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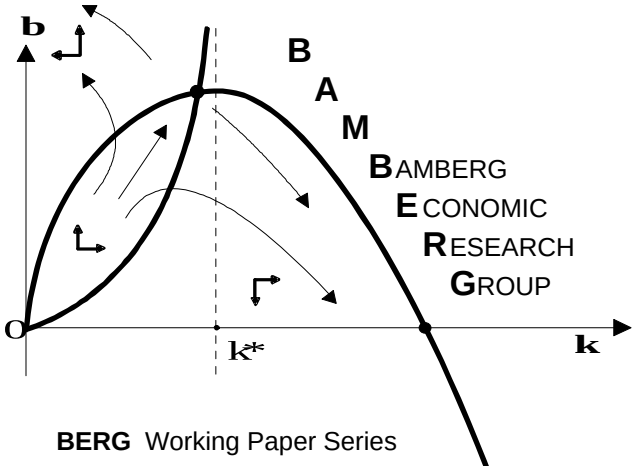

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Impact of an educational demand-and-supply policy on girls' education in West Africa: Heterogeneity in income, school environment and ethnicity

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Abstract

The present paper measures the impact of an educational demand-and-supply side policy in a developing country, Benin. This West African country has introduced in 2006 a program to eliminate school fees, build schools and recruit teachers. The data used are the National Demographic and Health Surveys of 2006 and 2012. The difference-in-differences estimations reveal that the policy has lead to a huge increase in enrollment and attendance of birth cohorts of children eligible for the program. Indeed, children stayed on average two more years in school following the implementation of the program. Nevertheless, the gender disparities are tenacious. The heterogeneity analyses suggest that girls' schooling is also influenced by the school infrastructure and the cultural beliefs.

Keywords: Policy evaluation, Education policy, School fees, Inequality, Infrastructures.

JEL classification: H43, I24, I25, I28

1. Introduction

To reach the Millennium Development Goal 2 (MDG), several developing countries implemented an essential elimination of school fees. However, these programs neglect the modest schooling conditions in the countries. Consequently, a Report from the Education For All Global Monitoring reveals that 250 million children are not learning the basics in primary school due to the school quality (UNSECO, 2014). In some rural settings, the closest school is astonishingly distant. In others, the schools lack fundamental equipment. This article argues that a demand-and-supply side policy could be beneficial for some developing countries, especially in Sub-Saharan Africa. Indeed, the removal of direct costs might encourage parents to send their children to school, but the decision to continue could depend, for instance, on the distance to school, the qualification of the teachers, the overcrowding of the classroom or the school's equipment. These policies are usually costly and the national budgets restricted. Yet, considerable funds could be lost in enrolling children that do not complete their primary education.

A demand-and-supply side policy considers both an elimination of school fees and an upgrading of the school environment. On one hand, the school fees partly determine the parents' choice to provide an education for their children in developing countries. This relationship has been evaluated through natural or randomized experiments on the removal of school fees (Ranasinghe and Hartog, 2002; Deininger, 2003; Lincove, 2012; Lucas and Mbiti, 2012). On the other hand, the school environment comprises all factors in school that could affect a child's learning process. The lack of basic equipment for the classroom or the absenteeism of teachers may weaken the child's ability to learn and eventually discourage it to stay in school (Glewwe and Jacoby, 1994; Michaelowa, 2001; Glick and Sahn 2006; Glick, 2008). Numerous studies have examined the case of policies aiming at the upgrading of schools. A large school construction program in Indonesia rose years of schooling and earnings of individuals exposed at different degrees (Duflo, 2001). Chin (2005) also found that a redeployment of teachers across schools in India increases primary school completion. Nonetheless, only a few empirical studies have analyzed the impact of a demand-and-supply side policy in a developing country. Actually, most studies investigate the potential effects of raising demand or supply sides factors. For instance, Handa (2002) found in Mozambique that raising adult literacy or building schools have more impact on schooling than increasing the household income. The present study has thus a rare opportunity to assess the impact of such program in Benin, a developing country.

This research considers the case of a major demand-and-supply side policy in Benin. In this West African country, the government declared primary education free in October 2006. The decision went along with upgrading in the school environment with the recruitment of teachers and construction of schools. The data come from Benin Demographic and Health Survey (DHS) of 2006 and 2012 provided by the National Institute for Statistics (INSAE) in collaboration with Macro International. To assess the impact of the FPE on schooling, the paper uses a double differences method on multiple birth cohorts in the pre- and post-treatment years. Actually, children eligible for the FPE are children of primary school-going age. Hence, the birth cohorts of individuals no more eligible in primary schools are used as control groups for the evaluation. The estimations take advantage of the fact that the post-treatment year is five years after the launch of the program. Thus, it is possible to measure the medium term impacts on attendance. Another particularity of this research is the distinction between all children enrolled and children that are already enrolled before the program. It allows measuring the impact of the policy on the attendance of those children. After evaluation, the study uses different heterogeneity analyses to explain the gender disparities. Indeed, the household income, the school environment or the ethnic and religious norms might explain the preference for boys' schooling over girls. A placebo experiment, on birth cohort not eligible for the program, confirmed the different results.

The contribution of this research is threefold. This article is one of the first evaluations of the demand-and-supply side policy in Benin. It exposes the effects of the policy on gender, income, ethnic and religious disparities in schooling. The paper also examines the influence of the school environment on enrollment and attendance. The article's structure is as follows: section 2 presents the policy, section 3 covers the methodology, section 4 discloses the results on current enrollment, section 5 displays the results on attendance, section 6 reveals the robustness check and section 7 concludes.

