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Effect of School Factors on Gender Gaps in Learning Opportunities in Rural Senegal: Does School Governance Matter?

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Abstract

In the international sphere, gender equality is primarily discussed in relation to the gender parity index (GPI), a female to male ratio of enrollment. This paper attempts to adopt a wider scope of gender equality that includes continuous learning and achievement. By using the data from 306 primary schools in rural Senegal, collected by the Japan International Cooperation Agency Research Institute (JICA-RI), this paper examined school factors that affect the gender gaps in internal efficiency and learning achievement by considering policy input and the environment at the school level. The results show that the existence of a school management committee ("CGE"), is associated with lower dropout rates for both boys and girls and that the amount of financial contribution made by a CGE is correlated with fewer gender gaps in the number of dropouts and the repetition rate. We also found that providing parents with a periodic report on students' attendance and learning achievements as well as offering remedial lessons is negatively correlated with gender gaps in the repetition rate. Although we need to further investigate the mechanism that brought about this result, learning support initiatives may affect students differently according to gender depending on how one plans and implements them. School-level interventions should mainstream gender considerations so as to ensure gender equality in learning processes and achievements.

Keywords: gender, primary education, SABER, school governance, Senegal, rural schools

1. Introduction

Now that developing countries have almost achieved equal access to primary education for both boys and girls when measured in terms of enrollment, focus on gender parity in access to primary education has shifted to other issues including poverty, disability, and transition to secondary school. In fact, the gender parity index (GPI) of primary enrollment, a ratio of female to male enrollment, reached over 0.9 in all regions in 2010 (UNESCO Institute for Statistics 2010a). According to the World Bank (2012), rather than looking at gender in relation to access to education, what now matters in most countries are other socio-economic factors, such as disability and socio-economic status (SES).

However, the scope of gender equality should be broader than access to education. The GPI of enrollment is a first step on the road to gender equity; now that access has been resolved, it is time to pay attention to equity in learning. UNESCO (2003; 2005) indicated that gender equality has to be examined through access to education, processes, and learning achievements of education as a whole. Although many case studies and anecdotal evidence have shown some factors, such as household chores, child labor, and discrimination of pedagogical practices, that cause gender inequality in education (Colclough et al. 2003; Stromquist 2007: Tumushabe et al. 1999); these factors deal with access to education, learning processes, and learning achievements separately, mainly because of the availability of such comprehensive data. Consequently, there is little research treating gender equality of access, process, and learning achievements as a whole process and comprehensively analyzing them as such. School data collected by the Japan International Cooperation Agency Research Institute (JICA-RI) in 2013 enabled the analysis of gender gaps in access to education, internal efficiency, and learning achievements at the school level in Senegal.

This article aims to examine gender equality in primary schools in rural Senegal by focusing on the process of policy implementation and environment at the school level. It

specifically examines inputs and the policy environment, and their links to gender gaps in access to education and learning achievements. This study is timely as the current discussions on the newly-adopted Sustainable Development Goals (SDGs) (2016-2030) look more carefully into learning achievements, whereas the Millennium Development Goals (MDGs) (2000-2015) set only the GPI of enrollment as an indicator for assessing the achievement of gender equality in universal primary education.

The next section presents a literature review on gender and education in Senegal and school governance, performance, and gender in education. Section 3 outlines the methodology and data. Section 4 presents the findings, and Section 5 discusses the results and conclusion.

2. Gender Equality and School Governance

2.1 Gender and education in Senegal and sub-Saharan Africa

The gender parity index (GPI) of primary enrollment worldwide has improved from below 0.9 in 1990 to 0.97 in 2012 (UNECO 2015). A lot of this progress is attributed to South and West Asia, while sub-Saharan Africa (SSA) still has the lowest GPI in the world at 0.92. Among the 18 countries that have a GPI of below 0.9, 13 countries are in SSA. Gender parity often indicates in many countries in the world girls are under-enrolled, while the recent improvement of the GPI also implies a rising dropout rate for boys in some countries. For instance, UNESCO (2015) reports that over the past decade in the Gambia, Nepal, and Senegal, the enrollment of girls has increased, and at the same time the dropout rate for boys has also increased. In Senegal, 81 boys for every 100 girls dropped out in 1999, whereas 113 boys for every 100 girls dropped out in 2011 (UNESCO 2015). Thus, contextual understanding of gender parity is important for interpreting gender dynamics.

Various empirical studies have shown that gender and SES interactively affect educational access, processes, and learning achievement in Senegal and other SSA countries (Diagne 2010; Dramani 2012; Lloyd 2003; Montgomery and Hewett 2005; Tas, et al. 2013). In Senegal, gender norms are more severe in rural areas than in urban areas, and girls are more culturally restricted in

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their access to learning than boys are (Diagne 2005; Montgomery and Hewett 2005). Even under the fee abolition policy, the direct and indirect costs of schooling still prevent poor children from going to school (Colclough et al. 2003). On the supply side, the low motivation of teachers to teach, and absenteeism, in addition to the lack of infrastructure, are serious impediments to learning opportunities (Bennel and Akyeampong 2007). In many SSA countries including Senegal, the recent upsurge in primary enrollment has resulted in a rapid increase in overcrowded classrooms and declining quality of education. Consequently, many students do not attain the proficiency level sufficient for their particular grade (Hungi et al. 2010; Michaelowa 2001; UNESCO 2013). UNESCO (2013) estimates that approximately 250 million children worldwide (among whom non-enrolled children account for 58 million) are not learning, and as high as 60% of children of school-going age in SSA are not attaining a proficient level of learning[1].

In Senegal, gender roles are clearly defined at home, and the opportunity cost of schooling tends to be higher for girls than for boys, and more so in rural areas (Dramani 2012). Moreover, the fear of going against social norms and practices, the weak linkage between the school curriculum and the domestic work ability demanded from girls and women, and the direct benefits and employment in rural life for boys, leads to non-enrollment of girls and causes boys to drop out (Colclough et al. 2003).

In relation to the gender gap in learning achievement, the Program on the Analysis of Education Systems (PASEC), which is the West African regional learning assessment conducted between 2004 and 2009, provided interesting results. The PASEC showed that there was no gender gap in french and mathematics test results for Grade 2, but in 7 out of 11 countries, the mean score for mathematics in Grade 5 was higher for boys than for girls (FAWE 2011). Michaelowa (2001) showed that the gender of teachers was associated with learning achievement,

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[1] The proficiency level for learning is calculated based on the percentage of children of primary school age who reached Grade 4 and achieved a minimum learning standard in reading and mathematics derived from various international assessments (UNESCO 2013: 191).

as there was a link between female teachers and better performance by girls, and between male teachers and better performance by boys in five West African countries including Senegal. Moreover, according to UNESCO (2013), the interaction between SES and gender affects the proportion of students who complete primary education through the attainment of a proficient level in the primary leaving exam. As such, in Senegal, Benin, Uganda, and Kenya, high SES boys perform the best, and low SES girls perform the worst.

