factors as specific things that families do, including parental involvement, parenting style or disciplinary practices, parental expectations and beliefs (Xia, 2010). Family process factors are grouped into five types: parental expectations, structure for learning, home affective environment, discipline, and parental involvement. Among all the five types of process factors, parental involvement seems to be the most studied. Epstein (1987) is one the first scholars to introduce a theoretical framework modeling parental involvement in relation to schools. The author identifies six types of involvements: parenting, communicating, volunteering, learning at home, decision-making, collaboration with the community. Hoge et al. (1997) in a study identified four family process factors which are relevant to the education of children. These factors are parental expectations, parental interest, parental involvement, and family communication.

There are other forms of parental involvement that have been defined by previous scholars, and an example of such involvement in the involvement of parents in children's homework (Wilder, 2014). The rationale behind this form of involvement is that students need self-regulatory homework management strategies to complete homework and submit timely, and parents can play an important role in helping their children in this management process, mostly at low levels of the education system where children do not have enough abilities to self-regulate their homework tasks (Cunha et al., 2015). In order to guide education stakeholders in what can be done within the framework of homework assistance, a parental homework management scale was framed, and tested by many scholars (Cunha et al., 2018; Xu, 2008; Oubrayrie-Roussel & Safont-Mottay, 2011). In addition to the concept presented, some other scholars may use terminology of parental involvement to refer to actions like parent-child communication about school, parental participation in school activities, parental

aspirations for the education of their children, and home learning culture (Avvisati et al., 2010; Aries & Cabus, 2015).

Families play an important role in the behavior of children (Jogdand & Naik 2014), and school attendance is one. There is a growing attention that is given to the relationship between family factors and school attendance, both in developed countries and developing ones. School attendance can be understood as household demand for education, and that is why family factors are given some importance when it is related to school attendance. The purpose of this section is to review previous studies that have been done on the effect of family factors on school attendance.

1) Family status factors and school attendance

Education has a cost that families have to bear, therefore literature gives a place of importance to family income among factors that have a relationship with the school attendance of children. Hattory (2014) used household survey data from 63 countries to determine the socio-economic factors that determine school attendance of children. Findings from the scholar indicate that among the 63 countries, in 56 of them, the most significant determinant factor of school attendance is family wealth (income). In other words, just like many other scholars found, children from families with a higher income have more school attendance than others (Sackey, 2007; Glick & Sahn, 2000; Shehu, 2018). The scholar adds that family income is not significantly related to school attendance in countries that have already a high level of school attendance rates. Most empirical studies linking school attendance to family income or households in general did it by setting an analytical framework that is based on one of the most dominant theory in the literature, the human capital theory.

Human capital theory is one of the most dominant theory in the literature explaining why people attend school. According to this theory, education can be seen as an investment good, in which people renounce current income opportunities in exchange with better ones that they will have in the future. People make their decision to attend school by "estimating" the marginal cost of education and the missed income opportunity, and compare it to the lifetime

revenue that they will have in the future; when future income opportunities seem better, they will tend to invest more on education (Schultz, 1961). This implies one aspect of education that is mentioned in the human capital theory, which is the relationship between education and earnings. When individuals have more education, they tend to have higher capabilities, which affects earnings positively (Becker, 1964; Mincer, 1958). Looking at education from this perspective, it is assumed that parents (based on the income they have, and it is usually constrained) would decide about their children attending school based on the future benefits that can be earned in relation to the current cost incurred from school attendance (Glewwe, 2002; Kodde & Ritzen, 1985).

Another way of relating family income and school attendance is conceiving education as a commodity or consumption good, i.e. individual attend school because they enjoy acquiring new knowledge from school. As a commodity, education satisfies some human needs, has a commercial value and can be sold or exchanged (Longhurst, 2006). Consequently, according to the economic theory of education as a commodity or consumption good, it can only be acquired by people who can afford it, and a higher income effect raises the consumption of education just like any other commodity. This helps explain why more children from rich households attend school relative to children from poor households. Moreover, according to Fershtman et al. (1996), as education is a commodity, "wrong" people (those with a lot of wealth but low inability) can acquire much of it and even oblige workers (with high ability but low wealth) to leave some industries that are strongly related with economic growth. The explanation behind this is that higher education provides higher social status, and the over emphasis on status pushes individuals to gain more education to have more esteem from other individuals. As a whole, school attendance depends to some extend on family financial resources.

The limited finances available to families oblige them to make a trade-off between having their children attend school or sending them for income-generating activities: the issue of the trade-off between school attendance and child labor. Jafarey & Lahiri (2001) reviewed most theories around the issue of child labor. They concluded that studies have emphasized on

giving economic explanations of child labor. Specifically, children work instead of attending school because their families cannot afford their schooling, and sometimes cannot even make two ends meets: the poverty theory. Such families would send children to work part-time while still going to school (with risks or absenteeism) or get the child completely out of school to join labor activities full time, i.e. not school attendance at all. Consequently, children from poor families attend less school and tend to be more involved in child labor (Webbink et al., 2012; Huisman & Smits, 2009; Patrinos & Psacharopoulos, 1995). However, some other factors drive child labor, among which education quality, family beliefs etc. (Hilson; 2012; Drèze & Kingdon,2000). Much of the literature has analyzed child labor in mostly developing countries in general, and recently a context that is getting more and more global attention in relation to the trade-off between schooling and labor is a mining context (gold mining).

Though some scholars "support" that child labor and school attendance are not mutually exclusive, some others support that child labor is detrimental to school attendance. For example, Islam et al. (2009) in a study found that children attend school less, because they have to work for long hours. This time spent on labor is the time that they are supposed to spend in school. Lancaster & Ray (2004) also analyzed the relationship between child labor hours and their school attendance (number of hours in school). They found a strong negative impact on the number of child labor hours and the number of hours of school attendance. However, they suggested that there seems to be a cut-off point, beyond which the negative impact is observed. Some previous authors looked at child labor and school attendance in small-scale gold mining communities.

Research has shown a close relationship between family status factors and school attendance. One of the most studied family status factors in relation to the schooling of children is parental education. Burke & Beegle (2004) used a quantitative method to examine the factors within households that affect school attendance of primary school children in Tanzania. Among factors that authors examined was parental education. According to their findings, parents' educational background is an important factor that determines school attendance of children. Precisely, the authors found that when a father has some education, it affects the school

attendance of all children positively, but this effect is higher on boys. However, when mothers have education, it affects all children, and there is no difference in this effect on children from a gender perspective of the children.

The positive relationship found between parental education and child school attendance is supported by previous studies. For instance, Kabubo-mariara & Mwabu (2007) who studied Kenya found that parental education is positively related to children's primary school attendance, though fathers' education is relatively more important than mothers' education. This can be explained by the fact that parents that have education place a higher value on education, as they are aware of its economic return or positive externalities, and therefore they choose to send the children to school and commit to their children attending school. On this topic of the decision to get children and committing that they attend school and do not join income generating activities, Hilson (2012) supports that in gold mining areas, the value that families place on formal education is a factor that affects the school attendance of children.

The high fertility rate, i.e. high number of children per family that many developing countries have is often cited as the explanation for the low education demand in those countries. In other words, family size is an important determinant of education (Argys, & Averett, 2015). The effect of family size on school attendance is related to the economic theory of education viewed as an investment good. Larger families are more likely to be poor, because as families get bigger in size, they are unable to sustain their income, will tend to spend more and cannot save, and consequently, the family wealth is deteriorating more and more (Orbeta, 2006). Looking back to education as a commodity, families with low wealth cannot afford it, and the human capital theory predicts that children from these families are less likely to attend school.

One of the empirical studies that establish this is Bansagan & Panganiban (2008). This study examined the case of the Philippines and found that family size and children's school attendance have a negative correlation. Precisely, one more child reduces the likelihood of school attendance by 10%, but the size of the effect decreases when some parental characteristics are controlled for. Another similar study is that of Kugler & Kumar (2017), who employed an instrumental variable approach and found that family size has a negative effect

on school attendance of mostly children from families that are constrained in liquidity, i.e. children from poor families. This financial resource constraint limits the family to bear the direct and indirect cost of related to education.

Focusing on West African countries, Glick & Sahn (2000) also gave important insights into family composition and school attendance of children. In their study, they found that school attendance of girls is affected by family size. Specifically, when there are more siblings under the age of 5 in the family, it reduces girls' school attendance, while a higher number of siblings aged 13-20 in the family increases girls' school attendance. The authors concluded that mostly siblings under 5 affect girls' school attendance negatively. However, the authors did not find any correlation between family size and boy's school attendance. This interaction of family size and child gender (negative for girls) can be explained by the fact that within households, girls are more likely to have household chore obligations relative to boys (Congdon & Lindskog, 2017).

In many developing countries, previous research has established that school attendance has a gender perspective, to some extent reinforced or reduced by household specific characteristics (Kazeem et al., 2010; Alhassan & Odame, 2015; Wolf et al., 2016). In many communities in developing countries, livelihood is based on small farming, therefore household income varies with exogenous variations in rainfalls. Björkman-Nyqvist (2013) exploited these various variations to examine how income of households affect school attendance of children in the family. The analysis of the author found that when there are low levels of rainfalls (lower income for households), primary school attendance of girls is negatively affected, with a stronger effect as the age of the girls increases. For boys, there was no relationship between income shock and school attendance found by the author. Therefore, when there are income shocks, girls are disadvantaged by households in terms of financial commitment to their education, while boys are protected.

Lachaud et al. (2014) also examined education in Ouagadougou, Burkina Faso and found that lower fertility is leading to an increase in the children's education investment, but all children within families do not profit the same way from this increase of education investment.

Specifically, the authors found that even though family size decreases, girls' education participation (mostly first-born ones) still decreases. There are therefore social gender inequalities within families in favor of the schooling of male children, even when the financial resources of households are increasing. School attendance when related to child labor can have a gender perspective, depending on factors of schooling decisions within households, such as parental education and the type of labor (Emerson & Souza, 2007).

Maiga (2015) investigated some gold mining sites in some small-scale gold mining sites in Burkina Faso and found that many children are working on those sites. Families who are residing on mining sites or outside mining sites allow their children to join these activities, creating a situation of much child labor in small-scale gold mining communities. These children working on mining sites are very young, and some are even below 7 years old. The author mentioned that school attendance of these children working on gold mines is low, because children leave classes in order to work. However, due to the gender division of labor on gold mining sites, households make schooling and labor decisions also considering the child gender.

ILO (2007) studied the cases of mining communities in Africa and Latin America and found that the working conditions and the environment where children work often "oblige" parents to keep female children at home and do not let them attend school, because they have to take care of themselves and their siblings too. Consequently, girls have less chances of regular school attendance relative to boys, and boys have more chances of attending school and more time to study. In general, due to various reasons, working boys and working girls do not have the same chances or patterns of school attendance, and this may be due to many factors, such as the nature of the work, the environment, and beliefs of parents (Doh et al., 2016; Hinson et al., 2003).

2) Family process factors and school attendance

School attendance of children depends on socio-economic factors of families, but it is also established by several previous studies that school attendance is determined by family process

factors, among which are behaviors, practices, and beliefs of parents related to the schooling of children. Dwyer & Hecht (2001) found that parental monitoring or supervision of children has a strong link with school attendance. Some children may not like studies, mostly young ones in elementary school years who may not like school due to some reasons, and do not want to attend school. However, when parents monitor and supervise them, they will attend school, out of fear of being punished or out of encouragement from parents. Many factors affect school attendance, some which are out of the control of schools, and some which are under the control of parents (Robinson et al., 2018; Kim & Page, 2013).

According to these scholars, it is important that parents view school attendance as valuable if we want to improve school attendance, because students whose parents value education are more likely to attend school. The perception or parents' value for education and their engagement in it can be better grasped through the lenses of the expectancy-value model. This model suggests that the motivation to engage in a given task is determined by the perceived value for that task (Eccles & Wigfield, 2002). Therefore, parents who do not value school attendance will not be engaged in trying to get their children attend school. Parents that have some negative attitudes and perceptions of education can therefore be explained by this model, and these negative attitudes and perceptions influence their children's school attendance negatively (Powell, 2012).

Breda (2015) approached parental process factors and their children's school attendance in terms of interest in getting involved in children's education. According to the author, school attendance of children is largely determined by the aspirations that parents have for their children's education success. To this respect, the more aspiration that parents have, the more their children will attend school because such parents are more likely to engage themselves in interactions that promote school attendance of their children. Reid (2005) linked parental process factors with careers that are more likely to affect school attendance of children negatively. The study identified four types of parental attitudes and behaviors that are likely to influence school attendance either positively or negatively.

The four types are: parents making efforts to address low attendance rates of their children; parents that have much observation of their children; parents who believe themselves as not able to address school attendance issues of their children; and parents who do not want to partner with schools to tackle the issues of attendance. According to Swartz (2015), there may be reasons for parents not willing to partner with schools, and this comes from their perceptions of school environment. When parents have negative experiences with schools or school staff, worsened by some family issues that they may have, they are likely not to encourage their children to attend school. Donoghue (2011) suggests that parents have responsibilities, among which ensuring school attendance of their children. In the study, the author criticizes some punishment and retribution approaches towards "flawed" parents and some educational and legal authorities employed.

3.2. The Factors that Determine Students' Learning Achievements

1) The Effect of Family Factors on Students' Learning Achievements

Many studies have been carried to investigate the relationship between family factors and learning achievements, and many have established that family factors influence the learning of students. Therefore, more and more interest has been given to which family factors and how family factors can contribute to improve the academic performance of children in both developed countries and developing countries. In other words, it can be said that schools are not the only factor of academic performance, as family factors are found to be a key factor that also determine academic performance. Family factors in relation to students' academic performance are also generally divided into two groups: family status factors (e.g. income, parental education, social class), and family process factors (e.g. parental involvement, disciplinary factors, parenting). As children depend on families and spend much time with their parents at home, parents' beliefs, behaviors, and interactions inevitably influence them (Xia, 2010).

Many studies have shown that there is a relationship between family involvement and learning achievements (Phillipson & Phillipson, 2012; Hill & Tyson, 2009; Kloosterman et al., 2011; LaRocque et al., 2011). For example, Mahuro & Hungi (2016) used a quantitative method to analyze the effect of parental involvement on learning achievements of students in Uganda. Precisely, they investigated how parental involvement viewed as parenting and communicating affects students' learning achievements. According to their findings, an increase in these two types of involvement also increases students' learning achievements. In other words, parental involvement is a factor that contributes to improve the learning achievements of students. In this sense, the schooling of children does not stop only at school, but also continues when they return at home. Appropriate parenting and communication with the children encourage them and support them, and these are necessary conditions to create an environment that is good for learning. Schools and families need then to partner together towards supporting students in their learning process, as this is how it can help improve learning (Murray et al., 2014).

In addition to the above-mentioned scholars, Gubbins & Otero (2016) investigated the relationship between parental involvement and students' learning achievements, precisely their language and mathematics performance. These authors focused on parental involvement in terms of what they called "parenting" coming from a "parenting style" model. The former refers to the making an environment that encourages and promotes learning for the students, and the latter the climate in which and how parents apply their authority to deal with the need of their children. Seeking to understand what type of parenting involvement style best predicts learning achievements, the analysis of the authors used the construct of "punitive parental involvement" and "nourishing parental involvement. According to their findings, the former is negatively associated with the learning of students, while the latter is positive correlated with students' learning achievements. However, just like Cain & Hendryx (2010) also found, parental socio-economic factors mitigate the relationship. This finding suggests that parents strive to help their children get good grades in school but they may be doing it the wrong way. In other words, "forcing" children to study does not lead to better grades (Bowen et al., 2012).

In a similar study, Dehyadegary et al. (2012) examined the impact of three parenting styles on learning achievement. They found that authoritative parenting style is positively associated with better academic performance, because such a style of parenting still gives room to some flexibility towards children, is loving and communicative, as parents using that style are still moderate in their ways. However, authoritarian parenting style is not significantly associated with learning achievement, very likely because parents of that style want to control all the aspects related to the studies of their children, use coercion and power over them, and children do not feel good about it. The third style of parenting examined by the author, permissive parenting style, was found to be negatively associated with academic performance. Children under such style of parenting are left on their own, and they do not have any reference as to any high achievement, so they tend to be less motivated to work hard in school.

Caño et al. (2016) also examined how parental involvement affects the learning of students, and their study is a qualitative one that was conducted through the lenses of Epstein's parental involvement framework which includes six types of involvement. The author extended their research objective to investigate whether the socio-economic status and educational attainment of parents have an effect on parental involvement itself. They found that in general, parental involvement has a positive influence on students' learning achievements. Specifically, in terms of parenting, parents try to create an environment that is appropriate for learning, for example a quiet place. For the learning at home, children are given some autonomy, even though parents try to help them do their exercises when necessary.

Furthermore, it was found that students tend to perform better when their parents attended school PTA meetings. This allowed parents to discuss matters related to their children, and when they had problems with their children, they can discuss that directly with schools. However, the authors found that despite the willingness of some parents to support the schooling of their children, they are limited in terms of what they can do. In other words, socioeconomic status of parents influences parental involvement, a finding that Jafarov (2015) through a meta-analysis of the literature supports. Caño et al. (2016) concluded then that

families and schools need to make mutual efforts for students, as this is how they are given more chances to succeed.

Family practice factors have an influence students' learning, and so do family status factors. One of the status factors examined in the literature is the presence of books in the home and the academic performance of children. Coulidiati-Kielem (2016) used a quantitative methodology to examine the effect of family factors on the academic performance of children in Burkina Faso, and among variables examined was having a textbook at home. The author found in her analysis that parents that invest in making a textbook available for their children at home contribute to improve their learning achievements. However, having books in the home is strongly related to the socio-economic level of parents and their educational. Only parents that can afford books will buy some for their children and parents with education value education better than those without education, so they have preferences that favor education for their children (Rau et al 2015; Shukakidze, 2013).

The finding of the study on Burkina Faso is corroborated by another study, though from another context, that of 27 nations. This study was conducted by Evans et al. (2010), in which the authors also found a significant positive relation between home library and school grades of individuals. According to the authors, the taste for buying and reading books is transmitted from generation to generation, regardless of factors like education or socio-economic status. Parents that has a taste for reading books give some kids books to their children to play with, and engage with their children using books. Their children get the taste of reading from this, do buy books to read or read the ones they are given, and this all results into better performance of these children in school. Therefore, it can be said that having books in the home in itself does not improve academic improvement, there is a need to actually get children use the books if parents want them to get better grades in school.

Bergen et al. (2016) also used a quantitative methodology to investigate the relationship between the access to books at home and the reading fluency of children. The authors found that having access to books at home is a strong predictor of children's reading fluency, and a positive effect that remains present even when parental reading fluency is controlled for. This

suggests that even though some scholars support that reading abilities are inherited or genetic, a home environment where children have access to books has an influence on their reading skills (Thomson, 2018; Dudaitė, 2016).

According to the authors, the number of books or the size of the library at home could give an idea about the importance parents give to reading, but just increasing the number of books in itself cannot guarantee better reading skills for children. Sikora et al. (2019) examined how books at home affects academic performance and even has an effect on the individual at the adult age. The authors did their analysis using scholarly culture theory, which highlights a book-oriented socialization (size of library at home). The authors of the study found that students who are from families that have a more book-oriented culture performed better in school compared to similar students that come from less book-oriented families. An interesting finding from the authors is that the effect of the size of the library is consistently positive, but the rate or size of the impact reduces as the number of books in the library increases.

Many studies have found that the number of books at home is positively related to learning achievements, but some scholars recommend a lot of caution about these results that are found, precisely for studies that interpret the number of books at home as the literacy environment at home. For example, Park (2008) writes that the number of books at home may not accurately measure the degree to which parents read books to children or the degree to which children themselves read books. Therefore, there is a need to pay much attention to the variable “number of books”, uncover its properties and features, before drawing conclusions. Just like to confirm this warning, Friedlander et al. (2017) evaluated a large program by Save the Children called Literacy Boost, a program that addressed home literacy environment in a set of South-Saharan Countries.

While in many of these countries the effect of home literacy environment was found to be positively related to the reading performance of students, in Ethiopia and Zimbabwe, no significant results were found. One of the possible explanations of these results given by the authors is that in Ethiopia and Zimbabwe, students have significantly lower levels of literacy. From an overall perspective, when we consider the number of books available to children as

presented in the literature, it can be said that opportunities to have books at home are associated with better learning achievements (Dowd & Pisani, 2013). However, there is no evidence to show that making books available to children at home necessarily improves their academic performance, so there are some heterogeneities of student-related factors or parameters to consider to better understand the relationship between the number of books in the home and academic performance.

In developing countries, there is an extensive literature on the relationship between child labor and learning achievements. In this extensive literature on the topic, some scholars have found a negative correlation, some a positive one, and some no significant correlation at all (Bezerra et al., 2009; Odey, Ita, & Nchor, 2017; Ligeve & Poipo, 2012; Post, 2018). For example, Holgado et al. (2014) studied children labor as it is presented in the case of Columbia. The authors considered proxies and characteristics of child labor such as housework, the number of hours worked, paid work outside the household and sometimes combination of housework and paid work outside the household. They found that the relationship between child labor and academic performance is negative from an overall perspective, but it is a complex one which cannot be assessed in terms of whether there is child labor or not.

Different characteristics or features of child labor, such as the type of labor and the intensity affect academic performance in different ways. For example, as mentioned by Zabaleta (2011), labor conditions or intensity that involve physical and psychological risks for children affect their academic performance negatively, while the type of work in itself is not significantly related to academic performance. Post (2011) has also found that for the case of Latin American countries, child labor has a negative impact of learning achievements, specifically for students who work four or more hours a day. Abou (2016) examined the topic from a gender perspective, examining the effect of household chores on girls' academic performance in Cote d'Ivoire. The author also found that girls doing household chores performed lower compared to those who do not. Such a finding indicates that there could be a gender perspective in the effect of child labor on learning achievements.

Opposite to scholars that found a negative influence of child labor on learning achievements, some other scholars did not find any signification relationship between the two. For instance, Watson (2008) used ordinary least square and instrumental variables regressions to examine the effect of child labor on test scores of students in Vietnam. The author defined child labor as the number of hours a child spends daily on household chores, household farm or business, and on paid labor outside the household. The author found no significant correlation between child labor and test scores of students studied. Such a finding suggests that average level of child labor does not have a significant influence on learning achievements on the short-term. Furthermore, Byun, Henck, & Post (2014) studied child labor and learning achievements in a few countries from a comparative perspective. The authors found that child labor generally influences academic performance negatively, but the influence is weak in countries that have adopted the International Labor Organization's Convention 138 by 1995. Therefore, national and international policies have something to do with how child labor affects learning performance of students within countries.

2) The Effect of School, principal and teacher factors on Students' Learning

Schools are important actors in the expansion of knowledge and skills, and they are supposed to produce knowledge as a manufacturing unit or a factory. However, there seems to be a gap between the increase of students going to schools and the expansion of knowledge and skills (Pritchett & Filmer, 1999). Due to this mismatch between the inputs and the outputs in education, scholars tend to agree that there are deficiencies in the education production, that is schools are not able to function at their optimum scale of production (Wokadala, 2016; Hanushek, 2008). Therefore, according to the education production function theory, this inefficiency in the provision of schooling is related to an inappropriate use of inputs, among which school resources and teacher and head teacher qualification (quality). In other words, an appropriate use of the inputs would produce better results, and these results are usually measured by students' outcomes.

Though the education production function is supported by some authors as mentioned previously, Chattopadhyay (2012) examined the education production function theory in a deeper way and criticized its input-output relation advanced by supporters of the theory. According to the author, there must be caution in the view of an educational institution as a factory that gives products based on the inputs that are employed, because there are difficulties in defining the inputs and outputs for an educational institution. Another author that goes in line to bring a criticism to the education production function is Klein (2007). According to the author, the economic performance or the production efficiency of educational institutions cannot be assessed to its fullest, because all the inputs and outputs cannot be captured. For example, education demand characteristics or demographic are important factors the affect the inputs and outputs of education, therefore they must be accounted for in measuring school efficiency.

Policy-makers are interested in getting children learn once they go school; to this respect, many inputs are made available, among which qualified teachers. This comes from the results of previous research that shows that teacher qualification is strongly related to the learning achievements of students. Among the different components of teacher qualification, teacher pre-service training, in-service training, and experience are examples that had attention of previous research (Munawaroh, 2017; Abdalla et al., 2014). Bartilol & Ng‟eno (2016) in a quantitative study examined the influence that teacher factors have on learning achievements of students in Keiyo South Sub-County in Kenya. From the perspective of teacher experience, they found that teacher experience is associated with higher learning achievements.

This finding can be explained by the fact that the longer teachers teach, the more they get practically used to the teaching job and learning processes, therefore it becomes easier for them to manage classes and teach appropriately. In other words, more experience increases teacher competency, which affects learning positively (Prasertcharoensuk, Somprach & Ngang, 2015). The finding of these authors is consistent with the one of Harris & Sass (2011) who also found that teachers with more experience are more effective at their teaching, shown through better performance of their students relative to students from teachers of less experience.

However, the authors precise that this positive effect of teacher experience on learning outcomes is only substantial in the first few years of experience.

Outside the African continent, Rahman et al. (2011) in a qualitative study examined the extent to which teacher quality in terms of in-service professional development training affects learning achievements. The findings of the authors indicate that students from teachers who have professional development training perform better than the students who are under different teachers. This can be explained by the fact that professional development trainings are the opportunities when teachers can learn better classroom management techniques, better teaching methods, and better ways of interacting with students. All these factors are what contribute to improve the effectiveness of these teachers, and to some extent the academic performance of their students. Teacher professional development training is highly related to the subject matter knowledge of teachers, and when teachers gain more of this type of knowledge, their students tend to perform better academically (Shamim, Rashid, & Rashid, 2013).

A study by Akinfe, Olofinniyi, & Fashiku (2012) on a State of Nigeria confirms that teachers who have professional development training know how to adopt teaching methods according to the needs of their students, and this ultimately enhances students' academic performance. Even though some scholars found positive association between teacher quality and students' academic performance, some others do not share the same view. For example, Waseka, Simatwa & To (2016) used a quantitative method in a study to examine how teacher factors affect learning achievements in Kenya. They found that teachers who were professionally qualified, i.e. have a teacher's education qualification and teachers that are experienced are not statistically associated with better performance for their students. Similar non-significant results were also found by some previous scholars, precisely for teacher quality factors such as certification/licensing and teacher pre-service training (Zuzovsky, 2009; Kane, Rockoff & Staiger, 2006; Glewwe et al., 2011).

Within schools, teachers are not the important factor for learning, as research shows that school management also matters for students' outcomes. School principals have many

roles and functions, which are linked to academic performance of schools. According to Lortie (2009), school principals are the backbone of school life, and evidence suggests that they influence the quality of education in their schools; they are in charge of organizing the school personnel or time, and they are also in charge of allocating resources within schools so as to promote learning. Makore & Shukuru (2017) studied the effectiveness of school principals in Tanzania and found that when that training equips them with the skills and tools needed to accomplish their tasks appropriately. When principals accomplish their tasks appropriately, it affects the school as a whole, including students' the learning outcomes. The tools principals need may be abstract, for example leadership and vision (Grubb, 2009).

Other studies including Day et al. (2011), Sebastian et al. (2016), and Burhanuddin (2018) also examined principals' leadership, effectiveness, and working performance and how these are associated to the learning outcomes of students. Within schools, teachers, students and other school staff view principals as the principal source of leadership, which inspires them to work together to meet learning objectives assigned by the leader. Clark et al. (2009) explored the association between school principal factors such pre-service training and professional development training and students' learning achievements. They found little evidence on the association between principal characteristics and students' learning outcomes. However, they found a positive relationship between principals' previous assistantship experience at their current school and students' outcomes, among inexperienced principals.

According to Fuller et al. (2007), principals affect students' students' achievements through mechanisms related to instructional leadership, the creation of a learning culture in schools, and the mentoring of teachers. They add that the quality of principals is determined by a good quality training program, from both the perspectives of pre-service and in-service trainings. Some other studies also support that school principals' preparation programs in terms of their content, quality, and standards play an important role in determining the effectiveness of principals in improving school performance (Kaplan et al., 2005; Knoeppel & Rinehart, 2008; Owings et al., 2005). For instance, Knoeppel & Rinehart (2008) found that principals'

pre-service training and experience in education are good predictors of their actions in the schools, and these are linked with better students' academic performance.

Students' learning depends to a large extent on schools, as they are the primary place where it takes place. Therefore, may studies investigated how school factors or inputs like school resources contribute to improve learning (Ishiguro, 2018; Adelabu, 2012; Krishnaratne et al., 2013). Wokadala (2016) quantitatively examined how school and teacher inputs are related to performance of students in Uganda, and among school factors investigated are school resources like textbook-student ratio and per student expenditure. The results of this study indicate that school resources are significant predictors of literacy and numeracy scores of students. However, one highlight of the study is that resources are important for learning achievements, as well as how the resources are used, because efficiency of use of resources is also a mitigating factor.

The finding is consistent with Glewwe, Kremer & Moulin (2009) who studied school resources viewed as textbooks and learning achievements in Kenya. They also found that textbooks increase the learning achievements of students, but only good students. For these authors, textbooks are written in English, the third language of most students, and because of that weak students cannot use them efficiently. This suggests that heterogeneity of student individual factors is to be considered to better grasp how resources affect students.

In addition to the case of Uganda and Kenya, Glewwe & Kremer (2006) compared the effect of school resources in developed countries and developing ones, and found that given the current conditions of education in developing countries, there is no evidence that an increase in resources will improve learning achievements. In other words, there is no significant relationship between school resources and learning achievements. A literature review by Glewwe et al. (2011) focused solely on the relationship between school resources and student outcomes in developing countries. The objective of the authors was to find whether there is consistency in the research results given by previous scholars on the impact of school resources on learning achievements in developing countries. The finding of the authors was

that there is little evidence to support a relationship between school resources and learning achievements.

Sabarwal, Evans & Marshak (2014) also studied how school resources proxied by textbooks affect students' performance. The authors exploited a program by the government of Sierra Leone which provided students with textbooks in 2008. This evaluation of the authors was through a quantitative method, and the results showed no impact of the school resources distributed on the literacy and numeracy scores of students. The explanation given by the authors for this non-significant finding is that resources were not reaching students, i.e. many school administrators were just storing books received, without allowing students to use them. In fact, according to the hypothesis of the authors, it was uncertain for school administrators that they would have other resources in the future, so they were storing the ones received, to ensure that they have enough stock for future use. This finding indicates that agents within schools are mediators on the impact of school resources on academic performance. Kremer, Brannen & Glennerster (2013) also examined developing countries and found that test scores are not affected by school resources, but rather pedagogical reforms on teaching practices, and reforms that increase accountability or incentives.

3.3. The Effect of Community Factors on Students' Learning Achievements

An aspect of parental involvement in education developed by Epstein (1987) is collaboration with the community. Communities are groups where members share many characteristics, such as geography, culture, and race; they can be homogeneous or heterogeneous (Shaeffer, 1992). Community participation in education has become a topic of concern, and there are various reasons given for the rationale of this participation of the community in education. It is recognized by scholars that participation of the local community in education affairs has many benefits for many educational outcomes (Kumar, 2013). Governments want to provide equal access to quality education to all individuals, but also improve educational management and planning. In developing countries, where governments usually face financial difficulties, communities can contribute for example to expand access to education by taking their own

initiatives in building schools and hiring teachers while waiting for support from the government (World Bank, 1999).

In addition to the its potential positive impact on education demand, some scholars found that community involvement in education can contribute to improve education quality. In terms of the management of schools, communities can help supervise school finances, they can provide necessary physical resources or human resources to schools where governments fail to, and they can constitute themselves as advocators at local and national level for an improvement of education quality (Kendal, 2007). However, community participation in terms of how it is defined is not clear, and it can be presented in various forms.

Swift-Morgan (2006) investigated what community means in the case of Southern Ethiopia and found that the concept is complex, but there are more or less visible characteristics or forms of community participation. These characteristics or forms mostly refer to financial contributions instead of involvement in the decision-making, the administration of schools, or the learning and teaching process. In addition to the various forms that community involvement can take, there are various factors that determine involvement of the community in the local school affairs. Some communities want to have an "immediate return" (payments or per diems) of their involvement in school affairs, as an incentive or sometime a condition for their involvement.

This is what Takyi et al. (2014) found for the case of communities in Salaga Town Council, Ghana. The authors added other reasons that encourage or reduce community participation in education. These reasons are time constraints, conservative ideas of some community members, communication gaps, and some schools not open to "allow" communities in school affairs etc. Regarding this last aspect of the challenges to get involvement of the community in education, Abbass (2012) suggests that it is of great importance for schools to be open to welcome communities so that they can work together. In addition, democratic participation of the community in education needs to be encouraged. In other words, there is a need to bring all members of the community, regardless of their social

background, so that all together the community can work towards achieving quality education for students.

Participation and involvement of the community in the school life are important inputs that can enhance the academic performance of students. A common body through which the community gets involved in school life is PTAs in schools. This type of involvement can have a direct impact on students' learning, but it can influence students indirectly through inputs which can affect academic performance. Coly (2014) examined the effect of involvement of PTAs in Senegal on students' learning outcomes. The scholar found that in general, commitment and efforts of PTA is seen by students as reassuring and an encouragement for them to perform well in school. Furthermore, many students can have educational and social needs that schools by themselves cannot meet, and involvement of PTAs help meet these needs, contributing to avoid academic failures within schools. Still on the case of Senegal, Coly (2014) also added that the presence of PTAs in school management meetings gave students confidence to present learning issues or needs that they have and want solutions for.

PTAs implications in school life also have an indirect influence on children's academic performance, through the effect on parents and teachers (Park & Holloway, 2017). For example, community involvement in education was found to improve teacher attendance for some cases in India and Uganda (Galab et al., 2013; Zeitlin et al., 2011); it is known that teacher non-attendance is one of the barriers to the learning of students in many developing countries, so this increased teacher attendance can help increase learning. Alam (2015) used a case study method to investigate how community factors contribute to improve the quality of education. The scholar found that cooperation and involvement of the community contribute to improve education quality in primary education no matter the location of the school, i.e. rural or urban. Communities can cooperate with schools through school bodies like Parents Teacher Association (PTA), School Management Committee (SMC). This cooperation allows the schools, parents and the whole community to communicate, share knowledge about the performance of students and take corrective measures if needed.

In addition to these inputs, a previous scholar has shown that the community can contribute by creating an environment with supportive relational networks among community members, and these important factors contribute to the academic outcomes of students in the community (Williams, 2011). A supportive relational network is a strong group that can encourage students to work harder and there can be role models for these students in the network to guide them towards academic success. Nyoni et al. (2017) examined how external factors to schools affect academic performance of students in Zimbabwean schools. Among the external factors that they investigated, they included school-community relations, which is a form of involvement of community in education.

Results of the scholars suggest that community involvement is positively related to academic performance, as it helps students and school staff feel that they belong to the same community: this is an encouragement for each party to give the best of themselves for a good academic performance. Owoeye (2011) who examined the case of some rural schools in Nigeria added that important teaching and learning resources needed by schools may not be enough, so a good school-community relationship allows the community to support schools with such resources, and also incentives to encourage the teachers. This is consistent with Santos (2014), who found that communities can influence students' learning achievements by using part of local resources to improve resources of schools. From these studies, it can be said that community involvement in the form of good relationship between schools and communities is positively related to academic performance of students.

Kozuka, Sawada & Todo (2016) exploited the "School for All" school-based project in Burkina Faso to investigate the relationship between community involvement and educational performance in Burkina Faso. The program consisted of organizing schools to establish a management committee and also added community members who are in charge of promoting community involvement in school affairs among other community members. In addition, the program provided training for school staff and community member involved in school life. After evaluation of the program, the authors did not find any significant impact of community involvement on learning outcomes of students in participating schools. One explanation of this

finding given by the authors is that the involvement of the community was more in a form of supplementing school infrastructure and supplies, and not one that directly targeted learning achievements. Banerjee et al. (2010) evaluated the participation of community members in a program that provided them necessary training and materials to get involved in school life in some Indian villages. The finding of this study was that the involvement of the community did not show any significant impact on students' learning outcomes.

Beasley & Huillery (2015) examined the impact of community involvement program (in form of giving communities opportunities to participate in school management) on learning achievements in some schools in Niger. Through the program the contributions and involvement of parents in school life matter increased, and there was more cooperation between school and education stakeholders. This helped schools reduce issues related school infrastructures or resources and improve school attendance at lower grades. Despite these gains, the study highlights that the increase of community involvement did not have any significant effect of students' test scores. Therefore, despite the strong willingness of communities to improve education quality through more involvement in school management, they are unable to due to low authority and weak capacity.

Menno et al. (2014) also examined the impact of community involvement in Indonesian schools by exploiting a community engagement program that aimed at improving education quality in these schools. The program involved reforms that strengthened the school committee trustworthiness and relationship with the community. Evaluation of the program by the authors revealed that community involvement has no impact on mathematics score. Therefore, reforms to engage communities more in education can be implemented, but their effectiveness on learning outcomes are not obvious or can even be negative (Vasquez, 2012).

Research has shown that a form of community involvement that can be beneficial to education quality in developing countries is the participation of women in the school life of their children (see for example Banerji et al., 2017; Deshpande et al., 2017; Niels-Hugo, 2017). A study by UNICEF (2009) reported how such a contribution of women in the community through their involvement in school PTAs influenced positively the quality of education in a

rural village in Ghana. Regular PTA meetings were held and only fathers attended them, until actions were taken to get women involved in PTA meetings, because schools wanted issues related to girls to be better understood and well-represented. The involvement of community women in PTA meetings contributed to enrich communication about gender issues that are linked to the learning of students, and even contributed on topics that are relevant to all students and affect their learning. The lack of involvement of community women in school affairs was due to lack of education, and the belief that women could not contribute in school life or that community contributions were only reserved to men. Awareness and knowledge of the potential that of involvement of the whole community has for education quality is needed for a full involvement of community women in school life (Rao, 2012).

In addition to this general literature on factors that affect school attendance and leaning achievements, some studies focused on gold mining area context to analyze the topic. In this specific economic context, some parents leave home for a long period, leaving children without the necessary adult supervision, and specifically this can be found in mining areas where parents work on mining related activities, which require them to be away from home for a long time (Nightingale et al, 2017). This lack of supervision is still there even when parents come back home, as even when parents are back home, for the first few days they are sleeping because they are tired from work. Some parents would give their children pocket money, thinking they are providing for the needs of the children, but the children would use that money to do whatever they want and not attend school. In this sense, the decision to attend school also depends to some extent on children themselves, that is their individual characteristics. Students have different personalities, skills, perceptions, and goals, which determine their decisions to attend school or not. Families enroll children, but some of them would not go to school due to some reasons like peer pressure, or lack of motivation. Redehey (2017) supports this as he wrote that children from elementary school age and above decide by themselves not to attend school but rather join mining sites to work to get money, and sometimes their parents are not aware of the children not attending school.

Osei-Tutu (2017) examined the case of some Ghanaian students living, working, and going to school in some small-scale gold mining communities. According to him, child labor contributes much to the schooling of students, because students get financial benefits which are crucial to their attending school. In fact, many families cannot afford the direct or indirect cost of education (Emery et al., 2012; Morrissey et al., 2013) and would not have sent their children to school, but children find a way to support their families and their own schooling through innovative ways, in exploiting the gold mining context that is relatively favorable in terms of employment opportunities. Maconachie & Hilson (2016) also studied the case of children in small-scale mining communities in Sierra Leone, and found that children participating in mining activities not only provide much needed income for their families, but their labor is also the only way through which they can obtain the finances necessary for them to attend school. Because of such realities, some voices advocate the contextualization and a more understanding of child labor, supporting that child labor and school attendance can be combined (see for instance Ravallion & Wodon, 2000).

Adu-Gyamfi (2014) examined the case of some gold mining communities in Ghana and found that labor affects school attendance negatively, but mainly based on seasons. Gold mining activities have peak seasons (when it is not raining for example), and students do not attend school regularly during these peak seasons, as they spend most of their time working on mining activities to get money ILO (2007). In other words, mainly in peak seasons of gold mining activities, students use their school time for labor, and that is why their school attendance is affected negatively. Santos (2014) & Santos (2018) exploited the gold mining boom in Columbia to investigate how school attendance reacts to child labor in a context of gold mining, using instrumental variables as a method. The author found that when child labor increases, school attendance decreases. This can be explained by the fact that families increase their income more when they send the child to work instead of attending school, because the gold mining context makes wages relatively good.