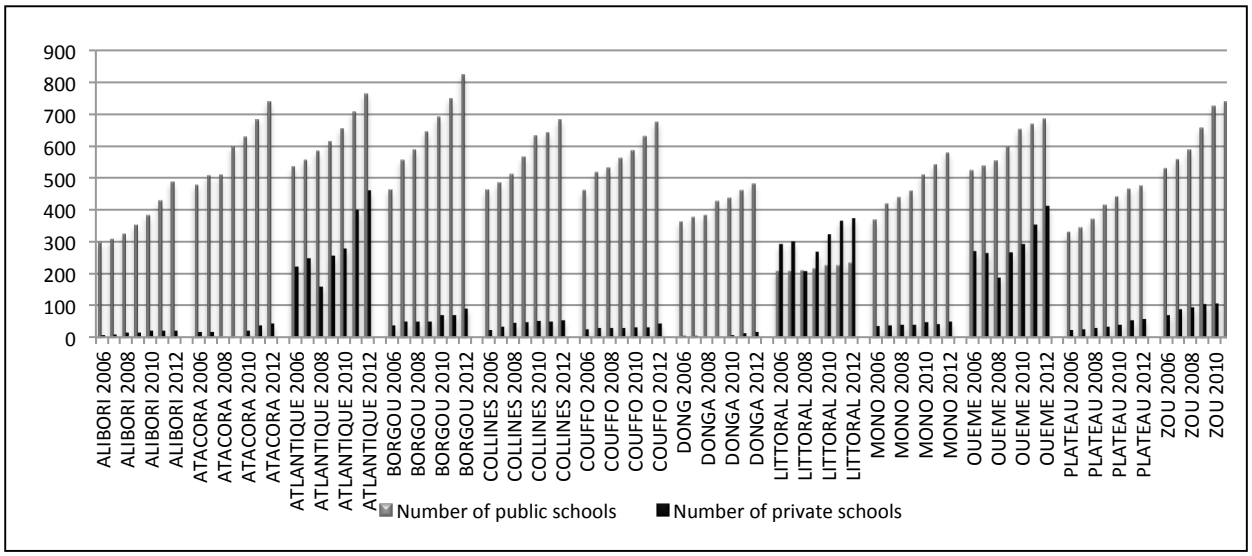
2. The context of primary education in Benin

In October 14, 2006 Benin launched the second Free Primary Education (FPE) policy. The government did not only remove school fees, but also improved the school environment. It was a demand-and-supply side policy. Indeed, the program consisted in the elimination of school fees for every pre-primary and primary school age children as well as the recruitment of teachers and

construction of classrooms. This is one of the dissimilarities with the first policy (OCS, 2012). The first FPE covered just a removal of school fees for girls in rural areas in primary schools. This section presents some evidence of the second FPE, which is the interest of this research.

Hence, the subsequent graphs give a glance at the situation in terms of number of schools and teachers between 1998 and 2011. The graph 4 shows mainly that the number of schools has increased constantly between 1998 and 2011.

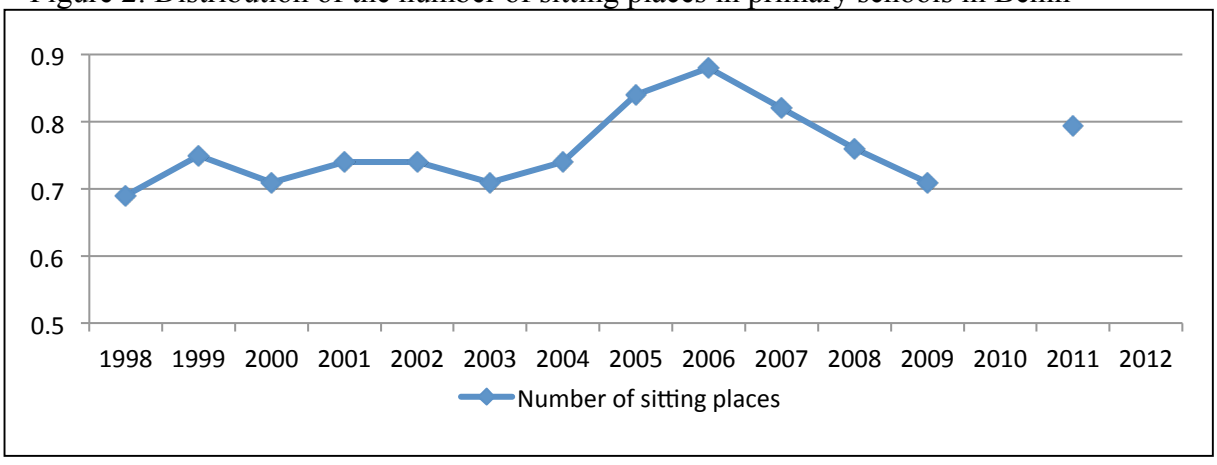
Figure 1: Distribution of the number of primary schools in Benin



Source: Author own computation based on statistics of INSAE (2008, 2009, 2010, 2011)

The chart 4 points out first that the number of schools has increased in every district between 2006 and 2011. Second, the number of private schools is mostly lower than the number of public schools.

Figure 2: Distribution of the number of sitting places in primary schools in Benin



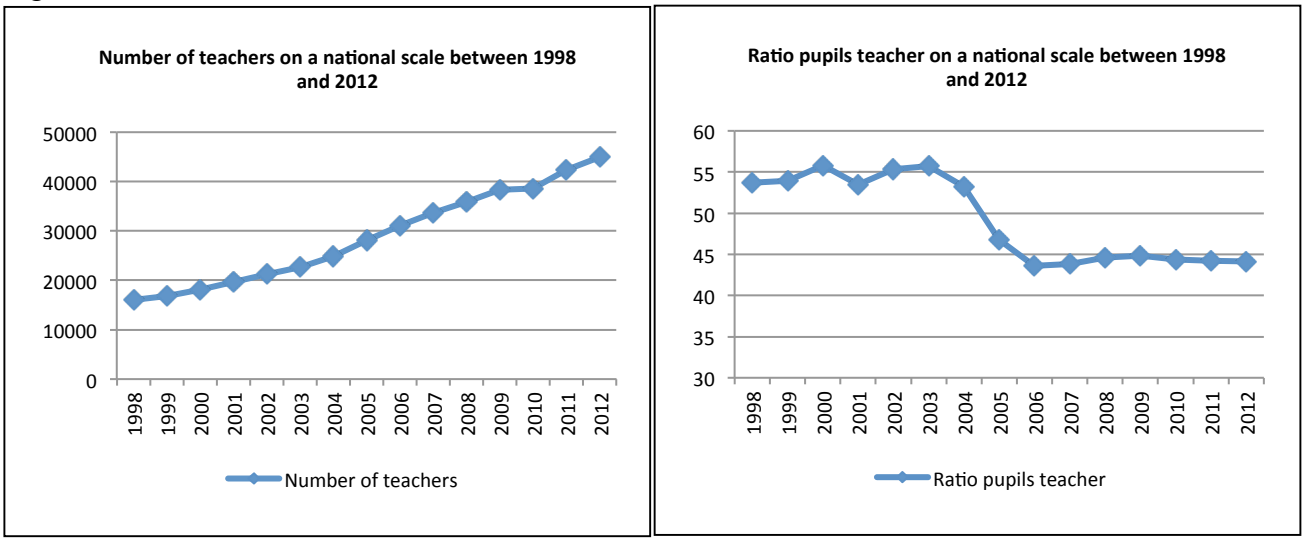
The break in the graph is due to missing data in 2010 and 2012.
Source: Author own computation based on statistics of INSAE (2008, 2009, 2010, 2011)

For instance, in the region "Alibori", the number of private schools is less than 30 schools in 2011 for 430 public ones. An exception is Littoral, where the number of schools is higher in the private than in the public system. Moreover, there are important fluctuations in the figures from one district to another.