In school, duties such as cleaning, fetching water, cooking, and babysitting for teachers and their families are often imposed on girls, and some teachers may be gender biased, encouraging boys to learn more than girls (Stromquist 2007; Tumushabe et al. 1999). Furthermore, sexual harassment by teachers and students mainly against girls is problematic. Some parts of SSA promote early marriage and housekeeping job opportunities for girls, and these options lead to non-enrollment and dropout of girls (Colclough et al. 2003; Tuwor and Sossou 2008).

Gender is an important factor for access, process, and learning achievements in schooling in all parts of the world. In the context of SSA generally, and particularly in Senegal, schools tend to function in favor of boys, leaving girls with more obstacles to schooling. School factors and socio-economic factors entwine themselves in the gender norms embedded in schools. However, present literature lacks empirical research that carefully looks into the policy environment in schools to examine how gender gaps are produced, or reproduced, in schools. School management structures, gender-specific interventions at the school level, information sharing, and feedback mechanisms, as well as gender balance in participation in school management are important components of the policy environment that characterizes a gender-friendly environment.

2.2 School governance, performance, and gender in education

Worldwide, growing attention has been paid to the decentralization of education and the effect of school governance on access to education and learning achievement since the 1990s. Empirical evidence, mostly from Latin American countries, has highlighted some of the effects of

community participation on the increased attendance of students and teachers as well as on the learning achievements of students (Bruns et al. 2011). In contrast, Hanusheck et al. (2013) analyzed a panel dataset from international PISA[2] tests between 2000 and 2009 and found that school autonomy negatively affects student achievement in developing and low-performing countries, while its effect is positive in developed and high-performing countries. In Senegal, a recent study that used a randomized control trial method reports that the positive impact of school grants was seen on the test scores of Grade 3 students in french, mathematics, and oral reading; this was particularly so for girls with high ability levels at the baseline (Carneiro et al 2015). As such, the existing studies present mixed results on the effect of school governance on attendance and test scores, albeit with a different focus on school governance.

A number of other qualitative studies have posited the challenges of community participation in school governance in terms of the social and cultural aspects of individual and organizational behaviors. Previous research has argued that due to an unwillingness to change the situation and the lack of understanding and confidence necessary to discuss the quality of education, community participation did not lead to any improvement in the quality of education in Ghana and the Philippines (Chapman 1998; Chapman et al. 2002; Mfum-Mensah and Friedson-Ridenour 2014). It has also been reported that school culture that generates community participation is important for bringing about an improvement in the school environment (Rivarola and Fuller 1999; Shoraku 2008).

Few studies have discussed the effect of school governance and community participation in school management on gender equality in education. JICA's *Schooling for All Project*[3] focused

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[2] The Program for International Student Assessment (PISA) is a triennial international survey that tests the skills and knowledge of 15-year-old students and is conducted by the Organization for Economic Cooperation and Development (OECD).
[3] The official name of the project in Senegal is "the Project for the Improvement of the Educational Environment in Senegal" (Phase I: 2007-2010 and Phase II: 2010-2015). The original idea comes from a project in Niger entitled "the Project on Support to the Improvement of School Management through Community Participation" (Phase I: 2004-2006 and Phase II: 2007-2010).

on improving the function of *Comités de Gestion d'Ecole* (CGE) - a school management committee - by introducing information sharing on school management with the community, conducting a democratic election to select CGE members, and encouraging the participation of parents and the community in school planning and its monitoring and evaluation. Hara (2011 and 2014) argued that the intake rates, enrollment rates, and completion rates of both boys and girls substantially improved in Niger because of such an intervention (Hara 2011 and 2014). However, the effect of gender-specific interventions at the school level is unclear at best. Similar interventions have been made in Senegal; however, the results on gender equality are not yet known. Ngom (2013) revealed that gender equality in participation in CGEs has remarkably improved in Senegal and claimed that such change could have some effect on the situation in schools.

Many input-output analyses based on the education production function have discussed possible factors affecting the performance of students and deal with gender as one of the inputs. The gender of students and teachers is often considered as one of the independent variables among other teacher and school characteristics, such as the pupil-teacher ratio, the pupil-textbook ratio, qualification of teachers, and school facilities to predict a test score as a proxy indicator for quality of education at school (Glewee et al. 2013). However, these models do not include the policy environment of the school. Moreover, the models have been criticised for dealing with school as "a black box" and often lacking analysis of the way schools are managed and how they use resources to improve learning (Hanushek 2003; Rogers and Demas 2013).

The theory of school-based management (SBM) emphasizes the importance of community participation for the efficient and effective delivery of educational services (Bruns et al. 2011). The underlying belief is that the closer the decision-making power is to the local communities, the more efficient and relevant the consequent resolutions will be. The theory of SBM identifies the following four elements as essential for improving learning outcomes: namely, 1) increasing poor people's opportunity to choose schools and to participate in school

management, 2) giving citizens a stronger voice, 3) making information about the performance of schools widely available, and 4) strengthening the rewards and penalties for schools based on their performance (Barrera-Osorio et al. 2009).

In more concrete terms, there are three essential components of school management in the theory of SBM, namely autonomy, assessment, and accountability for improving the learning outcomes (Barrera-Osorio 2009; Demas and Arcia 2015). Autonomous school management often gives an important role to the school management committee (i.e., CGEs in Senegal) and its formation of school policy (Yuki et al. 2016). Reviewing a wide range of past empirical literature, Bruns et al. (2011) note that a combination of school autonomy, assessment of students' learning, and accountability to parents and other stakeholders brought about improved learning performance by students. Nevertheless, the theory of SBM has not paid much attention to gender issues such as the gender gap in performance and the gender dynamics of community participation.

Researchers from the World Bank developed the System Approach for Better Education Results (SABER) tool to overcome the limitation of the traditional input-output analysis and to examine the inside of the "black box" by looking at variables related to policy intent and implementation at the school and government levels. JICA-RI contributed to developing questionnaires at the school and government levels aimed at capturing the different levels of intent and implementation of an education policy, focusing on the school autonomy and accountability domain.[4] Gender is the major component of the equity and inclusion domain but is also dealt with as a cross-cutting element. Thus, we incorporated gender-related questions into a questionnaire for the school autonomy and accountability domain. The SABER data on the school autonomy and

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[4] The SABER tool covers 13 domains, namely early childhood development, workforce development, tertiary education, student assessment, teachers, ICT, school health and school feeding, school finance, school autonomy, and accountability, The EMIS, engages with the private sector, education resilience, and equity and inclusion.

accountability domain allows us to analyze how policy intent and implementation of school governance is associated with gender gaps in the quality of learning at the school level.