CHAPTER 4: METHODS

4.1. Analytical Framework

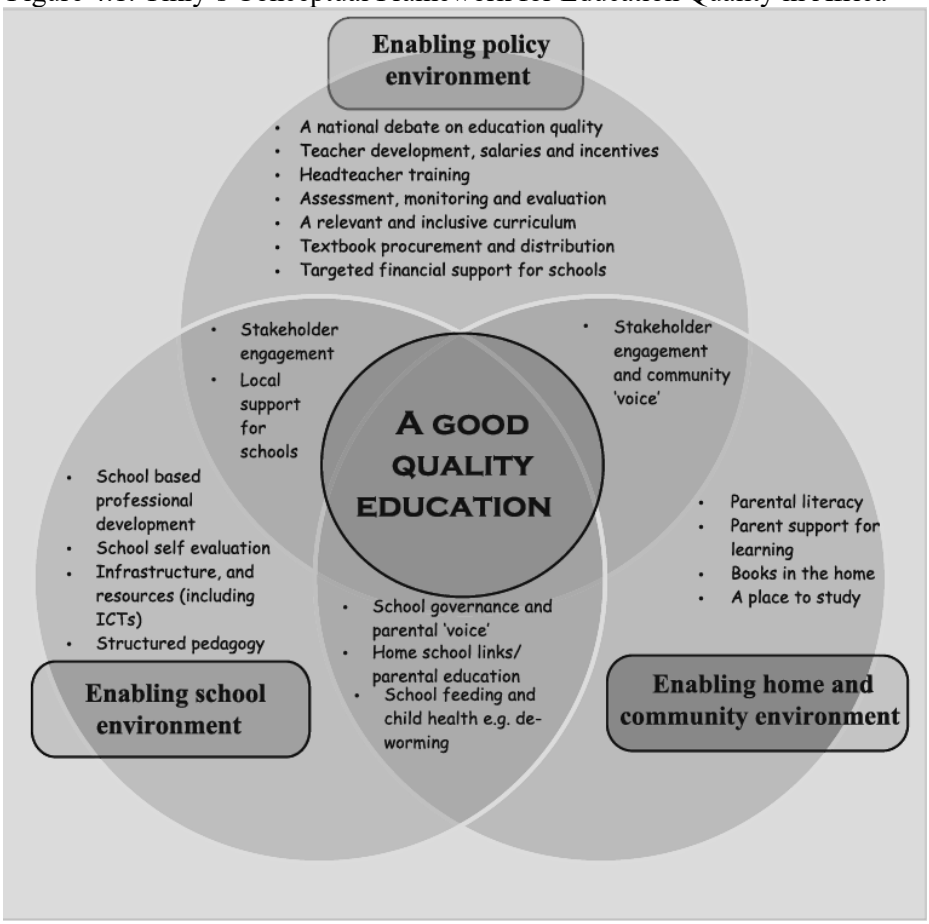
The main purpose of this study is to evaluate the effect of family, school, and community factors on primary school students' attendance and learning achievements in Burkina Faso's gold mining areas. School attendance and learning achievements are used as poxies of education participation and education quality, respectively. With school efficiency discussions in the background, many scholars have developed conceptual frameworks of the factors that influence education participation and quality (e.g. see Heneveld & Craig 1996, Heneveld 1994; Scheerens, 2005).

Under the education production function, the frameworks developed by scholars assume that education production is determined by an input-output function. Many scholars viewed what is happening between the input and output process as a black box, i.e. they are not much interested in what is happening within the process. The primary goal of the education production function is to grasp the combination of factors that would produce the optimum of the outcome of interest, for instance cognitive skills (DÖŞ, 2014). This entails that there is a maximum level of output that can be produced for a given combination of inputs (Krugman, 2009). However, many other scholars suggested that the process between the input and output is also very important in understanding education production, then it needs to be considered in analyses of the education production function.

From the perspective of considering the process in the education production function, Tikly (2011) developed a conceptual framework for understanding quality education in the context of developing countries. According to this scholar, education quality is a product of the interaction of three environments, namely, policy, school, and home/community environments. The common point of this framework with the one of the education production function is that it assumes that the right mix of inputs into each environment component can contribute to get the desired output. However, what makes it different from the early education production function scholars is that it goes beyond the input-output view of education.

Specifically, it stresses the importance of the processes that are taking place within each environment, as a requirement to get expected or desired outcomes. Therefore, creating quality education involves paying attention to what is happening within each environment and ensuring that inputs and effects close the gaps that may exist between two environments (e.g. implementation gap between national policy and its implementation at the school level).

Figure 4.1: Tikly's Conceptual Framework for Education Quality in Africa



Source: Adapted from Tikly (2011)

Figure 4.1 describes Tikly (2011)'s environments or dimensions that determine quality education: enabling policy environment, enabling school environment, and enabling home and community environment. Within each enabling environment, there are many variables or factors that are very important to the outcome. The selection of these variables or factors to assess each enabling environment must be done based on identification of those variables that have been proven to produce relatively high levels of the outcome of interest (Scheerens, 2005). This implies that some variables may be theoretically related to the outcome of interest, but

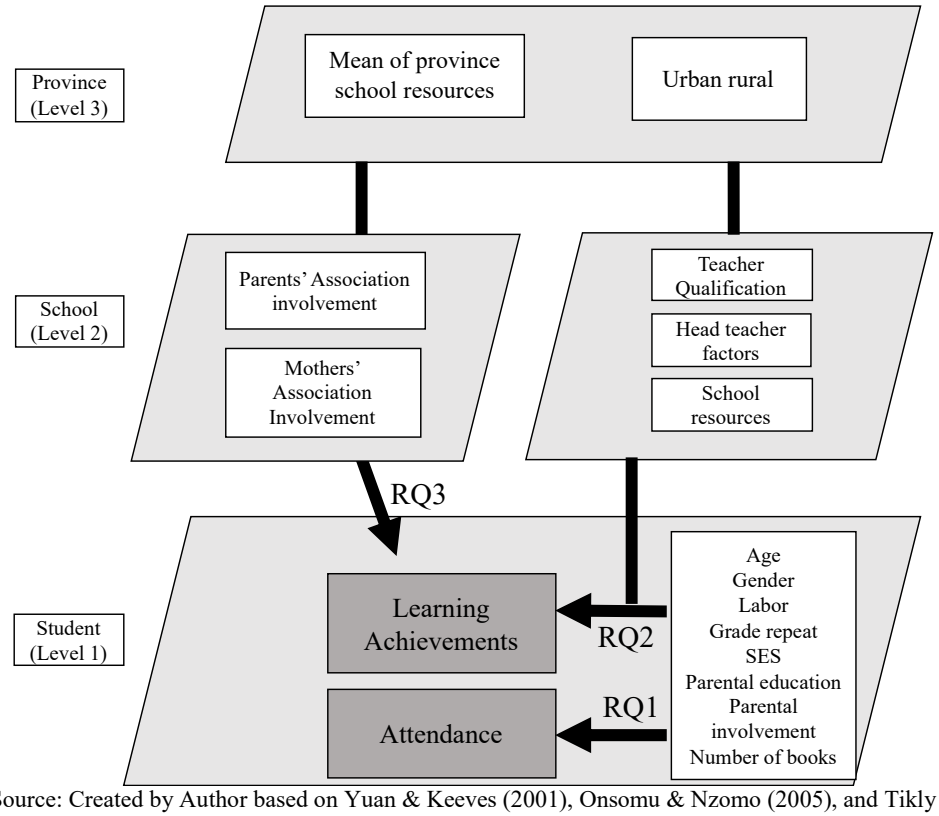
empirically, they may not be. There may not be a need to pay attention to these factors not strongly related to the outcome, but they are to be examined empirically first to check an existing or lack of relation with the outcome of interest.

The analytical framework in figure 4.2 below is designed based on two previous works, precisely those of Yuan & Keeves (2001) and Onsomu & Nzomo (2005), and also incorporated much of conceptual framework for understanding education quality in Africa developed by Tikly (2011). In creating it, this study followed the assumption of previous scholars, dividing the factors affecting education participation and quality into three groups of factors: student individual and home level factors, school level factors, and province level factors. As already presented above, Tikly (2011) also divides the dimensions that affect quality education into three groups. Student individual level factors include child basic attributes, namely gender and age. The individual level factors also include those related to the characteristics of the household the child belongs to, such as socio-economic status of the household, parental involvement in child's education, and parental education status. School level factors include teacher professional qualification and other related factors, school head teacher factors, school resources, and the forms of involvement that the community members (Parents Teacher Association and Mothers Association) provide to schools. Province level factors involve the geographical location of the school (i.e. rural or urban), and the mean province school resources by province.

Figure 4.2. also indicates a multilevel conception of the framework that is study employs. As can be seen, students are at the lowest level (level 1) and are nested within schools (level 2), which are nested within provinces (level 3). The rationale behind the hierarchical conceptual framework is that the differences in level 1 (individual students and respective family factors) account for variations in the outcomes of interest. Moreover, differences at level 2 (schools) also explain variances in the outcomes of interest, and so do differences at level 3 (province levels). The data is then conceptualized in different levels or groups, each grouping having an effect on the outcome of interest (in addition to the variables used in the study). In order to avoid biased estimates of the effect of factors of each level on the outcome of interest,

differences at the lowest level, middle, and the highest level need to be considered (Ker, 2014). The traditional one-level analyses, that is to conventional regression, do not take the hierarchical nature of the data into account. In other words, school level effect and province level one must be included in the analysis, to avoid biased estimates.

Figure 4.2: Analytical Framework of the Study



Source: Created by Author based on Yuan & Keeves (2001), Onsomu & Nzomo (2005), and Tikly (2011)

In order to evaluate the factors that are important for the school attendance and learning achievements of students in gold mining areas in Burkina Faso, a certain number of factors are employed by this study. Student level factors are individual ones that are known to affect the outcomes of interest, and they refer mainly to gender, age, and labor status. Students' family factors such as family SES, parental involvement and household head education also influence the outcomes of interest. School level factors are composed of teacher and head teacher factors, school resources, and the involvement of the community through the community as a whole and community women as well.

4.2. Hypotheses

This study identified six hypotheses corresponding to each sub-research question that is given in section 1.3. Precisely, the sub-research questions were: 1-1: To what extent does parental involvement increase the likelihood of primary school attendance across socio-economic groups in gold mining areas? 1-2: To what extent does the effect of parental involvement on the likelihood of primary school attendance differ depending on child gender and child labor status in gold mining areas? 2-1: To what extent do the level of parental involvement, the number of books at home and child labor affect students' learning achievements between high-performing students and low-performing ones in gold mining areas? 2-2: To what extent do teacher qualification, head teacher factors and school resources influence students' learning achievements between high-performing students and low-performing ones in gold mining areas? 3-1: How does support of students in need by school Parents Association (PA) affect learning achievements in mining areas? 3-2: How does Mothers Association (MA) involvement in school life affect students' learning achievements in gold mining areas? Before answering the research questions, the study set up hypotheses, based on previous studies, and the following are the formulated hypotheses for each sub-research question:

Hypothesis 1-1: **In gold mining areas in Burkina Faso, the effect of parental involvement on primary school attendance increases as socio-economic level increases.**

Hypothesis 1-1 is formulated based on the existing literature in relation to the determinants of school attendance. The determinants of school attendance have been examined by previous scholars (De Walque & Valente, 2018; Sackey, 2007; Simuforosa & Rosemary, 2016). Among the scholars given, Simuforosa & Rosemary (2016) found that when parents are involved in their children's education, the latter attend school without missing any classes. According to this scholar, some parents may be busy and some do not give much importance to education, but when they find time to monitor their children, it leads to an increase of their school attendance. Moreover, Cook & Ezenne (2010) suggest that the monitoring of children by

parents is a way of involvement in education which encourages children to attend school. From these perspectives, parental involvement increases school attendance.

While studies seem to suggest that parental involvement has a positive effect on school attendance, little is known about the effect of involvement on school attendance of children from different socio-economic categories. Despite this, a study by Komakech & Osuu (2014) found that poverty is among most of the reasons for children not attending school. Due to poverty, children may not be listening to parents even though the latter strive to get them attend school. In other words, the hard situation that children may be going through (poor families usually cannot provide the basic needs of their children) can be a hindrance to the effectiveness of parental involvement on school attendance of children. Furthermore, Ocak, Ocak & Baysal (2017) found that parental involvement on students' school attendance may be ineffective due to reasons which are at the student individual level characteristics. These characteristics would moderate the effectiveness of parental involvement, and depending on the situation it can even make it disappear.

The study also expects the effect of parental involvement on school attendance to be higher among families with higher economic status. This hypothesis is based on a study by Shehu (2018) which found in northern west Nigeria that wealth moderates the impact of some household factors on school attendance. As children may want to generate income for themselves and sometimes even for the family, they tend to have much freedom when parents are not able to create an environment where there is not a need for children to work. When parents are not physically available or they cannot afford financially for the needs of their children, the latter decide to go on their own to look for what parents could not provide for them. Rich families are able to provide for the basic needs of their children and also monitor the education of these children, then the latter are more likely to attend school, as they have no reasons or excuses not to.

Hypothesis 1-2: **The effect of parental involvement on primary school attendance is higher for boys relative to girls, and also higher for working children relative to non-working ones**

Hypothesis 1-2 is about how gender and child labor moderate the effect of parental involvement of primary school attendance. There are not many studies that assess how these two factors moderate the effect of parental involvement on school attendance. A study that has addressed a similar topic is Posso & Feeny (2016). The study by these scholars found that the likelihood of school attendance is determined by child labor factors. Precisely, because children have to do household chores or some labor outside the house, the likelihood of their school attendance reduces. However, when parents get involved in the education of these children, the likelihood of their school attendance increases, while for non-working children they will likely attend school, even without much involvement of parents. Moreover, a study by Sore & Maiga (2015) found that there is no combination between school attendance and labor, as a child cannot be in school and at the same time be working at a given place. Parents then need to monitor the children for their school attendance to increase.

This study expects to find that the effect of parental involvement on primary school attendance is higher for boys, based on some previous studies that found that girls may have to do work outside the household, and even inside the household when they come back home (Lodhi, Tsegai & Gerber, 2011; Admassie, 2000). For example, Lodhi, Tsegai & Gerber (2011) found that the differential between boys and girls is also related to the selection of the type of job related to genders. In other words, in a rural environment, the types of jobs that boys may have access to are different than those girls can have access to. Jobs are very closely related to gender, in terms of requirements and also in terms of social views sometimes.

As this study focuses on gold mining areas, we hypothesize what was just mentioned above. In gold mining areas, there is relatively jobs that are available in abundance and done by children. Some previous scholars found that due to various reasons, most working boys and working girls do not have the same chances or patterns of school attendance, and this may be due to many factors, such as the nature of the work, the environment, and beliefs of parents (Doh et al.,2016; Hinson et al., 2003). For example, Doh et al. (2016) found that girls can afford many things financially, but they cannot attend school regularly due to the reasons mentioned

above. It is therefore important to consider these factors in order to understand the relationship between parental involvement, child labor and school attendance.

Hypothesis 2-1: **In gold mining areas, parental involvement, the number of books at home and child labor increase learning achievements of high-performing students relative to low-performing ones**

Hypothesis 2-1 is about the relation between family factors and learning achievements of students. It therefore addresses demand-side factors in terms of students' learning achievements. There are few studies that have addressed directly the topic of this study. However, since there are previous studies that may have links to the topic, this study relies on these previous ones to formulate the current hypothesis.

The study expects to find that family factors (parental involvement, the number of books at home and child labor) are more important for high-performing students relative to low-performing ones. Precisely, the study expects that these factors positively affect high-performing students relative to low-performing ones. Previous studies found that the involvement of parents has a positive influence on the learning achievements of students, and therefore parents need to make some time to sit and communicate with children at home (Obeta, 2014; Mahuro & Hungi, 2016 Gubbins & Otero, 2016). With these studies in the background, this hypothesis is that these students perform high because there are students who are receptive of the involvement that parents may provide to them. This involvement is therefore more effective on this category of students.

The hypothesis related to having books at home was formulated based on Coulidiati-Kielem (2016). This scholar found that the fact of having books at home gives an advantage to children, as they can study even outside the school, and that will help them perform well in school. Having books is more effective for learning achievements of high-performing students relative to low performing ones, because books are usually written in the official language, the second or third language of the students (French for the case of Burkina Faso), but only good students (high-performing ones) can use them or read them and comprehend the content: this

is what Glewwe, Kremer & Moulin (2009) found for on the effect of textbooks on learning achievements for the case of Kenya.

This study focuses on gold mining areas, and the hypothesis related to the effect of child labor on learning achievements was formulated based on studies related to education of children working on gold mining areas. Okyere (2012) found for the case of Ghana that the interconnectivity of learning achievements of children living around gold mining areas or even working on mines is not entirely negative compared to those who are not. In mining areas, the socio-economic conditions of many families reveal much poverty and poor good living conditions. In such circumstances, gold mining labor is an opportunity for children, as they can find work or activities related to mining, to provide for their schooling needs. They can then "innovatively finding a balance between schooling and work" (Osei-Tutu, 2017). Ultimately, according to these scholars, child labor helps students' schooling instead of hindering it.

Hypothesis 2-2: **In gold mining areas, teacher qualification, head teacher factors and school resources have a positive effect on learning achievements of high-performing students relative to low-performing ones**

In hypothesis 2-2, we posit that teacher's qualification is positively associated with students' learning achievements, based on previous studies which found that teachers have what it takes to conduct effective and efficient classes (Prasertcharoensuk et al., 2015; Bartilol & Ng"eno, 2016; Munawaroh, 2017; Abdalla et al., 2014). Teachers who have had professional development training know how to adopt teaching methods according to the needs of their students, impacting their learning achievements positively (Akinfe, Olofinniyi & Fashiku, 2012). Just as to support this view, Harris & Sass (2011) found that teachers with more experience are more effective at their teaching, shown through better performance of their students. Training gives them the necessary tools to face any situation that they may come across during their teaching process. Pedagogical practices are known to be strongly related to children's learning achievements, that is why training is expected to be positively related to students' learning achievements.

Like the case of teacher training, this study expects that qualified school head teachers have higher impact on high-performing students, as previous studies found that qualified head teachers improve their management skills through trainings, and they can impact students' learning achievements directly or indirectly through teachers (Iwu & Iwu, 2013; Day et al., 2011; Sebastian et al., 2016). According to Burhanuddin (2018), teachers, school staff and students view the head teacher as the source of leadership. A qualified one will therefore inspire all school actors and stakeholders to work together to the meet the learning objectives that they set together. School head teachers seem to be affecting not only students, but everyone in the school. Because of such findings of these scholars, this study assumes that head teachers affect learning achievements of high-performing students positively relative to low-performing ones.

Furthermore, this study assumes that schools with better resources improve learning achievements of high-performing students relative to low-performing ones. This was formulated based on the background that higher school resources can provide better teaching materials to facilitate teaching, and also learning materials to help students in their learning process (Maimela, 2016; Ishiguro, 2018; Adelabu, 2012; Krishnaratne et al., 2013). School resources, such as textbooks, were found to be improving the learning of "good" students only, because these resources fit these students due to their high language competencies (Glewwe, Kremer & Moulin; 2009). This study also assumes that high-performing students are the "good ones", and school resources will fit them more than low-performing ones.

Hypothesis 3-1: **In gold mining areas, parent's association support of students in need has a positive effect on students' learning achievements.**

This study expects the support that parents' association provided to students in need to improve learning achievements. In many developing countries, like Burkina Faso, there are many students who are in need, academically and non-academically (financial hardship, family issues etc.). Communities that support students to meet their needs encourage them to work harder and this has a positive impact on their learning achievements (William, 2011; Coly; 2014; Owoeye, 2011). This encouragement can make other students in the school work harder, as

they know that the whole community cares for their success. This is the finding that was the basis for the assumption of hypothesis 3-1.

Moreover, hypothesis 3-1 was formulated based on other previous studies. Involvement of PTAs in some schools and their relationship with education quality was examined by previous authors who found a positive relationship between the two (Park & Holloway, 2017; Galab et al., 2013; Zeitlin et al., 2011). Park & Holloway (2017) found that PTA involvement in supporting schools has an indirect effect on students' learning outcomes through parents and teachers. It reduces for example teacher absenteeism, one of the factors of poor learning achievement of students (Galab et al., 2013; Zeitlin et al., 2011). Hypothesis 3-1 is formulated with also an indirect effect assumption, as well as a direct one.

In many developing countries, involving the community (e.g. PTA) in school management is one of the widespread practices, with the premise that it has the potential to improve performance of students (Kozuka, Sawada & Todo, 2016). Based on these scholars, this study expects then the participation of PAs in school life by supporting students in need to be positively related to education quality. PAs are aware of the current low education quality and seek to improve learning achievements of students when they participate in school life. This is also what is assumed when formulating hypothesis 3-1.

Hypothesis 3-2: **In gold mining areas, mothers' association involvement in school life affects students' learning achievements positively.**

Hypothesis 3-2 was formulated based on previous studies that examined the involvement of community women in school life, mainly through mothers' association for education (Deshpande et al., 2017; Niels-Hugo, 2017). In a study related to the involvement of communities in school life in Burkina Faso, Compaore (2006) found that women may play a role that contributes to improve education quality in school. In Burkina Faso, women structure their involvement through shifts and help in school feeding programs. This helps students who live far away to study right after eating lunch, instead of using their time to walk long distances for food. Hypothesis 3-2 assumes a similar indirect effect.

Awareness of the potential that involvement of community women has for education quality is needed for a full involvement of community women in school life (Rao, 2012). This implies that women engagement has a potential to improve education quality, including learning achievements. UNICEF (2009) found that involvement of women in school management meetings in rural Ghana contributed to issues related to girls to be better understood and girls being well-represented. Based also on these studies, hypothesis 3-2 was formulated, and the study expects mothers' association participation in school life to be effective to improve learning achievements.

4.3. Models

4.3.1. Model Identification Strategy

This section describes the regression models used in this study. The main goal of the study is to evaluate the effect of family, school, and community factors on students' school attendance and learning achievement in Burkina Faso's gold mining areas. Some research questions related to the main research objectives were set up, and sub-research questions related to the research questions were formulated in order to reach the objective assigned. In order to answer research questions 1-1 and 1-2, this study employs maximum likelihood probit. A probit model is often used to estimate the association between a dependent variable and one or more independent ones. Generally, in order to investigate the family factors of interest which affect school attendance of children in gold mining areas in Burkina Faso, a linear probability model (LPM) may be applied. LPM is a regression applied when a study has a dichotomous response variable, also referred to as binary response variable. LPM model can be specified as:

$$\Pr(y=1|\mathbf{X}) = \mathbf{X}\beta \qquad (4.1)$$

Where $\mathbf{X}$ is a vector of explanatory predictors, i.e. the independent variables, and β is the slope coefficients of these explanatory predictors. y is the dependent variable, and is random with a Bernoulli distribution, therefore, the conditional mean and variance of y can be written as:

$$E(y=1|\mathbf{X}) = \mathbf{X\beta}, \quad (4.2)$$

$$\text{Var}(y=1|\mathbf{X}) = \mathbf{X\beta\,(1-X\beta)}. \quad (4.3)$$

Equation (4.2) implies that there is heteroskedasticity that occurs, except in the case when all of coefficients of the slopes equal zero. Just like in a regular Ordinary least square (OLS) regression, heteroskedasticity-consistent standard errors are one of the required assumptions in LPM (Wooldridge 2010). Furthermore, when there is consistency in the parameters estimates in the linear projection, LPM estimations are useful. However, there are moment when the fitted values are continuous, i.e. not between zero percent and one hundred percent. In such cases where the fitted values are continuous, the value of $\hat{y}$ cannot be explained by the estimated predicted probability which may have positive or negative values. These will be inconsistent in the results that are estimated.

There are therefore known inconsistencies in estimating probability of a binary response variable in using LPM. Among the issues, a major one is that the fitted values can be less than zero or over one, which does not make sense, as fitted values of conditional probabilities are in theory expected to be between zero and one. Moreover, when LPM is put through the homoscedasticity test as a requirement of OLS, the test may show that this assumption requirement is not met, i.e. the error term is heteroscedastic. Due to these various issues in estimating a dichotomous response variable with LPM, the method is not recommended when estimations are employing a binary response variable. There are other methods which are recommended, as they yield more consistent estimates. One of these methods addressing the issues of LPM that is often used in a dichotomous response variable is probit model. This is the method that this study employs to answer its first sub-research questions.

Previous studies about factors affecting student's school attendance utilize the number of hours in school attendance over a period of time (e.g. a week or a month) as a proxy of school attendance, and use methods like OLS regression for their analysis (see for instance

Burke & Beegle, 2004). However, probit regression is the method retained for this study because school attendance is treated as a binary variable in the dataset used. Probit regression is among regression methods that have a treated limited dependent variable (LDV), which is a dependent variable whose range values are substantially restricted (Woolridge, 2013). Probit regression was also used in previous studies similar to this current one (see for example Bansagan, & Panganiban, 2008).

In order to avoid the issues of the LPM explained above, equation (4.1) is transformed into a probit regression model. This can be specified as shown in equation 4.4 below:

$$\Pr\ (y=1|\ \mathbf{X}) \ = \ G(\beta_0 + \beta_1 x_1 + \ldots. + \ \beta x_k) = \ \ G\ (\beta_0 + \mathbf{X}\beta) \qquad (4.4)$$

Where **X** is 1 x K conditioning variables, and we take the first element of **X** to be unity. G is the standard normal cumulative distribution function (cdf), and takes a value between 0 and one for all real number z: $0 < G(z) < 1$ for all $z \in R$. Equation (4.4) restricts the estimated response probabilities between zero and one (Woolridge, 2010). In order to ensure that the response probabilities fall between zero and one, there are some non-linear functions in equation (4.4). G the standard normal cumulative distribution function (cdf) is expressed in equation (4.5) below:

$$G(z) \equiv \boldsymbol{\Phi}(z) \equiv \int_{-\infty}^{z} \emptyset(v)dv \qquad (4.5)$$

Where $\emptyset(z)$ refers to the standard normal density, and is expressed below in equation (4.6):

$$\emptyset(z) = (2\pi)^{-1/2} \exp\ (-z^2/2) \qquad (4.6)$$

Moreover, estimations of the dichotomous response variable can be expressed as in equation (4.7):

$$y^* = \ \beta_0 + \mathbf{X}\beta + \boldsymbol{e},\ \ y = 1[\ y^* >0] \qquad (4.7)$$

$y = 1[\ y^* >0]$ defines the dichotomous outcome and is called the indication function which is a value that ranges between zero and one, i.e. $y = 1$ if $y^* >0$ and $y = 0$ if $y^* \leq 0$. There error term

e has to be independent from X, i.e. there must not be any correlation between the two. Also, the error term is assumed to be normally distributed.

$$\Pr\ (y=1|\ \mathbf{X}) = \ P(\ y^* >0|X) = P\ [\boldsymbol{e} >0 - (\boldsymbol{\beta_0} + \mathbf{X\beta})|\mathbf{X}]$$
$$= \ 1- G[-(\boldsymbol{\beta_0} + \mathbf{X\beta})] = \ G\ (\boldsymbol{\beta_0} + \mathbf{X\beta}) \qquad (4.8)$$

It can be seen that equation 4.8 is the same as equation (4.4), but it can derive the response probability of *y*, and is able to explain the effect of X on the response probability Pr (*y*=1| **X**). In binary response models like the probit model, caution is needed when interpreting the values of the coefficient parameters $\boldsymbol{\beta_j}$. As the dependent variable *y* denotes a response between zero and one, the average of the explanatory independent variables represents no one in the sample. In addition, if the explanatory independent variables are continuous variables, the magnitude of the effect on the coefficients is not clear in the non-linear function. For these reasons, the following models are necessary to compute the values of the coefficient parameters.

$$G\ [\widehat{\beta_0} + \widehat{\beta_1}\hat{x}_1 + \cdots\ \hat{\beta}_{k-1}\,\hat{x}_{k-1} + \ \hat{\beta}_k\ (C_k + 1)] \qquad (4.9)$$
$$-G\ (\widehat{\beta_0} + \widehat{\beta_1}\hat{x}_1 + \cdots\ \hat{\beta}_{k-1}\,\hat{x}_{k-1} + \ \hat{\beta}_k\ C_k)$$

$$n^{-1}\ \sum_i^n\ \{\ G\ [\widehat{\beta_0} + \widehat{\beta_1}\hat{x}_{i1} + \cdots\ \hat{\beta}_{k-1}\,\hat{x}_{ik-1} + \ \hat{\beta}_k\ (C_k + 1)] \qquad (4.10)$$
$$(\widehat{\beta_0} + \widehat{\beta_1}\hat{x}_{i1} + \cdots\ \hat{\beta}_{k-1}\,\hat{x}_{ik-1} + \ \hat{\beta}_k\ (C_k)$$

Equations (4.9) and (4.10) are very useful, as they are used to compute what is called the partial effect at the average (PEA) or average marginal effect (AME). The AME is what is used to interpret the results from the probit regression in a straightforward way. For each unit *i*, they estimate the predicted difference in the probability that y_i=1 when x_k = 1 and x_k = 0. When using probit with a dichotomous response variable, equations (4.9) and (4.10) are needed to compute the AME, which is what is used for interpretation of estimates as in a regular OLS.

The method used to answer research questions 2-1, 2-2, 3-1 and 3-2 is hierarchical linear modeling (HLM). In general, one of the most widely used methodologies in statistical analysis with a continuous outcome variable is multivariate linear regression analysis. This is also referred to as Ordinary Least Square (OLS) regression. The simple multivariate regression model of an OLS estimation can be specified as follows:

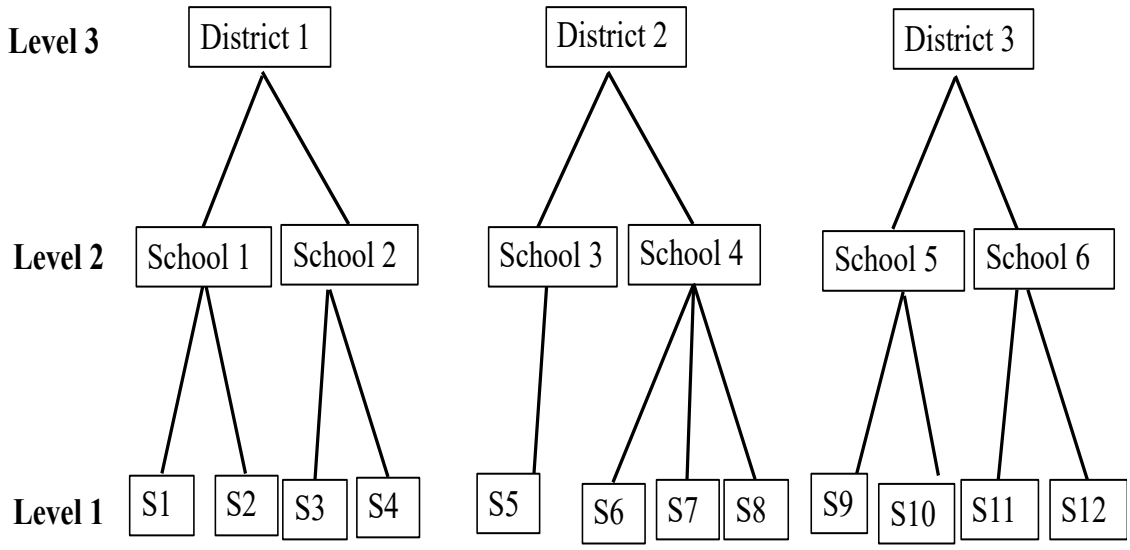
$$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} \ldots + \beta_k x_{ki} + \varepsilon_i \quad (4.11)$$

Where y, x_1, x_2, x_3 ....x_1 are observable random scalars, i.e. they are observable in a random sample of the study population. ε_i is the unobservable random error term, which can consist of various things, for instance omitted variables and measurements errors. The β_0 , β_1, β_2 ... β_k are the parameters the analysis seeks to estimate. One of the critical conditions required to have consistent β_j is that the error term has a zero mean and is not correlated with one of the independent variables, i.e. x_j.

$$E(\varepsilon) = 0, \qquad Cov(x_j, \varepsilon) = 0, \qquad j = 1, 2, \ldots, k \quad (4.12)$$

OLS estimation assumption conditionalities are the requirements to yield consistent results. However, there are cases when the assumptions underlying equation (4.11) do not hold. Therefore, the model and estimation method needs to be changed to another one that addresses these issues. One of the situations when the conditions are not met is when the data arise in forms of groups, precisely in a nested or clustered structure (Woltman et al., 2012). According to Osborne (2000), data grouped in hierarchical levels are common in research, that is they often occur in real world situation. Data in hierarchical structure is often found in the education sector, for example data structured at student, school, and district levels (see figure 4.3). Analysis of data structured in hierarchical levels may yield inconsistent estimations if it is not performed using statistical methods that account for the hierarchical nature of the data: HLM accounts for the nested structure of the data, and is one of the best methods of analysis of hierarchically organized data.

Figure 4.3. Unit Diagram of a Three-Level Hierarchical Linear Model



Source: created by Author based on Leckie (2013)
Note: S= student

HLM is known to be a form of complex OLS regression that is often encountered in education research interested in factors that affect students' learning achievements (Woltam et al., 2012). HLM assumes that individuals within a specific cluster are more similar to one another compared to individuals who are from another cluster. Therefore, examining the individuals without considering the clustering may not provide robust estimations, because clusters may not be homogeneous and individuals are also influenced by them (Hofmann, 1997). The advantage of the method is that it allows the estimation of variances resulting from each cluster while maintaining the appropriate analysis on the independent variables. Moreover, relationships across clusters and between them can be investigated in HLM (Raudenbush & Bryk, 2002). Models applicable for data from the sampling design of HLM framework in figure 4.3 are called three-level hierarchical models, and are specified in steps as follows:

$$y_{ijk} = \beta_{0jk} + \beta_{1jk}x_{1ijk} + \ldots + \varepsilon_{ijk} \quad (4.13)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

Equation 4.13 is the first level model in the hierarchy, and captures the variations in the outcome variable explained by the student individual level covariates. y_{ijk} refers to the

outcome variable for student *i* in school j in district k, β_0 refers to the mean across all districts, and x_{1ijk} refers to a student level independent covariate. ε_{ijk} refers to the student level error terms, and they are assumed to be independent and normally distributed. In the second level of the hierarchy in HLM, the intercept of equation 4.13 becomes the outcome of the model, and is specified as follows:

$$\beta_{0jk} = \beta_{0k} + \beta_{2k}x_{2jk} + ... + u_{jk} \quad (4.14)$$

$$\beta_{1jk} = \beta_{20k}$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

Equation 4.14 does not assume variations of slopes at the school level. In other words, the model assumes that regardless of the school, the effect of the independent variable on the dependent one is the same. β_{0k} refers to the intercept at the school level model. u_{jk} refers to the error term at the school level of the hierarchy, and also refers to the school (as a group) effect on the dependent variable. Just like in the first level of the hierarchy, when moving from the second level equation to the third level one, the intercept of the second level becomes the outcome of the third level equation. This gives the following specification:

$$\beta_{0k} = \beta_0 + \beta_3 x_{3k} + ... + v_k \quad (4.15)$$

$$\beta_{2k} = \beta_{30}$$

$$\beta_{20k} = \beta_{31}$$

$$\nu_k \sim N(0, \sigma_v^2)$$

Equation 4.15 does not assume variations of slopes at the level of provinces. In other words, the model assumes that regardless of the province, the effect of the independent variable on the dependent one does not differ. β_0 refers to the intercept at the province level model. v_k refers to the error term at the province level of the hierarchy, and also refers to the province (as a group) effect on the dependent variable.

Equations 4.13, 4.14 and 4.15 can be specified together as a set, showing the equation of all levels together, as follows in the set of equation (4.16) given below:

Level 1

$y_{ijk} = \beta_{0jk} + \beta_{1jk}x_{1ijk} + ... + \varepsilon_{ijk}$

Level 2

$\beta_{0jk} = \beta_{0k} + \beta_{2k}x_{2jk} + ... + u_{jk}$

$\beta_{1jk} = \beta_{20k}$ (4.16)

Level 3

$\beta_{0k} = \beta_0 + \beta_3 x_{3k} + ... + v_k$

$\beta_{2k} = \beta_{30}$

$\beta_{20k} = \beta_{31}$

$v_k \sim N(0, \sigma_v^2)$
$u_{jk} \sim N(0, \sigma_u^2)$
$e_{ijk} \sim N(0, \sigma_e^2)$

Where x_{1ijk}, x_{2jk} and x_{3k} are the level 1, level 2 and level 3 predictor variables with slope coefficients β_1, β_2 and β_3, respectively. The v_k and u_{jk} are the random effects at the province and school levels, respectively. The ε_{ijk} refers to the residual errors and are assumed independent of the predictor variables. Just like in equations 4.14 and equation 4.15, equation 4.16 assumes the same slope at the province level and the school level of the data. β_0 refers to the intercept at the highest level of the hierarchy, and v_k is the error at that level. The terms v_k, u_{jk}, and ε_{ijk} are assumed independent and normally distributed. It is important to mention that the equations 4.13, 4.14 and 4.15 function as a set of equations, since they cannot be separated. Furthermore, it is important to test the clustering of the data empirically, to establish that a three-level HLM (or a two-level HLM) fits the data to be analyzed better than a single-level model (ordinary OLS that includes no cluster or supercluster).

4.3.2. Model Specification

School attendance in this study takes the nominal value of 1 if the child surveyed attends primary school, and 0 if otherwise. Following sub-research questions 1-1 and 1-2, the two categories are children who attend school and children who do not attend school. Let *y* denote the binary decision of school attendance, and X is a vector of K conditioning variables, the probability that a student attends school can be expressed as follows:

$$\Pr\ (y=1|\ \mathbf{X}) \ = \ G\ (\beta_0 + \mathbf{X}\beta) \qquad (4.17)$$

Where y_i is the dependent variable, precisely $y_i = 1$ if child attends school and $y_i = 0$ if child does not attend school. β_0 is the intercept, and **X** is a vector of the predictors that are used for the analysis. Specifically, there are predictors at the child individual level (age, gender), at the child household level (parental involvement, parents' age, family SES), predictors that include school information (for example distance from household to school and school facilities quality), and predictors that are related to community level characteristics. G is the standard normal cumulative distribution function (cdf). Details about the variables used in the analysis of sub-research questions 1-1 and 1-2 are given in section 4.4.1, the section which provides the data description. A longer version of the model in equation (4.17) is also given in annex 1.

This study selected a certain number of variables in order to answer research questions 2-1, 2-2, 3-1, and 3.2. In terms of the organization of the data, it is assumed that individual student variables are level one, schools level variables level 2, and the province level variables constitute level three. Specifically, as presented in the analytical framework, students are nested in schools nested in province, which gives a hierarchically nested data structure as mentioned above. This assumption was driven by the sampling method applied to collect the data used in the analysis. Differences among students and respective family factors explain variances in learning achievements, and so do differences among schools and differences among provinces. For instance, there are private schools included in the data used in the analysis. Usually, these private schools have selection criteria for student intakes, making students in these schools more similar to one another, relative to students from public schools.

In the context of this study, the first condition for HLM to be employed is to estimate empirically the between group variances, that is the proportion of variances that are due to grouping of the data. This can be done by running what is called in the literature a "null model"[11]. In other words, we estimate the variances in students' achievements due to differences in schools as well as differences in provinces. Obtaining the variances at each level can help determine the proportion of variances within each of the three levels. The empty model can be specified by the following equation (4.18) given below:

Model 1 (Null model)

Level 1 $y_{ijk} = \pi_{0jk} + \varepsilon_{ijk}$

Level 2 $\pi_{0jk} = \beta_{0k} + u_{jk}$

Level 3 $\beta_{0k} = \gamma_{00} + \nu_k$ (4.18)

$\nu_k \sim N(0, \sigma_v^2)$
$u_{jk} \sim N(0, \sigma_u^2)$
$e_{ijk} \sim N(0, \sigma_e^2)$

Where:

y_{ijk} = learning achievement of student *i* associated with school j, and province k.

π_{0jk} = intercept

β_{0k} = mean of level 2

γ_{00} = mean of level 3

$\varepsilon_{ijk} = \sigma^2_{ijk}$= the student level residual term.

$u_{jk} = \sigma^2_{jk}$= the effect of school *j*

$\nu_k = \sigma^2_k$ = is the effect of province *k*

The province and school effects and the residuals term are assumed independent and normally distributed with zero means and constant variances.

In Equation (4.18), the effects of the province and school levels and the residuals term are assumed independent and normally distributed, with zero means and constant variances. The

[11] The null model is also called empty or unconditional model, and is the equivalent of a one-way ANOVA

equation contains no predictors, that is it is an intercept only regression, hence its name empty model. At this stage of the analysis, it is crucial to establish empirically that a three-level HLM can be used for this study. In other words, there is a need to ensure that a three-level HLM regression fits the data significantly better than a two-level model or a single level model regression (conventional OLS regression). This is done through the steps given below. When there is no statistical power of significance found to support empirically the clustering of the data employed, a traditional regression is suitable for the study. As this study assumes a three-level hierarchy, the statistical significance must be tested for up to the third level.

In order to empirically test the clustering of the data, first the null hypothesis that there are no hierarchical level effects at all is tested, by comparing the three-level model in equation (4.18) to the single-level model in equation (4.19) below.

$$y_{ijk} = \beta_0 + e_{ijk} \quad (4.19)$$

$$e_{ijk} \sim N(0, \sigma_e^2)$$

The null and alternative hypotheses for this equation are written as:

H_0: $\sigma_v^2 = 0$, $\sigma_u^2 = 0$ (there are no province variations and no school variations)

H_1: $\sigma_v^2 > 0$, $\sigma_u^2 > 0$ (there are significant province variations and/or school variations)

The two models in equation (4.18) and equation (4.19) can be fitted by maximum likelihood (ML), and likelihood ratio (LR) tests used to compare the fit of the two models. The LR test to compare the null joint hypothesis is calculated using equation (4.20):

$$LR = (-2\log L_0) - (-2\text{Log } L_1) \quad (4.20)$$

Where L_0 is the likelihood values of the model with a single level, and L_1 the ones of the three-level model.