Graph 5 presents the development of the numbers of places for 100 between 1998 and 2011. It enables the analysis to go one step further with the comparison of the number of places with the actual number of pupils per year. This variable is a good proxy to analyze the study conditions in schools. Overall, the percentage never reaches 100%, which would mean that each child has a place to sit on. In other words, despite the growth of the places in school observed, the number of seats is still insufficient. In fact, the rate goes from around 69 seats for 100 pupils in 1998 to 74 seats for 100 pupils in 2004. Apparently, no major change occurred during this period. In 2006, there is an upsurge of the variable with the value of 88 places for 100 pupils. The chart presents a decrease in the number of sitting places after the year 2006. These periods followed the launch of the second FPE and might denote an overpopulation of primary schools.

Graph 6 shows the evolution of the teaching staff between 1998 and 2011. Mainly, the number of teachers has increased over time.

Figure 3: Distribution of the number of teachers



Source: Author own computation based on statistics of INSAE (2008, 2009, 2010, 2011)

The chart on the left represents the pupils-teacher ratio in primary schools between 1998 and 2012. The pupil-teacher ratio is the number of pupils per teacher at a given level of education in a given school year (UNCESCO, 2009). The graph shows that from 1998 to 2004, the pupils-teacher ratio is approximately 55. It means that there was one teacher for 55 pupils in primary schools. However, there is a drop in the pupils-teacher ratio up to 45 in 2006 onward. It could imply that teachers have been recruited as planned after 2006 to go along with the second FPE.

These statistics show that the second FPE was not just a removal of school fees. It also included recruiting teachers and building schools.

3. Methodology

The section consists of the identification strategies, the presentation of the data, and the estimation procedures.

3.1 Identification strategies

The main challenge of this evaluation is to identify the impact of the second FPE of 2006, knowing that it has targeted all children. The solution for this evaluation is to consider older children that could not have benefitted from the program. Indeed, the primary school age in Benin is normally between six and 11 years old. Otherwise, children older than 11 years old could not have benefitted of the second FPE and are potential counterfactuals for the evaluation. The treatment group is thus divided into two cohorts: the younger cohort 1 (aged 6 to 8) born between 1998 and 2000 and the younger cohort 2 (aged 9 to 11) born between 1995 and 1997.

The control groups could be any cohorts of children born before 1994. However, the first FPE implemented in 2001 aimed at girls in rural areas and in primary schools. It is possible that this first policy has consequences for children in primary schools in 2001 onward. In other words, children 12 to 17 years old in 2006 were still in primary schools in 2001 and might be affected by the first FPE. Therefore, these cohorts of children cannot be used as controls. These birth cohorts born between 1989 and 1994 are not considered in the evaluation. Finally, the control group is children born before 1989 that could have benefitted neither of the first nor of the second FPE. They are the older cohort 3 (aged 18 to 20) born between 1986 and 1988.

Mainly the strategy consists to compare the educational outcomes of the younger birth cohorts 1 and 2 to the older cohort 3 in 2006 and 2012. The difference-in-differences is used here to

differentiate the difference between birth cohorts before the second FPE and after. Additionally, this strategy benefits mostly from the fact that the control group is the birth cohorts that have plausibly completed primary schools. Indeed, they are no more eligible for registration in primary schools in 2006. The evaluation is performed five[3] years after the implementation of the second FPE; it is thus possible to properly capture the impact on variables like the years of schooling.

3.2 Data and descriptive statistics

The data come from the National Demographic and Health Surveys (DHS)[1] of the year 2006 and 2012 produced by the National Institute for Statistics and Economic Analysis (INSAE) in collaboration with Macro International. They are representative cross-sectional data that contain information on economic and demographic information on at least 17 000 households for each survey. The sample included children from six to 28 years old in order to follow the same birth cohorts of individuals in 2006 and 2012. Two indicators were retained to measure access to education and attendance: current enrollment and the years of schooling completed.

3.2.1 The current enrollment

The variable "current enrollment" indicates whether an individual is enrolled in the year of the survey. The statistics for some of the explanatory variables are presented in table 1 and graph 3 gives more details on the current enrollment.

Table 13 presents the descriptive statistics according to the birth cohorts. On average the household heads have 2 to 3 years of schooling in every cohorts. It is quite the same for the number of children under five years old and the quintiles of wealth. In other words, there is not much difference in the cohorts except their age.

However, there are some differences in enrollment with regards to the ethnicity and religion. Benin has more than 50 ethnicities that could be classified in eight ethnic groups (INSAE, 2002).

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[1] Despite the launch of the second FPE in October 2006, the DHS 2006 is considered as a pre-treatment survey because the data collection was from August to November 2006. The survey began before the launch of the program so it is assumed that the impact of the second FPE in that period is negligible. Moreover, the evaluation considered a five-year gap between both DHS surveys, because the data for the DHS2011/2012 were collected between December 2011 and March 2012.