As demonstrated above, in spite of the growing attention paid to the effect of school governance on access and learning achievements since the 1990s, empirical evidence on its effect worldwide has been mixed at best. Neither traditional input-output analyses nor the more recent SBM theory pays much attention to gender dynamics in school governance or its effects. Thus, this paper attempts to compensate for the weaknesses of the previous literature.

3. Methodology

3.1 Research questions

This study attempts to respond to the following research questions:

1) How do the gender-related inputs and the policy environments differ among schools in rural Senegal?
2) How do inputs and the policy environments relate to the gender gaps in access and learning achievement of primary schools in rural Senegal?

3.2 Conceptual framework

This study applies the theory of school-based management (SBM) to investigate the inside of the "black box" (i.e., the school system). Figure 1 illustrates the conceptual framework of this study with a list of variables used for analysis in each conceptual category. As the purpose of the study is to examine the factors of gender equality of learning opportunities and learning achievement, we use the GPI of the dropout rate, the repetition rate, and the pass rate of the primary leaving examination (CFEE) as well as those rates by gender as the dependent variables. Inputs include those used in input-output analysis such as pupil-teacher ratio, availability of textbooks, and students' SES, in addition to gender-specific policy input such as the GPI of enrollment and that of teachers.

The factors related to the policy environment are organized around three themes that sustain the cycle of autonomy, assessment, and accountability, namely school management structure and intervention, information sharing and feedback mechanisms, and participation and trust (Barrera-Osorio 2009; Demas and Arcia 2015). As for school management structures and interventions that support autonomy, the CGE is a decision-making body at the school level, albeit some schools do not have a CGE, and its activeness and gender-specific policy formation ability[5] are important indicators of autonomy. As for information sharing and feedback mechanisms that link assessment with accountability, the annual report of the CGE to parents and community members and the regular report on student attendance and learning to parents are the two most important means of information sharing on learning performance that hold a school accountable to the parents and the wider school community. Additionally, remedial lessons are the most popular means for improving the learning performance of low achievers, bridging assessment, and accountability. Finally, the link between autonomy and accountability requires that parents and the community participate in and trust the school (Barrera-Osorio 2009; Bruns et al. 2011; Demas and Arcia 2015). The most notable indicators that influence participation and trust include the per-pupil financial contribution made by the CGE and the parents association (i.e., Association de Parents d'Elèves (APE) in Senegal) as well as the percentage of female members on the APE board.

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[5] "Gender-specific policy formation ability" is the ability of a school to analyze gender gaps in the school data and to create some gender-specific policies such as early pregnancy prevention policy.

3.3 Data collection and analysis methods

3.3.1 Data collection method

As was discussed earlier, the World Bank developed the SABER tool as a way to assess the linkage between policy intent and learning achievement. Based on this diagnostic tool, JICA-RI developed a complementary tool in the policy domain of school autonomy and accountability, and applied it to Senegal in 2013. Data was collected from various actors, including central and provincial education officers, rural communes, head teachers of public schools, and presidents of CGEs and APEs. This paper used the surveys conducted on head teachers of public schools and rural communes, which are the units of decentralized management of primary education in Senegal. As not all schools filled out the surveys on CGEs and APEs due to the absence of such organizations in their schools, this subset of available data was deemed appropriate for generating the necessary information for a cross-sectional analysis at the school level.

The data came from 306 randomly selected public schools that had Grade 6 students from 91 rural communes in the four regions of Fatick, Louga, Matam, and Tambacounda. The four regions were selected based on the proportion of rural population and public primary schools, the condition of enrollment and learning achievements, and the socioeconomic indicators, so as to capture the general situation of rural schools in Senegal. From the 13 departments in the four regions, we randomly chose 70% of the rural communes in each department. Finally, in each commune we randomly selected public schools that had sixth grade students, which covered 13% of the public schools in the selected regions (see Yuki et al. 2016 for more details). In addition, Louga was the first (since 2007) and Fatick was the second (since 2010) pilot area in JICA's *Schooling for All Project* to implement the minimum package of democratic election for the CGEs, participatory planning and implementation of school improvement plans, and collaborative monitoring and evaluation of school activities and accounting through community gathering. The project had expanded to all regions by April 2015.

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3.3.2 Data analysis method

Descriptive statistics by region were obtained to assess the status of gender-related input and the policy environment of the schools, as well as the gender gaps in access and learning achievements in primary schools in rural Senegal. In answering the second research question, the ordinary least squares (OLS) regression model was used to examine the effect of factors related to inputs and three areas of the policy environment (i.e., school management structure and intervention, information sharing and feedback mechanisms, and participation and trust) on gender equality variables at the school level (see the variable description in Annex 1).

$$Y_s = f(I_s, SI_s, IF_s, PT_s)$$

Y_s represents the gender equality variables of school s, including GPIs and gender gaps in the dropout rate, the repetition rate, and the exam pass rates in 2012 and 2013 respectively. Gender gaps in the dropout and repetition rates were obtained by subtracting the male rate from the female rate in each school. The exam pass rate was defined as the percentage of students who passed the primary leaving exam (Certificat de Fin d'Etudes Elémentaires: CFEE) over the total number of students enrolled in Grade 6. The gender gap in the exam pass rate was obtained by subtracting the female rate from the male rate in each school. The dropout rate, repetition rate, and exam pass rate were also regressed by gender.

I_s represents the inputs in school s that include the GPI of enrollment, the GPI of teachers, the level of economic disadvantage of students (a scale ranging from 1 to 4, with 4 being the most disadvantaged), pupil-teacher ratio, and availability of textbooks for Grade 6 students. SI_s is the school management structure and intervention of school s including the existence of a CGE, activeness of a CGE according to the head teacher, and the existence of a gender-specific intervention. IF_s represents the information sharing and feedback mechanisms in school s which includes the existence of a CGE report, the existence of a periodic report to parents on the learning

and attendance of students, and whether the school provides remedial lessons. *PT*s is a set of indicators related to participation and trust that includes the percentage of female members in the APE board, the amount of financial contribution per student made by the CGE in AY2011 and AY2012, and the amount of financial contribution per student made by the APE in AY2011 and AY2012.