Second, the null hypothesis that there are no province effects is tested, by comparing the three-level model (4.18) to the two-level model in equation (4.21) given below.

$y_{ijk} = \beta_0 + u_{jk} + e_{ijk}$ (4.21)

$u_{jk} \sim N(0, \sigma_u^2)$

$e_{ijk} \sim N(0, \sigma_e^2)$

The null and alternative hypotheses are written as:

H_0: $\sigma_v^2 = 0$ (there no province variations)

H_1: $\sigma_v^2 > 0$ (there are significant province variations)

Just like in the first comparison above, LR is used to test the fit between the two-level model in equation (4.18) and the three-level one in equation (4.211). This comparison is calculated using equation (4.22):

$LR = (-2\log L_0) - (-2\text{Log } L_1)$ (4.22)

Where L_0 is now the likelihood values of the two-level model, and L_1 the ones of the three-level model.

After establishing empirically that a three-level model fits the data the best for this analysis, the province, school, and student variances from the fitting of the unconditional model were used to compute what is known as the variance partition coefficient (VPC) and the inter-class correlation (ICC). The VPC and ICC are estimates of the relative magnitude of the variance components in learning achievement scores. The VPC statistics expresses the proportion of learning achievements variances that are at student, school, and province levels, respectively. The ICC is an estimate of the expected proportion of homogeneity between learning achievement scores within specific levels (e.g. schools).

Let *i* be a student. The total response variance of student *i* is constant, and defined as follows:

$\text{Var}(y_{ijk}) = \text{var}(\beta_0 + v_k + u_{jk} + e_{ijk})$ (4.23)

$= \text{var}(v_k) + \text{var}(u_{jk}) + \text{var}(e_{ijk})$

$= \sigma_v^2 + \sigma_u^2 + \sigma_e^2$

The province-level, school-level, and student-level VPCs are calculated using below equations 4.24, 4.25, and 4.26, respectively.

$$VPC_v = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} \quad (4.24)$$

$$VPC_u = \frac{\sigma_u^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} \quad (4.25)$$

$$VPC_e = \frac{\sigma_e^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} \quad (4.26)$$

As mentioned above, the ICC was also calculated, using the information of the variance components of each level. Let *i* and *i'* be two students, the ICC is estimated as the correlation between these students as two students within the same province *k*, but from different schools *j*. It is obtained from the computation of the equations (4.27) and (4.28) specified below:

$$\rho_v = \text{Corr}\,(y_{ijk}, y_{i'j'k}) = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} = \quad (4.27)$$

$$\rho_{vu} = \text{Corr}\,(y_{ijk}, y_{i'jk}) = \frac{\sigma_v^2 + \sigma_u^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} = \quad (4.28)$$

Model 2

After fitting the unconditional model and establishing HLM statistical assumptions, student-level predictors are added to equation (4.18). The purpose of model 2 is to examine the effect of child level variables on learning achievements, which is much more of interest in research question 2-1 compared to the rest of the research questions (2-2, 3-1 and 3-2). Adding level one predictors gives equation 4.29 specified below:

Level 1 $y_{ijk} = \pi_{0jk} + \pi_1 X_{1ijk} + \pi_2 X_{2ijk} + \pi_3 X_{3ijk} + \pi_4 X_{4ijk} + \pi_5 X_{5ijk} + \pi_6 X_{6ijk} + \pi_7 X_{7ijk} + \pi_8 X_{8ij} + \pi_9 X_{9ij} + \varepsilon_{ijk}$

Level 2 $\pi_{0jk} = \beta_{0k} + u_{jk}$

Level 3 $\beta_0 = \gamma_{00} + \nu_k \quad (4.29)$

$\nu_k \sim N(0, \sigma_v^2)$
$u_{jk} \sim N(0, \sigma_u^2)$
$e_{ijk} \sim N(0, \sigma_e^2)$

Where:

y_{ijk} = learning achievement of student i associated with school j, and province k.

π_{0jk} = the intercept

$\pi_{0jk} \sim \pi_{9jk}$ = slopes at the student level

$X_{1ijk} \sim X_{9ijk}$ = Factors at the student level

β_{0k} = mean of level 2

γ_{00} = mean of level 3

ε_{ijk} = σ^2_{ijk}= the student level residual term.

u_{jk} = σ^2_{jk}= the effect of school *j*

ν_k = σ^2_k = is the effect of province *k*

Each explanatory variable in equation (4.29) represents respectively student's gender, age, labor status, grade repeated, books at home, family involvement, father and mother educations, and family SES. At this stage of the estimation, there are no level 2 or 3 predictors, so these levels remain models involving only an intercept and a residual. To estimate how much of the variance in learning achievements the level 1 covariates added explain, the R-square of the concerned level is computed following Luo & Azen (2013). This is done by comparing the variance of the outcome in the intercept model in equation (4.29) and that in the null model in equation (4.18). This can be obtained by computing the following ratio specified in equation (4.30) below:

$$R_1^2 = 1 - \frac{\sigma_\varepsilon^2}{\sigma_{\varepsilon null}^2} \qquad (4.30)$$

Where R_1^2 represents the R-square of model 2 level 1 predictors, σ_ε^2 the variance component of model 2 level 1 specified in equation (4.29), and $\sigma_{\varepsilon\text{null}}^2$ refers to the student-level component (level 1) in the null model in equation (4.18).

Now we want to account for variations in the overall intercept, and we do so by including level 2 predictors. The addition of the predictors is very important for research questions 2-2, 3-1 and 3-2, because the factors of interest of these research questions are at the school level. We obtain then model 3 as specified in equation (4.31) below:

Model 3

Level 1

$y_{ijk} = \pi_{0jk} + \pi_1 X_{1ijk} + \pi_2 X_{2ijk} + \pi_3 X_{3ijk} + \pi_4 X_{4ijk} + \pi_5 X_{5ijk} + \pi_6 X_{6ijk} + \pi_7 X_{7ijk} + \pi_8 X_{8ij} + \pi_9 X_{9ij} + \varepsilon_{ijk}$

Level 2

$\pi_{0jk} = \beta_{0k} + \beta_{1k} W_{1jk} + \beta_{2k} W_{2jk} + \beta_{3k} W_{3jk} + \beta_{4k} W_{4jk} + \beta_{5k} W_{5jk} + \beta_{6k} W_{6jk} + \beta_{7k} W_{7jk} + \beta_{8k} W_{8jk} + \beta_9 W_{9j} + \beta_{10} W_{10j} + \beta_{11} W_{11j} + u_{jk}$

$\pi_{1jk} = \beta_{10k}$ $\pi_{5jk} = \beta_{50k}$ $\pi_{9jk} = \beta_{90k}$

$\pi_{2jk} = \beta_{20k}$ $\pi_{6jk} = \beta_{60k}$

$\pi_{3jk} = \beta_{30k}$ $\pi_{7jk} = \beta_{70k}$

$\pi_{4jk} = \beta_{40k}$ $\pi_{8jk} = \beta_{80k}$

Level 3 Model

$\beta_{0k} = \gamma_{00} + \nu_{0k}$ (4.31)

$\nu_k \sim N(0, \sigma_\nu^2)$
$u_{jk} \sim N(0, \sigma_u^2)$
$e_{ijk} \sim N(0, \sigma_e^2)$

Where:

y_{ijk} = learning achievement of student i associated with school j, and province k.

π_{0jk} = the intercept

$W_{1j} \sim W_{8j}$ = Factors at the school level

$\pi_{0jk} \sim \pi_{9jk}$ = slopes at the student level (outcomes at school level)

$X_{1ijk} \sim X_{9\,ijk}$ = Factors at the student level

β_{0k} = mean of level 2

$\beta_{10k} \sim \beta_{90k}$ = intercepts of school level

γ_{00} = mean of level 3

$\varepsilon_{ijk} = \sigma^2_{ijk}$ = the student level residual term.

$u_{jk} = \sigma^2_{jk}$ = the effect of school *j*

$\nu_k = \sigma^2_k$ = is the effect of province *k*

After fitting model 3, it is also of importance to estimate the amount of variance that is accounted for by the addition of variables at the school level. Just like in the case of model 2 above, we apply the equation (4.32) to determine the proportion of variance component change at the level of interest:

$$R_2^2 = 1 - \frac{\sigma_u^2}{\sigma^2_{u-\text{null}}} \qquad (4.32)$$

Where R_2^2 represents the R-square of model 3 level 2 predictors, σ_u^2 the variance component of model 3 level 2, and $\sigma^2_{u-\text{null}}$ is the school-level component (level 2) variance in the null model in equation 4.18. At this second stage of adding predictors to the empty model, level three still contains no predictors. Therefore, after model 3, model 4 was created by adding level three variables to the third level of the equation (4.31). The variables at the level are also important for the analysis, since they can change the results of the effects found after adding level one and level two variables. In addition, even not tested in this study, there can be potential interaction between a variable from this level and a variable from another level. These interactions are referred to as cross-level interactions.

Model 4

Level 1

$$y_{ijk} = \pi_{0jk} + \pi_{1jk}X_{1ijk} + \pi_{2jk}X_{2ijk} + \pi_{3jk}X_{3ijk} + \pi_{4jk}X_{4ijk} + \pi_{5jk}X_{5ijk} + \pi_{6jk}X_{6ijk} + \pi_{7jk}X_{7ijk} + \pi_{8jk}X_{8ij} + \pi_{9jk}X_{9ij} + \varepsilon_{ijk}$$

Level 2

$$\pi_{0jk} = \beta_{0k} + \beta_{1k}W_{1jk} + \beta_{2k}W_{2jk} + \beta_{3k}W_{3jk} + \beta_{4k}W_{4jk} + \beta_{5k}W_{5jk} + \beta_{6k}W_{6jk} + \beta_{7k}W_{7jk} + \beta_{8k}W_{8jk} + \beta_{9}W_{9j} + \beta_{10}W_{10j} + \beta_{11}W_{11j} + u_{jk}$$

$\pi_{1jk} = \beta_{10k}$ $\pi_{5jk} = \beta_{50k}$ $\pi_{9jk} = \beta_{90k}$

$\pi_{2jk} = \beta_{20k}$ $\pi_{6jk} = \beta_{60k}$

$\pi_{3jk} = \beta_{30k}$ $\pi_{7jk} = \beta_{70k}$

$\pi_{4jk} = \beta_{40k}$ $\pi_{8jk} = \beta_{80k}$

Level 3 Model

$$\beta_{0k} = \gamma_{00} + \gamma_{01}Z_{1k} + \gamma_{02}Z_{2k} + \nu_k$$

$\beta_{1k} = \gamma_{10}$ $\beta_{5k} = \gamma_{50}$ $\beta_{10k} = \gamma_{010}$ $\beta_{50k} = \gamma_{050}$ $\beta_{90k} = \gamma_{090}$

$\beta_{2k} = \gamma_{20}$ $\beta_{6} = \gamma_{60}$ $\beta_{20k} = \gamma_{020}$ $\beta_{60k} = \gamma_{060}$

$\beta_{3k} = \gamma_{30}$ $\beta_{7} = \gamma_{70}$ $\beta_{30k} = \gamma_{030}$ $\beta_{70k} = \gamma_{070}$

$\beta_{4k} = \gamma_{40}$ $\beta_{8} = \gamma_{80}$ $\beta_{40k} = \gamma_{040}$ $\beta_{80k} = \gamma_{080}$ (4.33)

$\nu_k \sim N(0, \sigma_v^2)$

$u_{jk} \sim N(0, \sigma_u^2)$

$e_{ijk} \sim N(0, \sigma_e^2)$

Where:

y_{ijk} = learning achievement of student i associated with school j, and province k.

π_{0jk} = the intercept

$W_{1j} \sim W_{8j}$ = Factors at the school level

$\pi_{0jk} \sim \pi_{9jk}$ = slopes at the student level (outcomes at school level)

$X_{1ijk} \sim X_{9\,ijk}$ = Factors at the student level

β_{0k} = mean of level 2

$\beta_{1k} \sim \beta_{8k}$ = slopes at the school level

$\beta_{10k} \sim \beta_{90k}$ = intercepts of school level

γ_{00} = mean of level 3

$Z_{1k;}\, Z_{2k}$ = factors at the province level

$\gamma_{01}; \gamma_{02}$ = province level slopes

$\varepsilon_{ijk} = \sigma^2_{ijk}$= the student level residual term.

$u_{jk} = \sigma^2_{jk}$= the effect of school *j*

$\nu_k = \sigma^2_k$ = is the effect of province *k*

The amount of variance explained by the province level variables added is also computed, using equation (4.34):

$$R_3^2 = 1 - \frac{\sigma_v^2}{\sigma^2_{v-\text{null}}} \qquad (4.34)$$

Where R_3^2 represents the R-square of model 4 level 3 predictors, σ^2_v the variance component of model 4 level 3, and $\sigma^2_{v-\text{null}}$ is the province-level component (level 3) in the null model in equation 4.18. The factors added at each level as presented in the different equations assume that the effects of the factors do not vary regardless of the school or the province. However, there are some cases where there are differences in the effects of variables. There are possible assumptions or hypotheses for the reasons about the effect differences, but an exploratory approach can be used to verify the differences in the effects of variables. When there are significant differences found, slopes need to be added to equation (4.33). The exploratory analysis revealed that the effect of the variables X_9 and W_1 vary across schools. This allows then the slopes of these predictors to vary across schools, giving model 5 specified below:

Model 5

Level 1

$$y_{ijk} = \pi_{0jk} + \pi_{1jk}X_{1ijk} + \pi_{2jk}X_{2ijk} + \pi_{3jk}X_{3ijk} + \pi_{4jk}X_{4ijk} + \pi_{5jk}X_{5ijk} + \pi_{6jk}X_{6ijk} + \pi_{7jk}X_{7ijk} + \pi_{8jk}X_{8ij} + \pi_{9jk}X_{9ij} + \varepsilon_{ijk}$$

Level 2

$$\pi_{0jk} = \beta_{0k} + \beta_{1k}W_{1jk} + \beta_{2k}W_{2jk} + \beta_{3k}W_{3jk} + \beta_{4k}W_{4jk} + \beta_{5k}W_{5jk} + \beta_{6k}W_{6jk} + \beta_{7k}W_{7jk} + \beta_{8k}W_{8jk} + \beta_{9}W_{9j} + \beta_{10}W_{10j} + \beta_{11}W_{11j} + u_{0jk}$$

$\pi_{1jk} = \beta_{10k} + \beta_{12k}W_{1jk} + u_{1jk}$ $\pi_{5jk} = \beta_{50k}$ $\pi_{9jk} = \beta_{90k} + \beta_{91k}X9_{ijk} + u_{2jk}$

$\pi_{2jk} = \beta_{20k}$ $\pi_{6jk} = \beta_{60k}$

$\pi_{3jk} = \beta_{30k}$ $\pi_{7jk} = \beta_{70k}$

$\pi_{4jk} = \beta_{40k}$ $\pi_{8jk} = \beta_{80k}$

Level 3 Model

$\beta_{0k} = \gamma_{00} + \gamma_{01}Z_{1k} + \gamma_{02}Z_{2k} + \nu_k$

$\beta_{1k} = \gamma_{10}$ $\beta_{5k} = \gamma_{50}$ $\beta_{10k} = \gamma_{010}$ $\beta_{50k} = \gamma_{050}$ $\beta_{90k} = \gamma_{090}$

$\beta_{2k} = \gamma_{20}$ $\beta_{6} = \gamma_{60}$ $\beta_{20k} = \gamma_{020}$ $\beta_{60k} = \gamma_{060}$

$\beta_{3k} = \gamma_{30}$ $\beta_{7} = \gamma_{70}$ $\beta_{30k} = \gamma_{030}$ $\beta_{70k} = \gamma_{070}$

$\beta_{4k} = \gamma_{40}$ $\beta_{8} = \gamma_{80}$ $\beta_{40k} = \gamma_{040}$ $\beta_{80k} = \gamma_{080}$ (4.35)

$\nu_k \sim N(0, \sigma_v^2)$

$$\begin{pmatrix} u_{0jk} \\ u_{1jk} \\ u_{2jk} \end{pmatrix} \sim N\left\{ \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} \sigma_{u0}^2 & & \\ 0 & \sigma_{u1}^2 & \\ 0 & 0 & \sigma_{u2}^2 \end{pmatrix} \right\}$$

$e_{ijk} \sim N(0, \sigma_e^2)$

Where:
y_{ijk} = learning achievement of student i associated with school j, and province k.
π_{0jk} = the intercept
$W_{1j} \sim W_{8j}$ = Factors at the school level
$\pi_{0jk} \sim \pi_{9jk}$ = slopes at the student level (outcomes at school level)
$X_{1ijk} \sim X_{9\,ijk}$= Factors at the student level
β_{0k} = mean of level 2
$\beta_{1k} \sim \beta_{8k}$ = slopes at the school level
$\beta_{10k} \sim \beta_{90k}$ = intercepts of school level

γ_{00} = mean of level 3
$Z_{1k;}$ Z_{2k} = factors at the province level
γ_{01}; γ_{02} = province level slopes
$\varepsilon_{ijk} = \sigma^2_{ijk}$= the student level residual term.
$u_{0jk} = \sigma^2_{jk}$= the effect of school *j*
$\nu_k = \sigma^2_k$ = is the effect of province *k*

The province and school effects and the residual term are assumed independent and normally distributed with zero means and constant variances.

The estimation results for each model provides the proportion of the variance of the intercept accounted for by each level component predictors. Moreover, this study conducted a model fit test when progressing from one model to another, using Likelihood ratio test (LRT) to find the model that fits the best. The primary fit statistic used in HLM analyses is the deviance statistic**,** and a larger deviance indicates a poorer model fitting (Anderson, 2012). The deviance statistic can be computed when maximum likelihood is used to fit models. It is obtained by the following equation (4.36):

$$\text{Deviance statistic} = -2\ln[L(\theta)] \qquad (4.36)$$

4.4. Data

4.4.1. Data Description

The datasets used for this study are obtained from the Program d'Analyse des Systemes Educatifs de la Confemen (PASEC)[12] and the Burkina Faso National Institute of Statistics (NIS). From PASEC, we obtained the 2014 dataset on reading and math test scores, and from NIS we obtained Burkina Faso 2014 Household Survey.

PASEC is a program that implements a standardized international exam to measure students' competencies in participating countries, and results obtained are used as references to solve issues of effectiveness and equity in concerned education systems. The dataset contains

[12] PASEC was launched after the Jomtien (Thailand) conference on Education for all and has conducted large sample surveys in participating countries since 1991. PASEC surveys were implemented in Burkina Faso in 1995/1996, 2006/2007, and 2014 survey was the third participation of Burkina Faso.

information about students and related families, schools, local communities, and education policies. It is nationally representative of the concerned student population in Burkina Faso. The clusters that we have are regions, and schools mainly, but we were able to create province clusters from MoE to conduct the study. In other words, data was sampled following the geographic stratification of the country: regions, provinces, and schools.

After the sampling that follows the geographical clustering of the country, primary schools, including public and non-public ones, were sampled by employing probability proportional to size (PPS) technique. Based on this sampling technique, the standard number of schools sampled in each country was 180, but some countries wished a larger sample size to assess some country- specific issues. This was the case of Burkina Faso, where 200 schools were sampled. At the level of each school, a grade 6 class was randomly selected, but if there is only one grade 6 classroom in the school, it is automatically selected. In each selected grade 6 classroom, 20 students were randomly drawn when the classroom had more than 20 students. In cases with a class containing 20 or less students, all the students of the classroom were automatically selected for the survey.

PASEC established 85% participation as minimum participation rate of all schools sampled for the sample to be considered as representative of its population. At the student level, the minimum participation rate chosen was 80% of the total number of students sampled. Participation rate of Burkina Faso schools and students was relatively high. At the end of the program, it was estimated that weighed participation rates were 97.39% and 98.73% for schools and students, respectively. This validated the PASEC data as to its national representativeness, and it allowed to obtain a dataset with extensive rich information on about 3300 students, who are nested within 182 schools (4 to 20 students per school), which are nested within the 45 provinces of the country. As the minimum survey participation rates were met for schools and students, the dataset is treated as nationally representative of grade 6 students in Burkina Faso.

In addition to the measured covariates in the dataset, some index variables are used in this study, and were created by PASEC using item response theory (IRT). For example, when concerned with binary item variables, Rasch one parameter model for dichotomous items was

used; for other types of variables like Likert-type ones, other models Rasch modeling were used. The index variables provided in the dataset are family SES (created using housing characteristics and household possessions), classroom resources (created using pedagogical resources the classroom possesses), and location development index (created using the connection of the locality to some amenities, such as electricity and tarred roads). For an easier understanding and interpretation of students' competencies in terms of reading, the program scaled reading scores, and scales are divided into different levels based on the knowledge and competencies required to reach a specific level. A "sufficient" level threshold of reading score is also provided by the program.

Burkina Faso 2014 Household Survey has a sample of 10860 households, and is nationally representative of the country. The sampling technique follows the country administrative division. This division is region, province, commune (municipality), and the lowest unit which is an enumeration area (EA) or referred to as primary units. Enumeration areas have been designed considering the number of households living within each, which allowed a random drawing of enumeration zones proportionally to the number of households within each. The units surveyed are the households and the individuals within the households. The survey contains variables about individuals, households, and areas where they live. The geographic location of households is known when designing the enumeration areas, and the NIS which designed them has a file of all records. Primary school age students data was used.

4.4.2. Variables

Table 4.1 presents a definition of the variables used in the analyses for this study. The study analyzes how a certain number of selected factors affect school attendance and learning achievements in gold mining areas in Burkina Faso. The outcomes of interest to this study determine the type of variables used as dependent variables in this study. The selection of the variables followed the literature, mainly similar studies in other contexts. The factors selected followed the evidence from these studies, in terms of their importance for school attendance

and students' learning achievements. Furthermore, the nature of the dependent and independent variables provided in the dataset guided the way variables were treated and defined in the study. Specifically, a dichotomous variable is used as a proxy for school attendance: (1) attends school and (2) does not attend school. In terms of learning achievements, the reading score of students are used as a dependent variable. It is readily provided in the dataset, and has continuous values. The same principles were followed to treat and define independent variables.

The variable related to parental involvement is a discrete one, in a Likert-type variable, with a range from zero to 4. This variable was transformed into four dummy variables expressing the level of involvement that parents provide to the education of their children. Precisely, the variables created are: no involvement, sometimes involved, often involved, and always involved. The sample transformation method was used to create four dummy variables expressing the number of books in child's household. Just using the terminology of PASEC, the variables obtained from this transformation are: no books, enough books to fill one shelf, enough books to fill two shelves, enough books to fill a library. Household head and mother's education are also dummy variables indication whether they have education or not.

As presented in table 4.1, the dependent variable used for learning achievements in this study is the reading score, a continuous variable provided by the program in the dataset. With regard to variables at the school level, some dummy variables are also used. These dummy variables were created based on the original variables provided in the dataset. They are namely head teacher training, teacher preservice and in-service trainings. The other variables that are used at this level are those related to school resources and distance to school. The highest level of the hierarchy contains a variable related to the level of development of the locality where schools are located, an index variable provided in the dataset. This level also includes a variable that indicates whether the locality is a rural or an urban locality.

Table 4.1: Variables Definition

Variable	Definition
Outcome variable	
Attendance	Dummy variable indicating whether child attends primary school
Reading score	PASEC test reading score of students
Students and family variables	
Gender	Dummy variable for child's gender (base = female)
Age	Child's age in years
Labor status	Dummy variable for child labor status school (base = no labor)
Class repetition status	Dummy variable for child repetition status (base = never repeated)
Mother education	Dummy variable for mother who has education (base = no education)
Head education	Dummy variable for head who has education (base = no education)
Household head occupation	Dummy variable for household head with job related to mining
Family SES	Family socioeconomic status
Involvement (attendance)	Dummy variable indicating if parents monitor child's schooling
No involvement	Dummy variable indicating parents never support child in homework
Sometimes involved	Dummy for parents who sometimes support child in homework
Often Involved	Dummy variable indicating parents often support child in homework
Always involved	Dummy variable for parents who always support child in homework
No books	Dummy variables for child who has no books at home
Booked fill one shelf	Dummy variables indicating child has books to fill one shelf at home
Books fill two shelves	Dummy variables indicating child has books to fill two shelves
Books fill a library	Dummy for child who has book to fill a library
School, teacher, head teacher variables	
School resources	School resources (pedagogical materials) index provided by PASEC
Teacher pre-train. (1 year)	Dummy variable for teacher who had one-year pre-service training
Teacher experience	Teacher professional experience in years
Teacher prof. training	Dummy variable for teacher that had at least one professional training
Teacher pre-train. (2 yrs)	Dummy variable for teacher who had two years pre-service training
Teacher practical training	Dummy variable for teacher that had internship during training
Principal training (1 year)	Dummy variable for principal that had one-year pre-service training
Principal train. (2 years)	Dummy variable for principal who had two years pre-service training
Principal pract. training	Dummy variable for principal that had internship during training
Principal experience	Principal professional experience in years
Parents Association (PA)	Dummy variable for PA that support students (base= no support)
Mother Association (MA)	Dummy variable for existence MA in school (base = no association)
Distance to prim. school	Variable for distance from household to primary school
Distance to usable road	Variable for distance from household to usable road
Distance to security station	Variable for distance from household to nearest police/gendarmerie station
Province variables	
Province school resources	Province average school resources based on school resources index
Urban/Rural	Dummy variable indicating rural or urban locality (base = rural)

Source: Created by Author based on PASEC 2014 and Burkina Faso household survey

Table 4.2 Descriptive Statistics of Variables Used (gold mining areas)

Variable	Obs	Mean	Std. Dev.	Min	Max
Outcome variable					
Attendance	1273	0.618	0.486	0	1
Reading score	1273	507.253	80.899	218.292	748.019
Students and family variables					
Gender	1273	0.496	0.500	0	1
Age	1273	13.361	1.298	11	15
Labor status	1273	0.691	0.901	0	1
Class repetition status	1273	0.521	0.500	0	1
Mother education	1273	0.307	0.461	0	1
Head education	1273	0.833	0.373	0	1
Household head occupation	1273	0.133	0.340	0	1
Family SES	1273	48.931	6.613	26.388	78.101
Involvement (attendance)	1273	0.301	0.459	0	1
No involvement	1273	0.771	0.420	0	1
Sometimes involved	1273	0.184	0.387	0	1
Often Involved	1273	0.352	0.478	0	1
Always involved	1273	0.155	0.362	0	1
No books	1273	0.456	0.498	0	1
Booked fill one shelf	1273	0.390	0.488	0	1
Books fill two shelves	1273	0.086	0.281	0	1
Books fill a library	1273	0.015	0.121	0	1
School, teacher, head teacher variables					
School resources	1273	51.515	11.192	-6.676	79.229
Teacher pre-training (1 year)	1273	0.713	0.452	0	1
Teacher experience	1273	10.465	4.735	2	25
Teacher prof. training	1273	0.781	0.414	0	1
Teacher pre-train. (2 years)	1273	0.341	0.474	0	1
Teacher practical training	1273	4.022	3.276	0	12
Principal training (1 year)	1273	0.183	0.387	0	1
Principal training (2 years)	1273	0.405	0.491	0	1
Principal practical training	1273	5.018	3.830	0	12
Principal experience	1273	8.844	5.926	1	24
PA involvement	1273	0.188	0.391	0	1
MA involvement	1273	0.504	0.611	0	1
Distance to primary school	1273	1.852	1.208	1	5
Distance to usable road	1273	2.504	1.607	1	5
Distance to nearest security station	1273	3.902	1.445	1	5
Province variables					
Province school resources	1273	47.497	5.104	45.657	68.164
Urban/Rural	1273	0.305	0.461	0	1

Source: created by Author based on PASEC 2014 and Burkina Faso household survey

Table 4.3 Descriptive Statistics of Variables Used (non-gold mining areas)

Variable	Obs	Mean	Std. Dev.	Min	Max
Outcome variable					
Attendance	2069	0.642	0.479	0	1
Reading score	2069	527.822	88.707	243.841	801.814
Students and family variables					
Gender	2069	0.494	0.500	0	1
Age	2069	13.25791	1.329	11	16
Labor status	2069	1.484	0.909	1	4
Class repetition status	2069	0.526	0.499	0	1
Mother education	2069	0.349	0.477	0	1
Head education	2069	0.570	0.495	0	1
Household head occupation	2069	0.143	0.350	0	1
Family SES	2069	50.365	7.682	26.388	79.828
Involvement (attendance)		0.315	0.465	0	1
No involvement	2069	0.198	0.398	0	1
Sometimes involved	2069	0.180	0.384	0	1
Often Involved	2069	0.376	0.485	0	1
Always involved	2069	0.184	0.387	0	1
No books	2069	0.409	0.492	0	1
Booked fill one shelf	2069	0.442	0.497	0	1
Books fill two shelves	2069	0.079	0.269	0	1
Books fill a library	2069	0.021	0.144	0	1
School, teacher, head teacher variables					
School resources	2069	53.00725	9.726	-6.676	79.229
Teacher pre-training (1 year)	2069	0.762	0.426	0	1
Teacher experience	2069	11.669	6.052	1	34
Teacher prof. training	2069	0.814	0.389	0	1
Teacher pre-train. (2 years)	2069	0.354	0.478	0	1
Teacher practical training	2069	4.871	3.244	0	12
Principal training (1 year)	2069	0.183	0.387	0	1
Principal training (2 years)	2069	0.418	0.493	0	1
Principal practical training	2069	5.075	3.791	0	12
Principal experience	2069	9.204	6.439	1	30
PA involvement	2069	0.161	0.368	0	1
MA involvement	2069	0.509	0.615	0	1
Distance to nearest primary school	2069	2.039	1.187674	1	5
Distance to usable road	2069	3.109	1.747	1	5
Distance to security station	2069	4.025	1.392	1	5
Province variables					
Province school resources	2069	53.007	7.417	15.819	79.229
Urban/Rural	2069	0.475	0.500	0	1

Source: created by Author based on PASEC 2014 and Burkina Faso household survey

In addition to observable variables, PASEC dataset provides index variables created using item response theory (IRT). Binary item variables were handled using Rasch one parameter model for dichotomous item variables. For Likert-type items, other models Rasch model were used to compute index variables. The provided index variables used in this study are family SES, classroom resources, and location development index. The computation method applied to create these index variables allowed negative indexes.

The data used for the study has been is presented all together in the descriptive statistics in tables 4.2 and 4.3. However, the data for the whole country was divided into two, namely the dataset for gold mining areas and the dataset for non-gold mining areas. This splitting of the data into two groups was motivated by the fact that this study is more focused on gold mining areas. The method that was employed to identify gold mining areas in explained in details in section 4.6 below. The division of the data also allowed application of the analysis for gold mining areas on gold mining areas as well, to see differences in terms of the effect of variables from the perspective of gold mining areas relative to non-gold mining ones. For harmony purpose, only observations for PASEC data is presented in the descriptive statistics in tables 4.2 and 4.3. Observations from the household survey were 29 519 children from 6 to 12.

4.5. Qualitative Approach of the Study

4.5.1. Semi-structured In-Depth Interviews

In addition to the quantitative approach presented above, the current study employed a qualitative approach, to collect data that are used to explain findings obtained from the quantitative analysis. The qualitative analysis helped refine and explain results of the quantitative analysis, through exploration of participants' view, perceptions, and experiences. In order to collect qualitative data, semi-structured interviews were conducted in some gold mining areas in Burkina Faso. The steps of the qualitative approach are explained below.

First, a questionnaire for a semi-structured interview was designed for educational officers at the ministry of education level, the provincial direction of education level, and also the education district level. The objective of this was to understand the perceptions and opinions of these stakeholders at each concerned level, in terms of the factors that determine school attendance and learning achievements in gold mining areas. The interview questionnaires are mostly open-ended questions, and it was designed partly based on Sore (2015) who conducted a similar study in the context of Burkina Faso. The focus of the questions was on the ways educational policies are implemented in schools, mainly in gold mining areas, and how government officials interpreted them.

Second, semi-structured interview questionnaires were designed for school principals, teachers, parents (PTA included), and students. The objective of this semi-structured interview was to understand practices, expectations, and views in terms of the factors that affect school attendance and learning achievement in gold mining areas in Burkina Faso. The interview questionnaires were designed based on Epstein (1995) and results of the quantitative analysis of this study. Each questionnaire included some specific points of interest, depending on the stakeholder targeted by the interview:

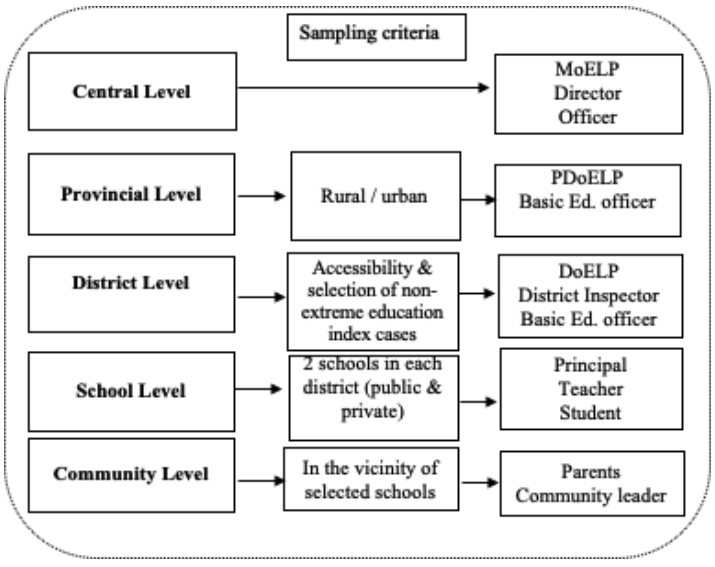
- The questionnaire for principals and teachers focused on perceptions of teachers and principals about their qualifications in relation to learning achievements of their students, their perceptions on the relationship between school resources and learning achievements, and their perceptions on family factors and children's education, community factors and children's education.
- The questionnaire for school PTA also covered the points related to parental factors and the education of children, and also the community factors or community actions that influence children's education in gold mining areas in Burkina Faso.
- The questionnaire for households and children focused on what parents think their role is in relation to their children's education, and the practices that they carry out. As of children, the questionnaire for them was interested in knowing some practices that their

parents apply with them and also some practices of education stakeholders (teachers, principals, community members etc.) towards them.

4.5.2. Sampling Method and Sample Size

A systematic sampling method was applied for the collection of the qualitative data for this study. This sampling technique consists of selecting the first units of the population to sample, and the subsequent units are selected based on a predetermined pattern that the research establishes (Sayed & Ahmad, 2018). Systemic sampling, by itself or combined with other sampling methods, is one of the common techniques used for data collection among researchers, very likely because of the many advantages it has (Levy & Lemeshow, 2008). One of these advantages is that is can be assumed that results obtained from the data collected using this technique represents the normal population under study, given that it provides a mean that is representative of the whole population. Moreover, systematic sampling provides an implicit stratification and provides good estimates (Cochran, 1977). Regarding the advantages of the technique and its applicability to the current study, it was used for the sampling of the different stakeholders interviewed to collect data for the study.

Figure 4.4: Framework for the Selection of Study Fields



Source: Created by Author based on Bamberger (2012)
Note: MoELP: Ministry of National Education, Literacy, and Promotion of National Languages
PDoELP: Provincial direction of Education, Literacy, and Promotion of National Languages
DoELP: District of Basic Education, Literacy, and Promotion of National Languages

Figure 4.4 shows that this study covers a wide range of geographical levels. Precisely, it covers regions, provinces, communities, schools and neighboring households. Two regions were selected, and one province was chosen from each region. For each selected province, one rural area and one urban area were selected. Inside the selected locations, a geographical cluster sampling was applied, where each cluster represents a division of provinces into education districts. Two schools from each district were retained from for the field study. Within the retained districts, some households surrounding the schools were surveyed, and some key community members (for example those referred to as development advisors in Burkina Faso) were interviewed. In Burkina Faso, there are mainly two types of schools, namely public schools and private ones. Therefore, the schools that were included in the same are public schools and private ones as well. The different stakeholders or key actors interviewed are summarized in table 4.4 below:

Table 4.4: Interviewed Key Actors

Participants	Central level	Yatenga Province		Bam Province		Total
	MoELP	Rural	Urban	Rural	Urban	
		Seguenega	Ouahigouya	Tikare	Kongusi	
Ministry level officials	2					2
Province level officials		2	2	2	2	8
District level officials		2	2	2	2	8
Principals		2	2	2	2	8
Teachers		6	4	6	4	20
Students (grade 6)		8	8	8	8	32
Parents		8	8	8	8	32
PA & MA		2	2	2	2	8
Total	2	30	28	30	28	118

Source : Created by Author
Note: PA : Parents Association MA : Mothers Association

In addition to the sampling criteria presented in figure 4.4, table 4.4 presents key informants that were sampled for the data collection. Key informants are individuals who are considered the best source of information, and they are a source of information that can provide the researcher with the insights which are necessary for the study. In this context, they are

individuals who are directly concerned by educational matters. Precisely, key informants of this study are education officers from the central and local government education institutions.

4.5.3. Qualitative Data Analysis and Linking the Quantitative to the Qualitative Approach

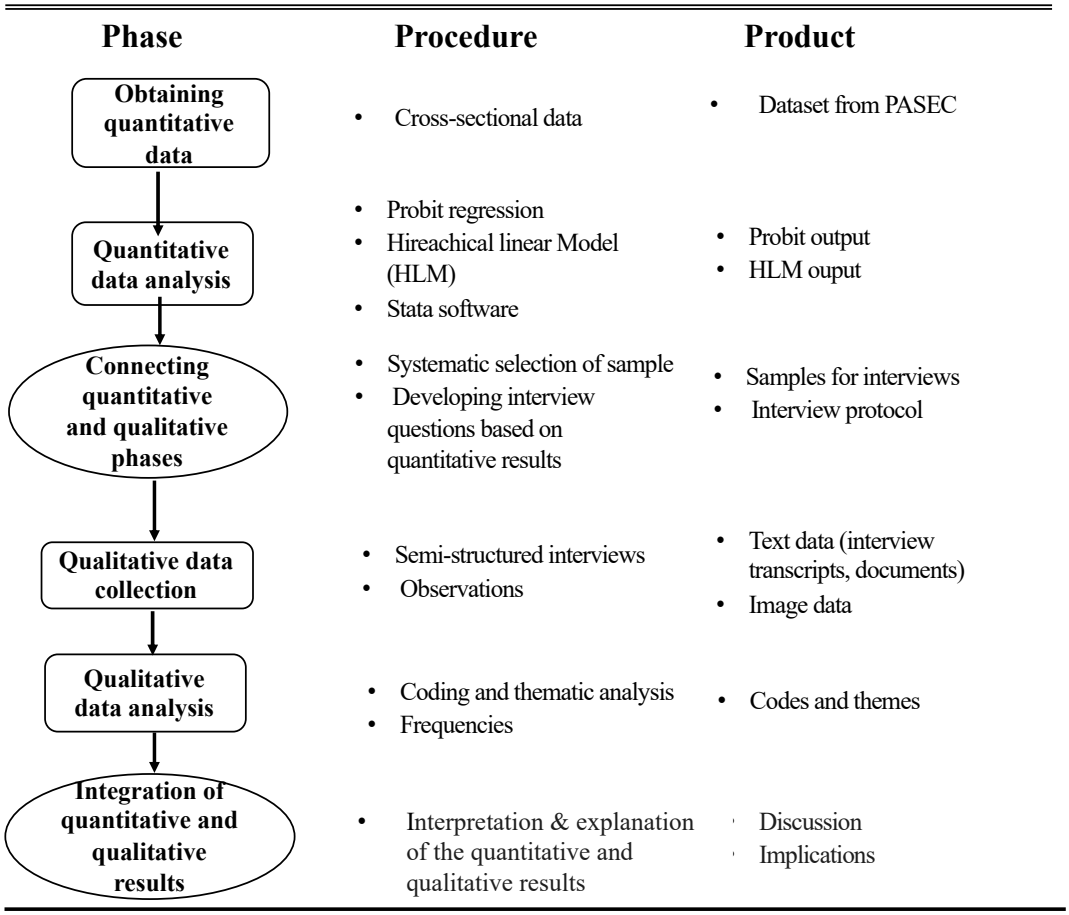
In order to analyze the data collected from the semi-structured interviews, an induction method was employed, in a way that themes can be extracted from the data and concepts generated from these themes. Precisely, responses were organized into coherent patterns which were coded, frequencies of each code calculated for interpretation in relation to the results of the quantitative study (Baglibel et. al, 2018). For the thematic content analysis, similar responses to open-ended questions were grouped, and important themes extracted from each group to explain or elaborate on results of the quantitative analysis (Daly, Kellehear & Gliksman, 1997; Braun & Clarke, 2006). In addition to these methods, the qualitative approach of this study used visual data displays for an easy reading and interpretation of qualitative analysis results.