Table 1: Descriptive statistics on birth cohorts in the sample

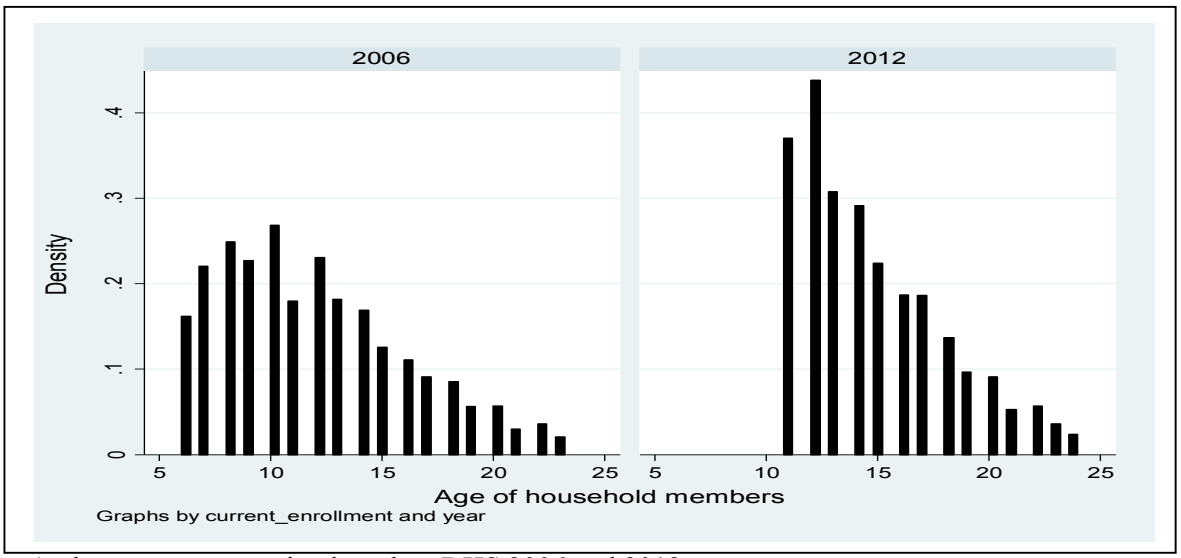
Variables	Younger cohort 1	Younger cohort 2	Older cohort 3
Age	9.161	11.968	21.361
	(2.607)	(2.558)	(2.741)
Household head education	2.436	2.638	3.450
	(3.984)	(4.204)	(4.750)
Number of children under 5 years old	1.466	1.301	1.207
	(1.409)	(1.399)	(1.363)
Quintiles of wealth index	2.783	2.901	3.108
	(1.358)	(1.376)	(1.413)
Current enrollment	.622	.683	.232
	(.484)	(.465)	(.422)
Current enrollment by ethnicity			
Adja and related	.691	.816	.294
	(.462)	(.386)	(.456)
Bariba and related	.555	.585	.160
	(.497)	(.493)	(.367)
Dendi and related	.450	.512	.145
	(.497)	(.500)	(.352)
Fon and related	.702	.743	.257
	(.457)	(.436)	(.437)
Yoa and related	.565	.638	.166
	(.496)	(.480)	(.373)
Betamari and related	.510	.569	.189
	(.500)	(.495)	(.392)
Peulh and related	.178	.217	.047
	(.383)	(.413)	(.211)
Yoruba and related	.736	.741	.286
	(.440)	(.438)	(.452)
Current enrollment by religion			
Traditional	.528	.649	.169
	(.499)	(.477)	(.375)
Islam	.513	.549	.151
	(.499)	(.497)	(.358)
Catholic	.746	.781	.334
	(.435)	(.413)	(.471)
Other Christians	.694	.754	.243
	(.460)	(.430)	(.429)
Current enrollment by regions			
Districts low	.480	.531	.124
	(.499)	(.499)	(.330)
Districts middle	.556	.643	.221
	(.496)	(.479)	(.415)
Districts high	.685	.735	.250
	(.464)	(.441)	(.433)
Years of schooling	2.211	3.565	4.264
	(2.388)	(3.027)	(4.804)
Years of schooling in rural areas	1.960	3.146	2.942
	(2.284)	(2.876)	(4.045)
Years of schooling in urban areas	2.678	4.238	5.969
	(2.504)	(3.141)	(5.157)
Total observations	17,622	13,528	8,550

Source: Author own computations based on DHS 2006, 2012

The ethnicities have their own dialects and cultural beliefs. Some ethnic groups are below the national level in terms of enrollment: Bariba, Dendi, Yoa, Betamari and Peulh. On the national level, about 62.2% of children between six and eight years old are enrolled. Yet, only 17.8% of the children from the ethnicity Peulh are likely to be enrolled. This ethnicity is mainly nomads. It could make it difficult for parents to register their children in the formal education system. In opposition, the ethnicities Adja, Fon and Yoruba have higher averages of current enrollment than the national level. For the religions, 74.6% of children aged six and eight and born in catholic households are enrolled in primary school. This statistic is above the national average of 62.2% of current enrollment for children aged six and eight.

Yet, the traditional religions and Islam have lower enrollment statistics than the other religion. In traditional religion, children are more likely to be sent to a convent instead of enrolled in schools. In Islam, some children are registered in another form of education: the Koranic schools. That could explain the disparities. It could be interesting to observe those dissimilarities after the policy as well. Graph 7 below shows the density of current enrollment per age in 2006 and 2012.

Figure 4: Distribution of the current enrollment, according to the child's age



Source: Author own computation based on DHS 2006 and 2012

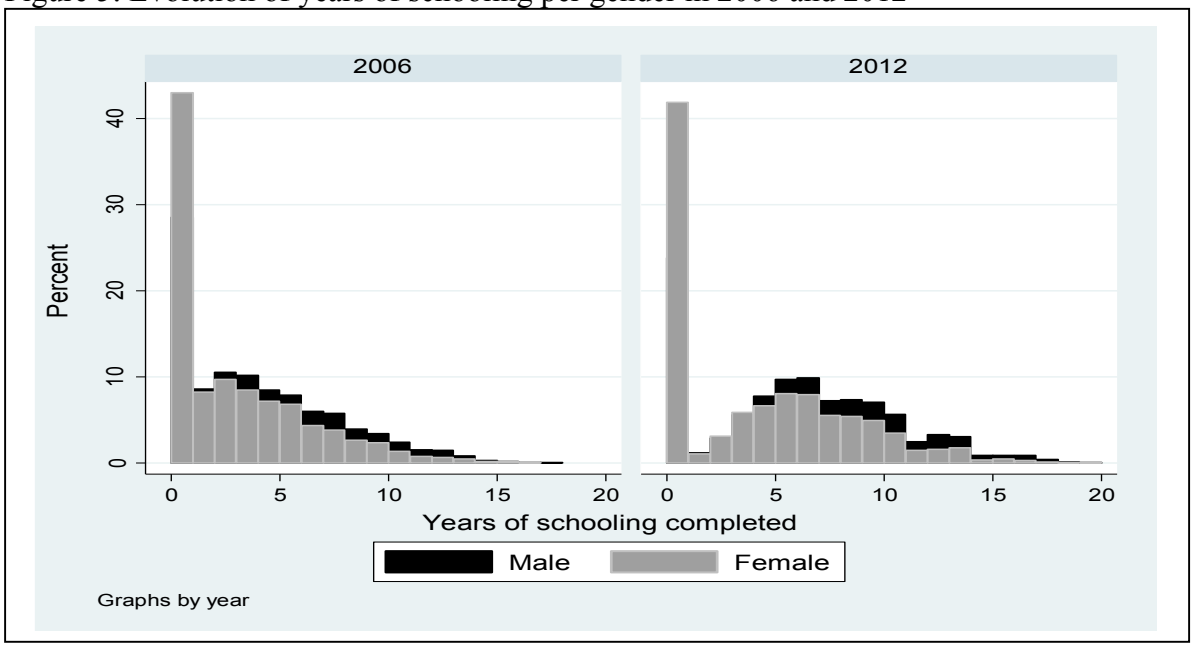
The chart shows essentially that the proportion of children enrolled between the age 10 and 15 is higher in 2012 compared to 2006. This increase in enrollment could be linked to the second FPE, because it is the birth cohorts that might have been affected by the second FPE. The histogram of 2012 starts with the age 12 compared to the histogram of 2006 because the samples

are composed of the same birth cohorts but five years older. In fact the youngest children in the sample of 2006 are six years old. Yet, the youngest children in the sample of 2006 are now 12 years old in 2012. Nevertheless, both histograms show that the current enrollment decreases with age. More importantly, the enrollment has generally increased in 2012. The impact evaluation will shed more light on this point.