4. Results

4.1 Gender-related input and policy environment (descriptive statistics)

The mean GPI of school enrollment, which is the ratio of female to male enrollment, shows that the enrollment of girls exceeds that of boys in all four regions in rural Senegal. By contrast, the GPI of teachers is low. The overall mean GPI of 0.44 indicates that in rural Senegal the number of female teachers is less than half that of their male counterparts.

As shown in Table 2, the mean dropout and repetition rates are low. The dropout rate stands at 4.1% for boys and 4.7% for girls and the repetition rate indicates approximately 2.9% for both boys and girls. The gender gap varies between regions. The dropout rate for boys exceeds that of girls in Matam, whereas the trend is reversed in each of the other three regions. While the dropout rates for both boys and girls are significantly higher in Tambacounda than in other regions, Tambacounda has the lowest repetition rate and the highest exam pass rates for both boys and girls.[6] Unlike enrollment which favors girls over boys, the pass rates of the primary leaving exam show consistently lower rates for girls than for boys in all four regions. Therefore, the outlook of gender equality in primary education in Senegal is not straightforward.

As for policy input and the environment related to gender and equality, the policy input of schools and their environment vary substantially as shown in Table 3. While the proportion of

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[6] Tambacounda has the lowest population density in Senegal, which may suggest that continuous enrollment in Tambacounda is hard to attain due to geographical hardship. In contrast, it may be that those who have managed to stay up to the final grade experience conditions in and out of school that are relatively conducive to learning.

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schools that have APE is almost 100% in all regions, only half of the schools in the Tambacounda region have a CGE. As the main decision-making body in schools in Senegal is the CGE, many schools still do not practice school autonomy and accountability as a way of initiating an intervention at the school level. Lack of interaction with a CGE may allow schools to let only the difficult students drop out, raising the average pass rate as indicated in the case of Tambacounda in Table 2. Similar to the case of the GPI of teachers, the mean percentage of female parents on the APE board is low at 24%, albeit that there is variety by region.

As for the equality-conscious interventions focusing on boys, girls, students with disabilities, and culturally and economically disadvantaged students, Table 3 shows that only 14.4% of schools have gender-specific interventions, with the range of 0% in Tambacounda and 28.9% in Fatick. Correlation is relatively high between interventions for boys and those for girls (r=0.74), whereas the correlation between other interventions is low (results not shown).[7] The power to make decisions on primary education is held at the commune level where discussion on equality is not uniform. Interestingly, discussions are held more actively at the commune level in Matam and Tambacounda where equality-conscious interventions are not common at the school level. This finding shows that a clear regional difference exists in the implementation of decentralized school management in rural Senegal.

Community background shows consistent trends across regions with little diversity. As shown in Table 4, poverty remains prevalent across the four regions, where nearly half to over 80% of the head teachers responded that more than 50% of students come from economically disadvantaged homes. The ability to speak french is low across the four regions, where on average 9.2% of parents speak french.

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[7] The question was asked as to whether or not a school provides specific intervention for improving the academic achievement of girls (or boys). While the question did not ask about the content of a specific intervention, it is assumed that interventions are made based on the perceived needs of each school.

Having an active APE or CGE seems difficult even when such organizations exist. Frequency and ways of communication between teachers and parents vary among schools. The majority of teachers meet with parents quarterly. However, the content of the communication and the manner with which teachers communicate with parents about the learning achievements and the attendance of students differs across schools in all four regions. Whereas the majority of teachers give report cards for students that focus on learning achievement, only one-fifth of schools provide parents with reports on student attendance. Furthermore, schools commonly have remedial lessons in rural schools, with 74.2% offering such lessons.

4.2 Determinants of gender gaps in access and learning achievement in rural Senegal

4.2.1 Factors affecting gender gaps in dropout and repetition

As shown in Table 5, the GPI of the dropout rate is strongly associated with the amount of contribution made by the CGE. When schools have a greater contribution from the CGE, the gender gap decreases. When using the gender gap measured by subtracting the dropout rate of boys from that of girls as a dependent variable, a higher GPI for enrollment relates to a lower gender gap in the dropout rate. The result that SES is not statistically significant to the gender gap in the dropout rate implies that where parents are aware of the importance of sending girls to school, girls are prevented from dropping out of school despite the economic hardship. This is important, as it confirms the need for an outreach program to get girls enrolled in the first place, so that the existing governance and other pro-girl indicators inside the school are allowed to work and have an impact.

As for the regression of the dropout rate for both boys and girls, the existence of a CGE and a higher pupil-teacher ratio are statistically significant factors for a lower dropout rate at 5 percent and 1 percent levels respectively. The higher GPI of enrollment correlates with the higher dropout rate of boys, while it is negatively associated with the dropout rate of girls, albeit at the 10 percent level. The CGE has a stronger correlation with the lower dropout rate of girls than with that of boys.

The gender gap in the repetition rate gives an interesting result, in that the per student financial contribution from the CGE, a school's report on the learning achievement and attendance of students, remedial lessons, and female participation in the APE board have a statistically significant correlation with it. Schools that receive a higher financial contribution from a CGE tend to have a lower gender gap in the repetition rate. On the contrary, reports from schools on the learning achievement and attendance of students, remedial lessons, and female participation in the APE board are associated with more of a gender gap in the repetition rate. There may be a gender gap in access to remedial lessons and other learning interventions based on school reports, as the regression coefficient is mildly significant. The regression models on GPI of the repetition rate and on the repetition rates of boys and girls were not statistically significant.

4.2.2 Factors affecting the gender gap in learning achievement

In testing the regression models of pass rates by gender and their gender gaps, only the pass rate of girls was statistically significant.[8] As shown in Table 6, SES disadvantage has a negative relation with the pass rate of girls in 2012. Surprisingly, another factor that has a negative statistical relation to the pass rate of girls was the availability of textbooks for grade 6 students. The exam pass rate of girls in 2013 shows even more puzzling results. The GPI of enrollment and the GPI of teachers are negatively correlated with the pass rate of girls. That is, the presence of female teachers and their female peers do not contribute to improving the pass rate of girls but negatively correlates to it instead. It is also important to note that the amount of contribution made by the CGE is positively associated with the exam pass rate for girls in 2013.

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[8] Although not shown in this paper, the GPIs of those who passed exams in 2012 and 2013 are strongly associated with the GPI of enrollment. Schools that have a higher representation of girls also tend to have a higher presence of girls amongst those who pass their exams. Also interesting is the fact that the existence of a CGE report and the amount of contribution made by the APE are weakly but positively associated with the GPI of those who passed their exams in 2012.