Linking the quantitative to the qualitative analysis (or vice versa) in a single study gives what is known in the literature as mixed-methods sequential explanatory design research (MSED). According to Creswell et al. (2003), MSED research consists of a quantitative phase followed by a qualitative phase (or the opposite way), but just having a quantitative and a qualitative analysis in a research does not necessarily make it a MSED research. More importantly, in MSED, the quantitative analysis serves as a general understanding of the problem, while the qualitative analysis helps refine and explain results of the quantitative analysis through exploration of participants' view, perceptions, and experiences. The advantages of MSED are straightforwardness and it provides opportunities for the exploration of the quantitative results in more details.

In a MSED research approach, three points must be dealt with: priority, implementation, and integration of the quantitative and qualitative analyses. Priority refers to the weight the study gives to either quantitative or qualitative analysis. Implementation refers to which type of analysis to implement first, and integration to how the two types of analyses are combined

or mixed. In this study, priority was given to the quantitative analysis as this study seeks primarily to identify, and then explain factors affecting school attendance and students' achievements (Morgan, 1998). The quantitative analysis was implemented first due to data availability, serving to identify potential significant factors and to give the main directions for the qualitative data collection (Creswell, 1999). Integration of quantitative and qualitative methods was made through the development of the qualitative data collection tools based on mainly the results obtained from quantitative analysis (Hanson et al., 2005). The procedure of the overall methodology that involves the quantitative and the qualitative analyses is visually presented in figure 4.5 below.

Figure 4.5: Visual Representation for Mixed-Methods Sequential Explanatory Design Procedure Used in the Study

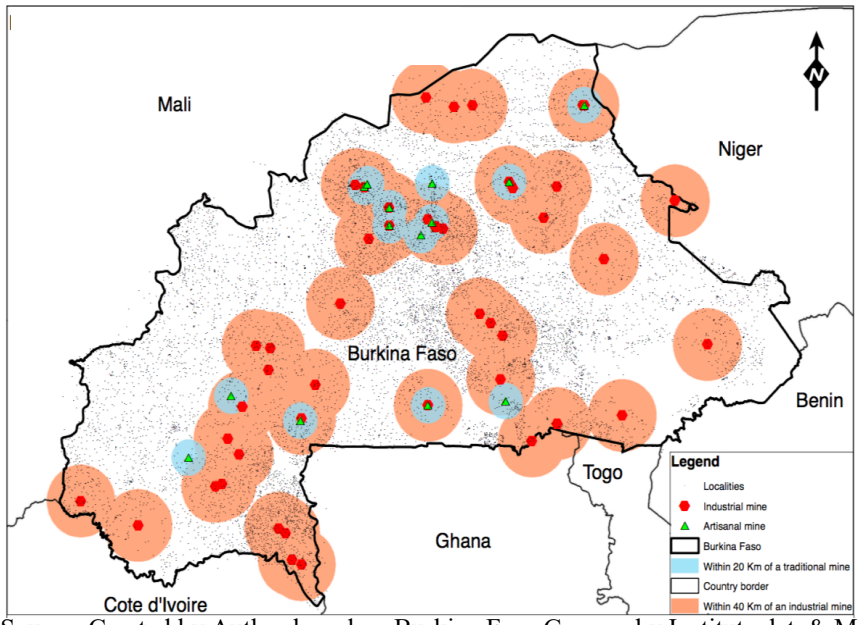


Source: Created by Author based on Ivankova, Creswell & Stick (2006)

4.6. Mining Areas Identification Strategy

The identification strategy of mining areas consists of using information on geographical locations of the schools as provided in the sample, to which is matched gold mines existing in the vicinity. Locations of mines as known as they are indicated by their longitude and latitude global positioning system (GPS) coordinates. A list of 62 significant gold deposits in Burkina Faso, up-to-date as of September 2015, were obtained from a private Australian gold mining consulting company named MinEx Consulting. The database was built up over several years and is based on compilation of information from company reports (e.g. annual reports and press releases), technical and trade journals (e.g. Economic Geology, Northern Miner and Mining Journal), government files from various geological surveys, and personal communications with people in the industry. MinEx estimates that its database for gold covers at least 99% of all giant-sized deposits (>6Moz), 95% of the major deposits (>1Moz Au), 70% of moderate deposits (>100Koz Au) and 50% of the minor deposits (>10Koz Au). The dataset also contains the name or calling of each mine, the year it started exploitation (and it was closed if applicable), and its type (artisanal or industrial) etc.

Figure 4.6 Location of Areas of within the Vicinity of a Gold Mine



Source: Created by Author based on Burkina Faso Geography Institute data& MinEx geocoded data

In the literature, there is consistency that individuals in the vicinity of a mine are exposed to the effect of mining activities. However, there is no consistency about the concept of vicinity. While some studies consider individuals within a radius of 100 kms as within the vicinity of a gold mine, some consider a radius of 20 kms or 80kms (Aragon & Rud, 2013). This study retained students going to a school that is within 20 kms of radius of a small-scale mine or 40 kms of radius of an industrial mine as students in the vicinity of a gold mine, and other students outside the retained radiuses as students in non-gold mining areas. Figure 4.6 gives an overview of areas retained as gold mining areas.

CHAPTER 5: RESULTS

5.1. The Effect of Home Environment Factors on the Likelihood of Primary School Attendance across Socio-Economic Groups in Gold Mining Areas in Burkina Faso's Primary Education

5.1.1. The Effect of Parental Involvement on the Likelihood of Primary School Attendance across Socio-Economic Groups in Gold Mining Areas

This subsection of the study shows the results of the analysis which investigates how parental involvement is related to children's primary school attendance in Burkina Faso's gold mining areas. This analysis is done using probit regression, and the results of the probit regression can be found in the annex in table A5-10. The results that are presented in this subsection are the marginal effects, as reported in table 5.1. Although the results presented focus on the research question of interest, results related to other factors are also presented.

Holding all other factors constant, among factors on individual characteristics, male children appear to have a higher likelihood of attending school when all children are compared on a gender basis. Male children have a 9% higher likelihood of school attendance. In the restricted sample in terms of quantile levels, males still have a 13.6% and 17.7% higher probability of attending school, for quantile two and quantile four, respectively. However, for quantile one and quantile 5, results are not statistically significant.

In order to reduce the quadratic effect of age on the likelihood of school attendance, the variable "age" was squared and this new variable was also included in the regression. Results of the regression revealed that the older children are, the less likelihood they have to attend school. In the overall sample, estimations show that being one year older reduces the likelihood of school attendance by 1%, statistically significant at a 1% level. Wealth quantiles do not change the negative relationship between age and the likelihood of school attendance, as coefficients across quantiles are all negative, though results are only statistically significant for quantiles two, three, and four.

The variable child labor status also shows that children who are working have a lower likelihood of school attendance. Results of the analysis show that among all children, when a child is working, it reduces the likelihood of that child attending school by 11%, statistically significant at 1% level. When the sample is restricted to each of the wealth quantiles created for this study, the coefficient remains negative no matter the quantile level, but results are statistically significant only for quantiles two and four. The reduction of the likelihood of school attendance for working children is 18.5% for quantile two, and 19.4% for quantile five, statistically significant at 5% level.

Many studies in the previous literature indicate that parental education is a strong determinant of school attendance of children, no matter the level of the education system (primary, secondary, and tertiary). The study was not able to categorize the parental education variable into the indicated different levels of education, due to some issues of missing data. The variable used then for parental education indicated whether the household head and mother have formal education or not. Results indicate that when the household head has education, it increases children's likelihood of school attendance by 10%. In the restricted sample, overall results have a positive coefficient, but only statistically significant for quantile three. This study confirms then that household head education is a strong determinant of school attendance. As for mother education, the coefficient for the all sample is positive but not statistically significant. All quantiles also show similar results, except quantile four that shows an increase in the probability of school attendance by 37%, statistically significant at 1% level.

A proxy for household heads that work on an activity which has a direct or indirect link with gold mining activities was also created. Usually, many households are primarily farmers, but also practice activities related to gold mining as well, mostly in the dry season when there are no farming activities. The estimation results reveal that when household head is involved in activities that have a relationship with gold mining activities, it increases the likelihood of their child attending school by 12.7%, statistically significant at 5% percent level. When the data is restricted to quantiles, the positive statistically significant results are observed only for quantiles 3 and five. For the remaining three quantiles, results are not statistically significant.

Table 5.1 Marginal Effect of Involvement on School Attendance in Gold Mining Areas

	Mining areas					
VARIABLES	ALL	Q1	Q2	Q3	Q4	Q5
Male	0.090***	0.106	0.136**	0.080	0.177*	-0.105
	(0.034)	(0.072)	(0.067)	(0.082)	(0.094)	(0.080)
Age	0.336***	0.208	0.432**	0.556***	0.526**	0.142
	(0.089)	(0.191)	(0.181)	(0.215)	(0.240)	(0.209)
agesquare	-0.017***	-0.010	-0.022**	-0.031***	-0.026*	-0.007
	(0.005)	(0.011)	(0.010)	(0.012)	(0.014)	(0.012)
Labor Status	-0.113***	-0.079	-0.185**	-0.004	-0.018	-0.194**
	(0.035)	(0.072)	(0.072)	(0.084)	(0.093)	(0.079)
Head education	0.100**	0.062	0.126	0.236***	0.101	0.100
	(0.040)	(0.087)	(0.082)	(0.084)	(0.097)	(0.091)
Mother education	0.196	0.000	0.097	0.114	0.369***	0.049
	(0.201)	(0.096)	(0.102)	(0.120)	(0.143)	(0.110)
Head occupation	0.127**	-0.187	-0.037	0.226*	0.118	0.202*
	(0.050)	(0.119)	(0.098)	(0.137)	(0.122)	(0.116)
Involvement	0.101***	0.109	0.118	0.069	0.093	0.240***
	(0.037)	(0.077)	(0.079)	(0.099)	(0.103)	(0.079)
Quantiles (base :1)						
Quantile 2	0.174*					
	(0.094)					
Quantile 3	0.199**					
	(0.098)					
Quantile 4	0.295***					
	(0.097)					
Quantile 5	0.168*					
	(0.095)					
Household: 20+	0.004	-0.009	0.002	0.016	0.021	0.013
	(0.004)	(0.008)	(0.011)	(0.011)	(0.013)	(0.010)
Household: < 5	-0.001	0.009	-0.017*	0.009	-0.002	0.016
	(0.004)	(0.009)	(0.009)	(0.009)	(0.015)	(0.014)
Household: 6-12	0.003	-0.002	0.008	0.002	-0.002	0.015
	(0.005)	(0.011)	(0.009)	(0.012)	(0.014)	(0.011)
Household: 13-19	0.006	-0.003	-0.002	0.027	0.019	0.033
	(0.006)	(0.013)	(0.009)	(0.021)	(0.018)	(0.022)
distance_road	-0.034***	-0.049*	-0.010	-0.081***	-0.042	-0.022
	(0.013)	(0.025)	(0.027)	(0.030)	(0.033)	(0.031)
Distance Primary School	-0.007	-0.002	-0.050	-0.044	-0.023	-0.022
	(0.015)	(0.035)	(0.031)	(0.035)	(0.042)	(0.032)

distance_security	-0.036**	-0.046	-0.014	-0.012	-0.013	-0.061
	(0.016)	(0.034)	(0.034)	(0.043)	(0.039)	(0.041)
Urban	0.196***	0.181*	0.248***	0.244**	0.267**	0.187*
	(0.044)	(0.100)	(0.087)	(0.097)	(0.133)	(0.103)
Rsquare	0.169	0.228	0.251	0.336	0.206	0.177

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Estimated by Author

In this study, wealth quantiles are used in order to capture the socio-economic status of the household where children live. Household wealth was then divided into five quantiles from quantile 1, the poorest households, to quantile 5, the richest ones. Quantile sample sizes are very unequal, and quantile 1 was used as the base group for the regression, because it was the one with the largest sample size. Family wealth was found to be a strong predictor of school attendance in gold mining areas. Relative to the base quantile group which is quantile 1, higher quantiles indicate an increase in the likelihood of school attendance as wealth increases. The increase is strongest among households from quantiles 4, where it is 29.5% and statistically significant at 1% level. The wealth level of households then determines child school attendance.

This study also examined the relationship between family structure and school attendance of children. Categories were created for family structure, using the age of the members the household is composed of. This was motivated by the assumption that the effect of the number of children (and adults) in the household depends on the age of individuals, since younger age children are more likely to be a burden, while older age ones can work and contribute financially to the household. In the full sample of the analysis, results showed no statistically significant relationship between household structure and school attendance of children. In the restricted sample, children from families in quantile 2 appear to have a lower probability of 1.7% of attending school, statistically significant at 10% level. From an overall perspective, in gold mining areas, family structure is not a strong predicator of school attendance of children.

Table 5.2 Marginal Effect of Involvement on School Attendance in Non-mining Areas

	Non-Mining areas					
VARIABLES	All	Q1	Q2	Q3	Q4	Q5
Male	-0.034	0.179***	0.021	0.047**	0.026	0.037
	(0.042)	(0.017)	(0.017)	(0.019)	(0.029)	(0.026)
Age	0.478***	0.500***	0.242***	0.213***	0.477***	0.454***
	(0.099)	(0.044)	(0.042)	(0.051)	(0.071)	(0.064)
agesq	-0.024***	-0.027***	-0.013***	-0.010***	-0.024***	-0.022***
	(0.006)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)
Labor Status	0.100**	-0.119***	-0.004	0.009	-0.055*	0.069***
	(0.042)	(0.018)	(0.018)	(0.020)	(0.029)	(0.026)
Head education	0.051	0.001	0.041*	0.025	0.011	0.001
	(0.048)	(0.023)	(0.021)	(0.022)	(0.033)	(0.029)
Mother education	0.006	0.009	-0.007	-0.002	0.007	0.051
	(0.009)	(0.006)	(0.006)	(0.005)	(0.015)	(0.038)
Head occupation	0.091	0.016	-0.004	0.302***	0.116**	0.098*
	(0.086)	(0.038)	(0.030)	(0.029)	(0.057)	(0.051)
SES	0.005					
	(0.015)					
Household 20+	-0.002	-0.008***	0.002	-0.004	-0.003	0.002
	(0.005)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Household: < 5	-0.008	-0.008***	0.011**	-0.003	-0.008**	-0.001
	(0.005)	(0.002)	(0.005)	(0.003)	(0.004)	(0.003)
Household: 6-12	0.008	0.011***	0.007***	-0.004	-0.006	-0.003
	(0.006)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)
Household 13-19	0.007	-0.006*	0.004	-0.003	-0.004	0.006*
	(0.009)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
distance_road	-0.065***	-0.002	-0.006	0.000	-0.059***	-0.044***
	(0.015)	(0.006)	(0.007)	(0.007)	(0.011)	(0.010)
distance_primary	0.034*	0.011	-0.008	-0.008	0.000	-0.009
	(0.020)	(0.008)	(0.008)	(0.009)	(0.013)	(0.012)
distance_security	-0.016	-0.001	-0.002	-0.027***	-0.013	-0.016
	(0.022)	(0.009)	(0.009)	(0.009)	(0.014)	(0.012)
Urban	0.272***	0.144***	0.113***	0.124***	0.122***	0.237***
	(0.061)	(0.028)	(0.026)	(0.027)	(0.038)	(0.033)
Involvement	0.027	0.019	0.020	0.013	0.032	0.026
	(0.045)	(0.017)	(0.018)	(0.020)	(0.031)	(0.028)
Rsquare	0.202	0.221	0.281	0.247	0.148	0.177

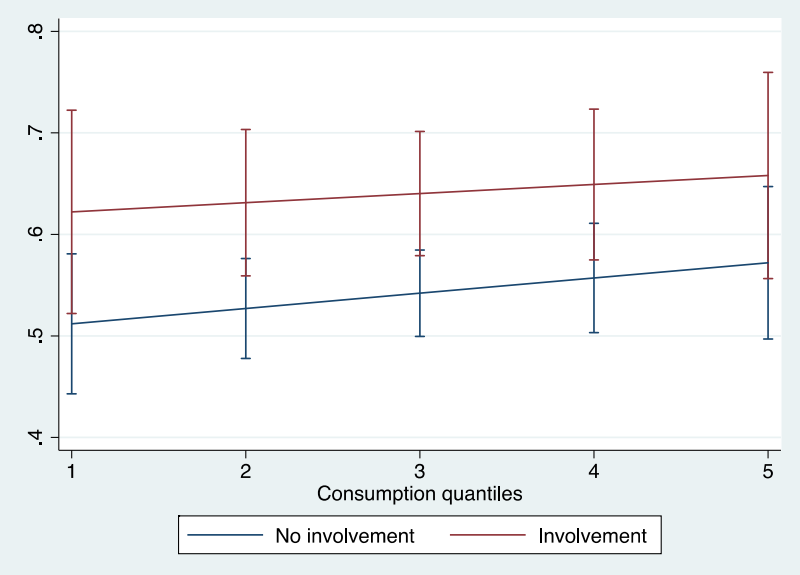
Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Estimated by Author

The main focus of this subsection is to estimate the impact of parental involvement on the likelihood of school attendance among socio-economic groups in gold mining areas in Burkina Faso's primary education. At home, some parents monitor the education of their children while some do not. This study then seeks to investigate the effect of such a monitoring on the likelihood of children's school attendance. The results from the full sample applying probit regression show that when parents are involved in the education of their children, it increases the likelihood of their school attendance. Specifically, children with parents involved in their education are 10% more likely to attend school, statistically significant at 1% level. Restricted sample analysis in quantiles reveals that there is no statistically significant relationship between parental involvement and primary school attendance for children from families from the consumption quintile 1 to 4. Parental involvement increases the likelihood of school attendance for children from the highest quantile level. Children from parents in consumption quantile 5 whose parents are involved are 24% more likely to attend primary school, statistically significant at 1% level.

Figure 5.1 Predicted Probabilities of the Effect of Involvement on School Attendance by Quintiles



Source: Created by Author based on probit estimation

The predicted probabilities of the effect of involvement on school attendance by quantiles is graphically presented in figure 5.1 below. From an overall perspective, the presence of parental

involvement gives a higher probability of school attendance, relative to the lack of involvement. Considering quantiles, the figure shows that the probability of school attendance increases as quantiles increase, and this increase is consistent. Whether there is parental involvement or not, wealth quantiles have an influence on the way parental involvement influences school attendance in gold mining areas in Burkina Faso.

In order to better understand the situation of the effect of parental involvement on primary school attendance in gold mining areas in Burkina Faso, the situation of non-gold mining areas was also analyzed from a comparative perspective. Table 5.2 above presents the results of the probit regression of the relationship between parental involvement and primary school attendance in non-mining areas. The results suggest that parental involvement is positively related to school attendance in non-mining areas, but results are not statistically significant. The data was also broken into different consumption quantiles just like for the case of gold mining areas, but results of these restricted sample do not show any statistically significant relation either. The results of this study show then that for improved school attendance in Burkina Faso, parental involvement is very important in gold mining areas, and wealth is a mediator of the effect of parental involvement on school attendance. However, parental involvement is not important for school attendance in non-gold mining areas.

5.1.2. The Effect of Parental Involvement on the Likelihood of Primary School Attendance Depending on Child Gender and Child Labor Status in Gold Mining Areas

This study also analyzed the effect of parental involvement on school attendance by gender and also by child working status in gold mining areas in Burkina Faso. The results that are presented in this subsection are the marginal effects, reported in table 5.3. The variables that were included in the research question 1.1 are the same that are used for research question 1.2. The results of the probit regression can be found in table A5-11 in the annex. The key explanatory variables of primary school attendance in this research questions are involvements

by gender and by working status. Table 5.3 presents the estimated marginal effects of variables both for mining areas and non-mining areas.

As shown in table 5.3, the overall data sample shows that parental involvement increases the probability of school attendance of children in gold mining areas by 10%, and results are statistically significant at 1% level. However, for the same overall data sample, there is no statistical relationship between parental involvement and school attendance in non-gold mining areas in Burkina Faso's primary education. There seems to be consistency that family involvement is important for improved school attendance in gold mining areas but not in non-gold mining ones. Since the number of variables used are the same as in research question 1.1, the results at this point of the analysis are the same of the two research questions.

Furthermore, in gold mining areas, results in table 5.3 indicate that parental involvement is not statistically associated with the school attendance of boys, but is it for girls. Precisely, the restricted sample by gender indicates that parental involvement increases the probability of girls' school attendance by 13.4% in gold mining areas. This result is statistically significant at 5% level. Oppositely, the analysis did not find any statistical association between parental involvement and school attendance by gender in non-gold mining areas. These results indicate that there is a gender dimension of the effect of parental involvement on children's school attendance in Burkina Faso, depending on whether these children are from gold mining areas or from non-gold mining areas.

Figure 5.2 presents graphically the probability of school attendance, when there is involvement and when there is not, for males and females. The lack of involvement shows a wide gap in the probability of school attendance between boys and girls, but with involvement, the probabilities of school attendance for both increases. Comparing this increase, figure 5.2 shows that the probability of school attendance of girls increases more than the one of boys, as the line for females in the figure is steeper than the one for males. However, there is still this gender gap in favor of boys in the effect of parental involvement on the probability of school attendance. However, the visual representation does not present the statistical significance of the results, so it must not be interpreted directly.

Table 5.3 Marginal Effects of Parental Involvement on School Attendance by Gender

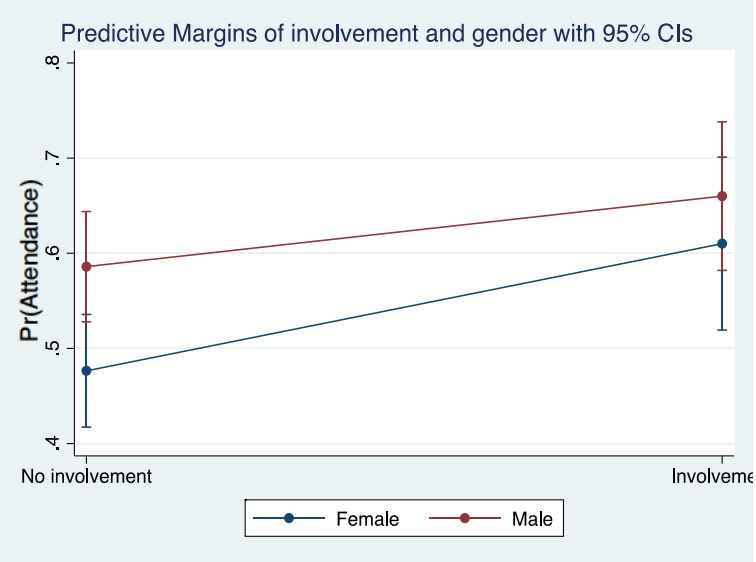
	Mining areas			Non-mining areas		
VARIABLES	All	Boys	Girls	All	Boys	Girls
Gender	0.090***			-0.034		
	(0.034)			(0.042)		
age	0.336***	0.333***	0.383***	0.478***	0.332***	0.491***
	(0.089)	(0.123)	(0.130)	(0.099)	(0.034)	(0.036)
agesq	-0.017***	-0.017**	-0.020***	-0.024***	-0.017***	-0.025***
	(0.005)	(0.007)	(0.007)	(0.006)	(0.002)	(0.002)
Labor Status	-0.113***	-0.164***	-0.074	0.100**	-0.011	-0.013
	(0.035)	(0.047)	(0.052)	(0.042)	(0.014)	(0.016)
Father education	0.100**	0.090	0.130**	0.051	-0.057***	0.018
	(0.040)	(0.055)	(0.059)	(0.048)	(0.016)	(0.018)
Mother education	0.196	0.178	0.123	0.006	0.078	0.007
	(0.201)	(0.340)	(0.245)	(0.009)	(0.121)	(0.125)
Head occupation	0.127**	0.087	0.197**	0.091	0.191***	0.105***
	(0.050)	(0.064)	(0.079)	(0.086)	(0.022)	(0.030)
Household size (age 20+)	0.004	-0.002	0.010*	-0.002	-0.008***	0.002
	(0.004)	(0.006)	(0.005)	(0.005)	(0.001)	(0.002)
Household size (5)	-0.001	-0.003	0.003	-0.008	-0.005***	-0.003
	(0.004)	(0.006)	(0.006)	(0.005)	(0.002)	(0.002)
Household size (6-12)	0.003	-0.000	0.008	0.008	0.006***	-0.002
	(0.005)	(0.006)	(0.007)	(0.006)	(0.002)	(0.002)
Household size (13-18)	0.006	0.007	0.007	0.007	-0.006***	0.002
	(0.006)	(0.010)	(0.007)	(0.009)	(0.002)	(0.002)
distance_road	-0.034***	-0.030*	-0.036*	-0.065***	-0.012**	-0.038***
	(0.013)	(0.017)	(0.019)	(0.015)	(0.005)	(0.005)
Distance Primary School	-0.007	-0.014	-0.003	-0.034*	-0.021***	-0.009
	(0.015)	(0.020)	(0.023)	(0.020)	(0.006)	(0.007)
distance_security	-0.036**	-0.021	-0.056**	-0.016	-0.016**	-0.019***
	(0.016)	(0.022)	(0.024)	(0.022)	(0.007)	(0.007)
Urban	0.196***	0.219***	0.164**	0.272***	0.144***	0.179***
	(0.044)	(0.059)	(0.066)	(0.061)	(0.019)	(0.021)
(Base = quant.1)						
Quantile 2	0.174*	0.139	0.229*	0.090***	0.117***	0.074
	(0.094)	(0.140)	(0.129)	(0.034)	(0.040)	(0.052)
Quantile 3	0.199**	0.159	0.272**	0.088***	0.115***	0.007
	(0.098)	(0.147)	(0.131)	(0.030)	(0.034)	(0.041)
Quantile 4	0.295***	0.232	0.382***	0.019	0.016	0.018
	(0.097)	(0.144)	(0.133)	(0.029)	(0.034)	(0.040)

Quantile 5	0.168*	0.040	0.330**	0.008	0.017	0.038
	(0.095)	(0.139)	(0.131)	(0.029)	(0.034)	(0.040)
Involvement	0.101***	0.081	0.134**	0.027	0.003	0.020
	(0.037)	(0.050)	(0.056)	(0.045)	(0.013)	(0.017)
Pseudo R2	0.169	0.167	0.188	0.202	0.227	0.251

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Estimated by Author

After the analysis on the gender dimension of the effect of parental involvement on school attendance, this study examined the moderating effect child labor has on the influence of parental involvement on primary school attendance. The same variables just like for the gender dimension were also used, but here the subsequent restriction of the data was on whether the child performed a physical work outside the household or not. As already presented in the results of research question 1.1, the overall data sample shows that parental involvement increases the probability of school attendance of children in gold mining areas by 10%, and results are statistically significant at 1% level. However, for the same overall data sample, there is no statistical relationship between parental involvement and school attendance in non-gold mining areas in Burkina Faso's primary education.

Figure 5.2 Predicted Probabilities of the Effect of Involvement on School Attendance by Gender



Source: Created by Author based on probit estimation

Table 5.4 Marginal Effects of Parental Involvement on School Attendance by Labor Status

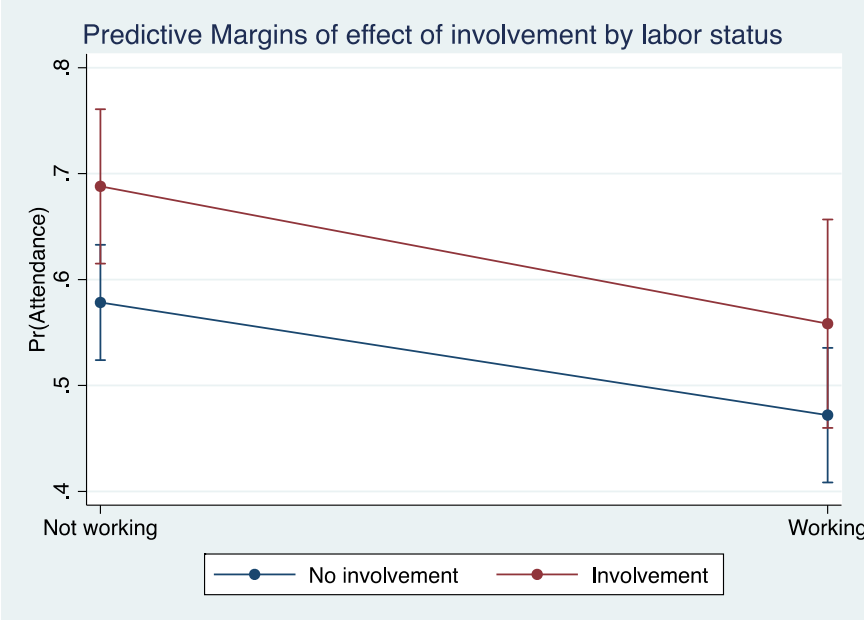
	Mining areas			Non-mining areas		
VARIABLES	All	Working	Not working	All	Working	Not working
age	0.336***	0.475***	0.241**	0.478***	0.403***	0.378***
	(0.089)	(0.137)	(0.118)	(0.099)	(0.033)	(0.037)
agesq	-0.017***	-0.025***	-0.012*	-0.024***	-0.020***	-0.020***
	(0.005)	(0.008)	(0.007)	(0.006)	(0.002)	(0.002)
gender	0.090***	0.026	0.121***	-0.034	0.061***	0.099***
	(0.034)	(0.054)	(0.045)	(0.042)	(0.014)	(0.014)
Labor status	-0.113***			0.100**		
	(0.035)			(0.042)		
Father education	0.100**	0.095	0.101*	0.051	-0.006	-0.045***
	(0.040)	(0.063)	(0.052)	(0.048)	(0.016)	(0.017)
Mother education	0.196	0.201	0.249	0.006	0.091	0.011
	(0.201)	(0.210)	(0.230)	(0.009)	(0.127)	(0.147)
Hous.head occupation	0.127**	0.062	0.168**	0.091	0.227***	0.019
	(0.050)	(0.075)	(0.068)	(0.086)	(0.020)	(0.030)
Involvement	0.101***	0.077	0.108**	0.027	0.014	0.007
	(0.037)	(0.061)	(0.048)	(0.045)	(0.014)	(0.015)
(Base = quant.1)						
Quantile 2	0.174*	0.275	0.163	0.090***	-0.033	0.082*
	(0.094)	(0.182)	(0.112)	(0.034)	(0.045)	(0.045)
Quantile 3	0.199**	0.402**	0.115	0.088***	0.076**	0.034
	(0.098)	(0.184)	(0.117)	(0.030)	(0.033)	(0.040)
Quantile 4	0.295***	0.495***	0.201*	0.019	0.019	0.028
	(0.097)	(0.186)	(0.115)	(0.029)	(0.032)	(0.040)
Quantile 5	0.168*	0.293	0.133	0.008	0.025	-0.023
	(0.095)	(0.184)	(0.113)	(0.029)	(0.032)	(0.039)
Household size (age 20+)	0.004	0.006	0.004	-0.002	-0.001	-0.006***
	(0.004)	(0.007)	(0.005)	(0.005)	(0.002)	(0.002)
Household size (5)	-0.001	-0.001	0.001	-0.008	-0.004**	-0.005***
	(0.004)	(0.007)	(0.006)	(0.005)	(0.002)	(0.002)
Household size (6-12)	0.003	0.009	-0.000	0.008	-0.003*	0.007***
	(0.005)	(0.008)	(0.006)	(0.006)	(0.002)	(0.002)
Household size (13-18)	0.006	0.008	0.006	0.007	0.000	-0.003
	(0.006)	(0.009)	(0.008)	(0.009)	(0.002)	(0.002)
distance_road	-0.034***	-0.027	-0.039**	-0.065***	-0.025***	-0.002
	(0.013)	(0.022)	(0.016)	(0.015)	(0.005)	(0.005)
Distance Primary School	-0.007	-0.004	-0.013	0.034*	0.005	-0.017**
	(0.015)	(0.024)	(0.019)	(0.020)	(0.006)	(0.007)
distance_security	-0.036**	-0.038	-0.034	0.016	-0.028***	-0.007

	(0.016)	(0.025)	(0.021)	(0.022)	(0.007)	(0.007)
Urban	0.196***	0.246***	0.172***	0.272***	0.118***	0.198***
	(0.044)	(0.068)	(0.059)	(0.061)	(0.020)	(0.020)
Pseudo R2	0.169	0.186	0.172	0.202	0.266	0.209

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Estimated by Author

Restricting the sample into whether children work or not shows that for working children in gold mining areas in Burkina Faso's primary education, the effect of parental involvement on school attendance increases, but the increase is not statistically significant. However, considering the sample for non-working children, results presented in table 5.4 indicate that for non-working children in gold mining areas in Burkina Faso's primary education, having parental involvement in the education of children increases the probability of their school attendance by 10.8%. The increase is statistically significant at 5% level. These results of this subsection of the study indicate then that in gold mining areas, the effectiveness of parental involvement for school attendance is moderated by whether children work or they do not work. There is then a reduction or an increase in the effect of parental involvement on school attendance depending on this third factor.

Figure 5.3 Predicted Probabilities of the Effect of Involvement on School Attendance by labor



Source: Created by Author based on probit estimations

Figure 5.3 is a graphical presentation of the effect of parental involvement on school attendance for working children and non-working ones in gold mining areas. The figure shows that parental involvement consistently increases the probability of school attendance of children, not matter their working status. However, the working status moderates the effect of parental involvement on children's school attendance, as the figure shows that the effect of parental involvement on school attendance is reduced when children are working. Even without parental involvement, when children are working, their probability of school attendance reduces. This shows visually the moderating effect that child labor has on the effectiveness of parental involvement for higher school attendance of children in gold mining areas.

The analysis of the moderating effect of child labor was also analyzed for children in non-gold mining areas. The results of the marginal effect of the probit regression are also presented in table 5.4. From these results, restricting the sample to working children does not show any statistical relationship between parental involvement and school attendance. Likewise, restricting the sample to non-working children does not show any statistical relationship between parental involvement and the probability of school attendance. There is therefore no statistical evidence to support that child labor increases or decreases the effect of parental involvement on school attendance in non-gold mining areas. The results in gold mining areas and those in non-gold mining areas differ, that is child labor has a moderating effect in gold mining areas but not in non-gold mining ones. Therefore, results provide a statistical power to indicate that in gold mining areas, child labor is a factor that reduces parental efforts for higher school attendance for their children. However, in non-gold mining areas, child labor has no moderating effect.

5.1.3. Qualitative Results of the Effect of Parental Involvement on Primary School Attendance

In order to understand what parents do as involvement for their children to go to school, parents were interviewed. In total, thirty-two parents were interviewed to study the dynamics of their involvement in the education of their children and how this relates to child school attendance.

The interviews reveal that most parents do not get involved in the education of their children at home, i.e. they show no engagement towards their children's schooling. When asked "What do parents do as a way of involvement to your child's school attendance?", results, as presented in table 5.5, indicate that the majority of parents, that is 59.09%, reported they do not do anything at all as a way to increase their children's school attendance. However, 27.27% of parents interviewed reported that they check whether children have attended school or not.

The checking of the school attendance is done employing various strategies. While some parents directly check at home by ensuring that the child is out of the house during school hours, some others ask children outside school hours to confirm they have been to school. This may leave some gaps, because children may be away from home during school hours, but they are not in school. Confirming with children by asking them directly, some children may lie that they have been to school, even though they have not. However, as to confirm these assumptions, outside the closed-ended question, some parents reported calling the child's teacher to ensure that the child who is out of the household is really in school during school hours. Apart from these two groups of parents, some parents take other actions, such as encouraging the children and talking to them about the value of education.

Table 5.5 Parental Involvement and School Attendance (N=32)

Involvement type	Percentage	Mitigating factors
Nothing	59.09%	Father occupation Poverty Parental education
Attendance check	27.27%	
Others	13.64%	
Total	100%	

Created by author

During the interview, parents were also asked to give the factors that prevent them from getting involved or more involved in the education of their children in order to ensure that they attend school. Among the responses, the recurrent theme that was found was being busy due to own work requirements. For example, the following statements are examples of what parents say about why they are not monitoring or may not be monitoring the attendance of their children:

> We work on the mountains [artisanal gold mining sites] and usually stay there for days before we come back home, so we cannot monitor the school attendance of our children.
>
> (P5)

> We have to go out to work, or else we cannot feed our families. We are poor and farming does not give a good harvest anymore, so there is nothing else we can do but mining activities.
>
> (P9)

Based on these responses, it appears that parents have to stay away from home for long days or hours, and poverty is what drives many of them not to be involved in the education of their children. They are busy then seeking to find a way to survive and feed their families. This lack of involvement in children's education can also be related to an issue of lack of education of these parents, as many of the parents interviewed cannot speak any French at all. In the context of Burkina Faso, not being able to speak French (the country's official language) at all indicates having no schooling at all. Educated parents may not "abandon" their children completely, but may likely try to find a way to go for their activities but care about the education of their children. However, the school attendance of children involves child level dynamics, which need to be considered, as suggested by one education official from a gold mining area:

> Parents may know the importance of education, even if they are themselves uneducated, and some are involved in the education of their children. The problem is that many parents cannot control their children anymore, as these children see their friends coming on new motorbikes and have new things they also want to have.
>
> (O2)

This statement shows then a peer pressure that children are undergoing, and some of them may not attend school due to this pressure. Children are likely to feel like being similar to their peers, and therefore will not listen to their parents, if what the latter say or do prevents them to. For

parents who cannot provide for their children to be materially like their peers, children will likely not listen to these parents. It can be said that family socio-economic status seems to be an important factor in understanding family dynamics with their children and the relation to their school participation. Even though parents may show given level of involvement in the education of their children, providing for the material and financial needs of the children seem to be a factor that is needed for the involvement to be effective.

In addition to parents, primary school students of grade 6 were also interviewed for this study. An aspect of the interview was interested in understanding possible interactions of parental involvement in relation to school attendance. Among all the children interviewed, only 13.50% reported that they were not doing any type of labor at all (inside or outside the household). 27% do some domestic work, while 54.55% do some work outside the household, for a financial remuneration. The smallest portion of 04.55% is doing some work that are difficult to classify as domestic or non-domestic. No matter the type of work done, some children reported that they feel tired after work, and for some, they are not able to go to school due to their work. For many of the children that do work for financial remuneration, they recognized that they can get a lot of money, though it depends on the day and the season. This labor for remuneration intensifies according to mining seasons, but also when new sites are discovered. New sites attract crowds and labor is relatively better paid in new sites, driving more and more children away from school. Once the children get money, they lose interest in going to school, until they do not have much left, and that is when they may think of going back to school.

Table 5.6 Labor and its Impact on School Attendance

Labor status	Percentage	Impact	Reasons to work
Not working	13.50%		N/A
Working (domestic)	27.40%	Absenteeism, tiredness	Family pressure Poverty Peer pressure Cultural views
Working (non-domestic)	54.55%	Absenteeism, Financial gain, tiredness	
Other	4.55%	Absenteeism, tiredness	
Total	100%		

Created by author

About the reasons why children work, the responses that came from them are family pressure to work, cultural views of labor, and peer pressure. For some boys, the family does not provide for their financial needs while they have friends who work on gold mining related activities and get money to buy new clothes or stylish phones. These boys also want to look like their friends, so they abandon classes to look for money to buy trendy items among boys. These observations seem to confirm the statement of the education official on the influence of peer pressure on the school participation of children. Similarly, for girls, providing for their own financial needs seems to be one of the reasons why they also work for money, as expressed by one the girls interviewed on a gold mining site:

> I come to look for gold and sell to buy clothes for the feast [traditional or religious Celebration], because our fathers [parents] do not give us money to buy the clothes and girls' accessories we need.
>
> (S1)

The responses of these stakeholders may imply that children who have the support of their families go to school regularly and do not go to the gold mining sites. Girls also recognized that they can go to work on mining sites for money, but they are not as free as boys, because their parents (mostly mothers) always have an eye on them. From a socio-cultural perspective, it seems that girls have to be showing more submission relative to boys, since they are future wives. Society seems to be requiring women to submit themselves to men, and part of the roles of these women. These socio-cultural views make girls more likely to follow the instructions of their parents, and mothers feel much pressure to ensure that their daughters become submissive women. The instructions, even though they may be unspoken, are from mainly fathers, who seem to have much of the authority in the household. Another gender perspective in relation to the labor is that girls seem to be doing labor requiring lower physical abilities, for instance winnowing. However, boys are involved in physically intensive activities, for example digging.

Based on these responses, what can be retained are the socio-economic, labor and gender factors that seem to be moderating the actions of parents for a better school participation of

their children, at least for those who are involved in their children's schooling. It is seen that many parents cannot provide children with the material or financial needs they have, and once these children can work and get some money, they may decide not to go to school and then parents cannot "control" them anymore. Boys seem to have more freedom to work, probably because they may get more financial income that can even supplement the one of the family. As for girls, socio-cultural views on the role of girls, future wives, want them to submit themselves to what their family or society as a whole says.