3.2.2 Years of schooling

The years of schooling completed is a long-term measure of attendance. This variable corresponds to the number of grades completed by each individual in the sample. The primary level of education in Benin is composed of six grades. The following graph is a plot of the years of schooling before and after the FPE.

Figure 5: Evolution of years of schooling per gender in 2006 and 2012



Source: Based on statistics of DHS 2006, 2012

The main observation is that males achieved more years of schooling than females. It appears that this gender gap has not reduced in 2012. In addition, the chart is left-tailed. It indicates that an important proportion of the sample has zero years of schooling completed. This is the case mostly of individuals that have never been enrolled or have not completed at least one grade of primary school. In 2006, after the proportion of the sample with zero years of schooling, there is around 10 % of the sample which has between one and five years of schooling completed. It

corresponds to the primary level of education. After five years of schooling, the density decreases. It means that the proportion of individuals that completes above six years of schooling is quite low. The histogram of years of schooling in 2012 is quite similar. However, the proportion of people that completes above five years of schooling has increased in 2012. It could be associated with the second FPE. The evaluation should expose the genuine impact of the program.

3.3 Estimation procedure

The difference-in-differences estimation is as follows:

$$E = \alpha_1 + \alpha_2 X + \alpha_3 Cohort + \alpha_4 dummy2012 + \alpha_5 Cohort * dummy2012 + v$$

With E the schooling decision (current enrollment or years of schooling), the parameters α being constants; *X* the household characteristics, *dummy2012 is* a dummy for the year of post-treatment 2012; and *Cohort* a dummy which equals 1 when the child belongs to one of the birth cohorts treated and 0 otherwise. The parameter of interest is α5, which gives the impact of the policy on the birth cohort. Moreover, the household's variables are household head's age, gender and level of education, the number of children under five years old in the household and the quintiles of wealth. The equations also include districts fixed effects because of the disparities across regions. The DHS databases contain as a proxy for income that is the wealth index. They are standardized indexes computed based on the household belongings. Besides, due to the disparities between gender and area of residence, there is one estimate per gender and area of residence for each outcome.

The current enrollment and years of schooling are estimated with an Ordinary Least Square (OLS) model. For the years of schooling, as aforementioned, over 30% of the sample has zero years of schooling completed. The interest of the evaluation is to find out whether the children stay longer in school after the second FPE. As a result, the years of schooling have been restrained to the grades completed above grade one. The idea is to retain only individuals that have been enrolled and completed at least one year of schooling. It will allow more variability in the sample and avoid that the results be driven by this important proportion of the sample with no years of schooling completed.

4. Impact of the free primary education of 2006 on current enrollment

This section covers the impact of the FPE on current enrollment as well as heterogeneity analyses. The estimations are performed with the Ordinary Least Squares model and are globally significant at the 5% level of significance. All standard errors are robust to clustering within the Primary Sampling Units of the DHS surveys.

4.1 Impact of the FPE on current enrollment

Table 14 displays the impact of the second FPE on current enrollment of children in rural areas. In general, the FPE has significantly increased the likelihood of current enrollment, but with some dissimilarity per gender.

The results in columns 2, 4, 6, and 8 of table 14 were obtained after estimation of equation 1. Columns 1, 3, 5 and 7 were also estimated with the same equation 1, but without the other control variables. They correspond to the basic model without additional controls. There are separate estimations per gender and also for the younger cohort 1 and the younger cohort 2. The children in the younger cohort 1 are between six and eight years old. The children of the younger cohort 2 are between nine and 11 years old. The control group is children between 18 and 20 years old.

The likelihood of enrollment has significantly more improved for boys than girls. Indeed, the probability of enrollment, of children in the younger cohort 1, has increased by 35% for girls and 57% for boys in rural areas in 2012. For children in the younger cohort 2, the probability of enrollment has increased by 8% for girls and 24% for boys in rural areas in 2012. The effect is quite the same in urban areas. Boys' enrollment has more progressed than girls'. The gender gap might not have diminished.

It is worth noticing that the enhancement of the current enrollment is not only for the younger cohort 2 but also for the younger cohort 1. In fact, the descriptive statistics in table 13 indicate that children in the younger cohort 2 are more likely to be enrolled than the children in the younger cohort 1. This is likely due to late enrollment. However, the results show that the impact of the FPE is more prominent on the younger cohort 1 than the younger cohort 2. It could go toward a reduction of late enrollment. It reinforces the influence of school fees on the decision to enroll at a given time.

In summary, the FPE has significantly enhanced the probability of current enrollment, but the gender disparities appear to be persistent.

Table 2: Impact of FPE on current enrollment for children living in rural areas

	Girls in rural areas				Boys in rural areas			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	OLS	OLS plus	OLS	OLS plus	OLS	OLS plus	OLS	OLS plus
Treatment variable: Enrollment Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012 Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012								
Dummy2012	-0.134***	-0.137***			-0.345***	-0.468***		
	(0.016)	(0.039)			(0.020)	(0.043)		
Younger cohort 1	0.305***	0.294***			0.046***	0.082***		
	(0.014)	(0.016)			(0.015)	(0.017)		
Younger cohort 1*dummy2012	0.337***	0.351***			0.608***	0.576***		
	(0.020)	(0.022)			(0.024)	(0.024)		
Treatment sample: population aged 9 to 11 in 2006 and 14 to 16 in 2012 Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012								
Dummy2012			-0.134***	-0.094**			-0.345***	-0.418***
			(0.012)	(0.038)			(0.020)	(0.042)
Younger cohort 2			0.462***	0.434***			0.290***	0.312***
			(0.017)	(0.017)			(0.017)	(0.016)
Younger cohort 2*dummy2012			0.074***	0.084***			0.262***	0.231***
			(0.023)	(0.024)			(0.024)	(0.024)
Other control variables	No	Yes	No	Yes	No	Yes	No	Yes
Constant	0.147***	0.263***	0.147***	0.194***	0.436***	0.638***	0.436***	0.576***
	(0.011)	(0.032)	(0.012)	(0.028)	(0.013)	(0.037)	(0.019)	(0.035)
Observations	8,184	8,175	6,403	6,398	8,027	8,018	6,689	6,681
R-squared	0.226	0.289	0.274	0.339	0.150	0.249	0.174	0.290

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

4.2 Heterogeneity of the impact of FPE, according to the level of income

Table 15 shows the results according to the level of wealth. In the main, the probability of current enrollment increased with the level of wealth in 2012. The results of table 15 are for the younger cohort 2 of children living in rural areas.