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5. Discussion and Tentative Conclusions

Although the sample size of the schools is small and the model fit is not favorable for all models,[9] this study shows the association between school level inputs and the policy environments with the gender gap in learning opportunities and achievement. Note that the CGE seems to function well in association with the lower gender gap in dropout, repetition, and learning achievement. The amount of financial contribution by the CGE itself may reflect the commitment of communities, but such financial contribution successfully correlates with more gender equality in the dropout and repetition rates. The higher the financial contribution made by the CGE, the higher the exam pass rate for girls in the school becomes. This study reaffirms the results of the recent experimental study that revealed the impact of school grants on the academic performance of girls (Carneiro et al. 2015). Conversely, these results contrast with previous studies in other developing countries, such as Ghana, Cambodia, and the Philippines, that pointed out that the community and parents are not confident or powerful enough to affect learning achievement beyond enrollment (Chapman 1998; Chapman et al. 2002; Shoraku 2008; Mfum-Mensah and Friedson-Ridenour 2014). The school management committee, the CGE, is important in Senegal. Therefore, JICA's support for enhancing the function of the CGE under the Schooling for All Project seems to have a relation to gender equality in the continuous learning of both boys and girls generally, and the learning performance of girls in particular. Although we need more qualitative speculation of the processes, the minimum package of the Schooling for All Project that promotes community participation in school management at all levels including the election of CGE members, planning, and monitoring of school plans seems to encourage gender equality at the school level.

The finding on dropouts implies that a CGE functions as a governance structure to ensure the continuous learning of students. As the regression results clearly showed, there is a positive

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[9] A low model fit may reflect a high degree of variation between districts, which makes generalization difficult. As CGEs and APEs become better, this district variation may diminish.

relation between existence of CGE and lower dropout rates for both boys and girls. Note that the contribution made by the CGE also relates to a lower gender gap in the dropout rate. However, the negative correlation between the existence of a CGE report and the GPI of the dropout rate may need further speculation. The content of a CGE report with regard to whether a CGE has a concrete preventive policy and plan for dropouts should be examined further through a qualitative study.

Contrary to the conventional wisdom that SES disadvantages induce more dropouts, schools with more disadvantaged students have a lower dropout rate for boys with statistical significance at the 10% level. This finding implies that educational aspiration may be higher in areas with economic hardship where only a few job opportunities are available for boys. Furthermore, the negative effect of the GPI of enrollment on the dropout rates for boys may be caused by the fact that less attention is given to boys than to girls. In addition, the result that a higher pupil-teacher ratio is associated with lower dropout rates for both boys and girls would require contextual understanding. In many SSA countries including Senegal, students have to pass the national primary leaving exam in order to continue to secondary level education. The results of the primary leaving exam are very important for the ability of schools to attract more students, as more students will come to a school with high exam performance rates. Thus, the higher pupil-teacher ratio may simply reflect the exam results and the popularity of the school where girls are less likely to drop out.

Interpreting the factors affecting the gender gap in the repetition rate is difficult. Two important learning interventions at the school level, namely reports by school on the learning and attendance of students to parents and remedial lessons, have a negative correlation with the gender gap in the repetition rate. When a school promotes learning achievement, the popular way of doing this is to recruit more community teachers and to increase remedial lessons. Although such interventions may improve the overall learning achievement, as reported by Kozuka (2015), they may widen the gender gap in learning opportunities if there is no gender consideration in how and

when to conduct the remedial lessons. Therefore, such interventions may not increase the learning opportunities for all students. A girl may need to go home early to do household chores and take care of her siblings while her mother cooks supper, and she may miss the chance for further learning in after-school remedial lessons.

Although the low performance is the direct reason for the repetition, repetition is usually related to educational aspiration of attaining a higher score in the primary leaving exam for SSA, where the result of the primary leaving exam determines the location of the secondary school (Ogawa and Nishimura, eds. 2015). When mothers are active in the APE and are willing to send their girls to school, girls may stay in school and repeat grades until they obtain better results.

It is the contribution of the CGE rather than the management structure that has a positive relation to learning performance. Some concerns are also raised in terms of the role of the school input, such as female teachers and textbooks, as they have a negative correlation to the exam pass rates for girls. How schools utilize the school input and community contribution should be examined further in order to clarify the ways in which teachers, parents, and community members collaborate to produce better learning outcomes in schools. It should also be noted that in the learning process, girls seem to be affected by SES when it comes to exam pass rates. Therefore, specific interventions on poor households with girls may require attention.

This study suggests the need for further investigation into the function of the APEs and the roles and status of female teachers. The percentage of female board members on the APE is positively correlated with the gender gap in repetition rates. This result is puzzling as Michaelowa (2001) did not find any statistically significant effects of a school's contact with women's groups on academic performance in the PASEC of five West African countries, including Senegal. The participation of mothers may be linked to the weak management of APEs in rural settings. It may be the case that when mothers are busy with school management work, the domestic responsibility of girls increases, leaving them with no time for learning at home. The link between participation of mothers in an APE and learning opportunities for girls should therefore be investigated further.

In any event, the election process for the APE board members and their actual functions should be examined more carefully.

Surprisingly, female teachers and the exam pass rates for girls are negatively associated after controlling for other factors. This finding is contrary to that of past studies that have found that female teachers can be role models for girls and encourage the enrollment and learning of girls (Michaelowa 2001; UNESCO 2010b). According to the UNESCO Institute for Statistics (2010b), a statistically significant positive relationship exists between the proportion of female teachers in primary schools and the enrollment rate of girls in secondary schools. On the other hand, Stromquist (2007) indicated the effect of a hidden curriculum, such as gender-biased pedagogical practices and teacher prejudices, on the socialization process for students in schools. Furthermore, Tumushabe et al. (1999) noted that in Uganda, female teachers tend to believe that boys are more intelligent than girls. This finding may also be explained by the association between gender and years of teaching experience, the way male and female teachers are deployed differently based on other factors associated with the exam pass rates, or simply the gender differences in the working conditions in Senegal where women bear the brunt of household work much more than men do. It is not possible to test these statements using the present data. The more detailed background of teacher deployment and the status and working conditions of female teachers, their pedagogical practices, and the prejudices that teachers may have should be further examined to clarify the background of this unexpected relationship.

In summary, this study confirms that inputs and policy environments relate to gender gaps in learning opportunities and achievements by primary schools in rural Senegal. It was especially evident that the existence of a CGE is associated with lower dropout rates for boys and girls. Also notable is the fact that financial contributions by a CGE mildly relate to greater gender equality in the dropout and repetition rates, and higher exam pass rates for girls. Nevertheless, more qualitative inquiries will have to follow to clarify the relationship between learning and some

aspects of school governance such as actual activities and interventions by schools (e.g., remedial lessons), the feedback mechanisms within a school, and how teachers and the APE work.