5.2. The Factors that Determine Students' Learning Achievements Between High-Performing Students and Low-Performing Ones in Gold Mining Areas in Burkina Faso's Primary Education

5.2.1. Variations at the School and Province Levels of the HLM Empty Model

This subsection presents the results related to the fitting of model 1 (empty model) as explained in the methodology. It is important to remind that this model serves to determine the proportion of variances in learning achievements that is available at each level of the hierarchy of the HLM analysis. The VPC and the ICC are the estimates in this sense, as they represent the proportion of variances in each level of interest. The use of HLM for this analysis allowed then the estimation of the relative importance or weight of each level of the hierarchy, that is student level, school level, and province level. Results of the model fitting are presented in table 5.7.

The results in table 5.7 indicate that variances that lie at the province, school, and student levels are 08.30%, 44.4%, and 47.3%, respectively. Therefore, there is relatively little variations of students' learning achievements across provinces in gold mining areas (08.30%), as the above estimation shows that most of the variation lies within provinces between schools (44.4 %), and within schools between students (47.3%). The highest variations lie within schools between students. Put in other words, without adjusting for explanatory factors, student level is the highest source of variation in learning achievements, followed by school level, and province level is the lowest source of variations in learning achievements.

The ICC was estimated, using the information of the variance components of each level obtained from the fitting of the empty model. ICC indicates variations in the learning achievements that are due to differences at student level, but also differences at the two other higher levels of the hierarchy. The results, also presented in table 5.7, indicate that between school differences explain 52.27% of the learning achievements variations, while between province differences explain only 08.30% of the variations in learning achievements. Both the VPC and ICC show that there is a relatively low level of clustering of the data at the province level, as there is only 08.30% province level differences in learning achievements.

Table 5.7 Estimates of the Variances in Students' Achievements at each Level

	Province	School	Student	Total
Variances	580.8426	3103.868	3311.889	6996.5996
VPC	0.083	0.444	0.473	1
ICC	0.083	0.527	N/A	N/A

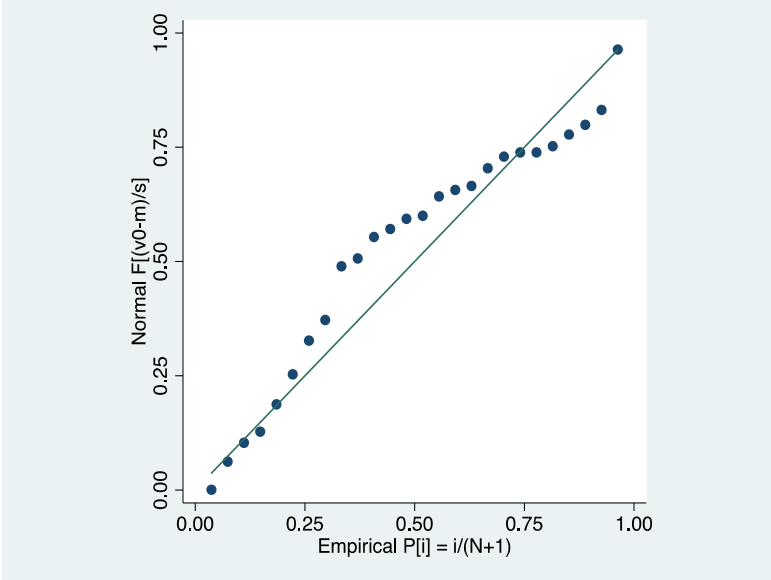
Source: Created by Author based on HLM estimation

The predicted random effects at the school level and at the province level were also computed after fitting the empty model. Results are presented in tables A5-1 and A5-2, and also visually presented in figures A5-3 and A5-4 in the annex. From the values in table A5-1, province 1, with a score of -36.61, is predicted to be the lowest scoring among all provinces. However, province 26, with a score of 18.68, is predicted to be the highest scoring province. Similarly, the values in table A5-2 indicate that school 1, with a score of -146.90, is predicted to be the lowest scoring school. However, school 70, with a score of 99.80, is predicted to be the highest scoring school. The predicted random effects help predict the performant schools or provinces.

In addition to the prediction of the school and province effects, the distribution of these effects was checked, by plotting quantile-quantile plots. It may be of interest to recall that the normal distribution assumption of these effects must be met in order for the results of HLM to be valid, as this is one of HLM validity requirement assumptions. From figure 5.4 below, it can be seen that all provinces do not lie exactly on the line but very close to the line. This suggests that the province random effects are approximately normally distributed, and the normal distribution assumption at the province level can be accepted as met.

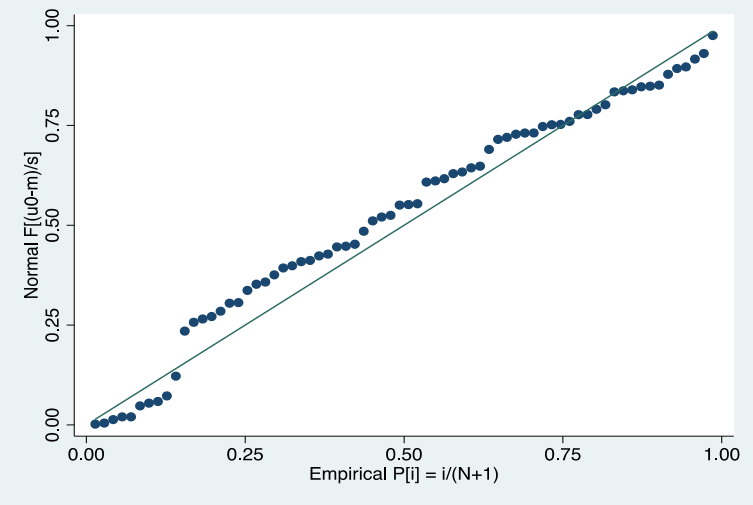
Considering figure 5.5, it can be seen that all schools are not on the line but close to it. Just like in the case of province random effects, school random effects are also approximately normally distributed, and the normal distribution assumption at the school level can be accepted as met. Therefore, the normal distribution assumption of the random effects at the school level and the province levels in this HLM study are met. Moreover, the predicted effects of each level allow to know the performant or non-performant schools and provinces.

Figure 5.4 Distribution of Random Effects at Province Level



Source: Created by Author based on PASEC (2014)

Figure 5.5 Distribution of Random Effects at School Level



Source: created by Author based on PASEC (2014)

5.2.2. The Effect of The Level of Parental Involvement, the Number of Books at Home and Child Labor on Students' Learning Achievements between High-Performing Students and Low-Performing ones in Gold Mining Areas

This subsection presents the results on the effect of parental involvement, the number of books at home, and child labor on students' learning achievements in gold mining areas in Burkina Faso. The estimation was done to answer the sub-research question 2.1, and PASEC 2014 data on students' learning achievements was used for the analysis. The estimation was done employing HLM, and the levels are student, school, and provinces levels. Table 5.8 presents the results of the effect of parental involvement, the number of books at home, and child labor on students' learning achievements. The full results of the regression of this stage of the analysis are given in the annex in table A5-12.

This study divided the level of parental involvement into four categories, which are parents not involved, parents sometimes involved, parents often involved and parents always involved. Parents not involved may be taken as the base group in the analysis, in traditional regression. However, previous studies suggest that in HLM there is generally no issues of collinearity when all groups are included directly in the regression, so the four groups were included. This is due to the clustering that allows group effects to avoid collinearity. Similarly, the number of books possessed by children at home was transformed in four groups: no books, enough books to fill one shelf, enough books to fill two shelves, and enough books to fill a library. As already mentioned, in HLM, fitting a model using all groups does not cause collinearity, so all groups were added in the regression for the variable number of books are homes. The transformation of variables into groups seeks to know which group is more effective in improving students' learning achievements.

Table 5.8: Effect of the Level of Parental Involvement, the Number of Books at Home and Child Labor on Students' Learning Achievements

	Mining areas			Non-mining areas		
VARIABLES	All	Repeated	Not repeated	All	Repeat	Not repeated
Age	-1.343	-1.178	0.294	-3.702***	-1.221	-6.143
	(1.615)	(2.236)	(2.321)	(1.377)	(1.812)	(2.121)
Labor status	-10.814***	-9.395***	-11.158***	-7.098***	-3.975*	-10.489***
	(2.251)	(2.994)	(3.267)	(1.824)	(2.262)	(2.937)
Repeated class	-7.084*			-10.755***	-	-
	(4.240)			(4.137)		
Family SES	0.612*	0.449	0.783	0.544*	0.287	0.891**
	(0.359)	(0.461)	(0.547)	(0.280)	(0.354)	(0.438)
No involvement	-0.677	-0.340	-6.721	4.878	-5.717	19.951*
	(8.838)	(12.305)	(12.151)	(7.618)	(10.053)	(11.303)
Sometimes involved	12.740	10.529	21.07	11.177	1.207	27.900**
	(8.952)	(12.159)	(19.781)	(7.478)	(9.901)	(11.277)
Often involved	6.956	7.545	17.498	11.408	1.110	24.605**
	(8.376)	(11.521)	(11.775)	(7.091)	(9.529)	(10.489)
Always involved	7.046	5.486	19.453	5.348	2.725	12.712
	(9.205)	(12.625)	(13.023)	(7.473)	(10.054)	(11.049)
No books	2.570	-1.706	14.978	4.009	-3.519	19.220
	(9.772)	(11.651)	(16.015)	(8.948)	(10.949)	(14.695)
Books fill one shelf	10.550	1.135	28.248*	18.049**	1.643	43.351***
	(9.765)	(11.676)	(16.189)	(8.863)	(10.892)	(14.601)
Books fill two shelves	27.374**	14.439	33.918	17.470*	0.590	37.736**
	(13.068)	(14.945)	(21.629)	(10.276)	(12.874)	(16.664)
Books fill library	9.229	-39.761	18.565	5.848	-1.090	22.578
	(18.896)	(34.621)	(24.886)	(13.720)	(20.394)	(19.794)
School resources	1.991***	1.880***	2.030***	1.635***	0.077	1.708**
	(0.344)	(0.511)	(0.452)	(0.585)	(0.744)	(0.668)
Teacher pre-train. (1 yr)	28.208*	43.564**	2.482	11.541	13.936	28.502*
	(15.389)	(19.398)	(16.476)	(12.298)	(12.215)	(15.182)
Teacher experience	2.491***	2.989**	0.911	1.889**	1.422*	1.908**
	(0.967)	(1.240)	(1.113)	(0.760)	(0.749)	(0.942)
Principal train. (1 yr)	14.475**	17.605**	12.410	7.291	18.251	-4.740
	(5.833)	(7.348)	(9.253)	(11.406)	(11.341)	(13.648)
Principal experience	1.152***	1.002**	0.987**	0.513	0.061	0.783
	(0.311)	(0.457)	(0.448)	(0.651)	(0.638)	(0.765)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Estimated by Author

Results indicate that in gold mining areas, the lack of parental involvement is related to lower learning achievements, but not statistically significant. The lack of statistical relationship between no parental involvement and learning achievements in gold mining areas applies to both students who have never repeated a grade (high-performing) and students who have already repeated one (low-performing). On the lack of parental involvement and students' learning achievements in non-gold mining areas, results also suggest no statistical relationship from an overall perspective, and for students who have already repeated a grade. For students in non-gold mining areas who have never repeated a grade (high-performing students), results suggest that even without parental involvement, they still score about 19 grade points higher.

In gold mining areas, when parents are sometimes involved in the studies of their children, there is no statistical evidence to show a relation with children's learning achievements. This lack of statistical evidence applies both to high-performing students and low-performing ones. However, the same results with no statistical evidence apply partially to students from non-gold mining areas. Among these students in non-gold mining areas, with parental involvement (sometime involved), there in an increase in high-performing students' learning achievements. Such students are expected to score about 28 grade points higher than low-performing ones. Results are statistically significant at 5 percent level. Results suggest then that when parents are sometimes involved, it is beneficial to the learning achievements of high-performing students in non-gold mining areas.

In gold mining areas, when parents often get involved in their children's studies, results of this study suggest that there is no statistical evidence to support any relation of this action and children's learning achievements. This lack of statistical evidence applies to both high-performing students and low-performing ones. In terms of non-gold mining areas, the same results apply, but there is a statistical relationship between parents being often involved and high-performing students' learning achievements. Specifically, this level of parental involvement contributes to make students' learning achievement approximately 24 grade points higher, statistically significant at 5% level. As a whole, parents often involved in the

studies of their children improve the learning achievements of only high-performing students from non-gold mining areas.

Results of this study suggest that there is no statistical evidence to support that parents who are always involved in the studies of their children influence the learning achievements of these children. The lack of statistically power to support any relationship was found both in gold mining-areas and non-gold mining ones, and also among high-performing students and low-performing ones. These results on the relationship between parental involvement and learning achievements, all levels taken as a whole, suggest that parental involvement seems to influence only high-performing students from non-gold mining areas. Parental involvement is not statistically related to the learning of students in gold mining areas, whether for high-performing students or low performing ones.

In terms of the factor number of books at home, when students have no books at all at home, not surprisingly, there is no statistical relation with their learning achievements. For children in gold mining areas, having enough books to fill one shelf is statistically related to the learning achievements of high-performing ones. The increase is of approximately 28 grade points, statistically significant at 10% level. For children in non-gold mining areas, considering all students in the sample, the same number of books (enough to fill one shelf) at home increases their learning achievements of approximately 18 grade points, statistically significant at 5% level. The same positive statistical relation with learning achievements was found for high-performing students in non-mining areas when they have enough books to fill one shelf. A number of books to fill two shelves is statistically related with students' learning achievement, from an overall perspective, both in gold mining areas and non-gold mining ones. For students in gold mining areas who have enough books to fill two shelves (all sample), their learning achievements increase of about 27 grade points, statistically significant at 5% level. For students in non-gold mining areas, having enough books to fill two shelves contributes to increase learning achievements of about 17 grade points, statistically significant at 10% level. In non-gold mining areas, this positive significant relation applies only to high-performing students, since no statistical evidence was found for low-performing students. For the variable

level of having enough books to fill a library, there is no found statistical relationship with students' learning, whether in gold mining areas or non-gold mining ones, regardless of their performance as well. This level does not seem to influence students' achievements then.

The relationship between child labor and students' learning achievements was also examined in this study. The estimations indicate that there is a statistically significant negative relation between the two, and this negative relation is observed in gold mining areas and non-gold mining ones, whether for high-performing students or low-performing ones. In gold mining areas, child labor reduces students' learning of about 10 grade points, statistically significant at 1% level. In terms of high-performing or low-performing students, there is a decrease of 9 grade points and 10 grade points for low-performing and high-performing students, respectively. For non-gold mining areas, for all students, the decrease is of about 7 grade points, statistically significant at 1% too. Low-performing students who work have about 4 grade points lower, while high-performing students have about 10 grade points lower. Overall, there is a suggestion that child labor affects students' learning negatively, whether these students are in gold mining areas or non-gold mining ones.

As already mentioned in the methods section above, HLM allows an estimation of the relative importance or weight of the level of family factors on students' achievements. Results of these estimations are presented in tables A5-3 and A5-4 in the annex. In gold mining areas, all family factors included in the analysis explain only 1.6% of the variance available in students learning achievements. In non-gold mining areas, the same factors explain 3.16% of the variations in students' learning achievements. These weights may seem low, but they are not informative in themselves unless compared to the weight of level 2 of the analysis. However, from a comparison in terms of gold mining and non-gold mining, it can be said that family factors seem to be relatively more important in non-gold mining areas. As a whole, in line with many previous studies, it can be said that family factors are predictors of learning achievements.

5.2.3. The Effect of Teacher Qualification, Head Teacher Factors and School Resources on Students' Learning Achievements between High-Performing Students and Low-Performing Ones in Gold Mining Areas

This part of the subsection examines the effect of teacher training, head teacher training and school resources on the learning achievements of students. Teacher and head teacher factors, namely their training status, have been analyzed in terms of one-year training and two-years training, to determine which one is more efficient in improving students' learning. Table 5.9 presents the results of the effect of teacher training, head teacher training and school resources on the learning achievements of students. The full results of the regression are given in table A5-12 in the annex.

From the results, in gold mining areas, teachers that have had an initial teacher training of one year increase the learning achievements of students of about 28 grade points, statistically significant at 10% level. In the restricted sample, the positive statistical relationship was also found for low-performing students. For high-performing students, results are not statistically significant. In non-gold mining areas, this teacher factor is statistically positively related to the learning of only high-performing students, significant at 10% level. For teachers that have had an initial training of two years, the results are not statistically significant, in gold mining areas and non-gold mining ones, and whether for high-performing students or low-performing ones. Therefore, there is no statistical evidence so support a relationship between two-year teacher initial training and students' learning achievements. In other words, this level of training is not efficient for the improvement of students' learning achievements.

In gold mining areas, teachers that have had an in-service training increase the learning achievements of their students of 19 grade points from an overall perspective, and 19 grade points as well for low-performing students. These Results are statistically significant at 10% level. However, for non-gold mining areas, professional training of teachers is not statistically related to students' learning achievements. The breaking down of the sample into high-performing and low-performing students does not change the statistically insignificant results.

Teacher professional training then seems to be important for students in gold mining areas but not in non-gold mining areas. The teacher factor that seems to be important for almost all students is teacher experience. This factor is statistically positively related to all students' learning achievements, except for high-performing students in gold mining areas.

Results of the analysis in terms of head teacher factors in gold mining areas indicate that head teacher initial one-year training is statistically associated with higher student learning achievements, mainly from an overall perspective and for low-performing students. In non-gold mining areas, head teacher one-year initial training is not related to students' learning achievements. Similarly, whether in gold mining areas or non-gold mining ones, head teacher two-year initial training is not related to students' learning achievements. In the restricted sample, the lack of statistical relationship was also found whether for high-performing students or low-performing ones. In addition to the initial training, head teachers may have practical training in school setting. This practical training is not statistically associated with students' learning achievements, regardless of location or performance of students. However, principal experience is statistically positively associated to all students in gold mining areas, whether high-performing or low-performing ones. In non-gold mining areas, no statistical correlation was found between head teacher experience and students learning achievements.

In terms of school resources, the results of the study indicate that they are related to higher learning achievements in gold mining areas. From an overall perspective and also in terms of performance of the students, school resources increase students' learning achievements of about 2 grade points. The statistical relation is significant at 1% level. In non-gold mining areas, school resources increase students' learning achievements from an overall perspective, and the breaking down of students into performance terms revealed that school resources are associated with higher learning achievements for high-performing students. From and overall perspective, school resources are important predictors of students' learning, whether in gold mining areas or non-gold mining ones.

Table 5.9: Effect of Teacher Qualification, Head Teacher Factors and School Resources on Students' Learning Achievements

	Mining areas			Non-mining areas		
VARIABLE	All	Repeated	Not repeated	All	Repeat	Not repeated
Gender	4.902	8.684*	1.771	5.160*	-1.127	12.881***
	(3.739)	(4.958)	(5.466)	(3.044)	(3.950)	(4.799)
Age	-1.343	-1.178	0.294	-3.702***	-1.221	-6.143
	(1.615)	(2.236)	(2.321)	(1.377)	(1.812)	(2.121)
Head educ.	3.981	5.092	6.065	3.013	2.993	5.326
	(5.421)	(7.073)	(8.339)	(3.304)	(4.189)	(5.283)
Family SES	0.612*	0.449	0.783	0.544*	0.287	0.891**
	(0.359)	(0.461)	(0.547)	(0.280)	(0.354)	(0.438)
School resources	1.991***	1.880***	2.030***	1.635***	0.077	1.708**
	(0.344)	(0.511)	(0.452)	(0.585)	(0.744)	(0.668)
Teacher pre-train (1 year)	28.208*	43.564**	2.482	11.541	13.936	28.502*
	(15.389)	(19.398)	(16.476)	(12.298)	(12.215)	(15.182)
Teacher exp.	2.491***	2.989**	0.911	1.889**	1.422*	1.908**
	(0.967)	(1.240)	(1.113)	(0.760)	(0.749)	(0.942)
Teacher prof. train.	19.460*	19.695*	19.091	9.879	3.774	13.382
	(10.952)	(7.281)	(13.811)	(9.773)	(9.681)	(11.691)
Teacher pre-train (2 yrs)	2.009	5.549	-2.666	1.331	6.557	-9.490
	(4.105)	(5.491)	(5.945)	(14.346)	(14.092)	(17.631)
Teacher prac. train	1.719	0.392	1.96	0.348	1.485	-0.115
	(1.948)	(1.956)	(2.463)	(2.124)	(2.098)	(2.622)
Principal train. (1 yr)	14.475**	17.605**	12.410	7.291	18.251	-4.740
	(5.833)	(7.348)	(9.253)	(11.406)	(11.341)	(13.648)
Principal train. (2 yrs)	-4.704	-9.467	-4.570	-3.661	7.246	-23.182
	(8.568)	(10.958)	(13.289)	(18.382)	(17.841)	(22.425)
Principal prac. Train.	0.469	1.055	0.560	1.460	-0.697	3.624
	(0.987)	(1.271)	(1.513)	(2.145)	(2.106)	(2.597)
Principal exp	1.152***	1.002**	0.987**	0.513	0.061	0.783
	(0.311)	(0.457)	(0.448)	(0.651)	(0.638)	(0.765)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Estimated by Author

5.2.4. Qualitative results on the Factors that Determine Students' Learning Achievements between High-performing Students and Low-performing Ones in Gold Mining Areas in Burkina Faso's Primary Education

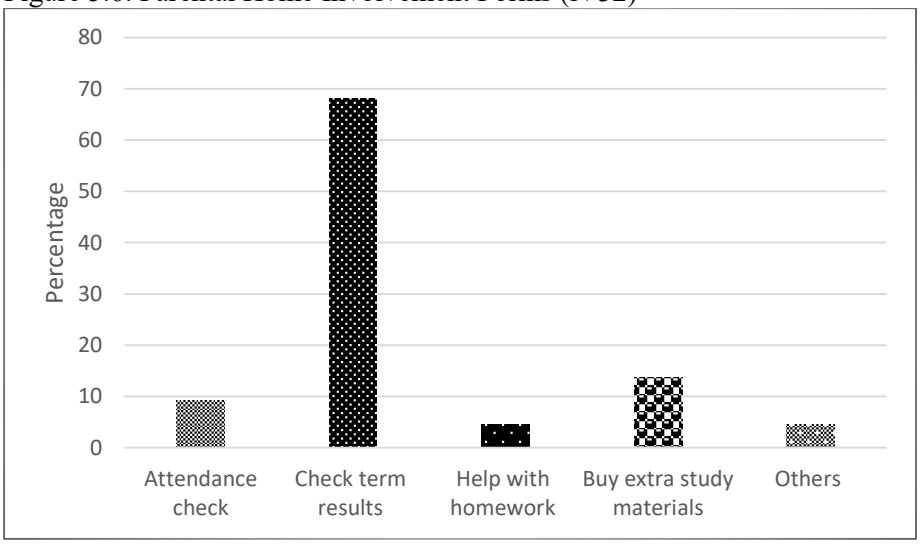
In order to understand what parents do as involvement in relation to the learning achievements of their children, children themselves, teachers, and education officers were interviewed. A certain number of home involvement forms were presented to participants, and they had to indicate the one (s) that parents are practicing in relation to the education of their children at home. In total, thirty-two parents were interviewed to study the dynamics of their involvement in the education of their children and how this is related to their learning achievements. Before getting into involvement itself, some questions related to the value that these parents have for education were asked. Many parents during this interview recognize the need for parents to check the studies of children at home, though in practice they may not be doing what they say they believe in. A parent, also a leader in a gold mining site, expresses this point of view in these words:

> School means many things and is important for us, because school is the future.
>
> P (1)

However, interviewing children reveals that parents do not actually practice what they may say or believe in. When children were asked "what is the form of involvement in your studies that your parents practice at home?", results as presented in table 5.6 indicate that the majority of parents, that is 68%, reported they check the children's end-of-term performance results. In the context of Burkina Faso, students are required to take their grade report books home at the end of the term and get a signature from parents before they can take them back to school. This is a way for schools to ensure that parents are aware of the performance of their children after each school term. This is then what many children reported as a way parents are involved in their studies. About the rest of parents, 14% buy extra study materials for their children, hoping

this will help them improve in their studies. 9% of parents ensure that their children attend school by checking their attendance. The results let us know that most parents get involved in the education of their children at home by doing only the minimum involvement as required by the educational system. They show this engagement towards their children's schooling most probably because it is embedded in the educational system and they have to follow it.

Figure 5.6. Parental Home Involvement Forms (N 32)



Source: Created by Author

Talking with parents reveals that some of them think that buying extra materials for students is enough to help them improve their learning achievements. Furthermore, some parents seem to believe that the requirement for learning is only attending classes regularly. This can be inferred because these two forms of involvements are the second and third ones after the minimum inputs from parents into the education of their children. There may be a misunderstanding, or to be pessimistic, an ignorance among parents as to what forms of parental involvements are efficient for their children's learning. In terms of helping children that have homework, results of the interview show that at home, only 4% of parents help their children do their homework. A small portion of 5% of parents do some actions which are not named in this study, due to the difficulty of putting them is the pre-determined categories for the study.

Education officials, head teachers and teachers were asked some questions on their perception of the level of involvement of parents in the studies of their children, the reasons for this level, and consequences of this level of involvement for students' learning achievements. Answers of interviewed people revealed that most of the participants think the level of involvement of parents in their children's learning at home is low. Specifically, among all interviewed participants, 53.22% of education officials, 71.43% of teachers, and 69.14% of head teachers answered that the involvement of parents is low. For the rest of participants in each group, the level of involvement of parents in the learning of their children is "average".

In stressing on the importance of the involvement of parents for the improvement of the learning of children, many of the actors in education seem to suggest a different approach to get parents more involved. They seem to be in favor of a top-down approach, with a different policy on parental involvement that is adopted from a ministry level and then applied in all areas of the country. An education official, specifically an advisor at a local education office, puts it clearly in these words:

> It is important to reconsider the policy or the mechanism [involvement practices], and everyone must be involved (…). Parents need to be informed, because they are the main actors in terms of education demand. Mainly, men need to be involved, because they have authority.
>
> (O4)

Such a statement lets us perceive some levels of effectiveness in parental involvement perspective, depending on which parent is involved in the education of the children. Specifically, fathers are said to have more authority over many aspects of the life of their children, then they are more likely to succeed in improving children's learning situation if they are involved in their education.

Table 5.10: Parental Involvement and Students' Learning Achievements.

Participants	Low	Average	High	Very high	Total
Officials (N=18)	53.22%	46.78%	0%	0%	
Teachers(N=20)	71.43%	28.57%	0%	0%	100%
Principals(N=8)	69.14%	30.86%	0%	0%	100%
Reasons	Uneducated and lack of knowledge, Illiteracy of parents and they are busy in doing other things	Some parents, but few, are educated and worry about the future of their children Uneducated parents do not know what to do to help their children Ignorance and poverty of parents			
Consequences	Their children perform less, They do not study outside the school, Absenteeism.	Low achievements, learning difficulties			

Source: Created by Author

In terms of the reasons that explain the level of involvement of parents in their children's learning, the answers of interviewed participants reveal that the level of education of parents is an important factor. For them, parents that tend to get involved in their children's learning are those who are educated, and they put efforts to offer the best learning environment to their children. Answers also related to parents' education are illiteracy, ignorance of parents in terms of how they can support the learning of their children. Some aspects of the occupation of parents also came out through the answers. It was noticed that some of the parents can support their children's learning, but they are rather busy in their work, so they forget about their children's education. Such parents are mostly those who work in gold mining related activities, as they have to be away from home on the mountains for many days before coming back. A teacher puts the "absence" of parents clearly in a statement:

> Ignorance of parents could be one of the reasons of parents not getting involved in children's schooling, but I think they are more in the mountains [mining sites] than they are at home. They leave the house and can spend one or two weeks in the mountains before coming back home. They cannot get involved in their children's schooling in such conditions.
>
> (T4)

Answers on the impact of the level of parental involvement in the education of their children reveal that most participants interviewed believe that low parental involvement is related to lower performance. In many families, students do not study once there are outside of the school, while teachers support that this is needed if these students want to improve the learning. There are some of these students who do not attend school regularly due to lack of supervision from parents, and this is related to a lower performance for these students. Absenteeism does not affect only student who are absent, but sometimes even the whole class or school performance. According to an interviewed teacher, this is revealed through the statement below:

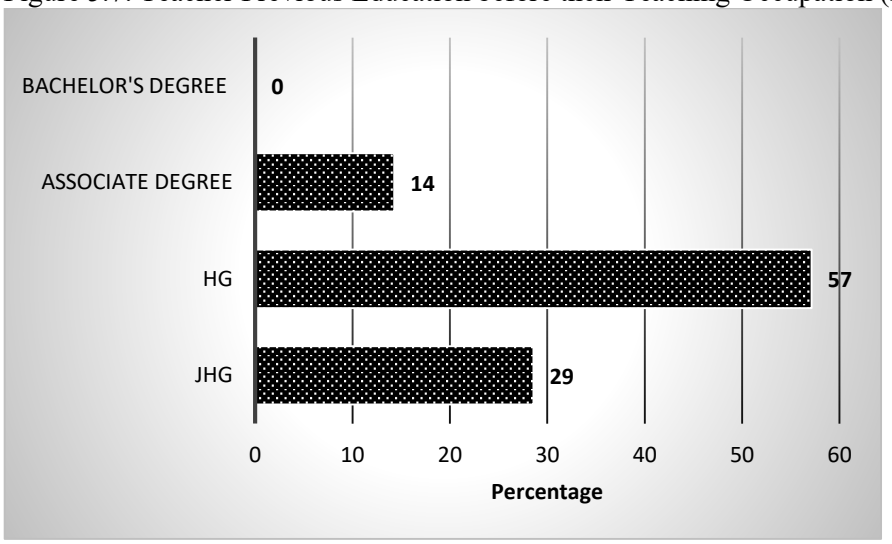
> In the morning all students come, and in the afternoon, some do not come back to school (after lunch time). I am obliged to take the same class again, and with time, I am not able to complete the program (curriculum). The whole class is affected, and even the primary school leaving exam. Children disappear and reappear later.
>
> (T10)

Many children therefore seem not to be going to school regularly. They are distracted by their peers, many like joining mines to work, and there is a need of parental involvement in their education, or else these will have a negative impact on their performance. However, as already mentioned, parents claim that they have to be away from home, because this is the only way for them to get the minimum subsistence resources for the family. As a whole, education officials, head teachers and teachers think that the low parental involvement in their children's learning has a negative impact on these children. As for parents, they seem to have a reason to be away from home, and poverty seems to be the main factor for their absence from home, even though some extent of ignorance could also explain it.

Figures 5.7, 5.8 and 5.9 present the credentials of teachers interviewed, in terms of their educational attainment, qualifications and experience, respectively. As can be seen, 57% from the sample are high school graduates, 29% a junior high school graduates, and only 14% are have an associate degree (two-year university degree). High school graduates therefore are the

highest in number in terms of teacher general education, that is before the general education they received before becoming teachers. In terms of the qualifications that these teachers have, 57% are certified teachers, 29% assistant certified teachers, and 14% senior teachers. Comparing qualifications, certified teachers are the highest in number among the three teacher qualifications. In terms of experience, 43% of teachers have an experience from one to three years, 29% have eleven years or more of experience. For the teacher experience groups that range from four to six and from seven to ten years of experience, the percentages of both groups are 14%. The group of teachers who have an experience from one to three years are therefore the dominant group among the four, and this suggests that many teachers are relatively young.

Figure 5.7: Teacher Previous Education before their Teaching Occupation (N=20)

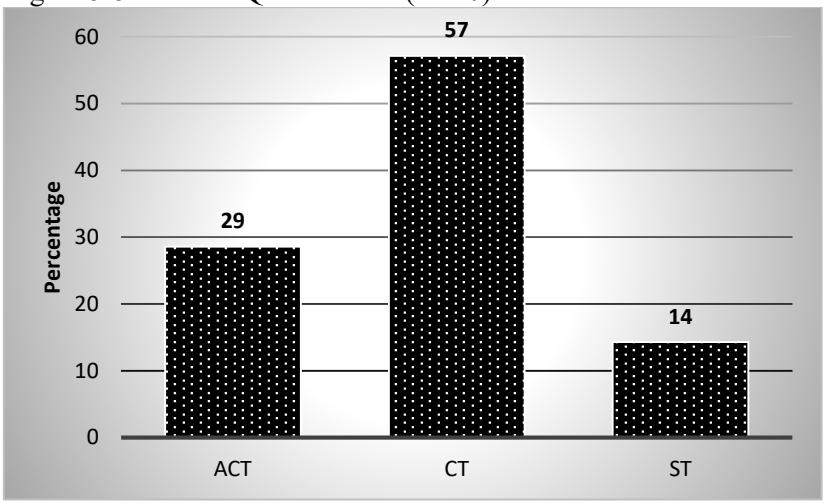


Source: Created by Author
Note: JHG: Junior High School graduate
HG: High school graduate

In the interview to collect qualitative data for this study, teachers were asked to give their opinion on the efficiency of the training they had before becoming teachers and also their in-service training. As can be seen in table 5.11, 71.73% of interviewed teachers say that they find their initial training not to be efficient for them to do their job successfully. Only 28.57% think the opposite. Therefore, the majority of teachers, for some reasons, think that the training they receive before becoming teachers is not efficient in helping them do their job properly. In terms of their professional training as well, most teachers (85.71%) say that it is not efficient for them

to do their job successfully. The minority of teachers that think the opposite in only 14.29%. Whether for pre-service or professional training, it can be said that teachers think they are not efficient in helping them do their job.

Figure 5.8: Teacher Qualification (N=20)



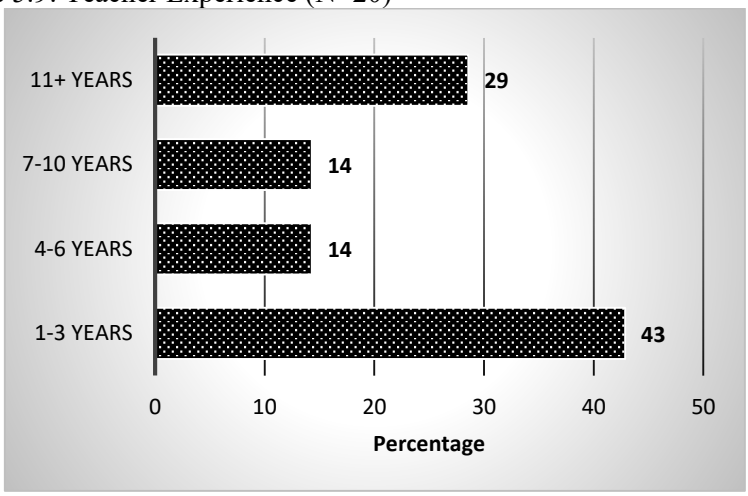
Source: Created by Author
Note: ACT: Assistant certified teacher (high school graduate and teacher education training)
CT: Certified teacher (at least an experience of five years as an ACT, no training needed)
ST: Senior Teacher (at least an experience of 3 years as a CT, and training in teacher school)

What is interesting are the reasons why teachers think about the effectiveness or ineffectiveness of their in-service and pre-service trainings. For teachers that say their in-service or professional training is relevant for them teaching efficiently, the reason is that training to some extent empowers them as it helps improve their subject matter knowledge. For the group that has an opposite view, the reason is that their trainings are not adapted to the realities that teachers face on the field, i.e. they are too theoretical and not practically oriented to what they usually face. These two groups bring out then some aspects of the training that teachers receive, as it may help improve subject matter knowledge, but it can also be theoretical.

About the credentials of school principals, as presented in figures 5.10 and 5.11, 45% from the sample interviewed are high school graduates, 33% are junior high school graduates, and only 11% have an associate degree (two-year university degree), and another 11% a bachelor's degree. It may be important to remind that principals can access principalship position after some years of teaching experience, and having a tertiary education degree is not a requirement to become one. This may explain why there is a low proportion of principals

having a university degree. Moreover, the qualifications that these principals had before their principalship gives an idea of their experience during their teaching profession. Among principals interviewed, before becoming principals, 43% were certified teachers, another 43% were senior teachers, and only 14% were assistant certified teachers. The higher the qualification, the longer the experience that the principal had as a teacher before climbing to principalship. Therefore, most principals had at least 5 years of previous experience as a teacher before their principalship, because becoming a certified teacher requires at least five years of experience.

Figure 5.9: Teacher Experience (N=20)



Source: Created by Author

Table 5.11: Teacher Training Efficiency for Learning Achievements (N=20)

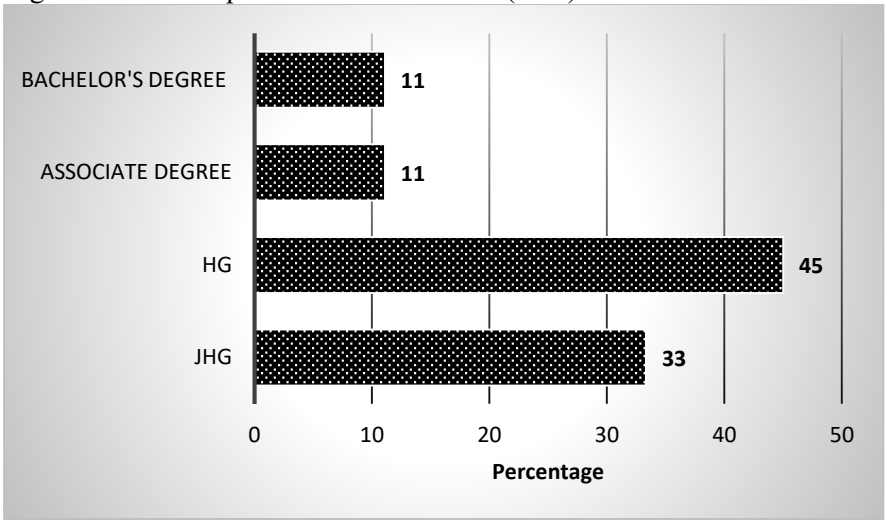
Training type	Efficient	Inefficient
Initial training	28.57%	71.43%
Professional training	14.29%	85.71%
Reasons	Empowers with necessary tool to becomes teachers Prof. training improves subject knowledge matter	More theoretical than realities on the field

Source: Created by Author

Principals were also asked to give their opinion on the efficiency of the training they had before becoming principals and also their in-service training in relation to principalship. As can be seen in table 5.12, 75% of interviewed principals say that they find their initial training not efficient for them to do their job successfully. Only 25% think the opposite way. In terms of their professional training as well, most principals (87%) say that it is not efficient for them to

do their job successfully. There is only a minority of principals that think the opposite way, that is only 12% of them. Similar to the case of teachers, it seems that most principals do not find their initial training or in-service training to be efficient is helping them do their job efficiently. However, this study was also interested in the reasons of the responses chosen by principals, and they were obtained during the interview. There are many reasons for most of them to have such a perception about the trainings.

Figure 5.10: Principal Previous Education (N=8)

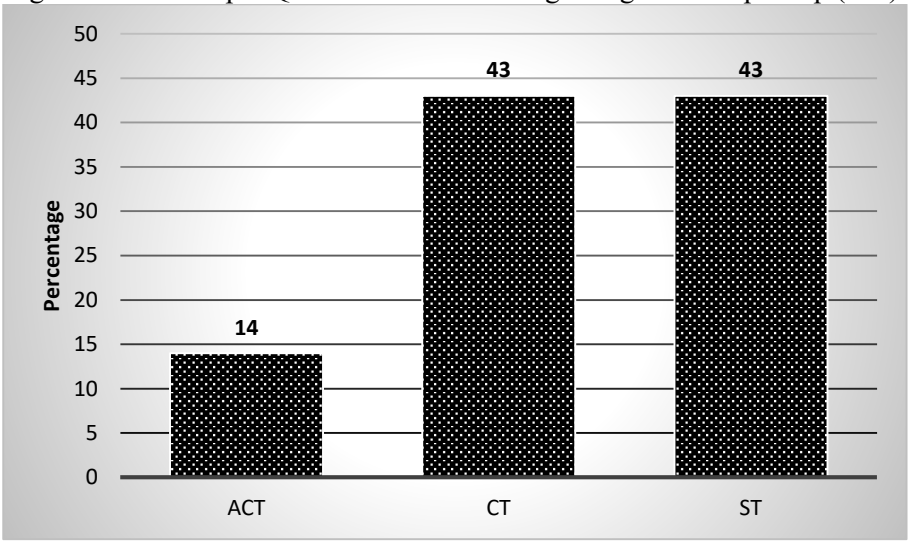


Source: Created by Author
Note: JHG: Junior High School graduate
HG: High school graduate

The reason why there is a dividing opinion about pre-service and in-service trainings is that for principals who think that training is efficient, they claim that their in-service or professional training is relevant for them manage schools efficiently. Specifically, training empowers them as it helps improve their school management skills, mostly in an environment where they have to make decisions. They face many challenges in their job and the trainings prepare them to know how to overcome these challenges. For principals that have an opposite viewpoint, the reasons they give is that their trainings are not adapted to the realities that they face on the field, i.e. they are too theoretical and not practical. Furthermore, principals are not taught much about school laws, while they have to act based on these laws. From these two opinions, it may be retained that some of the principals who got to principalship as a certified teacher did not have any pre-service training before their job. They may not know the school legislations and other

management tools before the start their job. They can find in-service trainings unnecessary or perceive it to be too theoretical because they were exposed to the reality before the theory.