In the DHS databases, there are five quintiles of wealth: the poor households are in the first and second quintiles; the middle households are in the third quintile; and the rich are in the fourth and fifth quintiles of wealth. For presentation issues, this study considers three levels of wealth: the poor, the middle and the rich. The equation 1 has been run separately for each level of wealth.

Table 3: Impact of the FPE on current enrollment of children living in rural areas, according to the level of wealth (2006/2012)

	Girls in rural areas			Boys in rural areas		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Poor	Middle	Rich	Poor	Middle	Rich
Treatment variable: Enrollment						
Treatment sample: population aged 9 to 11 in 2006 and 14 to 16 in 2012						
Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012						
Dummy2012	-0.102*	-0.0196	-0.123	-0.373***	-0.405***	-0.530***
	(0.0595)	(0.0705)	(0.0775)	(0.0680)	(0.0854)	(0.0736)
Younger cohort 2	0.380***	0.545***	0.459***	0.306***	0.350***	0.299***
	(0.0215)	(0.0306)	(0.0338)	(0.0214)	(0.0305)	(0.0293)
Younger cohort 2*dummy2012	0.0351	0.0210	0.252***	0.192***	0.213***	0.365***
	(0.0284)	(0.0451)	(0.0487)	(0.0335)	(0.0423)	(0.0531)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.155***	0.109**	0.204***	0.155***	0.109**	0.204***
	(0.0467)	(0.0519)	(0.0572)	(0.0467)	(0.0519)	(0.0572)
Observations	3,427	1,627	1,344	0.537***	0.524***	0.601***
R-squared	0.282	0.411	0.389	(0.0570)	(0.0709)	(0.0575)

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

Table 15 reveals that the impact of the FPE is the largest for children in wealthy households. The probability of current enrollment has significantly increased by 36.5% for boys in wealthy households and by 19.2% for boys in poor households in 2012. For girls, the effect is only significant for wealthy households. It means that the poor have not gained from the FPE. The impact is roughly similar in urban areas.

These results suggest that the FPE has more increased access to education for children in rich households than those in poor households. Especially, girls are still left behind, because in the same area parents prefer to enroll boys to the detriment of girls.

4.3 Heterogeneity in the impact of FPE, according to the regions

The purpose of this heterogeneity analysis is to observe the change in schooling across the different regions of the country. One main difference between the regions is the school infrastructure. The descriptive statistics presented some regions with quite low educational infrastructures (e.g. Low number of schools). Benin is divided into 12 districts and the heterogeneity analysis took into consideration this classification. The impact of the policy was observed with regard to three categories of districts: the districts with "lower" statistics for the school environment (Alibori, Donga and Plateau), districts with the "middle" statistics (Atacora, Borgou, Couffo) and those with the "higher" statistics (Atlantique, Oueme, Zou). The classification has been made considering three indicators: the percentage of female teachers, the total number of teachers and the number of primary schools per districts. The groups are supposed to reflect the school environment from the "less" favorable to the "most" favorable to education. This categorization has the inconvenience that it may reflect other characteristics of the districts like culture. Indeed, some district might be reluctant to school girls or children in general. It also does not cover all determinants of a favorable environment for education. Yet, it is assumed that the groups are homogeneous, so that only divergences in school environment may appear. Besides, the distribution of income is roughly the same in every district. This ensures that the differences observed would not be due to any income disparities.

Table 1 displays the current enrollment, according to this classification of the regions. It shows that the districts with the "low" statistics on the school environment have the lowest rates of current enrollment in any birth cohorts. The districts with the highest rates of enrollment are the districts with the "high" statistics on the school environment. It could be interesting to observe if there is any change following the FPE. The upgrading of schools and recruiting of teachers should improve the school environment in the areas with previously "low" school environment. Thus, the expected results would be higher improvement of schooling outcomes in areas with "low" school environment.

Table 16 indicates that the impact of the FPE on current enrollment increased with the school environment in the districts. The results presented in table 16 are only for children in the younger cohort 1 in rural areas. The probability of current enrollment has significantly increased by 34.1% for girls in districts with "higher" statistics and by 22.6% for girls in districts with "lower" statistics in 2012. The likelihood of current enrollment has bettered by 56.7% for boys in districts with "higher" statistics and by 40.7% for boys in districts with "lower statistics. In urban areas, table 17 reveals that the impact of the FPE on current enrollment of boys decreased with the school environment in the districts. The results are also for the younger cohort 1. Columns 4, 5 and 6 of table 17 show that the probability of current enrollment has significantly increased by 57% for boys in districts with "low" statistics and by 50.3% for boys in districts with "high" statistics. This is not the case for girls in urban areas.

Table 4: Linear regression of current enrollment for children living in rural areas, according to the regions (2006/2011)

	Girls living in rural areas			Boys living in rural areas		
VARIABLES	(1) Districts Low	(2) Districts Middle	(3) Districts High	(4) Districts Low	(5) Districts Middle	(6) Districts High
Treatment variable: Enrollment Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012 Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012						
Dummy2012	-0.0856	-0.119	-0.330***	-0.211*	-0.394***	-0.546***
	(0.0855)	(0.0846)	(0.0998)	(0.118)	(0.0896)	(0.0706)
Younger cohort 1	0.249***	0.263***	0.383***	0.110***	0.0842**	0.137***
	(0.0285)	(0.0300)	(0.0379)	(0.0339)	(0.0350)	(0.0300)
Younger cohort 1*dummy2012	0.226***	0.336***	0.341***	0.407***	0.526***	0.567***
	(0.0389)	(0.0449)	(0.0492)	(0.0516)	(0.0465)	(0.0384)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.244***	0.258***	0.444***	0.567***	0.604***	0.642***
	(0.0643)	(0.0644)	(0.0747)	(0.0842)	(0.0768)	(0.0590)
Observations	1,815	2,310	1,285	1,690	2,249	2,707
R-squared	0.255	0.230	0.372	0.213	0.186	0.249