This study also has some limitations. First, the analysis is based on cross-sectional data which limits conclusions about causality. Second, there may be a number of additional important factors confounding the relationships of interest, such as the commitment of parents and community members to education. Third, the data does not include detailed information on the gender-specific interventions at the school level. Moreover, more questions need to be asked: What kinds of gender-specific interventions are financed by a CGE? What interventions are most effective for continuous learning and achievement by gender? Although this study indicates that the role of a CGE seems functional and important, the detailed policy making and implementation processes need to be examined further through qualitative inquiry. At the national level, the Government of Senegal formed structured legal and administrative frameworks to promote and achieve gender equality in access to education and allocated part of the national budget to it (Ministry of Education, Government of Senegal 1991; 2004; 2006; 2009; 2013). Nevertheless, regional differences in decentralized management need to be investigated to explore the various types of school governance and their linkage to the gender gap in learning achievement.

JICA has been implementing the *Schooling for All Project* to enhance the function of the CGEs in Senegal, Niger, and Burkina Faso and is now expanding to Madagascar and Côte d'Ivoire. The project has resulted in increased enrollment in schools in the targeted areas (Hara 2011 and 2014). This study reveals that the project also seems to have contributed to gender equality in continuous learning and learning achievement. However, this finding should be used with caution, as learning support initiatives tend to be associated with a greater gender gap in the learning process, mainly in the repetition rate. Gender consideration should be mainstreamed in any school intervention to ensure gender equality in the whole learning process in rural schools in Senegal.
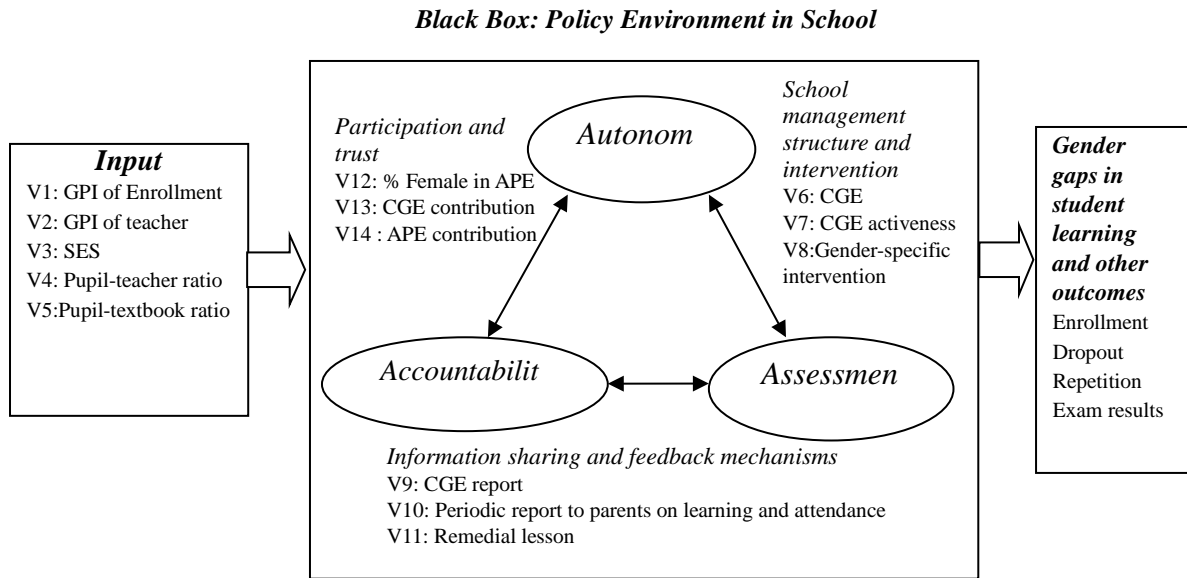
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Figure 1. Conceptual Framework for School Governance and Gender Gaps in Learning Achievement

Black Box: Policy Environment in School

Input		Gender gaps in student learning and other outcomes
V1: GPI of Enrollment		Enrollment
V2: GPI of teacher		Dropout
V3: SES		Repetition
V4: Pupil-teacher ratio		Exam results
V5:Pupil-textbook ratio		

Participation and trust
V12: % Female in APE
V13: CGE contribution
V14 : APE contribution

School management structure and intervention
V6: CGE
V7: CGE activeness
V8:Gender-specific intervention

Autonom

Accountabilit

Assessmen

Information sharing and feedback mechanisms
V9: CGE report
V10: Periodic report to parents on learning and attendance
V11: Remedial lesson

Source: Created by Author based on Barrera-Osorio (2009) and Yuki et al. (2016).

Table 1. Mean gender parity index of enrollment of pupils and number of teachers

	Fatick	Louga	Matam	Tambacounda	Total	N
Enrollment	1.097	1.351	1.834	1.297	1.324	306
Teachers	0.461	0.567	0.348	0.299	0.444	241

Source: Author.

Table 2. Dropout and repetition rates by gender and by region

	Fatick	Louga	Matam	Tambacounda	Total	N
Dropout rate						
Boys	2.66	3.75	5.23	5.72	4.10	294
Girls	3.37	4.27	3.68	7.23	4.65	297
Repetition rate						
Boys	3.48	3.45	2.75	1.57	2.91	305
Girls	3.14	3.54	2.38	1.83	2.85	305
Pass rate						
Boys	51.41	61.72	65.76	74.88	61.19	257
Girls	46.61	54.50	61.88	68.68	55.51	257

Source: Author.

Table 3. Input and policy environment related to gender and equity by region

	Fatick	Louga	Matam	Tambacounda	Total	N
Schools that have an APE (%)	89(98.9)	101(99.0)	39(100)	74(98.7)	303(99.0)	306
Schools that have a CGE (%)	90(100.0)	35(89.7)	35(89.7)	37(49.3)	256(83.7)	306
Average percentage of female board members in APE	21.5%	32.0%	22.3%	16.9%	24.0%	287
Number of schools with specific intervention for boys in all schools (%)	19/90 (21.1%)	18/101 (17.8%)	2/39 (5.1%)	0/75 (0.0%)	39/305 (12.8%)	305
Number of schools with specific intervention for girls in all schools (%)	26/90 (28.9%)	17/101 (16.8%)	1/39 (2.6%)	0/75 (0.0%)	44/305 (14.4%)	305
Number of schools with special program for disabled pupils in all schools (%)	4/89 (4.5%)	3/101 (3.0%)	0/39 (0.0%)	0/75 (0.0%)	7/304 (2.3%)	304
Number of schools with special program for culturally or economically disadvantaged pupils (%)	13/90 (14.4%)	14/101 (13.9%)	3/39 (7.7%)	2/75 (2.7%)	32/305 (10.5%)	305
Number of schools that belong to commune where discussion was made on equity at the Education Technical Committee of the Town hall/Rural commune in all schools (%)	63/90 (30.0%)	34/102 (33.3%)	30/39 (76.9%)	42/75 (56.0%)	37/306 (44.8%)	306

Note: Numbers in parentheses in the first two rows are the percentage of schools that have an APE or a CGE in the total number of schools in each region.
Source: Author.