Figure 5.11: Principal Qualification at The Beginning of Principalship (N 8)



Source: Created by Author
Note: ACT: Assistant certified teacher
CT: Certified teacher
ST: Senior Teacher

Table 5.12: Principal Training and Efficiency (N=8)

Training type	Efficient	Inefficient
Initial training	25%	75%
Professional training	12%	87%
Reasons	develops school management skills	Not enough school law training Not relevant to realities on the field

Source: Created by Author

Principals and teachers, as first actors of learning in schools, were also asked questions on the relationship between school resources and students' learning achievements. Results of responses are presented in table 5.13. As the table indicates, most of the interviewed principals and teachers (100% of teachers and 85.7% of principals) say that school resources are related directly or indirectly to students' achievements. Only a percentage of 14.29% of school principals said that school resources are not really necessary to help improve students' learning achievements. There is therefore a consensus among the first actors in schools that resources

are very important for the leaning of students. Some express their opinion in statements such as these:

> I cannot imagine teaching a class [students of a given grade] without the minimum of required resources to do it.
>
> (T7)

> Resources are the tools for the functioning of schools. Without resources, schools cannot function.
>
> (P3)

In addition to their view on the effectiveness of pre-service and in-service training, teachers and principals were asked to elaborate on their opinions by giving the reasons for these opinions. This is synthetized and presented in the results in table 5.13. The reasons why teachers or school principals think that school resources are related to students' learning achievements are that they contribute to better school management, they facilitate school administrative activities. Moreover, school resources help make more concrete lessons, and in that, effective teachings can be implemented. For principals and teachers that say school resources are not related to students' learning achievements, the reasons they give is that school actors can be creative and overcome the lack of school resources, and then still be efficient in helping students learn. According to them, being efficient in your tasks is not necessarily related to the tools you are given, but how creative you can be. In such a sense, resources are complementary, but not a condition to be successful or effective in the tasks.

Table 5.13: School Resources Relationship with Learning Achievement

Informants	Yes	No
Teachers	100%	0%
Principals	85.71	14.29
Reasons	Better school management, facilitates school management, more concrete lessons, effective teachings can be implemented	Creativity helps overcome lack of resources

Source: Created by Author

5.3. The Effect of Community Involvement in School life on Students' Learning Achievements in Gold Mining Areas in Burkina Faso's Primary Education

5.3.1. The Effect of the Support of Students in Need by School Parents Association (PA) on Learning Achievements in Mining Areas

This subsection presents the results on the effect of the support of Parents Association (PA) on students' learning achievements in gold mining areas in Burkina Faso's primary education. As already explained in the methods section, the analysis used a three-level HLM as a method, and partial results are presented in table 5.14. The whole computed results of the regression can be seen in the annex in table A5-5. It is important to recall that the variable of interest is a dichotomous variable, referring to whether PA support students in need or not. The variable of interest including control variables at the three levels of the HLM hierarchy were regressed against the reading score of students. The analysis relied on the PASEC 2014 primary school students' learning achievements data, as it contains the variables of interest and control variables need for to answer the sub-research question 3.1.

From the results of this analysis, it can be seen that gender is not statically related to students learning achievements in gold mining areas, but it is the opposite in non-gold mining ones. Specifically, while there is no statistical significance in the relationship between gender and learning achievements in gold mining areas, male students from non-gold mining areas score higher than female ones. The relationship between gender and learning achievements in non-gold mining areas is statistically significant at 10 % level. In terms of the relationship between age and students' learning achievements in gold mining areas, there is a negative correlation between the two, but there was no statistical significance that was found. However, from a different area perspective, in non-gold mining areas, the relationship is negative and statistically significant. Precisely, older students score about 4 grade points lower than younger ones, statistically significant at 1% level.

Table 5.14: PTA Support of Students in Need and Students' Learning Achievements

	Mining areas			Non-mining areas		
VARIABLES	All	Boys	Girls	All	Boys	Girls
Male	4.639			5.655*		
	(3.756)			(3.062)		
age	-1.054	-0.507	-1.510	-3.918***	-5.893***	-2.691
	(1.623)	(2.457)	(2.265)	(1.386)	(2.088)	(1.920)
Labor status	-11.119***	-9.588***	-14.386***	-7.178***	-5.782**	-8.815***
	(2.274)	(2.982)	(3.668)	(1.836)	(2.517)	(2.787)
Repeated class	-7.947*	-2.841	-10.804*	-10.951***	-15.997***	-3.532
	(4.281)	(6.223)	(6.044)	(3.527)	(5.377)	(4.838)
Mother education	4.057	6.603	0.127	3.552	6.814	2.214
	(4.290)	(6.261)	(6.169)	(3.596)	(5.403)	(4.965)
Father education	3.730	0.964	7.168	2.271	7.336	-4.261
	(5.488)	(8.011)	(7.865)	(3.339)	(5.053)	(4.653)
Family SES	0.640*	0.963*	0.599	0.548*	0.462	0.662*
	(0.360)	(0.530)	(0.498)	(0.282)	(0.424)	(0.391)
School resources	1.909***	1.798***	2.021***	1.638***	1.553**	1.617***
	(0.442)	(0.508)	(0.438)	(0.564)	(0.656)	(0.591)
Teacher experience	1.999*	2.213*	1.667*	1.841***	1.651**	2.216***
	(1.037)	(1.200)	(1.007)	(0.706)	(0.795)	(0.785)
Teacher prof. training	19.763*	19.488	16.608	8.831	12.470	1.517
	(11.233)	(13.173)	(10.775)	(9.430)	(11.326)	(9.717)
Principal training (1 year)	15.692***	14.206**	16.548**	8.357	11.660	10.414
	(4.659)	(6.712)	(6.896)	(8.777)	(10.013)	(9.132)
Principal practical training	0.011	1.012	0.805	0.890	1.021	0.494
	(0.492)	(0.730)	(0.706)	(0.957)	(1.115)	(0.992)
PA	24.370**	24.060*	24.554**	27.512***	28.106**	20.739**
	(12.396)	(14.449)	(11.650)	(9.703)	(11.427)	(9.973)
Province school resources	0.872	0.259	1.239	0.222	0.194	0.158
	(0.912)	(1.049)	(0.866)	(0.757)	(0.876)	(0.798)
Urban	31.086***	40.548***	21.483**	33.455***	39.269***	29.382***
	(10.784)	(12.609)	(10.208)	(8.517)	(9.815)	(8.684)
Constant	246.292***	268.801***	225.695***	362.828***	375.656***	362.569***
	(57.434)	(71.498)	(64.274)	(38.772)	(49.576)	(47.759)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Estimated by Author

Furthermore, just like it was found is research question 2.1, child labor is negatively associated with students' learning achievements, whether in gold mining areas or non-gold mining ones. The negative influence of child labor on students' learning achievements is strong and significant at 1% level for the two types of areas analyzed. Variables on the relationship between family factors and students' learning were also included in the analysis. Results suggest that parental education is not statistically related to students' learning achievements, but family SES is. This non-significant relationship between parental education and students' learning achievements was found for students in gold mining areas and those in non-gold mining ones. In terms of gender moderating perspective related to the two variables, the results are statistically non-significant for boys in non-mining areas.

At the province level, the indicator of province school resources is not statistically related to students' learning. However, at the school level, school resources are statistically positively related to learning achievements of all students, both in gold mining areas and non-mining ones. Teacher experience is one of the factors that are positively statistically associated with higher learning for all students and in both types of areas. However, teacher professional training is statistically related to only students in gold mining areas, from an overall perspective. In terms of school principal factors, only school principal initial training was found to be statistically associated with students' learning achievements, and only in gold mining areas. This association applies both to male and female students. In non-gold mining areas, principal training is not related to learning.

Community involvement in this study is approached as the support that PAs give to students in need, in terms of their academic needs and non-academic ones. As can be seen in table 5.14, in gold mining areas, it appears that PAs that support students in need increase students' learning achievements of about 24 grade points. This positive statistical relationship is significant at 5%. As a way of comparing the effect based on the gender of students, the analysis restricted the data to female and male students. The restricted sample also revealed that communities helping students' in need contribute to increase students' learning achievements of about 24 grade points, both for male students and female ones. The

relationship is statistically significant at 10 percent level for male students and 5 percent for female students.

In non-gold mining areas, the estimation results indicate that PAs that support students in need increase students' reading score of about 27 grade points. This positive statistical relationship is significant at 1%. As a way of comparing the effect based on the gender of students, just like in the case of gold mining areas, the analysis restricted the data to female students and male ones. The restricted sample revealed that communities helping students in need contribute to increase students' learning achievements of about 28 grade points for male students and 20 grade points for female students. The relationship is statistically significant at 5 percent level for both genders. From an overall perspective, the support of PAs for students in need is associated with higher learning achievements for students both in gold mining areas and non-gold mining one, and no matter their gender.

5.3.2. The Effect of Mothers Association (MA) Involvement in School Life on Learning Achievements in Gold Mining Areas

This subsection presents the estimation results on the effect of Mothers Association (MA) involvement on students' learning achievements in gold mining areas in Burkina Faso's primary education. The analysis used a three-level HLM as a method, and partial results are presented in table 5.15. The whole computed results of the regression can be seen in the annex in table A5-5. Some schools have an MA while some do not, and this existence or non-existence of an MA in the school gave a dichotomous variable that was used to estimate the effect of MA involvement in school life on students' learning achievements. The variable of interest including control variables at the three levels of the HLM hierarchy were regressed against the reading score of students. The analysis relied on the PASEC 2014 primary school students' learning achievements data, as it contains the variables of interest and control variables need for to answer the sub-research question 3.2.

The regression estimations were carried out in terms of the geographical belonging of students, i.e. whether students belong to a gold mining area or a non-gold mining one. This

allows to have a comparative perspective, to determine whether the significant relationship between independent variables and the dependent one is specific to a given area or is general to both types of areas. Furthermore, during the estimation, the data was restricted in terms of gender, to estimate any relationship that may be significant for male students and not for female students, or vice versa. Control variables at the student, school, and province levels were included in the regression.

MA involvement in school in this study is represented by the variable on community women involvement. As already mentioned above, a dichotomous variable is used to show MA involvement in school life. In Burkina Faso school system, as way for community women to contribute to education, there are some women associations that may be accepted by schools. One of the structured women associations, mainly focused on education and that officially recognized in the education system, are MAs. When a principal reported to have an MA in the school, then it was considered that an MA was present in that school and it was involved in school life in that school. This involvement could be in various forms, including school clean-up to helping cook school lunch.

As can be seen in table 5.15, in gold mining areas, results indicate that MA involvement in school life increases all students' reading score of about 16 grade points. This positive relationship is statistically significant at 5% level. As a way of comparing the effect based on the gender perspective of students, as already mentioned in the method of statistical analysis of the study, the estimation restricted the data to female and male students. The restricted sample revealed that MA involvement in school life is not statistically related to male students' learning achievements in gold mining areas. However, in the same type of areas, MA involvement in school life contributes to increase learning achievements of female students of about 20 grade points. The relationship between MA involvement and the learning achievements of female students is statistically significant at 1 percent level. There is therefore a gender perspective that is brought out as to the effect of the involvement of MAs in school life in gold mining areas.

Table 5.15: MA Involvement in School Life and Students' Learning Achievements

	Mining areas			Non-mining areas		
VARIABLES	All	Boys	Girls	All	Boys	Girls
Male	4.639			5.655*		
	(3.756)			(3.062)		
age	-1.054	-0.507	-1.510	-3.918***	-5.893***	-2.691
	(1.623)	(2.457)	(2.265)	(1.386)	(2.088)	(1.920)
Labor status	-11.119***	-9.588***	-14.386***	-7.178***	-5.782**	-8.815***
	(2.274)	(2.982)	(3.668)	(1.836)	(2.517)	(2.787)
Repeated class	-7.947*	-2.841	-10.804*	-10.951***	-15.997***	-3.532
	(4.281)	(6.223)	(6.044)	(3.527)	(5.377)	(4.838)
Mother education	4.057	6.603	0.127	3.552	6.814	2.214
	(4.290)	(6.261)	(6.169)	(3.596)	(5.403)	(4.965)
Father education	3.730	0.964	7.168	2.271	7.336	-4.261
	(5.488)	(8.011)	(7.865)	(3.339)	(5.053)	(4.653)
Family SES	0.640*	0.963*	0.599	0.548*	0.462	0.662*
	(0.360)	(0.530)	(0.498)	(0.282)	(0.424)	(0.391)
School resources	1.909***	1.798***	2.021***	1.638***	1.553**	1.617***
	(0.442)	(0.508)	(0.438)	(0.564)	(0.656)	(0.591)
Teacher experience	1.999*	2.213*	1.667*	1.841***	1.651**	2.216***
	(1.037)	(1.200)	(1.007)	(0.706)	(0.795)	(0.785)
Teacher prof. training	19.763*	19.488	16.608	8.831	12.470	1.517
	(11.233)	(13.173)	(10.775)	(9.430)	(11.326)	(9.717)
Principal training (1 year)	15.692***	14.206**	16.548**	8.357	11.660	10.414
	(4.659)	(6.712)	(6.896)	(8.777)	(10.013)	(9.132)
Principal practical training	0.011	1.012	0.805	0.890	1.021	0.494
	(0.492)	(0.730)	(0.706)	(0.957)	(1.115)	(0.992)
MA	16.563**	14.011	20.782***	12.602**	14.149*	10.102
	(8.268)	(9.707)	(8.005)	(6.115)	(7.219)	(6.327)
Province school resources	0.872	0.259	1.239	0.222	0.194	0.158
	(0.912)	(1.049)	(0.866)	(0.757)	(0.876)	(0.798)
Urban	31.086***	40.548***	21.483**	33.455***	39.269***	29.382***
	(10.784)	(12.609)	(10.208)	(8.517)	(9.815)	(8.684)
Constant	246.292***	268.801***	225.695***	362.828***	375.656***	362.569***
	(57.434)	(71.498)	(64.274)	(38.772)	(49.576)	(47.759)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: created by Author

In non-gold mining areas, the results indicate that MA involvement in school life, from an overall perspective, increases students' reading score of about 12 grade points. This positive statistical relationship is significant at 5% level. As a way of comparing the effect based on the gender of students, just like in the case of gold mining areas, the analysis restricted the data to female and male students. The restricted sample revealed that MA involvement in school life contributes to increase male students' learning achievements of about 14 grade points. The relationship is statistically significant at 10 percent level. As for girls, there was no statistical relationship that was found. An opposite result in terms of gender exits then based on the areas.

From an overall perspective, MA involvement in school life is associated with higher learning achievements for students in gold mining areas and non-gold mining ones as well. However, there seems to be a contrast when a gender perspective of students in considered. Specifically, the effect of MA involvement in school life on students' learning achievements is higher for female students than male ones in gold mining areas, while the opposite was found for non-gold mining areas. The results reveal then that the involvement of community women in school life has an effect on students' learning achievements, but the effect has a gender perspective that changes depending on whether the students live in a gold mining area or a non-gold mining one.

5.3.3. Qualitative Results on the Community Involvement in School life and Learning Achievements in Gold Mining Areas

The interviews to collect qualitative data for this study addressed the topic of the involvement of the community members (PAs, MAs and community leaders) in school life and how it is related to the learning of students. Students, teachers, principals, and education officials were asked questions about the different ways or forms through which community members contribute to school life. These education stakeholders were also asked to share their experience of how community members involvement in school life can be related to students' learning achievements. Analysis of the data collected is presented in table 5.16, and focuses

mainly on the recurrent forms that were given by the education stakeholders who were interviewed.

In general, students reported that PAs contribute to or support schools, through involvement forms such as the encouragement of students in general, and mostly students who tend to lag behind their peers in terms of their grades. In order to bring the encouragement to students, PA's representatives sometimes visit classes, and talk to students directly. PAs also sometimes provide schools with needed school materials for teaching, and financial support is sometimes provided by PAs for schools, when needed. In such cases when there is an urgent problem to be solved in a given school, all parents who have their children in that school would be asked to contribute with a certain amount of money to solve the specific school issue[13]. Another aspect that students mentioned as a form through which parents show involvement in the learning of their children is that some parents allow students (most of the time friends of their own children) to use private learning materials or aids being in the parents' house (chalk, chalkboard etc.) for the home group studies of children[14].

Teachers, principals, and education officers also shared information on the forms of community involvement in school life, shared their opinion about the importance of the community for schooling and the relationship between communities and students' learning achievements. Apart from responses similar to those given by students, teachers and principals reported that PAs offer rewards to students, which might create a spirit of competition to win. PAs also sensitize parents to get more involved in their children' education. Furthermore, they support schools in order to follow up students that need such a follow-up, in terms of their learning or financially. PAs are backed up by some parents at home who encourage students to learn their lessons. Community leaders also support the work of PAs. Education officials also reported almost the same thing as teachers and principals, and a statement justifies this as a something natural since parents are regularly doing it:

[13] At the beginning of the school year, some schools ask parents to contribute financially as a way for PAs to have finances available just in case it is needed in the future to solve specific or urgent issues.
[14] It is common for teachers to organize students in groups and encourage them to study in groups after school hours whether using the school facilities or other ones they can find at home.

> Parents' committee (PA) develops an action plan that it has from the beginning of the school year, and within that action plan they see how they can help the school.
>
> (O3)

This statement suggests structured and organized committees which contribute to school life in an organized way as well. This point of view is supported by some PA members during interviews. In fact, PAs have a committee with a president and other positions below, and everyone is trying to contribute the best way they can. However, PAs do not easily function the way they should, due to some internal politics that seem to reduce its effectiveness. All parents do not agree with some of the opinions given, and would adopt some behaviors that are against some decisions taken by the general assembly but are opposite to what they want. Not taking the politics into account, parents being organized is not surprising because actions carried out by PAs are reported by teachers, principals, and education officials as part of the school management practices required by law. Now, the reasons for the politics inside are from social dynamics that were not born in schools, but outside schools.

Education actors agree that having communities participate in school life is important. During the interviews, many teachers, principals, and education officers stressed on this importance. According to them, the contribution of communities complement what governments were not able to bring, in various aspects of school life. An official expresses the limitations of the government and the need for parents to be involved in school life through this statement:

> The government cannot do or provide everything. It is important to sensitize communities, to get their participation in school life to help solve potential existing problems.
>
> (O3)

In addition to the different forms of involvement mentioned in the previous paragraph, PAs efforts in schools was linked to the learning achievements of students. The financial means that PAs may provide to schools serve to encourage teachers to work harder, or it allows them to have a certain teaching or living advantage that teachers in other areas may not have. In such a context, teachers may work harder, and somehow become accountable for the performance of students. For students, knowing about rewards given to the best students, even average or low-level students get a spirit of "I want to win the prize". Therefore, the actions of PAs in schools can be linked to students' learning achievements directly, or indirectly through teachers. Therefore, it can be said that what PAs do may not be targeting students' learning achievements directly, but they also have some involvement forms which are directly linked to students' learning. Depending on what they PAs do, the link can more or less be determined and the relationship to students' learning established.

The encouragement and financial support that PAs bring to students are not the only forms of involvement. The contribution of the community towards students' learning achievement can also be perceived in terms of the actions of community leaders, who are usually involved in PAs as advisors. The community leaders can be religious or traditional ones, and they have a lot of authority in terms of the actions that the whole community takes in education or any other development sector. These community leaders are found to be supporting PAs so that their actions in schools can be efficient. The type of support that PAs get from the leaders are non-financial but can be financial as well. For example, when PAs lack financial means, some community leaders who are wealthy finance the budget of PAs. In return, PAs become somehow accountable to community leaders and schools, and that makes them contribute more to the needs of students, so as to have good schooling results for all students in the community.

The qualitative aspect of this study was also interested in the relationship between MAs involvement in school life and students' learning achievements. In order to understand the relationship, school actors, such as students, teachers and principals, were asked to give information about the different forms MAs are involved in school life and how it can be linked

to students' learning achievements. During the interviews, interviewees were asked to separate as much as possible contributions of MAs from those the PAs or the whole community in general. The main objective of this separation of roles or contributions was to grasp the actions of MAs solely, though they may be linked with those of other community bodies or organizations. Separating roles and involvements, it can help to determine the effect of each type of body in the community. MAs have some overlaps with some of the roles of PAs, so it is important to deconstruct roles for a better understanding of the situation. Results of the contributions of MAs in school life are presented in table 5.17.

Table 5.16: Community Involvement in School Life and Students' Learning Achievements

	Parents' Associations	Parents	Community leaders
Students	Encourage students Visit classes Supply needed materials Financial support	Allow use private learning materials (blackboard, electricity etc.)	N/A
Teachers	Rewards to create competitions Encourage teachers & student	Inquire about the grades and behavior of their children	Promotion of education in the community
Principals	Sensitize parents to get more involved in school life Reward good students Support poor students Supply teaching materials	Contact school	Religious and traditional leaders promote education in the community
Officials	Performance-based rewards for students Financial support to teachers for tutoring need students	Support schools as members of the community they belong	Religious and traditional leaders promote education in the community

Source: Created by Author

MAs involvement in children's education in general and in school life in particular can be observed through various forms. Results of the interviews related to the topic reveal that the largest form of contribution of MAs in school is through the school feeding programs in schools. As presented in table 5.17, among all forms of contributions of MA to school affairs, their contribution to school feeding program represented 64% from overall contributions. The exact contribution in terms of the school feeding program is that they act in rotation as cooks for the

cooking of school lunch, or they also assign one of their members to be the main actor in terms of the cooking of school lunch. The way women organize themselves depends on the school, but the contribution to school feeding program seems to be common to most MAs in all schools. One teacher in a school describes MAs contribution to the school feeding program:

> There is no one to cook for our students, and the school cannot afford a descent salary for a cook. That is why women are helping us. Without the contribution of women, we would not be able to use the food supplies that we have received from the ministry.
>
> (T6)

There seems to be no rigid guidelines from the MoE that is regulating the contributions of women to schools. The way school feeding program is structured, the government just offers supplies and it is up to each school to buy ingredients and also find the personnel that will cook. Regarding the poor financial situation of schools, the contribution of women is of a great help, because without it, some schools would not be able to afford to pay for a cook to for their feeding program.

Table 5.17: MAs Involvement in School Life and Students' Learning Achievements

Involvement form	Percentage	How it may contribute to learning
Nothing	0%	Students stay in school to study in groups after lunch time Homework done in school, as students may not do them at home Women on duty remind students when it is time to study Rewards for best students, mostly girls Encouragement of students
Student follow-up	14%	
Student support & mentoring	14%	
Cooking (School feeding program)	64%	
Other	8%	
Total	100%	

Source: created by Author

In addition to the contribution to school feeding programs, organizations of MAs also serve as mentors to some of the students, mainly girls. This mentorship form of involvement in school life represented 14% of all contributions of MAs, as can be seen in table 5.17. Mentors from MAs are usually role model women in the community, and they act as mentors to girls that

may have difficult situations in their studies, or any other girl in the community that need mentorship. Furthermore, a form of involvement of MAs that is similar to mentorship is the follow-up of students. This form of contribution also represented 14% of all forms of involvement of MAs in school life. Precisely, some school teachers reported that some students have issues in their families that may hinder their education, so MAs are the ones that follow-up those students to their families and act with parents to make sure that these students can get the necessary environment at home to study.

Among all individuals interviewed, it came out that in most schools, women are involved in school life through the forms that were presented above. Some other forms that were also mentioned, which constitute 08% of all forms of involvement, are among the forms of involvement that MAs bring to school life. These forms of involvements, which are usually temporary, are for instance getting some rewards for top students, mainly girls. This is an encouragement for all students and mostly girls to study harder so that they can get the rewards that others got. These rewards are usually composed of extra learning materials, such as books and stationaries. For communities that can afford it, they offer bicycles to top performing girls.

Beyond the various forms of involvement, how they can be linked to students' learning achievements were also presented in the results in table 5.17 above. The table indicates that MAs contribution to school feeding programs allows many students not to walk a long distance to go back home and get lunch. Instead, they can get lunch in school and right after that study their lessons before the beginning of the afternoon session. Mostly, teachers mentioned that once students go home, they do not have time to study at all due to parents getting them involved in some household chores, and for some students there is no food at home because other family members are out to gold mining sites. A student put it clearly:

> Usually, at home we only cook at night for the whole family. For breakfast or lunch, each one has to manage individually to get some food. Even if we come go back home during lunch time, there is no food at home to eat. Everybody is even out to the mountains [mining sites].

(S13)

For some of the students then, the contribution of MAs to school life is a life-saver, beyond the fact that it helps them to some extent stay in school to study. This contribution seems to be crucial for students who are likely not to have lunch at home. School principals mentioned that we have this situation because schools cannot afford to hire and pay someone to cook regularly for students. Women from the community come then to the rescue, and this form of contribution is one that has been appreciated and encouraged my many. However, some principals pointed the need for women contributing to school feeding programs to be trained, for them to improve some aspects for the cooking practices.

CHAPTER 6: DISCUSSION AND CONCLUSION

This section of the study presents the interpretation and discussion of the estimation results given in chapter 5. In this section, interpretation and implications of the results are presented, with regards to the hypotheses developed in section 4.2, guided by the conceptual framework and previous literature. In addition to interpreting estimation results based on the conceptual framework and the literature, the qualitative analysis results will also serve to explain the results. This is due to the mixed-method sequential explanatory design that this study adopts. In other words, the results of the qualitative analysis will also serve to explain the findings of the quantitative ones, as this is one of the reasons for applying a mixed-method approach in this study.

6.1. Discussion

6.1.1. The Effect of Home Environment Factors on the Likelihood of Primary School Attendance across Socio-Economic Groups in Gold Mining Areas in Burkina Faso's Primary Education

1) The effect of parental involvement on the likelihood of primary school attendance across socio-economic groups in gold mining areas

This subsection discusses the results related to the first sub-research question. Precisely, the first sub-research question asks to what extent does parental involvement increase the likelihood of primary school attendance across socio-economic groups in gold mining areas. In order to answer this question, this study tested hypothesis 1.1, which says that in gold mining areas in Burkina Faso, the effect of parental involvement on primary school attendance increases as socio-economic level increases. Results of the analysis have shown that parental involvement affects school attendance positively, and the effect is highest from students from

the highest socio-economic level. Therefore, hypothesis 1.1 is confirmed, as socio-economic status increases the effect of parental involvement on school attendance, though no continuously across socio-economic groups.

The findings related to sub-research question 1.1. are consistent with some previous studies done in other general contexts, as these studies examined the same topic. The authors of these studies found that there is a positive relation between parental involvement and students' school attendance, and income has a moderating effect in the process (Hattory, 2014; Shehu, 2018; Owusu & Dwomoh, 2012). As highlighted by Nightingale et al. (2017) and Yakovleva (2007), many parents are spending many days a week on mining sites, limiting their presence at home. This long presence on mining sites is due to the requirements of the gold mining activities they are involved in, as these activities require long working hours and staying on gold mining sites many days a week.

This suggests that, as the field work showed that most parents were away from home, as parents are away, there is no one at home to ensure that children go to school. Even when parents are at home, they may not monitor the children, because they likely want to take time to rest from the long working days they had at work. This leaves children on their own to make school attendance decisions by themselves. However, parents that have been able to profit financially from their gold mining activities are more likely to "have more time and means" to be involved in their children's schooling, resulting in an increase of school attendance of these children. These parents who are better-off usually hire other people to work for them, that is they do not work on sites by themselves. Consequently, they do not need to stay on mining sites for days before returning home, they can go back home almost every day. Once they are frequently at home and monitor children, the latter are more likely to attend school. In addition, these are the parents that would call teachers to know more about the children's schooling.

Schools are available at a reasonable distance, but many children still do not attend them or do so sporadically. Much of this situation reflects poverty obliging parents to think more about surviving than monitoring the studies of their children. However, this does not necessary mean that these parents do not have value or know the value of education. They seem

to be in a socio-economic context of hardship where gold mining activities seem to be the only way for them to get out of their hard times. During the interviews, most parents recognized that it is better to have some education than have none, because of benefits like reading and writing. For poor parents, being close to home all the time to monitor children's' education has a high cost of forgone earnings. Also, the socio-economic context of gold mining activities creates an environment where the return to education investment (monetary benefits) is low. However, parents who are able to be at home more often and monitor the schooling of their children will likely find these children attending school more than other children.

In gold mining contexts in other countries, the mediating effect of family income with parental involvement influence on children's school attendance was also studied. A study by Adu-Gyamfi (2014) in the context of Ghana revealed that many parents living in gold mining areas are small-scale farmers who give themselves to gold mining activities. They do so because rainfall patterns changed negatively, and they farmers are currently in a situation where they cannot grow enough crops to feed their families. Gold mining activities are a hope for families to get money for their subsistence. Because these households focus solely on these socio-economic activities, sometimes obsessed about the idea of getting rich quick, they tend not to care much about the education of their children, who are free to decide whether to attend school or not. The decisions of the left-alone children unfortunately tend to be not to attend school. These children themselves, not getting any money from their parents, try to find ways to make some on their own. Besides, they also want to look like their peers who might have been lucky enough to have some money, and would not hesitate to show-off with items they bought. Parents not providing for their children and peer pressure are aspects then that can explain differences in the effect of parental involvements on children's school attendance in gold mining areas. Parents may encourage children to go school, but if these children do not have the minimum food or pocket money, they will likely not go to school.

Results of the interviews that were carried out for this study in gold mining areas in Burkina Faso indicate that Burkina Faso's gold mining areas contexts do not differ much from those of Ghana. Indeed, they revealed that poverty drives many parents to be obsessed about

getting rich quick, to the extent that they forget about the education of their children. The presence at home of many of these parents is limited, since they usually stay on mining sites for many days. This qualitative analysis confirms that most parents do nothing as a way of involvement in the education of their children, and the main reason is that they are almost never at home. Such parents do not care much about the education of their children, giving much room to the children to make schooling decisions on their own. These children usually decide to go to school when they feel like it and do not feel like doing income-generating activities.

The comparison of estimation results from gold mining areas to those of non-gold mining areas can also contribute to understand the mediation of socio-economic status on the effect of parental involvement on children's school attendance. Parents from non-gold mining areas do not have a single socio-economic activity to focus too much on, and their jobs do not require them to stay many days away from home. Many of these parents, even though they may also be poor like those from gold mining areas, they still stay more at home. They can monitor the education of their children more than parents in gold mining areas. The children from these non-mining areas are more likely not to be carried away by the quest of money coming from some working activities, since there are even less of such opportunities.

Children in non-gold mining will likely tend to attend school even without monitoring of their parents, because they know they have no easy access to jobs worth it in their immediate environment. Jobs that children can have access to in non-gold mining areas do not pay much, relative to those in gold mining areas. Children in non-gold mining area find then no motivating reason, monetary or not, not to attend school. They are also aware that they cannot get any well-paying job in the future without education, so even without monitoring of parents, they will likely attend school. That is the plausible reason why in non-gold mining areas parental involvement is not significantly related to children's school attendance, because children have nothing to distract them. There is already a personal decision to attend school, and parental monitoring will likely have a non-significant effect on a behavior that is already towards what parents wants, just like estimation results of the study reveal it.

In the context of South Africa, a study of Breda (2015) pointed out some parents' socio-economic differences regarding the involvement that parents show for the school attendance of their children. Parents of a lower socio-economic level would tend to show a lower level parental involvement in the education of their children, producing poor attendee children at the same time. Many other studies pointed out that the main factors that determine school attendance of children are based on family circumstances, including parental involvement, family socio-economic status, and parenting styles (Walls, 2005; Sheppard, 2009). Osei-Tutu (2017) points out that in an environment where the priority of families is to find a way to survive, the schooling of their children is negatively affected. In gold Burkinabe mining areas, many families cannot afford to pay for the education of their children, due to poverty that they are undergoing. Their priorities are not the schooling of their children, but rather surviving. The cost of education becomes an economic burden to these families, which can make them reluctant to take measures for their children to attend school (Emery et al, 2012; Morrissey et al, 2013). But families that are out of the financial needs can concentrate more on the education of their children, and the latter will not be distracted away from attending school by other factors.

Despite the socio-economic reasons that explain the relationship found, it is important to mention that it was found that many parents do not care whether their children have been to school or not. Unfortunately, for many of these parents, there is no value in going to school. They perceive education from a functional perspective, and since they cannot see any direct or quick function of education, they do not see its value. Some parents revealed that they do not want their children to become civil servants, because for them civil servants are not well-paid. Some children are encouraged by their parents not to go to school but join some activities that they will be doing in the future, as these activities are more practical or beneficial to their lives than going to school. What the actions of some parents reveal is a negative mindset towards education, a mindset that might have been framed by the sporadic gains from mining activities or the belief of becoming rich overnight with much luck.

2) The effect of parental involvement on the likelihood of primary school attendance depending on child gender and child labor status in gold mining areas

This subsection discusses the results related to the second sub-research question. The second sub-research question asks to what extent does the effect of parental involvement on the likelihood of primary school attendance differ depending on child gender and child labor status in gold mining areas. In order to answer this research question, this study tested hypothesis 1.2, which says that in gold mining areas in Burkina Faso, the effect of parental involvement on primary school attendance is higher for boys relative to girls, and also higher for working children relative to non-working ones. As already presented in the section 5, results of the analysis have shown that the effect of parental involvement is higher for girls, and also higher for non-working children. Therefore, findings of the study are not in line with hypothesis 1.2, that is the hypothesis is no confirmed.

Findings related to this research question are inconsistent with previous studies on the topic (Alhassan & Odame, 2015; Wolf et al., 2016). Kazeem et al. (2010) highlights for the case of Nigeria that attitudes of parents towards the education of children, considering the gender of these children, have an influence on the school attendance of the children. The traditional pattern of parental attitudes that favor school attendance are targeting boys, but actually many parents in gold mining areas in the context of Burkina Faso describe themselves as not having power or means to address school attendance of boys. In other words, no matter what they do, they do not have much influence on boys, and as parents they tend to give up. "Powerless" parents are among those that are likely to raise children that do not attend school but rather do what they like (Reid, 2005).

There are possible explanations why even though parents may get involved for a better school attendance, this involvement is less efficient for boys. One of these explanations is the employment opportunities that are available in gold mining areas. Gold mining socio-economic activities give opportunities to individuals of all ages, boys and girls (children), as well as adults. Boys are the ones who tend more to get involved in related activities, due to the physical requirements of mining activities, such as digging or pulling out the sand from pits. Such boys

get money, sometimes amounts of money that children of their age could ever imagine having. Because they can make their own money, boys do not listen to their parents and parents cannot control them. Some of them would adopt rebellious attitudes towards their parents when the parents want to put some pressure on them. That is why involvement of parents has a lower effect on them compared to girls. As the qualitative results already presented indicate, cultural norms require girls to be submissive to their parents, because they are meant to be future wives, and society requires wives to show submission in front of men. Therefore, girls are more likely to listen to what parents say whenever they start going astray.

Just like to confirm the explanation on the gender moderating effect on the effectiveness of parental involvement for school attendance, results of the analysis revealed that non-working children will likely go to school with some supervision or monitoring from their parents. On the possibilities of combing schooling and gold mining activities, in a study on the context of a small gold mining village in Burkina Faso, Maiga (2015) wrote that one cannot be in school and at work at the same time. Children who do not do any labor at all, whether physical or non-physical, are likely to be from households with parents who have a certain level of education, and do not allow their children to be involved in labor. Because such children are usually from families with educated parents who value education, they will tend to listen more to their parents when the latter monitor their schooling. These children are likely not to adopt the attitudes of not attending school as working children do, due to the differences in values that they have for education.

Beyond the factors discussed above, a hidden aspect that this study suggests is the influence of gold mining activities on the local economy (increase of wages, easy access to labor), with implications for education decision-making of households. The local gold mining boom of some areas have changed negatively the values and perceptions that households give to education. In other words, this study shows that in gold mining areas, the educational aspirations that parents hold for their offspring does not show a value given to education. Gold mining booms create environments where the return of education is low, as lower skills (sometimes even without education) jobs pay more than high education (sometimes not even

needed). Such a context, exacerbated by the lack of rainfalls that would allow farming for subsistence, households (originally small farmers that are transformed into small-scale gold miners following the gold mining boom) tend to favor an early involvement of their offspring in "promising" activities rather than taking the long and uncertain route of education (Sore & Maiga, 2015).

Ahlerup et al. (2017) highlights that in a socio-economic context of small-scale gold mining boom, there may be less education demand, because of the quick employment opportunities and financial inducement from gold that drive parents to neglect the education of their children. Regardless of family socio-economic status, child gender or working status, parents who value education and have high educational aspirations will likely engage in activities and communication that promote school attendance of their children. The study highlights then that family factors may be very important for school attendance in Burkina Faso's gold mining areas, but socio-economic realities and the value that families have for education is what really would determine the efficiency of family factors to improve school attendance. Furthermore, inside households, fathers seem to be having much authority to decide much on the education of children. However, they can apply this authority on a successful way to get children attend school under the condition that they have fulfilled their role of providing for the needs of these children. In the opposite case, children just choose to go their own way and fathers' authority does not have any control on the behavior they will have related to their schooling.

6.1.2. The Factors that Determine Students' Learning Achievements Between High-Performing Students and Low-Performing Ones in Gold Mining Areas in Burkina Faso's Primary Education

1) The effect of the level of parental involvement, the number of books at home and child labor on students' learning achievements between high-performing students and low-performing ones in gold mining areas

This subsection discusses the results related to sub-research question 2.1. This sub-research question asks to what extent do the level of parental involvement, the number of books at home and child labor affect students' learning achievements between high-performing students and low-performing ones in gold mining areas. In order to answer this question, this study tested hypothesis 2.1, which says that in gold mining areas, parental involvement, the number of books at home and child labor increase learning achievements of high-performing students relative to low-performing ones.

Estimation results of the analysis have shown that parental involvement is not statistically related to students' learning achievements, regardless of students' performance. However, the number of books, to a certain extent, positively influences learning achievements of high-performing students. Furthermore, child labor is negatively associated with students' learning achievements, regardless of previous performance of these students. Therefore, from these results, it can be said that hypothesis 2.1 is not confirmed for parental involvement and child labor, but confirmed for the relationship between the number of books and students' learning achievements.

The findings on the relationship between parental involvement and learning achievements is inconsistent with Rogers et al. (2009). On the relationship between the number of books at home and the learning achievements of high-performing students, findings are consistent with the studies of Coulidiati-Kielem (2016) and Davoodi et al. (2017). On the association between child labor and students' learning achievements, the findings of this study are inconsistent with Osei-Tutu (2017) who studied factors affecting learning achievements of students in gold mining areas in the context of Ghana.

The possible explanation of the non-significance of the relationship between parental involvement and learning achievements of students can be found in the qualitative analysis of this study. From the reports of people interviewed during the collection of the qualitative data, the form of involvement of the parents have something to do with the non-significant relationship found by this study. Many parents just wait until the end of the school term to check the grade report of their children, and it is not surprising to see that such a way of

involvement is not linked with higher learning achievements. Children need to be monitored during the school term, regularly, so that they can study their lessons to improve in class. When parents do so, there is a way to know the learning needs of children, and possibly help those who are struggling. From the perspective that most parents check children's results only at the end of each term, it can be assumed that they would not even check them, if signing children's grade report was not made compulsory by the government.

Actually, signing grade reports at the end of each school term is a way found by Burkina Faso ministry of education to ensure that parents have a minimum awareness about the achievements of their children in school. The context of gold mining areas (and likely many rural areas in the country), many parents are illiterate and may not know that their involvement in children's education at home is necessary. They just wait until the end of the school year to ask their children whether they pass or not, and some do not, until children tell them they have to find another school because of insufficient performance in their current school. Currently, the new policy of keeping children in school until age 16 obliges schools to keep students until that age. However, among all parental involvement behaviors reported in gold mining areas, there was no direct link with students' learning achievements found by this study.

Furthermore, a possible explanation of the results on the relationship between parental involvement and learning achievements is in the proxy used in this study for parental involvement. Precisely, helping children in their homework is used in this study as a proxy of parental involvement. Parents in general are very likely not to have the necessary skills to support or guide children in the process of their homework or their learning. This is very likely to be in cases when parents have a child with learning difficulties, because such children need special care (Rashid et al., 2005). It is a known fact that from a general perspective, adult illiteracy is still high in Burkina Faso, and particularly in gold mining areas since many of them are in rural areas. As already mentioned, the attention of parents in gold mining context is away from the education of their children, and even when it is towards the education of their children, illiterate parents are very likely not to be able to adequately support their children in their homework (Caño et al., 2016).

There are plausible explanations of the findings on the relationship between the number of books at home and learning achievements. The number of books at home is related to higher learning achievements for mostly high-performing students because the number of books at home can be linked to family SES. Specifically, students who have many books at home are usually students from high SES families, with parents who are educated and value education. Such parents are likely to not only buy books, but also promote their use, since no parent will buy so many books for children without promoting their use. Educated parents who buy books for their children create an environment for the children to use the books. Also, children with fewer books are likely not to engage in activities that require use of books, thus do not improve their learning achievements (Puglisi, 2017).