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

Table 5: Linear regression of current enrollment for children living in urban areas, according to the regions (2006/2011)

	Girls living in urban areas			Boys living in urban areas		
VARIABLES	(1) Districts Low	(2) Districts Middle	(3) Districts High	(4) Districts Low	(5) Districts Middle	(6) Districts High
Treatment variable: Enrollment Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012 Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012						
Dummy2012	-0.0681	-0.464***	-0.330***	-0.443***	-0.640***	-0.598***
	(0.121)	(0.0772)	(0.0998)	(0.148)	(0.0942)	(0.103)
Younger cohort 1	0.373***	0.316***	0.383***	0.0957	0.0695**	0.177***
	(0.0475)	(0.0344)	(0.0379)	(0.0578)	(0.0346)	(0.0363)
Younger cohort 1*dummy2012	0.235***	0.296***	0.341***	0.570***	0.550***	0.503***
	(0.0623)	(0.0434)	(0.0492)	(0.0787)	(0.0518)	(0.0533)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.213**	0.506***	0.444***	0.677***	0.887***	0.778***
	(0.105)	(0.0620)	(0.0747)	(0.108)	(0.0581)	(0.0859)
Observations	777	1,378	1,285	795	1,333	1,280
R-squared	0.319	0.313	0.372	0.293	0.255	0.302

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.
Source: Author's own computation based on DHS 2006 and 2012

In summary, districts with an overall better environment for education, have encountered more progress in their children's current enrollment than other districts. These results were unexpected. Indeed, the second FPE is a demand-and-supply side policy. It means that school fees have been eliminated, schools built and teachers recruited. The expected results would be that the disparities across districts would reduce following the implementation of the policy. Hence, the current enrollment would not increase with the level of infrastructures in the districts. It denotes that the school environment still influences the decision to enroll a child. The results disclose that the efforts on the supply side of education might not be enough in rural areas. In urban areas, the supply side investments yield a significant impact on boys. Indeed, the districts with "low" statistics have more benefitted of the program than the districts with "high" statistics. This result was expected. Surprisingly, the impact of the second FPE, according to the school environment, is only beneficial for boys in urban areas. It might either mean that the level of improvement of

the school environment is not enough to enhance schooling for the other groups or that the effects might appear later on.

4.4 Heterogeneity of impacts of FPE, according to the ethnicity and religion

The third heterogeneity analysis consists to observe the change in enrollment with regards to the ethnicity and religion. Tables 18 and 19 disclose the dissimilarities in ethnicity and religion before and after the FPE. Mainly, the differences in enrollment depending on the ethnicity did not change after the FPE, except for boys in urban areas.

The results in table 18 were obtained after estimation of equation 1 with additional variables on ethnicities. The estimations, presented in table 18 and 19, are only for boys of the younger cohort 1. In rural areas, the likelihood of enrollment has significantly increased by 16.3% for the boys of Adja ethnicity and has significantly decreased for boys of ethnicities Bariba, Dendi and Peulh. The descriptive statistics in table 13 indicate that the ethnicities Bariba, Dendi and Peulh had mean of current enrollment below the national level. They tend to enroll their children less than the other ethnicities. For the remaining ethnicities (Yoa, Betamari and Yoruba), there is no significant change in 2012. Hence, the differences in enrollment with regards to the ethnicities have not diminished in rural areas.

The effect is the same for girls. Yet, there is a higher increase in enrollment for boys in some ethnicities compared to girls of the same ethnicities. In urban areas, the probability of current enrollment of boys has significantly increased for children of ethnicities Yoa by 18.1% and Betamari by 16.9%. There is no significant impact for the other ethnicities. Thus, the disparities in enrollment might have reduced for two ethnicities and not for the others. These results suggest that the ethnic differences in enrollment have not changed with the FPE, but some improvement can be observed for boys in urban areas.

Table 19 shows the differences in impact, depending on the religion. In the main, religious disparities have not changed after the FPE. Households of Islamic or Traditional beliefs tend to have fewer children enrolled in primary schools. This has not changed after the FPE. Indeed, the impact of the FPE on current enrollment for children of Islamic beliefs is negative in 2012. It means that their probability of current enrollment has significantly decreased in 2012. Yet, there is no significant impact on the other religions.

Table 6: Linear regression of current enrollment for boys, according to the ethnicity (2006/2012)

	Boys in rural areas	Boys in urban areas
	(1)	(2)
VARIABLES	OLS	OLS
Treatment variable: Enrollment		
Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012		
Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012		
Dummy2012	-0.519***	-0.494***
	(0.0453)	(0.0509)
Younger cohort 1	0.116***	0.223***
	(0.0235)	(0.0230)
Younger cohort 1*dummy2012	0.595***	0.439***
	(0.0290)	(0.0315)
Younger cohort 1*Dummy for Adja	-0.0599*	-0.0416
	(0.0345)	(0.0360)
Younger cohort 1* Dummy for Adja *dummy2012	0.163***	0.0737
	(0.0420)	(0.0512)
Younger cohort 1*Dummy for Bariba	0.0302	-0.0559
	(0.0491)	(0.0451)
Younger cohort 1* Dummy for Bariba *dummy2012	-0.261***	-0.00145
	(0.0630)	(0.0690)
Younger cohort 1*Dummy for Dendi	-0.0120	-0.118
	(0.0642)	(0.0780)
Younger cohort 1* Dummy for Dendi *dummy2012	-0.127*	0.0207
	(0.0703)	(0.114)
Younger cohort 1*Dummy for Yoa	-0.0895*	-0.184***
	(0.0501)	(0.0677)
Younger cohort 1* Dummy for Yoa *dummy2012	-0.0222	0.181*
	(0.0609)	(0.0982)
Younger cohort 1*Dummy for Betamari	-0.0533	-0.109*
	(0.0461)	(0.0638)
Younger cohort 1* Dummy for Betamari *dummy2012	-0.0482	0.169*
	(0.0574)	(0.0882)
Younger cohort 1*Dummy for Peulh	-0.242***	-0.349***
	(0.0385)	(0.0676)
Younger cohort 1* Dummy for Peulh *dummy2012	-0.207***	0.0716
	(0.0623)	(0.0892)
Younger cohort 1*Dummy for Yoruba	0.0758*	0.0349
	(0.0431)	(0.0308)
Younger cohort 1* Dummy for Yoruba *dummy2012	-0.0686	-0.00556
	(0.0458)	(0.0466)
Other control variables	Yes	Yes
Constant	0.728***	0.712***
	(0.0365)	(0.0406)
Observations	8,018	4,788
R-squared	0.284	0.320