Table 4. Community background and policy environment by region

	Fatick	Louga	Matam	Tambacounda	Total	N
Pupils from economically disadvantaged homes (%)						
0-10%	2(2.2)	16(15.7)	5(12.8)	10(13.3)	33(10.8)	306
11-25%	3(3.3)	19(18.6)	4(10.3)	5(6.7)	31(10.1)	
26-50%	10(11.1)	17(16.7)	12(30.8)	5(6.7)	44(14.4)	
More than 50%	75(83.3)	50(49.0)	18(46.2)	55(73.3)	198(64.7)	
Average Percentage of parents who can speak french	11.2%	5.6%	12.6%	9.6%	9.2%	300
Schools that have:						
Active APE (%)	84(93.3)	65(63.7)	29(74.4)	55(73.3)	233(76.1)	306
Active CGE (%)	75(83.3)	59(57.8)	22(56.4)	23(30.7)	179(58.5)	306
Schools that have a periodic progress report of:						
APE (%)	26(29.9)	14(14.1)	7(18.0)	6(8.2)	53(17.8)	298
CGE (%)	55(61.1)	15(16.0)	7(20.0)	3(8.3)	80(31.4)	255
Frequency of teachers communicating with parents (%)						
Weekly	2(2.3)	5(4.9)	3(7.7)	2(2.7)	12(3.9)	305
Monthly	11(12.4)	13(12.8)	3(7.7)	1(1.3)	28(9.2)	
Quarterly	56(62.9)	68(66.7)	22(56.4)	50(66.7)	196(64.3)	
Once a year	0(0.0)	0(0.0)	1(2.6)	1(1.3)	2(0.7)	
Only if necessary	20(22.5)	16(15.7)	10(25.6)	21(28.0)	67(22.0)	
Provision of a report card on learning and attendance of pupils to parents						
No information sharing	1(1.1)	17(16.7)	7(18.0)	9(12.0)	34(11.1)	306
Oral information only	5(5.6)	12(11.8)	3(7.7)	6(8.0)	26(8.5)	
Only on learning achievements	69(76.7)	49(48.0)	20(51.3)	41(54.7)	179(58.5)	
On both learning achievements and attendance provided	15(16.7)	24(23.5)	9(23.1)	19(25.3)	67(21.9)	
Remedial lessons provided (%)	82.2	75.5	71.8	64.0	74.2	306

Source: Author.

Table 5. Regression results of gender gaps in dropout and repetition rates

	Dropout Rate				Repetition Rate			
	GPI	Girls-Boys	Boys	Girls	GPI	Girls-Boys	Boys	Girls
Input								
Enrollment GPI	-0.92	-3.96**	1.51†	-3.29†	3.01**	-0.21	0.71†	0.49
Teacher GPI	-0.00	-0.27	-1.26†	-2.41	0.17	-0.08	0.56	0.48
SES disadvantage of pupils	0.27	0.51	-0.90†	-0.87	0.30	-0.05	-0.25	-0.31
Pupil-teacher ratio	0.06†	-0.03	-0.06**	-0.11**	0.01	0.01	-0.01	-0.00
Textbook in Grade 6	0.14	0.31	0.03	0.48	-0.33	0.01	0.06	0.07
School management structure & intervention								
CGE	2.17	-3.62	-3.87*	-7.86*	-1.47	-0.10	0.25	0.15
CGE activeness	-1.07	-0.82	2.07†	2.02	2.70†	-0.00	-0.03	-0.04
Gender-specific intervention	-0.79	-0.03	0.24	4.22	-2.13	-0.70	-0.02	-0.73
Information sharing and feedback mechanisms								
CGE Report	-2.91†	-1.84	0.67	-2.50	-0.57	0.11	0.33	0.43
Periodic Report to parents	-0.86	1.84	-0.51	0.65	2.01	1.27**	-0.78	0.49
Remedial lesson	2.68	-0.23	-1.76	-1.74	0.32	0.89†	-0.07	0.81
Participation and trust								
% Female in APE	0.03	0.03	-0.03	-0.02	0.02	0.02†	0.01	0.03*
CGE contribution	0.003**	0.00	-0.00	0.00	-0.00	-0.001**	0.001†	-0.00
APE contribution	-000	-0.00	-0.00	-0.00	0.00	0.00	-0.00	-0.00
Constant	-3.31	6.59†	11.17	21.4	-1.57	-0.97	2.63†	1.67
Model fit								
R-square	0.12	0.13	0.13	0.11	0.07	0.12	0.09	0.08
Adjusted R-square	0.06	0.07	0.07	0.05	0.01	0.06	0.03	0.02
Probability>F	0.02	0.01	0.01	0.05	0.29	0.02	0.12	0.16
N	225	219	219	220	231	225	225	225

Note: ** indicates a statistical significance at the 1% level, * indicates a statistical significance at the 5% level, and †shows a statistical significance at the 10% level.
Models in shadow are not statistically significant.
Source: Author.

Table 6. Regression results of a gender gap in the pass rates of the primary leaving examination