A study of Glewwe et al. (2009) explains why textbooks may not be efficient at improving students' learning achievements. In the context of many African countries, books are written in English or in French, the second or third language of most students. Only students who are good can read these books, comprehend them, and link that to their learning achievements in schools. Gold mining areas in Burkina Faso seem to be presenting a picture of what the authors explained even though contexts are different. In many households, individuals speak the local language, and many of the low-performing students are likely not to be able to read a paragraph and comprehend it.

The qualitative interviews revealed that many children do not understand French much, as they expressed their willingness to have the interview conducted in the local language, since they cannot communicate their thoughts in French appropriately. This seems to be the general tendency among all the students that were interviewed. While books are written in the official language which is French, it is a challenge for low-performing students to make good use of these books, even if they do have many of them at home. Oppositely, high-performing students, usually the good ones, are more likely to be able to comprehend the contents of books even though written in French. Consequently, those high-performing students that have a certain number of books and make use of them will tend to show higher grades in school. In a context of the low literacy rate of children like in gold-mining areas, it is not surprising that even though

they may have books, these books are not of much use to them. Only students who have a certain mastery of the language in which the books are written and use them to study can make the best out of these books that they may have at home.

It is important then to know children's motivation and abilities to use books before getting them many of them or some at all. The qualitative results of this study showed that buying extra learning materials is among the contributions in children's studies for some parents, with the hope that they will have higher performance with these extra learning materials. Parents who do not know the mechanism through which books influence children's learning achievements may just buy so many books for their children, hoping that they will improve in school. Low-performing students are likely not to engage in reading activities, even if they have many books. Therefore, not merely having books will improve students learning achievements, but promotion of their use and their actual use are the requirements for books to contribute to better students' learning achievements. Parents can support children in the use of the books that they may have at home, or find tutors who may support children in their use of the books. Unless these conditions are met, the mere presence of books at home is likely not to produce better learning achievements for the children who have them.

Many studies, whether in gold mining context or not, have shown the negative impact of child labor on children's learning achievements (Buonomo, 2011; Holgado et al., 2014; Admassie, 2003). The explanation of this negative relationship is that hard working conditions of children make them tired, and do not leave them enough time to study. In Burkina Faso's small-scale gold mining areas, some students join mining or related activities on weekdays and weekends, while others would join gold mining activities on weekends only. In both cases, these students do these activities during the time when they are supposed to take a rest or do some homework in preparation of classes coming the following day or week. Spending their free time working will likely not allow children to have time to study or prepare before they go back to school. They will likely feel tired once they are back to school, as the working conditions on mines are dangerous for them. The qualitative data collection observations of

gold mines highlight indeed that children are working in very hard conditions, and are exposed to many risks, even though they are not adults.

Previous evidence from studies suggests that cognitive skills of individuals working on mines or near mines may be damaged by chemicals they are exposed to (Rau et al., 2015). The field study on gold mining sites to collect data allowed observations of children digging and panning to separate out gold from sand. The final process of separating gold out involves the use mercury, which children have direct contact to. The direct exposure to mercury can affect the cognitive skills or the development of the children using them. Once these children go back to school, they will likely not be able to perform to their full potential, since their cognitive skills are affected. Observations even allowed to see mothers who take children as young as one year old along with them to the gold mining sites. This early exposure to the chemicals or toxic elements on mining sites can have consequences on the cognition and health of these children (Currie et al., 2014) and they are likely to perform poorly when they grow up and start going to school.

The reasons why child labor in gold mines is high are many, for example social or economic ones. The economic ones seem to be more obvious, because many families would join these activities and take their children along with them. However, for social reasons, it can be said that many of these children join child labor through the introduction of a relative or a friend. The proximity of gold mines, sometimes less that 30-minute walk to the village, and the lack of inappropriate control of these places, make it easily accessible to almost everyone, including children. The friends are sometimes dropouts, who have been able to get some money to buy some items that they exhibit proudly to their peers still in school. This creates a pull-effect, since these children in school want to look like their peers, mostly when they are out together when there are no classes. Peer pressure is therefore one the ways through which children get into child labor. But obviously, it all comes back to the economic reason, since these children would not work if they had almost what they wanted from their parents.

The qualitative analysis of this study helps provide another explanation about the negative relation between child labor and learning achievements. Beyond the physical

weariness from working, some students have to skip classes, in order to join labor activities. Absenteeism is mostly very high in times of activity peaks, for example when a new mining site is discovered, creating a gold rush towards this site. New gold mining sites have a high demand of labor of various kinds, from commercial ones to physical ones, where jobs are relatively highly paying. The labor demand is very high, for all day even at night, and wages are relatively higher than in usual times. This attracts children then, and they can leave classes for up to a week. These children therefore have missed the classes that their fellow students have taken. This was mentioned by some teachers who say that children "disappear and reappear". These working students will then have less advantages than the non-working ones, when it comes to taking tests. They have not attended all classes and likely do not know what was taught during their absence, and since most of them would not bother to seek to catch up missed lessons. The consequences of these can be perceived through the poor grades that these working students will have in school.

2) The effect of teacher qualification, head teacher factors and school resources on students' learning achievements between high-performing students and low-performing ones in gold mining areas

This subsection interprets and discusses the results related to sub-research question 2.2. The sub-research question asks to what extent do teacher qualification, head teacher factors and school resources influence students' learning achievements between high-performing students and low-performing ones in gold mining areas. In order to answer the sub-research question, this study tested hypothesis 2.2, which says that in gold mining areas, teacher qualification, head teacher factors and school resources have a positive effect on learning achievements of high-performing students relative to low-performing ones.

Results of the estimation have shown that teacher qualification (pre-service training, experience, and professional training) is positively correlated with learning achievements of low-performing students, but not high-performing ones. This finding is inconsistent then with hypothesis 2.2 in terms of the relationship between teacher qualification and students' learning

achievements in Burkina Faso's gold mining areas. Moreover, school principal factors (pre-service training and experience) are positively associated with higher learning achievements for low-performing students. However, principal experience affects all students, regardless of their performance. The same significant positive relationship regardless of performance is found on the relationship between school resources and students' learning achievements. These estimation results partly confirm the hypothesis on the relationship between these factors and students' learning achievements in gold mining areas in Burkina Faso.

The findings on the relationship between teacher, school principal factors and learning achievements are consistent with some previous studies, such as Feng & Li (2016) and Farooq & Shahzadi (2006). These studies highlight the role that these school actors play in the improvement of students' learning achievements, and this is likely to apply to all students no matter the environment they are studying in. Trained teachers, whether pre-service or professional training, are better empowered to facilitate students' learning directly, from the pedagogical activities carried out inside classrooms. For instance, one of the pedagogical trainings that are offered to teachers who work in rural environments (many gold mining areas are from rural areas) focuses on how to handle students with differentials in learning abilities. Interviews with teachers showed that some of them find trainings to be practical for them, as trainings help them face the realities of their jobs. In a context where teachers have these skills and students have different learning abilities, those with lower learning abilities or with learning difficulties are very likely the ones teachers will address first before looking at high-performing ones. Teachers having received training are therefore likely to influence less-performing students more than high-performing ones. High-performing students can usually comprehend what is taught without much support from their teachers, hence no effect of teacher training on their learning performance.

Results about head teacher training might be interpreted in a sense that trained head teachers improve their management skilled so as to lead school staff, motivate teachers, and create a school environment that fosters learning too (Iwu & Iwu, 2013). As students reported during interviews, they find the encouragement and guidance they receive from school

principals a great support and a motivation to work harder for better grades. Even though improving school effectiveness and creating an environment to support students improve their outcomes is not straightforward, evidence seems to be consistent that quality school principals are crucial for the improvement of the performance of schools (Botha, 2016; Wokadala, 2016). It is therefore important to supplement school principals with the skills they need to carry out their tasks adequately, and this is done though trainings which are relevant to the context in which these principals will work. Even though some of the principals do not find the trainings they receive as helping them become efficient in their work, from the estimation of this study, it seems that principals influence students' learning achievements positively.

Another plausible explanation of the results in terms of the relationship between teacher experience and learning achievements is provided from the results of the qualitative analysis. The first largest group of teachers has about one to three years of experience, and the second one has more than eleven years of experience. Since in Burkina Faso primary school teaching jobs are regionalized and teachers are obliged to stay in rural areas from five to seven years before they can be transferred, many teachers are likely to have stayed in their areas (gold mining areas) for many years. The longer these teachers and other agents working in schools stay in a region or area, the more they get to know the educational issues that learners face and are able to address them better. Working for many years in a given environment, for instance a gold mining one, teachers or principals can feel a certain professional stability in these areas; thus, they can give the best of themselves for the learning of their students and also meet the expectations of parents.

Huberman (1989) highlights that the efficiency of professional experience of teachers depends on individual teachers, but it changes during their career and follows four main stages: 1) The first three years is a "survival" and "discovery" stage for teachers who just started their job; 2) Between the fourth and the six years of professional experience, teachers are in a stage of stabilization; 3) the stage that follows stabilization is the commitment and experimentation stage, between the seventh and tenth year of experience; 4) the fourth stage is when teachers can have a feeling of professional serenity or weariness. These stages of professional

experience have implications for the learning of students, mostly low-performing ones. The longer teachers stay in a given environment, the more likely they will know how to handle situations faced in this environment. Many teachers in the context of this study seem then to be at the third or fourth stage in their career development, stages when teachers seem to be more efficient at handling students in a way that affects their learning achievements positively.

This study also reveals the commitment of some school actors towards the schooling of children in gold mining areas. For actors that have been in the areas for many years, they master many aspects about it, are able to develop strategies to bring parents and students to be interested or more interested in schooling. As already previously mentioned, the aspirations and interests of parents or students are not in favor of education. In such conditions it takes strategies from motivated and committed school actors (teachers, school principals) to bring them back to the right tracks. Interviews seem to support that these actors are doing much towards the improvement of the learning opportunities of children. Some of these people seem to have become individuals originally from the places where they work, due to the level of commitment they give and the way they are well-known by people in the community. This can even suggest a certain level of good relationships with parents and a certain level of trust between these school actors and parents.

Unfortunately, many of these school actors are living in conditions which are not easy for them. For example, many of them live in not-descent lodgings, because many gold mining areas are in very remote areas. As some leaders among participants interviewed in some areas have mentioned, some villages came to existence due to the booming mining activities that brought many people together to live around these mines, obliging the building of a school to offer access to education to children in these villages. Despite these conditions, school actors are finding strategies to work, to get parents and students' attention in order to improve learning. One of those strategies is to keep students busy with some curricular activities even on days off or weekends, because many of the students tend to go for mining activities during these times instead of thinking of studying.

Estimation results also show that school resources are positively related to students' learning achievements, regardless of their performance. This can be explained by the fact that competent teachers cannot express their full potential in an environment where they do not have necessary resources to work with. This study uses the pedagogical materials available to teachers in the classroom as a proxy of school resources. These materials are the first aids used to implement effective and efficient lessons, at least when they are used appropriately by teachers. In schools where such resources are made available there will likely be a direct positive influence on the students' learning achievements. It is important however to mention that the resources per se may not influence students' learning, but how the resources are used is also very important (Wokadala, 2016). That is why it takes trained and experienced teachers to use them effectively and efficiently.

In this context of the results found in this study, it may be assumed that the more a school has resources, the better the performance of students of these schools. However, management of these resources, efficiency and appropriateness in their use are important factors for school resources to be efficient for students' learning (Cooper, 2017). Therefore, regardless of school location, school principals, teachers, and other education stakeholders need to know how to strategically use school resources to address the most pressing needs of students. For example, targeting most at-risk students in classrooms is likely to make of school resources efficient in relation to the learning achievements of students. For education administrators, it is important not to treat all schools the same, because some are more challenged than the others. Allocating school resources to such school will support them to change school teaching and learning climates.

A study of a small-scale gold mining village in Burkina Faso by Sore (2015) highlights the importance of school resources for the performance of students. School resources, in terms of pedagogical materials, are what allow students to take lessons and mostly understand them in a practical way. In other words, school resources contribute to a practical understanding of the classes that students take. For example, it is difficult to teach geography to students who have never seen an administrative or relief map of a country. In the context of Burkina Faso,

many of these students, even after many lessons on the same topic, cannot locate cities or rivers on a map, because the lesson was too theoretical for them (Sore, 2015). There are real world items needed for students to make a sense of out the lesson, to score high during tests.

6.1.3. The Effect of Community Involvement in School life on Students' Learning Achievements in Gold Mining Areas in Burkina Faso's Primary Education

1) The Effect of the Support of Students in Need by School Parents Association (PA) on Learning Achievements in Mining Areas

This subsection interprets and discusses the estimation results related to sub-research question 3.1. This sub-research question asks how does support of students in need by school Parents Association (PA) affect Primary school students' learning achievements in Burkina Faso's mining areas. In order to answer the research question, this study tested hypothesis 3.1, which says that in gold mining areas, parent's association support of students in need has a positive effect on students' learning achievements.

Results of the estimation show that PAs support of students in need has a positive effect on students' learning achievements. Therefore, the findings of this study in terms of this sub-research question confirm hypothesis 3.1. The findings on the effect of the support of students in need by school PAs on learning achievements in mining areas are inconsistent with some previous studies which found that the involvement of PTA in school life does not improve students' learning achievements (Kozuka, Sawada & Todo, 2016; Banerjee et al., 2010; Beasley & Huillery, 2015). The finding of this study reveals a form of community involvement in education that is efficient for the improvement of students' learning achievements.

This finding might be explained by the fact that there are still many communities in gold mining areas that do value education. The practice of supporting students in need is not just to provide for the non-academic needs of students, but the academic ones are also targeted by PAs in gold mining areas. In Burkina Faso's gold mining areas, the interviews conducted during the qualitative data collection of this study show that communities put a common fund

from each gold mining site, and these funds are reserved for local development financing, including education. Some communities draw from these funds to pay teachers for extra classes of students with learning needs. Therefore, the support of the communities in this case seem to directly target students' learning achievements. Non-mining areas do not have local socio-economic activities that can allow this kind of fund-raising from communities, so they always have to wait for meager support from the government. While waiting for government which tends to always take time to address issues, students from these environments will likely lose in learning opportunities.

In addition to the value that communities give to education, practically, they play a prominent role in many of the official governing bodies of schools. For example, in Burkina Faso, communities play an important role in school management committees (SMCs). This is also the case of communities in the Ghanaian context, as found by Ampiah & Yamada (2015). Just like the case of Ghana, communities in Burkina Faso who are active in supporting the needs of students from academic and non-academic perspectives will also likely be playing active roles in the management of schools. As such, their actions will affect the learning of students, for example through the decisions they take related to teachers or the teaching practices in the classroom. This is a plausible explanation of the effect of communities on students' learning achievements, and the practices is general, showing similar results for gold mining areas and non-gold mining ones.

Another explanation of the significant positive relationship between community involvement and students' learning achievements can be found in reports of students during the qualitative phase of this study. In some communities, students in need are supported financially or with some learning materials when their parents cannot afford it. Coly (2014) analyzed the effect of involvement of PAs on students' learning achievements and demonstrates that in general, commitment and efforts of PAs towards education is seen by students as reassuring. According to the scholar, it also constitutes as encouragement for students to work harder in school. Moreover, the scholar highlights that many students can have educational and social needs that schools by themselves cannot meet, and involvement of

PAs help meet these needs, contributing to avoid academic failures within schools. The support of students by PAs can also be made by their presence in school management meetings, which is likely to give students confidence to present learning issues or needs that they have and want solutions for. These seem to be the case of the students in this study, as the data collection stage showed some encouragements from communities for students.

It is important to mention that the support of students in need is positively related to learning achievements, but the effect may not be direct, as it may follow a complex mechanism. Community participation in various aspects of school life creates a supportive environment where children can see that communities "have time" for them, and also for teachers and other school staff to work harder because they feel that they belong to the community. For instance, regular physical visits of community members in schools for encouragement shows the value that parents have for education; this in an environment where needs in teaching/learning resources are likely met, children are encouraged to work harder as they see that the community as a whole puts much efforts for their success, and teachers are more motivated because their efforts are recognized by parents. Furthermore, schools also reported that PAs sometimes offer rewards (learning materials or sometimes bicycles) to students who perform well, which is likely to create a spirit of competition among these students. This can stimulate almost all students within the school, contributing to improve learning achievements of all.

Preston (2013) explained another mechanism through which community involvement in school matters can contribute to improve learning achievements. According to this scholar, community involvement in school life can be beneficial to education quality, not because of a direct effect on students, but an indirect one through students' families. When community members are involved in school matters, this is also a chance for people in the local community to socialize and network. For example, when there are events and many community members attend those events, it is a chance for them to network among themselves and also with other school stakeholders. This creates trust, allowing people to communicate and share difficulties that they may have in terms of the education of their children. In other words, community involvement in school life contributes to a social capital among all the stakeholders of

education in the community, and that increases the sense or feeling of collective responsibility that all the stakeholders have for the education of children. Such an environment created is best for teachers and other school staff to work harder, which results in an improvement in the quality of education. This social capital must be at work in the areas studied.

Even though the actions of PAs seem to be efficient to improve education quality, there are some organizational issues in some of them, and these issues may reduce the efficiency of their actions. Maïga (2006) and Sore (2015) already highlighted that in some parts in Burkina Faso, rural organizations, including PAs, tend to work like political parties or unions. Specifically, in PAs for example, subgroups are created and initiatives coming from the "opponent" group are usually doubted or fought against. Sore (2015) clearly states that there is a kind of "cold war" that exists among the different groups that may compose PAs, and each group tries as much as possible to reject the ideas coming from another group, even though they may be convinced that the ideas are good ones. Indeed, during the qualitative data collection of this study, it was observed that there seems to be a certain lack of trust among some PAs members in some of the areas surveyed. This leads to a certain level of suspicion when it comes to the management of the common funds that are collected to solve educational issues. PA management leaders are sometimes suspected of misappropriating the collective finances for personal benefits, even though it might not be the case. Regarding these organizational issues, it would be good for the ministry of education to remind PAs their role and responsibilities, which are voluntary and should be for the benefit of schools.

2) The Effect of Mothers Association (MA) involvement in school life on learning achievements in gold mining areas

This subsection discusses the estimation results related to sub-research question 3.2. This sub-research question asks how does MAs involvement in school life affect primary school students' learning achievements in gold mining areas in Burkina Faso. In order to answer the research question, this study tested hypothesis 3.2, which says that in gold mining areas, MA involvement in school life affects students' learning achievements positively. Results of the

estimation show that MA involvement in school life has a positive effect on students' learning achievements. Therefore, the findings of this sub-research question confirm hypothesis 3.2 already mentioned above.

This study suggests that in a community where women are involved in school life, it contributes to influence students' achievement positively. This finding is consistent with Compaore (2006). An explanation of this finding can be found in the qualitative responses collected in for this study. One of the roles or responsibilities of women involvement in school life is to serve as follow-up people of students from disadvantaged backgrounds. These women contact these students' families to find out educational issues, that is students whose family environment is not favorable for their studies due to social or economic reasons. This follow-up mainly targets girls, with the assumption that women can advocate to fathers to give more chances to girls to study, by sensitizing them on the importance of girls' education. Because the actions of women are more likely to focus on the education of girls, it this study found that their actions profit female students more than male ones.

Moreover, as mothers also get involved in the education of students, they serve as examples first by giving more time to girls to study, instead of retaining them for household chores. ILO (2007) revealed that in gold mining contexts, such as in Niger, Peru, and Tanzania, girls are often left on their own at home, to take care of themselves or the siblings who stay home. Because of that, girls have less chance of attending school or they may not have enough time to study at home. The context of gold mining areas in Burkina Faso may be similar to those countries mentioned, but the actions of community women for the improvement of education quality seem to be working in favor of girls in Burkina. This finding shows then that even with similar contexts, as those mentioned above, the effect of women's involvement in school life benefits girls in Burkina Faso.

The voice of mothers in this context for the cause of girls seems to be heard then, through a mechanism that plausibly reduces the cultural factors that prevent girls from learning. In the context of gold mining socio-economic activities, women may have relatively easier access to income-generating activities due to the job multiplier effect of gold mining activities. As some

women mentioned in the interviews, they are working to get some finances to put in the education of their children. This context of job availability gives them a certain level of economic empowerment that they use to invest in the education of their children. As an association of women, women can also find strategies to contribute financially to the school life. Hatlebakk & Gurung (2016) have demonstrated that economic empowerment of women has a positive impact on the education of their children. This seems to be the case for women associations examined in this study, and an impact is the positive relationship it has on students' learning achievements, mainly girls.

Going further, from the perspective of the reasons why the involvement of women affects girls more than boys, Burkina Faso educational policy on girls' education is another reason that could explain the significant positive relationship between the involvement of MAs in school life and students' learning achievements. It may be important to remind that due to gender disparities in access and learning achievements of students in basic education, Burkina Faso came up with the National Strategy for the Acceleration of Girls Education (Stratégie Nationale d'Accélération de l'Éducation des Filles) to be implemented from 2012 to 2021. Analyses showed that some of the reasons for the low level of girls' education are economic or socio-cultural ones. One of the highlights of this policy is the support of MAs so that they can contribute more efficiently to the improvement of girls' education. Many gold mining areas in Burkina Faso are among rural areas, and rural areas are the main target of the policies that seek to improve girls' education in the country. This suggests that by targeting rural areas, the policy may have indirectly addressed gender disparities from the perspective of gold mining non-gold mining perspective.

Despite the National Strategy for the Acceleration of Girls Education that seems to be playing a role in favor of girls' education in gold mining areas, results of this study have shown that MAs involvement in school life is also positively related to students' learning achievements in non-mining areas. However, the effect is higher for male students relative to female ones. There is plausibly a certain mechanism in non-mining areas that still seems to be against the effect of education in favor of girls. What can be said is that the mechanism may

be related to the socio-cultural characteristics of communities in non-gold mining areas. Whether this is obvious or not, the finding of this study to some extent shows that there are still issues that education in Burkina Faso is facing, in terms of reducing the gap between female students and male ones. An ideal situation would not allow some disparities to be in favor of girls, as it may be viewed as policies are reversing the negative situation, but not getting rid of it. Whether in favor boys or girls, it would be better not to see any type of disparities.

Beyond the policy link of the actions of women and students' learning achievements, a more plausible reason for the significant positive relationship lies in the support that women bring in school feeding programs. As already presented in the qualitative analysis results, school feeding programs in Burkina Faso target mainly areas with low school attendance due to inability of parents to provide food for their children. These areas are usually rural ones, and many gold mining areas with the same issue are also involved since they are in rural administrative units. Many years ago, school feeding program was covered in Burkina Faso by Catholic Relief Services (CRS), but since their withdrawal from feeding programs, the government and local communities have to find ways to get school feeding programs going where needed. One of the strategies to reach this objective is to get parents more involved in the new school feeding program. In many schools, PAs collect from children a quantity of rice, beans, or some money for parents to guarantee a certain stock of products for the school feeding program. This is meant to complement the supplies received from the government.

The relationship between the school feeding program and the action of MAs is that members of MAs serve as cooks in school feeding programs. As already explained in the results of the qualitative section related to the contribution of MAs and students' learning achievements, the involvement of MAs in school feeding program makes food available to all students in schools during lunch time. Availability of lunch at school avoids students from walking long distances to go back home to get lunch, and therefore may study right after eating. For many of the students, even if they go home during lunch time, there is no food for them because many families cook only at night and during daytime nothing is available, children

who get back home from school have to manage on their own get some food to eat. With lunch available at school, the choice of many children not to go back home is clear and understood.

Teachers explained how crucial keeping students in school after lunch is for their learning achievements. Many of these students do not usually study once they go back home, and the time after lunch is a good one for teachers to have them study. Recently, since teachers value the time after lunch for students to study, they pressured the government to restore the three-hour lunch break for students, after the government had reduced it to only one hour for all administrations in the country. The government recognized the importance for children to stay in school and study right after lunch, as lunch break was restored to three hours for schools even if the one of other institutions remained shortened to the one hour. MAs manage cooking of the school lunch, and to some extent this contributes to providing more time to students to study, which has a direct link with their learning achievements. This involvement of women, at least for schools where it is successful, may then need to be promoted and improved where necessary.

6.2. Limitations of the Study

This study has some limitations, just like many studies, and these are worth mentioning. First, the analysis of the study is limited to factors in later stage of primary education, that is grade 6. However, the importance of family, school and community factors may be more critical when students are in earlier grades, as at this stage of their development they are more likely to be more dependent on these factors. Therefore, further studies can examine the effect of family, school, and community factors in earlier grades of primary education, to find out which ones are important for students' educational opportunity in these grades. In earlier stages, when specific learning needs for these students are identified, they can be addressed, so as not to have learning difficulties in later stages. Since this study relied on one grade level and also one indicator of learning achievements, findings cannot necessarily be generalized to all levels of primary education and all indicators of learning achievements. It would be interesting to test

the same factors for students at lower grades and math score, to ensure generalization possibilities of the findings in this study.

Second, the HLM analysis revealed low variances or low level of clustering at the highest level of the hierarchy. This suggests that differences among provinces in terms of students' learning achievements are not high. Even with the low level of clustering, theoretical studies on HLM support that this method is still preferred for studies similar to this one, but caution is needed as to the effect of this low level of clustering on some of the factors used. Besides, there were limited variables available at the province level. These did not allow to fully study effect differences on students' performance across provinces, and also control for province level factors that may affect learning achievements directly or through a cross-level interaction effects. In HLM, these are techniques that can allow to better analyze a dataset, but the lack of some variables did not allow a further analysis. Variables availably can allow this in future research.

Third, due to some challenges related to the collection of qualitative data, the sample size of the different participants interviewed is relatively small. Many gold mining areas are in remote rural areas, not easily accessible in the limited time that the fieldwork had to be conducted. In addition, there were many challenges in getting some people that are willing to stop their daily activities and engage in an interview. In many households, no one could be found at home, so the data collection with some parents was done where they could be found. Obviously, the place where these parents could be found are where they work, that is on gold mining sites. Unfortunately, stopping and getting engaged in "unproductive discussions" was not in the plan of many of the parents approached. For participants interviewed, there may be differences in the effects of the factors of interest of this study on learning achievements, depending on the province or village. The study could not address such aspects of the topic, due to the challenges and the small size of the sample.

6.3. Conclusion

The Education for All (EFA) objectives were not achieved by many countries all over the world when the Millennium Development Goals (MDGs) timeframe came to an end. The end of MDGs timeframe was followed by the international community embarking on a new world agenda for education: The Sustainable Development Goal (SDG) 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". This agenda is designed to be more inclusive, holistic and outcome-oriented. Backed by efforts from MDGs period, many developing countries have invested and are investing much resources in order to achieve the goals of this new world education agenda. A gain from this is the observed increase in primary education enrolments.

Despite the overall education access increase that can be observed in many of these countries, there are disparities that have developed or worsened with efforts meant to solve educational issues. These disparities that need to be addressed are for instance in terms of gender factors, socio-economic ones, and also geographical disparities. In addition to education access disparities, good quality education is another challenge that developing countries are currently facing. Many scholars and practitioners speak of a world learning crisis, as many students in developing countries go to school but do not learn. In other words, more students may be going to school, but many of them do not reach the learning objectives set by official teaching programs.

Research of the factors that determine access to education and good quality education is increasing, as a way to address education access and quality issues encountered nowadays. From this perspective, there seems to be a wide recognition and consistency among researchers and practitioners in international development that family, school, and community factors are important for school attendance and the learning achievements of students. Encouraged by findings from some contexts, many countries have developed some policies or laws that facilitate the involvement of families and communities in school life matters, with the hope that it will contribute to address some issues faced. In SSA, Burkina Faso is one of the countries that created a law to encourage the involvement of families and the community in education.

Efforts to get children to school, to ensure that they complete at least basic education and also that they learn are of a particular importance for a developing country like Burkina Faso, given that largest part of its population structure is composed of young people. Developing a human capital is one of the factors that can help the country get out of poverty. The contribution of households and communities towards education is crucial as well, because they are the first actors from the perspective of education demand. The government makes efforts from a supply side, and the interactions of demand-side and supply-side efforts will likely reduce the various issues that currently plague the educational system.

In Burkina Faso, the contribution of families, schools, and communities for the improvement of school attendance and learning achievements seem to be more crucial for gold mining areas. This is due to the recent gold mining boom that seems to divert the education values and aspirations of many education stakeholders towards the luring fast track of getting rich through gold mining and related activities. The gold mining boom contributes to economic development of the country, but it seems to have an impact on the local level, as indicators of education suggest that many of the gold mining areas are more challenged than non-mining ones. The government has not created a policy response for educational issues in these areas, but it seems to be getting more and more aware of the need. A few forums were organized on the topics of student dropouts in gold mining areas.

Despite their potential for education there is a debate on the importance of family, school, and community factors for students' schooling. One the one hand, the importance of family factors for the improvement of learning achievements seem to be well recognized by some empirical evidence in many countries all over the world, given that some studies found that parental inputs have a positive effect on the learning of students. On the other hand, some empirical studies used international assessment data and argue that family factor are important in developed countries but not in developing ones. The argument of these studies is that policies based on families may not be effective for learning in developing countries, so they should focus on school-based policies. Generalization of such findings may be problematic for policy development, due to differences of contexts of these studies and differences that may be from

the student level. Moreover, in terms of community involvement in education, some studies suggest that not all forms of community involvement are efficient to address education issues, so it is important to test what form of community involvement works in what context.

With this as a background, this study sought to explore three main research questions: 1) To what extent do home environment factors affect the likelihood of primary school attendance across socio-economic groups in gold mining areas in Burkina Faso's primary education? 2) What are the factors that determine students' learning achievements between high-performing students and low-performing ones in gold mining areas in Burkina Faso's primary education? 3) How does community involvement in school life influence students' learning achievements in gold mining areas in Burkina Faso's primary education? The main purpose of the study was to analyze the effect of family, school and community factors on school attendance and learning achievements of primary school students in Burkina Faso, with a focus on gold mining areas.

This study is significant, as it makes an academic contribution in the following respects. First, this study sheds light on what family inputs (practices) are needed to increase students' school attendance and improve their learning achievements in gold mining socioeconomic context. It reveals that family factors are important for school attendance in gold mining context, but not in non-gold mining one, a finding unique to gold mining areas then. It also highlights what can improve or reduce the effectiveness of parental practices in relation to the education of their children. There are some studies that identified parental inputs in terms of parental status factors (for instance household income or parental education) in general context in Burkina Faso and other developing countries. However, few studies empirically examined parental practice factors and students schooling in gold mining context relative to non-gold mining ones.

Second, this study is significant in that it comprehensively assesses the factors of learning that are subject of debate, and brings empirical evidence one the debated topic, from new perspectives. Specifically, the study contributes to show that family factors are important for the learning of students in Burkina Faso's gold mining areas, specifically, for high-

performing students but not for low-performing ones. The study demonstrates that school factors are more important than family ones for the learning of low-performing students. In addition, it was revealed through this study that family factors are relatively less important for learning in gold mining areas compared to non-gold mining ones. Previous studies identified some factors of importance for the learning, but they failed to show which factors are more important for the learning of students, based on student heterogeneous factors like performance.

Third, this study identifies community contribution forms that improve learning achievements, to better understand and integrate community connections that encourage learning and success in schools. Not all forms of community involvement are beneficial for the learning of students, but this study found what forms of community involvement are efficient for the learning in Burkina Faso and by extension other developing countries. Previous scholars contributed by identifying other forms that are relevant for learning, but this study adds to these previous findings by examining the role that communities can play in meeting the direct academic and non-academic students in need. This studies highlights that this role may have a different effect from a gold-mining and non-gold mining area perspective.

Fourth, one of the main contributions of this study is the gender perspective that it found in the effect of the involvement of MA movements in school life. Though MAs involvement in school life benefits all students in general whether in gold mining areas or non-gold mining ones, the study revealed that the benefit is higher for girls in gold mining areas while it is for boys in non-gold mining areas. Previous studies showed a gender perspective in education demand (enrolment or attendance), but no previous studies revealed a gender perspective in learning. This study demonstrates that socio-economic context or environment is important to understand gender disparities in the effect of the actions of local communities to improve education quality.

Based on sub-research questions derived from the main research questions, the analysis set out to test hypotheses it formulated. The hypotheses related to the main research question 1 are as follow (1-1): in gold mining areas in Burkina Faso, the effect of parental involvement on primary school attendance increases as socio-economic level increases; (1-2) the effect of

parental involvement on primary school attendance is higher for boys relative to girls, and also higher for working children relative to non-working ones. The hypotheses related to the second main research questions are as follow: (2-1) in gold mining areas, parental involvement, the number of books at home and child labor increase learning achievements of high-performing students relative to low-performing ones; (2-2) in gold mining areas, teacher qualification, head teacher factors and school resources have a positive effect on learning achievements of high-performing students relative to low-performing ones. In terms of the third main research questions, the hypotheses set out are: (3-1) in gold mining areas, parent's association support of students in need has a positive effect on students' learning achievements; (3-2) in gold mining areas, mothers' association involvement in school life affects students' learning achievements positively.

The overall method employed for the study is of a mixed-methods sequential explanatory design, given the sequential linkage of the quantitative analysis and a qualitative one, and the use of one the qualitative analysis to explain the findings of the quantitative one. In order to analyze the factors of interest that affect school attendance and learning achievement, this study employed probit regression and a three-level Hierarchical Linear Modeling (HLM). The probit regression was employed to analyze sub-research questions constructed from research question 1, while HLM was employed to examine the sub-research questions derived from research question 2 and research question 3. The clustering of the three-level HLM was child level (level 1), school level (level 2), and province level (level 3). The assumption is that student level data are nested in school, and school level data themselves nested in provinces. The study relied on cross-sectional data from Burkina Faso 2014 household survey and PASEC 2014 learning achievements data. In addition to the quantitative analysis, primary qualitative data was collected and analyzed after the quantitative analysis. The qualitative analysis served to explain the findings of the quantitative one.

The estimation results of family factors that determine school attendance show that in Burkina Faso's gold mining areas family factors in terms of parental involvement are positively associated with school attendance, and the effect is higher for students from high socio-

economic level. Estimation results also revealed that in Burkina Faso's gold mining areas the effect of parental involvement on school attendance is higher for girls relative to boys, and also higher for non-working children relative to working ones. This finding is specific to gold mining areas, because the estimation found no relationship between parental involvement and school attendance in non-mining areas.

Moreover, in terms of the effect of family and school factors on students' learning achievements in gold mining areas, results have shown that parental involvement is not statistically related to students' learning achievements, regardless of students' performance. The number of books at home positively influences learning achievements of high-performing students. Child labor is negatively associated with students' learning achievements, regardless of performance. For school level factors, what was found to be unique for gold mining areas and not for non-mining ones is the positive influence of teacher professional training, school principal training and experience on students' learning achievements. In terms of the last research question, the estimation results revealed that PAs support of students in need has a positive effect on students' learning achievements, and MAs involvement in school life also has a positive effect on students' learning achievements. What is specific to gold mining areas in that the latter relationship found is higher for girls in gold mining areas, while it is the opposite in non-gold mining areas.

In Burkina Faso's gold mining areas, what is happening within households and the status of households play an important role in the decision of whether to go to school or not. Looking inside households allows to understand more about the determinants of school attendance, and to some extent the demand for education. What is happening within households may be important for learning, but it is important for families to offer children studying or learning materials. Furthermore, the common view of schools as agents that produce knowledge remains supported by this study. The actors within these school also play an important role in the process of producing knowledge. As for the input of communities, the involvement of community in school life has a positive effect on students' learning achievements.

The government of Burkina Faso still focuses on the development of basic education as a priority in its strategy to develop the human capital of the country. It is facing many challenges that it seems not to be able to address on its own. Unfortunately, it has not addressed educational issues in gold mining areas so far, maybe "blinded" by of the high financial return of gold mining activities for the economy of the country. The responses of the government to issues like student higher dropout rates or lower completion rates in gold mining areas is organizing a few forums to talk about them. The more critical learning crisis in those areas may be hidden, but it seems to be there and if not addressed, it will worsen and get harder to be addressed in the future.

This study reveals that many of the educational issues in terms of school attendance and learning achievements that the country is facing in its gold mining areas are specific to these areas. However, the study also provides empirical evidence of demand-side factors and supply-side ones that can contribute to address these issues. Many scholars that examined developmental issues in resource rich countries argue that natural resources constitute a curse for the countries that have them. But the good news seems to be that they agree that the resource curse can be avoided, or at least transformed into a resource blessing if revenues from resources are directed towards relevant development sectors.

In Burkina Faso in general and gold mining areas in particular, this study reveals that determinant factors to improve demand for education and improve education quality are not only in schools, but also within households and communities. A gold mining socio-economic context matters for education demand and quality, and this study has highlighted the priorities towards which funds are to be channeled in order to "turn the resource curse into a blessing for education".

The results of this study also remind that not everything seems to be negative in terms of how gold mining socio-economic context affects educational opportunities, as proponents of the resource curse support in their conceptualization of the relationship between the two. The education of some children is disregarded by some parents who are believing in "getting rich quick", but the main drive behind this belief is the poverty that they are living daily, and

there seems to be no other way out of it for them. In fact, there is not much evidence that individuals in gold mining areas will have more chances of getting a decent job after receiving education. Many young people in the country are already struggling to get a decent job, which implies that the external efficiency of education in the country is to be reconsidered. When one has no other options of survival, the slightest one available, even though risky, will likely be chosen.

Scholars like Manning (2004) and Shao & Yang (2014) conceptualized natural resource rich contexts as affecting human capital accumulation negatively, and subsequently economic growth as well. However, we may rethink their conceptualization, to include a certain mechanism that allows to have a balance between money and educational opportunities. In such a circumstance, the relationship between natural resource rich contexts and human capital can be positive, and subsequently affect economic growth positively. The conditions for the balance between money and educational opportunities will depend on primarily on the individual, but also on how revenues from natural resources are redistributed to individuals in the community, and to a large extent how natural resources are used for social development like education. This is the role of policy-makers, but also the individuals themselves in the choices they make. Everyone has a role to play then in making of the resource opportunities a blessing for society.

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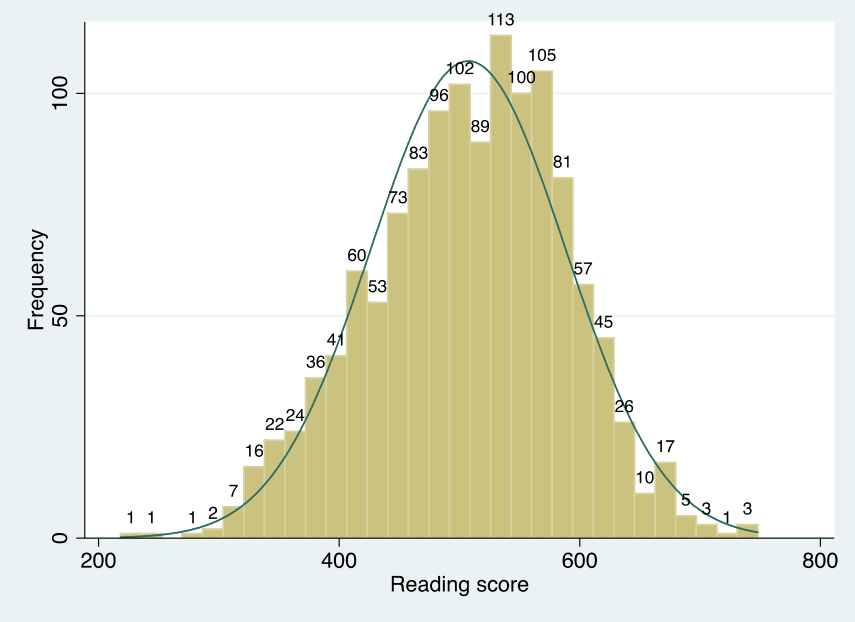
ANNEXES

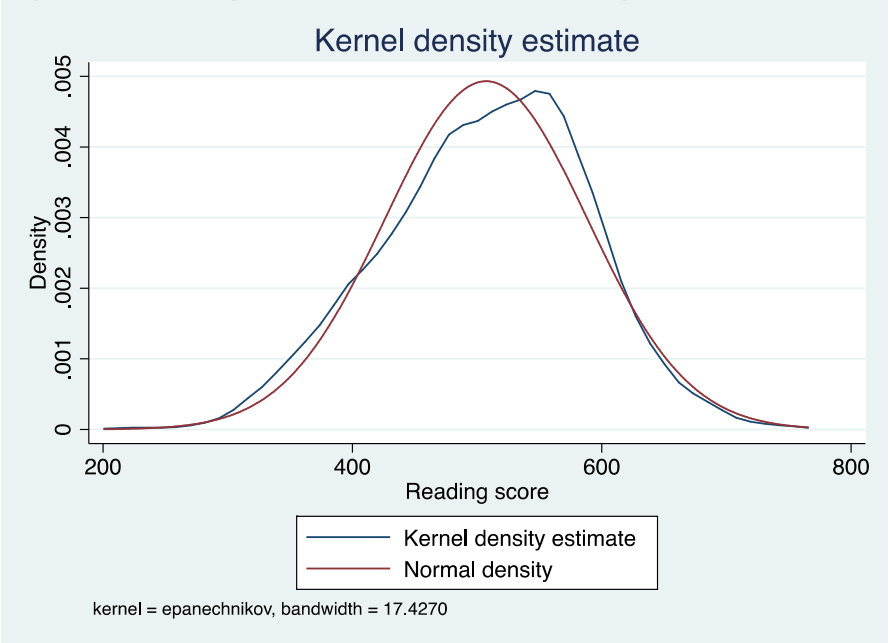
ANNEX 1

Figure A5-2: Histogram of the distribution of reading score



Source: created by Author based on PASEC (2014)

Figure A5-3: Histogram of the distribution of reading score



Source: created by Author based on PASEC (2014)

Table A5-1 Predicted province effects

Prov. ID	Effect	Std. err.	Rank
1	-36.61	19.50	1
2	-18.27	20.74	2
3	-15.23	22.31	3
4	-13.84	22.26	4
5	-11.07	22.21	5
6	-8.60	20.71	6
7	-6.20	22.24	7
8	-4.85	22.21	8
9	-1.52	20.71	9
10	-1.04	19.47	10
11	0.26	22.21	11
12	0.76	20.72	12
13	1.39	18.48	13
14	1.58	18.49	14
15	2.82	22.21	15
16	3.24	22.21	16
17	3.50	22.21	17
18	4.71	22.21	18
19	5.54	22.21	19
20	5.85	22.21	20
21	5.86	22.21	21
22	6.33	22.21	22
23	7.25	22.21	23
24	8.06	22.21	24
25	9.42	22.21	25
26	18.68	22.21	26

Source: created by Author based on PASEC (2014)

Longer version of the equation (4.17) in section 4.3.2

$$\Pr(y_i=1|\,\mathbf{X}) = G(\beta_0 + \beta_I \mathbf{I}_i + \beta_H \mathbf{H}_i + \beta_S \mathbf{S}_i + \beta_C \mathbf{C}_i + \varepsilon_i)$$

Where y_i is the dependent variable, precisely $y_i = 1$ if child attends school and $y_i = 0$ if child does not attend school. I is a vector of covariates at the child individual level (age, gender), H a vector of covariates at the child's household level (parental involvement, parents' age, family SES). The vector of school level covariates S includes school information, for example distance from household to school and school facilities quality. C is also a vector of covariates, precisely related to community level characteristics. G is the standard normal cumulative distribution function (cdf).