	Exam Pass Rate 2012				Exam Pass Rate 2013			
	GPI	Boys-Girls	Boys	Girls	GPI	Boys-Girls	Boys	Girls
Input								
Enrollment GPI	3.01**	1.17	-1.31	-4.55	0.06	-0.95	-6.70	-5.84*
Teacher GPI	0.17	1.49	-4.45	-5.67	-0.21	1.61	-5.39	-7.27**
SES disadvantage of pupils	0.30	2.30	-2.50	-4.94*	4.53	2.27	3.50	1.40
Pupil-teacher ratio	0.01	0.00	-0.08	-0.08	0.08	0.15*	0.05	-0.10
Textbook in Grade 6	-0.33	0.73	-1.09	-1.97*	-3.90	-0.34	-0.75	-0.65
School management structure & intervention								
CGE	-1.47	-14.08†	-18.09*	-6.30	-28.7	3.48	1.46	-4.08
CGE activeness	2.70	2.37	7.77	5.72	-0.27	0.30	3.75	3.29
Gender-specific intervention	-2.13	0.10	-7.03	-7.07	-7.24	-1.69	-1.63	0.08
Information sharing and feedback mechanisms								
CGE Report	-0.57	4.76	0.30	-4.51	-10.82	1.49	3.74	2.31
Periodic Report to parents	2.09	-4.63	3.62	7.99	12.32	2.06	8.36	7.42
Remedial lesson	0.32	-5.91	-4.93	0.11	-6.40	8.03	5.53	-1.38
Participation and trust								
% Females in APE	0.02	0.19	0.15	-0.04	-0.29	0.01	-0.03	-0.03
CGE contribution	-0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.003*
APE contribution	-0.00	-0.003†	-0.00	0.00	-0.00	0.00	-0.00	-0.00
Constant	0.00	2.56	95.5	98.72	67.60†	-15.4	21.9	39.17**
Model fit								
R-square	0.07	0.10	0.09	0.13	0.06	0.05	0.09	0.11
Adjusted R-square	0.01	0.03	0.02	0.07	0.01	-0.01	0.03	0.05
Probability > F	0.29	0.14	0.22	0.01	0.55	0.63	0.15	0.05
N	208	203	203	205	224	219	222	219

Note: ** indicates a statistical significance at 1% the level, * indicates a statistical significance at the 5% level, and †shows a statistical significance at the 10% level.
Models in shadow are not statistically significant.
Source: Author.

Annex 1. List of variables

Variable name	Variable description
Dependent variables	
GPI of the dropout rate	A female to male ratio of the dropout rate in schools defined above. Zero was replaced by 0.1 to avoid missing values before calculation.
GPI of the repetition rate	A female to male ratio of the repetition rate in schools defined above. Zero was replaced by 0.1 to avoid missing values before calculation.
GPI of the exam pass rate	A female to male ratio of the pass rate of the CFEE. Zero was replaced by 0.1 to avoid missing values before calculation.
The dropout rate	A percentage of pupils who dropped out of schools in AY2011/12 over the total enrolment in AY2012/13.
The repetition rate	A percentage of repeaters in total enrollment in AY2012/13.
The exam pass rate	A percentage of Grade 6 students who passed the primary leaving exam (CFEE) in the total number of enrollment in Grade 6 in the respective year.
Girls-Boys in the dropout rate	Gap in the dropout rate between boys and girls by subtracting a male rate from a female rate in each school.
Girls-Boys in the repetition rate	Gap in the repetition rate between boys and girls by subtracting a male rate from a female rate in each school.
Boys-Girls in the exam pass rate	Gap in the exam pass rate, a percentage of pupils who passed the CFEE over the total number of pupils enrolled in Grade 6, between boys and girls by subtracting a female rate from a male rate in each school in June 2012.
Input	
V1: Enrollment GPI	A female to male ratio of enrollment in each school.
V2: Teacher GPI	A female to male ratio of teachers in each school
V3: SES disadvantage of pupils	Four scales of economic disadvantage of pupils in school measured as a percentage of pupils who come from economically disadvantaged homes: 1=0 to 10%, 2=11 to 25%, 3=26 to 50%, and 4=more than 50%.
V4: Pupil-teacher ratio	The number of pupils per teacher in each school.
V5: Textbook in Grade 6	An average of the four scales of availability of math and french textbooks for Grade 6 students: 0=None, 1=Less than 50%, 2=80%-50%, 3=Almost all, and 4=All.
School management structure & intervention	
V6: CGE	A dummy variable of 1=School has a CGE and 0=School does not have a CGE.
V7: CGE Activeness	A dummy variable of 1=School has a very active or active CGE and 0=School has an inactive CGE or no CGE according to the head teacher.
V8: Gender-specific intervention	A dummy variable of 1=CGE financing girls' education promotion and awareness and 0=CGE not financing girls' education promotion and awareness.
Information sharing and feedback mechanisms	
V9: CGE Report	A dummy variable of 1=CGE having a periodic progress report, and 0=no report.
V10: Periodic report to parents on learning and attendance	A dummy variable of 1=School provides parents with a student report card that includes information on both learning achievement and attendance of pupils and 0=Otherwise.
V11: Remedial lesson	A dummy variable of 1=School having remedial or supplemental classes for pupils during the break or after regular school hours and 0=School not having remedial or supplemental classes.
Participation and Trust	
V12: % Female in APE	A percentage of female members in the APE board members.
V13: Contribution of CGE per pupil	The total amount of financial contribution made by CGE for AY2011/12 and AY2012/13 in FCFA per pupil (based on the enrollment of AY2012/13).
V14: Contribution of APE per pupil	The total amount of financial contribution made by APE for AY2011/12 and AY2012/13 in FCFA per pupil (based on the enrollment of AY2012/13).

Abstract (in Japanese)

要約

ジェンダー平等は、多くの国際的な場面で、就学者数における男子に対する女子の比率を示すジェンダーパリティ指数（GPI）を基に議論されてきた。本稿は、ジェンダー平等を継続的な学習と学習達成というより広い視野で捉えることを試みる。JICA 研究所により収集されたセネガル農村部の 306 校の小学校のデータを用い、学校の内部効率と学習達成におけるジェンダー格差に影響する要因を分析した。分析の結果、学校運営委員会（CGE）の存在が男女ともにより低い退学率と関連しており、CGE の学校に対する寄付金の額が退学者数および留年率におけるジェンダー平等と関連していることが分かった。また、児童の出席と学業成績に関する学校から保護者への定期的な報告と補習授業が、留年率におけるジェンダー格差と関連していた。保護者への定期的な報告や補習がなぜジェンダー格差と関連するかについてはより詳細な調査が必要であるが、学習支援活動をいかに計画し実施するかによっては、その恩恵を受けられる度合いにジェンダー格差が生じる可能性がある。学校レベルの介入策はジェンダー配慮を主流化することで、学習過程と学習達成におけるジェンダー平等を保障する必要があろう。

Working Papers from the same research project

"Research for Developing Tools of the System Assessment for Better Education Results (SABER): A Focus on the Participatory School-Based Management System, Decentralization, and Accountability"

JICA-RI Working Paper No. 109

Measuring Quality of Policies and Their Implementation for Better Learning: Adapting the World Bank's SABER Tools on School Autonomy and Accountability to Burkina Faso

Takako Yuki, Kengo Igei, and Angela Demas

JICA-RI Working Paper No. 113

Measuring the Quality of Education Policies and Their Implementation for Better Learning: Adapting World Bank's SABER Tools on School Autonomy and Accountability to Senegal

Takako Yuki, Kengo Igei, and Angela Demas