Table A5-2 Predicted school effects

Schoool ID	Effect	Std. err.	Rank
1	-146.90	20.74	1
2	-132.15	18.48	2
3	-112.57	18.49	3
4	-104.21	22.28	4
5	-104.01	19.50	5
6	-84.71	19.50	6
7	-81.38	22.31	7
8	-79.54	19.48	8
9	-73.95	22.26	9
10	-59.14	22.21	10
11	-36.70	20.71	11
12	-33.14	22.24	12
13	-31.85	20.72	13
14	-30.90	22.21	14
15	-28.89	22.21	15
16	-25.93	22.21	16
17	-25.72	18.43	17
18	-21.37	19.47	18
19	-19.25	22.21	19
20	-18.51	22.21	20
21	-16.08	22.22	21
22	-13.79	22.22	22
23	-13.07	19.47	23
24	-11.71	22.21	24
25	-11.30	20.71	25
26	-9.83	19.48	26
27	-9.24	20.71	27
28	-6.92	19.50	28
29	-6.70	22.21	29
30	-6.06	19.48	30
31	-1.90	22.21	31
32	1.41	22.21	32
33	2.63	20.71	33
34	3.17	20.71	34
35	6.45	18.44	35
36	6.61	18.44	36
37	6.89	18.43	37
38	13.94	22.21	38
39	14.32	20.71	39
40	15.05	22.21	40
41	16.75	22.22	41
42	17.31	22.21	42
43	18.72	22.21	43
44	19.29	18.49	44
45	25.17	22.21	45
46	28.86	19.47	46
47	29.62	22.21	47
48	30.81	18.48	48
49	31.28	22.21	49
50	31.29	22.21	50
51	33.81	22.21	51
52	34.51	22.22	52
53	34.66	22.21	53
54	35.88	20.72	54
55	38.68	18.48	55
56	38.74	22.21	56
57	41.04	22.21	57
58	43.06	22.21	58
59	49.27	20.74	59
60	49.81	18.49	60
61	50.32	22.21	61
62	51.92	18.49	62
63	52.23	18.44	63
64	52.84	22.21	64
65	59.16	18.43	65
66	62.98	18.44	66
67	64.08	22.21	67
68	70.08	18.48	68
69	74.96	18.43	69
70	99.80	22.21	70

Source: Created by Author based on PASEC (2014)

Table A5-3: Variance explained in the multilevel analyses (Mining areas)

	Student (Level-1)	School (Level-2)	Province (Level-3)	Total
Null Model	3311.889	3103.868	580.8426	
Full model	3193.756	1066.349	0.000	
Variance available	47.33	44.36	8.3	
Variance explained	3.56	65.64	100	
Total variance explained	1.69	29.12	8.3	39.11
Variance left unexplained	45.65	15.24	0	60.89

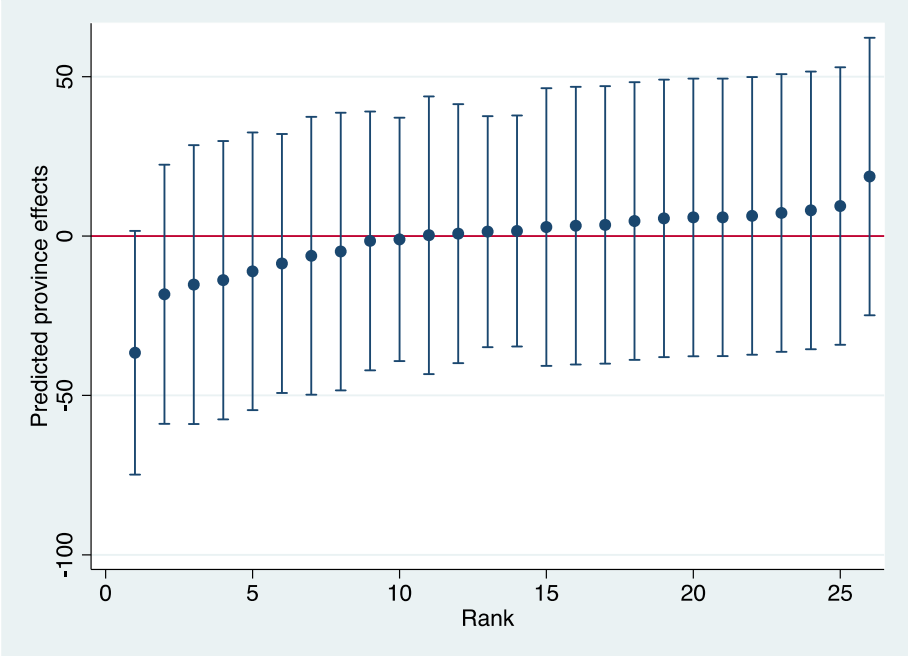
Source: Created by Author based on PASEC (2014)

Table A5-4: Variance explained in the multilevel analyses (Non-Mining areas)

	Student (Level-1)	School (Level-2)	Province (Level-3)	Total
Null Model	3445.89	3014.96	982.85	
Full model	3213.07	1165.92	224.31	
Variance available	46.29	40.50	13.20	
Variance explained	6.76	61.33	77.18	
Total variance explained	3.13	24.84	10.19	38.15
Variance left unexplained	43.16	15.66	3.01	61.85

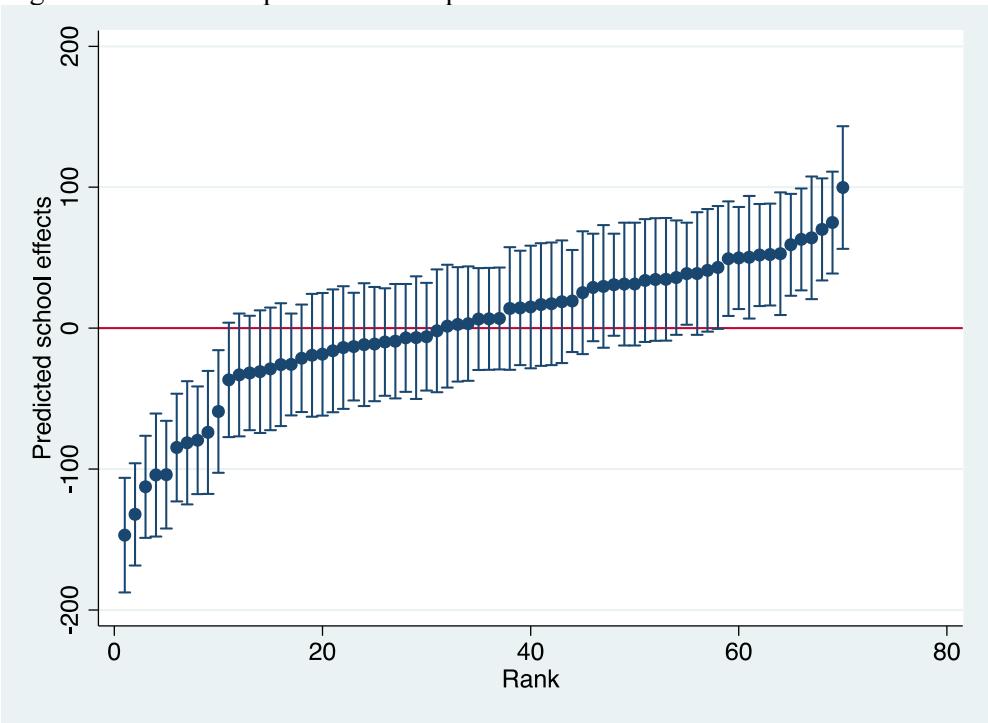
Source: created by Author based on PASEC (2014)

Figure A5-3 Visual representation of province effects



Source: created by Author based on PASEC (2014)

Figure A5-4 Visual representation of predicted school effects



Source: created by Author based on PASEC (2014)

Table A5-5: Full results of the effect of community involvement in school life on students' learning achievements

	Mining areas			Non-mining areas		
VARIABLES	All	Boys	Girls	All	Boys	Girls
Male	4.639			5.655*		
	(3.756)			(3.062)		
age	-1.054	-0.507	-1.510	-3.918***	-5.893***	-2.691
	(1.623)	(2.457)	(2.265)	(1.386)	(2.088)	(1.920)
Labor status	-11.119***	-9.588***	-14.386***	-7.178***	-5.782**	-8.815***
	(2.274)	(2.982)	(3.668)	(1.836)	(2.517)	(2.787)
Repeated class	-7.947*	-2.841	-10.804*	-10.951***	-15.997***	-3.532
	(4.281)	(6.223)	(6.044)	(3.527)	(5.377)	(4.838)
Mother education	4.057	6.603	0.127	3.552	6.814	2.214
	(4.290)	(6.261)	(6.169)	(3.596)	(5.403)	(4.965)
Father education	3.730	0.964	7.168	2.271	7.336	-4.261
	(5.488)	(8.011)	(7.865)	(3.339)	(5.053)	(4.653)
Family SES	0.640*	0.963*	0.599	0.548*	0.462	0.662*
	(0.360)	(0.530)	(0.498)	(0.282)	(0.424)	(0.391)
No involvement	-1.626	-11.808	7.750	6.633	14.107	4.960
	(8.881)	(13.287)	(12.094)	(7.656)	(11.714)	(10.245)
Sometimes involved	13.389	29.583**	7.774	11.896	15.621	16.278
	(8.937)	(13.523)	(12.148)	(7.501)	(11.688)	(9.989)
Often involved	8.046	21.087*	6.162	12.841*	14.237	19.691**
	(8.405)	(12.472)	(11.565)	(7.106)	(10.921)	(9.514)
Always involved	8.802	25.568*	3.123	5.999	16.212	6.937
	(9.220)	(13.812)	(12.652)	(7.498)	(11.550)	(10.053)
No books	2.209	-0.787	5.535	4.140	13.447	-2.111
	(9.814)	(14.651)	(13.323)	(9.019)	(13.313)	(12.379)
Books fill one shelf	10.063	9.565	9.450	17.899**	33.132**	3.620
	(9.802)	(14.993)	(13.012)	(8.936)	(13.264)	(12.216)
Books fill two shelves	24.972**	31.648*	20.925	15.704	28.664*	4.284
	(11.651)	(17.933)	(15.252)	(10.363)	(15.592)	(14.147)
Books fill library	9.078	-28.283	21.633	4.854	37.226	-17.182
	(18.957)	(33.938)	(23.992)	(13.841)	(22.817)	(18.074)
School resources	1.909***	1.798***	2.021***	1.638***	1.553**	1.617***
	(0.442)	(0.508)	(0.438)	(0.564)	(0.656)	(0.591)
Teacher pre-training (1 year)	22.167	26.044	13.086	10.543	1.996	15.036
	(16.034)	(18.680)	(15.406)	(11.768)	(13.552)	(12.728)
Teacher experience	1.999*	2.213*	1.667*	1.841***	1.651**	2.216***
	(1.037)	(1.200)	(1.007)	(0.706)	(0.795)	(0.785)
Teacher prof. training	19.763*	19.488	16.608	8.831	12.470	1.517
	(11.233)	(13.173)	(10.775)	(9.430)	(11.326)	(9.717)

Teacher practical training	1.647	1.814	0.906	0.972	1.749	0.798
	(1.961)	(2.282)	(1.871)	(1.409)	(1.605)	(1.479)
Principal training (1 year)	15.692***	14.206**	16.548**	8.357	11.660	10.414
	(4.659)	(6.712)	(6.896)	(8.777)	(10.013)	(9.132)
Principal practical training	0.011	1.012	0.805	0.890	1.021	0.494
	(0.492)	(0.730)	(0.706)	(0.957)	(1.115)	(0.992)
Principal experience	0.177	-0.257	0.531	0.506	0.646	-0.082
	(0.304)	(0.433)	(0.464)	(0.628)	(0.717)	(0.661)
Community involvement	24.370**	24.060*	24.554**	27.512***	28.106**	20.739**
	(12.396)	(14.449)	(11.650)	(9.703)	(11.427)	(9.973)
Com. Women involvement	16.563**	14.011	20.782***	12.602**	14.149*	10.102
	(8.268)	(9.707)	(8.005)	(6.115)	(7.219)	(6.327)
Province school resources	0.872	0.259	1.239	0.222	0.194	0.158
	(0.912)	(1.049)	(0.866)	(0.757)	(0.876)	(0.798)
Urban	31.086***	40.548***	21.483**	33.455***	39.269***	29.382***
	(10.784)	(12.609)	(10.208)	(8.517)	(9.815)	(8.684)
Constant	246.292***	268.801***	225.695***	362.828***	375.656***	362.569***
	(57.434)	(71.498)	(64.274)	(38.772)	(49.576)	(47.759)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Created by Author based on PASEC (2014)

Table A5-10 Probit results of the effect of involvement on attendance (gold mining areas)

VARIABLES	All	Q1	Q2	Q3	Q4	Q5
gender	0.278**	0.351	0.471*	0.323	0.607*	-0.331
	(0.108)	(0.245)	(0.242)	(0.333)	(0.337)	(0.259)
Age	1.041***	0.691	1.496**	2.232**	1.809**	0.448
	(0.284)	(0.641)	(0.662)	(0.947)	(0.875)	(0.662)
agesq	-0.052***	-0.032	-0.076**	-0.125**	-0.090*	-0.023
	(0.016)	(0.036)	(0.037)	(0.052)	(0.049)	(0.037)
Labor Status	-0.349***	-0.260	-0.640**	0.018	-0.063	-0.613**
	(0.110)	(0.241)	(0.266)	(0.337)	(0.321)	(0.265)
Father education	0.310**	0.205	0.436	0.950**	-0.349	0.317
	(0.126)	(0.288)	(0.288)	(0.371)	(0.338)	(0.291)
Mother education	0.608	-0.024	0.340	0.1158	0.131***	0.402
	(0.623)	(1.044)	(0.258)	(0.347)	(0 .055)	(0.267)
Hous.head occupation	0.392**	0.619	-0.128	0.906	0.405	0.638*
	(0.157)	(0.403)	(0.342)	(0.571)	(0.424)	(0.378)
Base (quantile 1)						
Quantile 2	0.540*					
	(0.294)					
Quantile 3	0.617**					
	(0.305)					
Quantile 4	0.913***					
	(0.306)					
Quantile 5	0.520*					
	(0.297)					
Household size (age 20+)	0.014	-0.030	0.006	0.064	0.071	0.042
	(0.012)	(0.026)	(0.037)	(0.044)	(0.048)	(0.031)
Household size (5)	-0.002	0.030	-0.059*	0.035	-0.006	0.052
	(0.014)	(0.030)	(0.034)	(0.038)	(0.050)	(0.046)
Household size (6-12)	0.009	-0.007	0.029	0.006	-0.009	0.046
	(0.015)	(0.038)	(0.033)	(0.047)	(0.050)	(0.035)
Household size (13-18)	0.018	-0.009	-0.008	0.108	0.065	0.104
	(0.018)	(0.043)	(0.032)	(0.087)	(0.062)	(0.071)
distance_road	-0.106***	-0.161*	-0.035	-0.326**	-0.144	-0.071
	(0.040)	(0.086)	(0.095)	(0.135)	(0.116)	(0.098)
Distance Primary School	-0.022	-0.008	-0.173	-0.175	-0.081	-0.07
	(0.047)	(0.117)	(0.109)	(0.145)	(0.145)	(0.100)
distance_security	-0.112**	-0.154	-0.048	0.050	-0.043	-0.191
	(0.050)	(0.113)	(0.117)	(0.174)	(0.133)	(0.133)

Urban	0.607***	0.602*	0.860***	0.980**	0.919*	0.591*
	(0.141)	(0.342)	(0.321)	(0.421)	(0.481)	(0.338)
involvement	0.314***	0.363	0.410	0.278	0.321	0.760***
	(0.117)	(0.260)	(0.281)	(0.401)	(0.361)	(0.274)
Constant	-5.641***	-2.781	-6.573**	-9.477**	-8.327**	-1.612
	(1.429)	(3.115)	(2.836)	(4.248)	(3.788)	(2.969)
Rsquare	0.1692	0.2281	0.2511	0.3361	0.206	0.1779

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Created by Author based on PASEC (2014)

Table A5-11 Probit results of the effect of involvement on attendance by gender and labor status (gold mining areas)

VARIABLES	Boys	Girls	Working	Not working
Male			0.080	0.385***
			(0.169)	(0.147)
Age	1.056***	1.204***	1.482***	0.767**
	(0.400)	(0.425)	(0.452)	(0.381)
agesq	-0.053**	-0.062***	-0.077***	-0.037*
	(0.022)	(0.023)	(0.025)	(0.021)
Labor Status	-0.518***	-0.231		
	(0.154)	(0.164)		
Father education	0.286	0.408**	0.295	0.322*
	(0.177)	(0.189)	(0.198)	(0.168)
Mother education	0.564	0.387	0.215	0.792
	(1.079)	(0.771)	(0.203)	(0.734)
Hous.head occupation	0.276	0.618**	0.193	0.535**
	(0.203)	(0.257)	(0.236)	(0.220)
Quantile 1	0.300	0.730*	1.102*	0.247
	(0.436)	(0.418)	(0.580)	(0.353)
Quantile 2	0.440	0.719*	0.858	0.519
	(0.446)	(0.410)	(0.576)	(0.358)
Quantile 3	0.504	0.856**	1.255**	0.364
	(0.469)	(0.420)	(0.589)	(0.375)
Quantile 4	0.734	1.201***	1.544**	0.639*
	(0.459)	(0.434)	(0.600)	(0.371)
Quantile 5	0.127	1.038**	0.913	0.424
	(0.442)	(0.425)	(0.582)	(0.361)
Household size (age 20+)	-0.006	0.030*	0.018	0.012
	(0.019)	(0.017)	(0.022)	(0.016)
Household size (5)	-0.009	0.009	-0.002	0.003
	(0.020)	(0.020)	(0.022)	(0.019)
Household size (6-12)	-0.001	0.026	0.028	-0.001
	(0.020)	(0.023)	(0.025)	(0.019)
Household size (13-18)	0.023	0.023	0.024	0.018
	(0.032)	(0.023)	(0.029)	(0.025)
distance_road	-0.094*	-0.113*	-0.085	-0.124**
	(0.055)	(0.061)	(0.069)	(0.051)
Distance Primary School	-0.046	-0.011	-0.012	-0.041
	(0.064)	(0.073)	(0.076)	(0.062)
distance_security	-0.068	-0.175**	-0.119	-0.108
	(0.069)	(0.076)	(0.080)	(0.068)
Urban	0.693***	0.516**	0.768***	0.545***
	(0.196)	(0.213)	(0.226)	(0.192)
involvement	0.258	0.421**	0.240	0.343**

	(0.162)	(0.179)	(0.191)	(0.156)
Constant	-5.170**	-6.337***	-7.713***	-4.512**
	(2.137)	(2.058)	(2.065)	(1.844)
Rsquare	0.167	0.188	0.186	0.172
Observations				

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Created by Author based on PASEC (2014)

Table A5-12: Full results of the effect of the family and school factors on learning achievements

	Mining areas			Non-mining areas		
VARIABLE	All	Repeated	Not repeated	All	Repeat	Not repeated
Gender	4.902	8.684*	1.771	5.160*	-1.127	12.881***
	(3.739)	(4.958)	(5.466)	(3.044)	(3.950)	(4.799)
Age	-1.343	-1.178	0.294	-3.702***	-1.221	-6.143
	(1.615)	(2.236)	(2.321)	(1.377)	(1.812)	(2.121)
Labor status	-10.814***	-9.395***	-11.158***	-7.098***	-3.975*	-10.489***
	(2.251)	(2.994)	(3.267)	(1.824)	(2.262)	(2.937)
Repeated	-7.084*			-10.755***	-	-
	(4.240)			(4.137)		
Mother educ.	4.672	1.935	5.761	4.009	2.782	6.236
	(4.253)	(5.447)	(6.687)	(3.565)	(4.618)	(5.622)
Head educ.	3.981	5.092	6.065	3.013	2.993	5.326
	(5.421)	(7.073)	(8.339)	(3.304)	(4.189)	(5.283)
Family SES	0.612*	0.449	0.783	0.544*	0.287	0.891**
	(0.359)	(0.461)	(0.547)	(0.280)	(0.354)	(0.438)
No involve.	-0.677	-0.340	-6.721	4.878	-5.717	19.951*
	(8.838)	(12.305)	(12.151)	(7.618)	(10.053)	(11.303)
Stimes inv	12.740	10.529	21.07	11.177	1.207	27.900**
	(8.952)	(12.159)	(19.781)	(7.478)	(9.901)	(11.277)
Often involv.	6.956	7.545	17.498	11.408	1.110	24.605**
	(8.376)	(11.521)	(11.775)	(7.091)	(9.529)	(10.489)
Always inv.	7.046	5.486	19.453	5.348	2.725	12.712
	(9.205)	(12.625)	(13.023)	(7.473)	(10.054)	(11.049)
No books	2.570	-1.706	14.978	4.009	-3.519	19.220
	(9.772)	(11.651)	(16.015)	(8.948)	(10.949)	(14.695)
Books fill one shelf	10.550	1.135	28.248*	18.049**	1.643	43.351***
	(9.765)	(11.676)	(16.189)	(8.863)	(10.892)	(14.601)
Books fill 2 shelves	27.374**	14.439	33.918	17.470*	0.590	37.736**
	(13.068)	(14.945)	(21.629)	(10.276)	(12.874)	(16.664)
Books fill library	9.229	-39.761	18.565	5.848	-1.090	22.578
	(18.896)	(34.621)	(24.886)	(13.720)	(20.394)	(19.794)
School resources	1.991***	1.880***	2.030***	1.635***	0.077	1.708**
	(0.344)	(0.511)	(0.452)	(0.585)	(0.744)	(0.668)
Teacher pre-train (1 year)	28.208*	43.564**	2.482	11.541	13.936	28.502*
	(15.389)	(19.398)	(16.476)	(12.298)	(12.215)	(15.182)
Teacher exp.	2.491***	2.989**	0.911	1.889**	1.422*	1.908**
	(0.967)	(1.240)	(1.113)	(0.760)	(0.749)	(0.942)
Teacher prof. train.	19.460*	19.695*	19.091	9.879	3.774	13.382
	(10.952)	(7.281)	(13.811)	(9.773)	(9.681)	(11.691)
Teacher pre-train (2 yrs)	2.009	5.549	-2.666	1.331	6.557	-9.490
	(4.105)	(5.491)	(5.945)	(14.346)	(14.092)	(17.631)

Teacher prac. train	1.719	0.392	1.96	0.348	1.485	-0.115
	(1.948)	(1.956)	(2.463)	(2.124)	(2.098)	(2.622)
Principal train. (1 yr)	14.475**	17.605**	12.410	7.291	18.251	-4.740
	(5.833)	(7.348)	(9.253)	(11.406)	(11.341)	(13.648)
Principal train. (2 yrs)	-4.704	-9.467	-4.570	-3.661	7.246	-23.182
	(8.568)	(10.958)	(13.289)	(18.382)	(17.841)	(22.425)
Principal prac. Train.	0.469	1.055	0.560	1.460	-0.697	3.624
	(0.987)	(1.271)	(1.513)	(2.145)	(2.106)	(2.597)
Principal exp	1.152***	1.002**	0.987**	0.513	0.061	0.783
	(0.311)	(0.457)	(0.448)	(0.651)	(0.638)	(0.765)
PA	26.853**	17.120	24.392	27.977***	25.953***	22.519*
	(12.252)	(12.071)	(15.535)	(10.086)	(9.799)	(11.978)
MA	16.212**	21.474**	5.992	13.201**	5.815	17.329**
	(7.997)	(8.531)	(10.438)	(6.317)	(6.225)	(7.814)
Provinc res.	0.859	0.798	1.164	-0.179	1.533*	-0.497
	(0.969)	(0.949)	(1.184)	(0.793)	(0.867)	(0.959)
Urban	26.405**	11.948	38.963***	40.157***	18.827**	44.929***
	(10.774)	(10.993)	(13.524)	(9.055)	(9.045)	(11.122)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Created by Author based on PASEC (2014)

Table A5-13 Definitions of variables used in HLM models

Variables		
Level 1(Student)	**Level 2 (School)**	**Level 3 (Province)**
$\mathbf{X_1}$ Gender	$\mathbf{W_1}$ School resources	$\mathbf{Z_1}$ Province school resources
$\mathbf{X_2}$ Age	$\mathbf{W_2}$ Teacher pre-training	
$\mathbf{X_3}$ Labor status	$\mathbf{W_3}$ Teacher post-training	$\mathbf{Z_2}$ Urban/rural
$\mathbf{X_4}$ Repeated class	$\mathbf{W_4}$ Teacher experience	
$\mathbf{X_5}$ Father education	$\mathbf{W_5}$ Teacher prof. training	
$\mathbf{X_6}$ Mother education	$\mathbf{W_6}$ Teacher practical training	
$\mathbf{X_7}$ Family SES	$\mathbf{W_7}$ Principal training	
$\mathbf{X_8}$ Involvement	$\mathbf{W_8}$ Principal practical training	
$\mathbf{X_9}$ Number of Books	$\mathbf{W_9}$ Principal experience	
	$\mathbf{W_{10}}$ Community involvement	
	$\mathbf{W_{11}}$ Women involvement	

Source: Created by Author

Table A5-14 Full results of fitted models for gold mining areas

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Gender		4.769	4.547	4.630	4.902
		(3.465)	(3.761)	(3.758)	(3.739)
Age		-1.867	-1.005	-1.041	-1.343
		(1.485)	(1.625)	(1.623)	(1.615)
Labor status		-10.528***	-11.396***	-11.110***	-10.814***
		(2.123)	(2.279)	(2.275)	(2.251)
Repeated class		-7.754**	-8.761**	-8.023*	-7.084*
		(3.933)	(4.290)	(4.283)	(4.240)
Mother education		1.981	4.094	4.091	4.672
		(3.958)	(4.299)	(4.290)	(4.253)
Father education		6.024	3.992	3.833	3.981
		(4.971)	(5.497)	(5.490)	(5.421)
Family SES		0.642*	0.675*	0.636*	0.612*
		(0.336)	(0.362)	(0.361)	(0.359)
No involvement		-8.338	-2.265	-1.749	-0.677
		(8.198)	(8.932)	(8.901)	(8.838)
Sometimes involved		17.549**	13.621	13.681	12.740
		(8.285)	(9.026)	(8.994)	(8.952)
Often involved		13.264*	8.447	8.209	6.956
		(7.799)	(8.457)	(8.429)	(8.376)
Always involved		13.970*	8.662	9.028	7.046
		(8.411)	(9.286)	(9.256)	(9.205)
No books		0.013	2.618	2.128	2.570
		(9.666)	(9.854)	(9.816)	(9.772)
Books fill one shelf		9.297	10.267	10.136	10.550
		(9.703)	(9.843)	(9.803)	(9.765)
Books fill two shelves		20.033*	24.689**	24.866**	27.374**
		(11.251)	(11.699)	(11.650)	(13.068)
Books fill library		10.878	9.817	8.898	9.229
		(18.013)	(19.006)	(18.972)	(18.896)
School resources			2.080***	1.912***	1.991***
			(0.465)	(0.441)	(0.344)
Teacher pre-training (1 year)			21.178	22.168	28.208*
			(17.066)	(16.007)	(15.389)
Teacher experience			2.663**	2.028*	2.491***
			(1.086)	(1.037)	(0.967)
Teacher prof. training			22.857**	19.712*	19.460*
			(11.549)	(11.214)	(10.952)
Teacher pre-training (2 years)			1.906	1.722	2.009
			(4.117)	(4.115)	(4.105)
Teacher practical training			-1.281	-1.649	-1.719
			(2.072)	(1.958)	(1.948)
Principal training (1 year)			14.315**	14.131**	14.475**
			(5.854)	(5.851)	(5.833)

Principal training (2 years)			-4.422	-4.207	-4.704
			(8.604)	(8.600)	(8.568)
Principal practical training			0.429	0.400	0.469
			(0.991)	(0.991)	(0.987)
Principal experience			0.163	0.167	0.152
			(0.313)	(0.312)	(0.311)
PA			22.910*	24.489**	26.853**
			(13.001)	(12.376)	(12.252)
MA			16.072*	16.476**	16.212**
			(8.918)	(8.255)	(7.997)
Province school resources				0.867	0.859
				(0.910)	(0.969)
Urban				30.953***	26.405**
				(10.768)	(10.774)
Constant	501.762***	499.299***	276.854***	246.025***	238.887***
	(7.924)	(28.484)	(41.065)	(57.410)	(57.355)
Variance					
Student (Level-1)	3311.889	3205.888	3193.95	3193.756	3142.465
School (Level-2)	3103.868	2731.515	1102.388	1066.349	945.735
Province (Level-3)	580.8426	408.3905	168.8911	2234.475	138.948
Random slope school resources					0.4041569
Random slope number books at home					860.8037

Source: Created by Author based on PASEC (2014)

Table A5- 15 Log deviance statistics of fitted models

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Log likelihood	-7071.492	-6596.678	-5561.236	-5556.486	-5554.23
Deviance statistics	14142.9842	13193.3564	11122.472	11112.9718	11108.46
LRT vs OLS	653.74	468.16	192.09	158.58	163.09

Source: Created by Author based on PASEC (2014)

ANNEX 2: Interview Questionnaires to participants

Questionnaire for elementary school teachers

Province :…… Department :…… ….District (CEB) :……
School :…….

A- Teacher qualification and student learning

What is your highest diploma??
Junior high school certificate ☐ Senior High School diploma ☐ Associate Degree ☐
Bachelor's Degree ☐ Other……

What is your professional qualification as an elementary school teacher?
Certified Assistant Elementary School Teacher (IAC) ☐ Certified Elementary School Teacher (IC) ☐ Elementary School Head Teacher ☐

What do you think of your pre-service teacher-training in relation to your teaching tasks??
Efficient ☐ Inefficient ☐ Neither ☐
Briefly explain why : ……

How long have you been teaching?
1-3 years ☐ 4-6 years ☐ 7-10 years ☐ more than 10 years ☐

Since teaching, how many times have you received on-the-job training (Educational Development Group and others)??
None ☐ 1-5 times ☐ 6 -10 times ☐ More than 10 times ☐

What do you think of the on-the-job training received in relation to your teaching tasks?
Efficient ☐ Inefficient ☐ Neither ☐
Briefly explain why : …….

B- Satisfaction about the teacher's living and working conditions

What is your level of satisfaction with your living conditions in this community?
Low ☐ Medium ☐ High ☐
Why?.....

What is your level of satisfaction with teachers' living working conditions in this community?
Low ☐ Medium ☐ High ☐
Why?.....

C- School resources and pupils' academic achievements

What resource issues do you have in your class? (Many answer choices are possible)?
No problem ☐ Teaching materials ☐ School books ☐ Others…….

More resources (textbooks or teaching materials) from your class help you have which of the points below? (Many answer choices are possible)?
Nothing ☐ Better teaching ☐ Better preparation ☐ Others…….....
Why ?.....

What are the relationships between more resources (textbooks and teaching materials) in your class and student learning? (Many answer choices are possible)
No link ☐ Better grades ☐ Better understanding of lessons ☐ Others…… …
Why?.....

D- Family socio-economic factors and children's education

What do you think about pupils' families (socio-economic) living conditions?
Bad/poor ☐ Average ☐ Good ☐ Very good ☐
What is the impact on their studies?.....

What do you think of parental involvement in the education of the children?
Low ☐ Medium ☐ High ☐ Very high ☐
What can the reason (s) be?.....

E- Community and Children's education

What are the contributions of the local community for the students of your school? (Many responses are possible)
Nothing ☐ Miscellaneous support ☐ Extra-curricular monitoring ☐
Other……

How do these contributions from the local community contribute to the pupils 'learning in your school (Many answer choices are possible)
Nothing ☐ Encouragement ☐ Competitions ☐ Other……
Why? ……..

What are the community's women's contributions to the students of your school? (Many responses are possible)
Nothing ☐ Miscellaneous support ☐ Extra-curricular monitoring ☐ Cooking for school canteen ☐ Other……
How do these contributions from women contribute to the children's achievements in your school? (Many answer choices are possible)
No link ☐ Encouragement ☐ More learning time ☐ Other…….
Why……...

Thank you for your cooperation

Questionnaire for elementary school Principals

Province Department District (CEB) School

A- Qualification of elementary school principals and pupils learning

What is your highest diploma?
Junior high school certificate ☐ Senior High School diploma ☐ Associate Degree ☐
Bachelor's Degree ☐ Other……

What is your professional qualification as an elementary school Principal?
Certified Assistant Elementary School Teacher (IAC) ☐ Certified Elementary School Teacher (IC) ☐ Elementary School Head Teacher (IP) ☐

What do you think of your pre-service teacher-training in relation to your teaching tasks??
Efficient ☐ Inefficient ☐ Neither ☐
Briefly explain why: ……

Do you have a class to teach in addition to your school principal duties?
Yes ☐ No ☐

What is the impact of this situation on your management of school life?
There is no relationship ☐ Less time for Management ☐ Other……

Since becoming an elementary school principal, how many times have you received on-the-job training for a principal??

No training ☐ 1-5 times ☐ 6-10 times ☐ More than 10 times ☐

What do you think of the on-the-job training received in relation to your principalship tasks? (Many responses are possible)
Useful ☐ Useless ☐ Efficient ☐ Inefficient ☐ Other…….
Briefly expalin why:……..

B- Satisfaction about living and working conditions in the community

What is your level of satisfaction with your living conditions in this community?
Low ☐ Medium ☐ High ☐
Why?.....

What is your level of satisfaction with the working conditions of elementary school principals in this community?
Low ☐ Medium ☐ High ☐
Why?.....

C- School resources and students' academic achievements

What resource issues do you have in your class? (Many responses are possible)
No problem ☐ Teaching materials ☐ School books ☐ Others…….

How does having more resources in your school relate to your management of school life? (Many answer choices are possible)?
No relationship ☐ Better Management ☐ Better learning achievements ☐
Other……
Why?.....

D- Family socio-economic situation and children's education

What do you think about pupils' families (socio-economic) living conditions?
Bad/poor ☐ Average ☐ Good ☐ Very good ☐
What is the impact on their studies?.....

What do you think about parental involvement in the education of the children?
Low ☐ Medium ☐ High ☐ Very high ☐
What can the reason (s) be?.....

E- Community related factors and pupils' education

What are the contributions of the local community for the students of your school? (Many responses are possible)
Nothing ☐ Miscellaneous support ☐ Extra-curricular monitoring ☐
Other……

How do these contributions from the local community contribute to the pupils 'learning in your school (Many responses are possible)
Nothing ☐ Encouragement ☐ fewer absences ☐ Other……
Why? ……..

What are the community's women's contributions to the students of your school? (Many responses are possible)
Nothing ☐ Miscellaneous support ☐ Extra-curricular monitoring ☐ Cooking for school canteen ☐ Other……

How do these contributions from women contribute to the pupils 'learning in your school? (Many responses are possible)
No link ☐ Encouragement ☐ More learning time ☐ Other…….
Why……...

Thank you for your cooperation

Questionnaire for Parents Association/Committee Members

A- Family related factors and pupils' education

How do you rate the students' families (socio-economic) living conditions?
Bad/poor ☐ Average ☐ Good ☐ Very good ☐
What is the impact on their studies?.....

How do you rate parental involvement in the education of the children?
Low ☐ Medium ☐ High ☐ Very high ☐
What can the reason (s) be?.....

B- Community related factors and pupils' education

What are the contributions of the Students' Parents Association for the pupils of this school? (Many responses are possible)
Nothing☐ Miscellaneaous support☐ Extra-curricular monitoring ☐
Autres……..

What are the contributions of the local community for the students of your school? (Many answer choices are possible)
Nothing☐ Miscellaneous support ☐ Extra-curricular monitoring ☐
Other……

How do these contributions from the local community contribute to the students' achievement in in your school (Many responses are possible)
Nothing ☐ Encouragement ☐ fewer absences☐ Other……
Why? ……..

What are the community's women's contributions to the students of your school? (Many responses are possible)
Nothing ☐ Miscellaneous support ☐ Extra-curricular monitoring ☐ Cooking for school canteen ☐ Other……

How do these contributions from women contribute to students' achievement in your school? (Many responses are possible)
No link ☐ Encouragement ☐ More learning time ☐ Other…….
Why……...

What values do the parents of pupils or the local community foster for the education of children?
…….
……

Thank you for your cooperation

Questionnaire for students

Region Province Municipality/Village

Gender Age Elementary school

What is your father's or your guardian's occupation or job?
Farmer ☐ Breeder ☐ Trader ☐ Civil servant ☐ Craftsman / worker ☐ Other… ..

On average, how many nights is he / she at home per week?
F- nights ☐ 3-4 nights ☐ 5-7 nights ☐ other ……..
What do your parents or guardians do at home regarding your studies?
Noting ☐ Check my school attendance ☐ Check my grades and term results ☐
help with my exercises ☐ other…….

What do you think is your family's contribution to your academic success (school grades) ?
None ☐ A little ☐ Much ☐ Too much ☐
Pourquoi ?.....

What influence does your family have on you regarding your decision to go to school or to play truant?
None ☐ A little ☐ Much ☐ Too much ☐
Why this?.....

What kinds of work do you do outside of school??
Housework ☐ Non-domestic work ☐ Nothing ☐ Other……

What are the consequences of this for your study conditions? (Many responses are possible)
Missing classes ☐ Tiredness in class ☐ money ☐ Other…….

What do you think your class teacher's contribution is to your grades in school?
None ☐ A little ☐ Much ☐ Too much ☐
Why do you think so ?.....

What influence does your school principal have on you regarding your grades in school?
None ☐ A little ☐ Much ☐ Too much ☐
Why do you think so ?.....

What influence does the local community have on you regarding your grades in school?
None ☐ A little ☐ Much ☐ Too much ☐
Why do you think so ?.....

What do you think about school or studies in general?
Necessary ☐ Not Necessary ☐ A waste of time ☐ Garantees the future ☐ Other…
Why do you think so ?.....

Thank you for your cooperation

Questionnaire for education officials

Region : Province :

Office/Work place: Position/Title :

1. Generally, what are the challenges in terms of needs for education and learning outcomes that the education system encounters?

2. What are the challenges in terms of needs for education and learning outcomes that the education system faces in mining / gold mining areas? (if you are from a decentralized structure and are in charge of a local community that does not have a mining area, the question is still applicable)

3. In your opinion, what are the reasons or causes for these challenges to the needs for education and learning outcomes in mining / gold mining areas?:

4. What policies or strategies have been set up by the education authorities to address these challenges in mining / gold mining areas?

5. What are the outcomes and the limits of the implementation of these policies or strategies set up to address the challenges?

6. What do you think of the contribution of the actors below to help support the actions of the education authorities to improve the demand for education and learning achievements in mining areas?

7. If you have something to say about the needs for education and learning outcomes in mining / gold mining areas, please do so below:

Thank you for your cooperation