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

Table 7: Linear regression of current enrollment for children living in rural areas, according to the ethnicity and religion (2006/2012)

	Boys in rural areas	Boys in urban areas
	(1)	(2)
VARIABLES	OLS	OLS
Treatment variable: Enrollment *Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012* *Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012*		
Dummy2012	-0.493***	-0.487***
	(0.0454)	(0.0514)
Younger cohort 1	0.148***	0.221***
	(0.0218)	(0.0232)
Younger cohort 1*dummy2012	0.573***	0.457***
	(0.0288)	(0.0319)
Younger cohort 1*Dummy for Islam	-0.0652**	-0.0733**
	(0.0278)	(0.0343)
Younger cohort 1* Dummy for Islam *dummy2012	-0.0858**	0.00695
	(0.0334)	(0.0452)
Younger cohort 1*Dummy for Traditional	-0.129***	-0.168***
	(0.0259)	(0.0430)
Younger cohort 1* Dummy for Traditional *dummy2012	0.0459	0.136*
	(0.0388)	(0.0699)
Younger cohort 1*Dummy for other Christian	-0.0381	0.0253
	(0.0247)	(0.0262)
Younger cohort 1* Dummy for other Christian*dummy2012	0.0212	-0.0354
	(0.0314)	(0.0379)
Other control variables	Yes	Yes
Constant	0.729***	0.706***
	(0.0360)	(0.0398)
Observations	8,018	4,788
R-squared	0.273	0.312

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

Overall, the second FPE has significantly bettered current enrollment. Nevertheless, the gender, income, ethnicity and religion disparities have not much changed.

5. Free primary education and years of schooling completed

This section includes the impact of the FPE on the years of schooling completed and the heterogeneity analyses. The estimations are estimated with the Ordinary Least Squares (OLS) and the standard errors are robust to clustering across the Primary Sampling Units (PSU). The estimations are also globally significant at 5%. As a remainder, the sample has been limited to individuals that have at least one year of schooling completed to observe the impact on those already schooled.

5.1 Impact of FPE on the years of schooling

The results of the impact evaluation of FPE on years of schooling are presented in table 20. The results in table 20 are only for children in rural areas. Generally, the FPE has significantly increased the years of schooling completed.

The children, of the younger cohort 1, have between six and eight years old while the children, of the younger cohort 2, have between nine and 11 years old. The control group is individuals aged 18 to 20 in 2006. Columns 1, 3, 5 and 7 display the basic model of equation 1 without additional explanatory variables. Columns 2, 4, 6 and 8 are the full models. The estimations are also run separately for the younger cohorts 1 and 2.

Table 20 reveals that the years of schooling completed of girls in rural areas have significantly increased by 2.32 years for the younger cohort 1 and by 2.89 years for the younger cohort 2. The outcomes are slightly lower for boys than girls. In fact, the years of schooling have increased by 2.58 years for boys and by 2.89 years for girls in rural areas. The results are roughly similar for children in urban areas.

The outcomes of the estimations on the years of schooling completed imply that the FPE has significantly enhanced the years of schooling completed especially for girls. The gender gap in years of schooling completed might have reduced.

Table 8: Impact of the FPE on the years of schooling completed for children living in rural areas

	Girls in rural areas				Boys in rural areas			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	OLS	OLS plus	OLS	OLS plus	OLS	OLS plus	OLS	OLS plus
Treatment variable: Years of schooling								
Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012								
Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012								
Dummy2012	0.275**	0.678***			0.616***	0.196		
	(0.136)	(0.263)			(0.125)	(0.251)		
Younger cohort 1	-4.205***	-4.154***			-5.561***	-5.510***		
	(0.0977)	(0.0999)			(0.0914)	(0.0960)		
Younger cohort 1*dummy2012	2.500***	2.328***			2.439***	2.349***		
	(0.152)	(0.157)			(0.144)	(0.150)		
Treatment sample: population aged 9 to 11 in 2006 and 14 to 16 in 2012								
Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012								
Dummy2012			0.275*	-0.767			0.616***	-0.447
			(0.158)	(2.420)			(0.136)	(0.351)
Younger cohort 2			-2.882***	-0.390			-4.169***	-4.171***
			(0.114)	(0.533)			(0.0948)	(0.119)
Younger cohort 2*dummy2012			2.899***	2.896***			2.802***	2.585***
			(0.182)	(1.025)			(0.157)	(0.262)
Other control variables	No	Yes	No	Yes	No	Yes	No	Yes
Constant	5.926***	5.430***	5.926***	0.230	7.319***	7.392***	7.319***	7.454***
	(0.0839)	(0.182)	(0.0979)	(1.095)	(0.0740)	(0.183)	(0.0803)	(0.203)
Observations	3,758	3,750	3,168	3,163	4,856	4,851	4,690	4,684
R-squared	0.452	0.462	0.336	0.367	0.520	0.528	0.426	0.434

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

5.2 Impact of FPE and heterogeneity of income

In this section, the heterogeneity analyses point to the largest impact of the FPE on children in poor households compared to rich households. The sole exception is for the years of schooling completed of girls in rural areas.

Table 9: Impact of the FPE on the years of schooling completed for children living in rural areas, according to the level of income (2006/2012)

	Girls in rural areas			Boys in rural areas		
VARIABLES	(1) Poor quintiles	(2) Middle quintiles	(3) Rich quintiles	(4) Poor quintiles	(5) Middle quintiles	(6) Rich quintiles
Treatment variable: Years of schooling						
Treatment sample: population aged 9 to 11 in 2006 and 14 to 16 in 2012						
Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012						
Dummy2012	0.266	0.485	-0.278	-0.00769	0.534	0.0770
	(0.570)	(0.573)	(0.784)	(0.466)	(0.538)	(0.675)
Younger cohort 2	-2.235***	0.0302	-1.169***	-3.974***	-3.860***	-4.504***
	(0.200)	(0.205)	(0.246)	(0.169)	(0.215)	(0.202)
Younger cohort 2*dummy2012	2.379***	2.904***	3.157***	3.072***	2.399***	1.875***
	(0.360)	(0.334)	(0.433)	(0.349)	(0.377)	(0.435)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.685***	1.493***	3.339***	7.614***	7.428***	8.254***
	(0.368)	(0.401)	(0.455)	(0.321)	(0.353)	(0.333)
Observations	1,341	1,626	1,338	2,278	1,251	1,155
R-squared	0.358	0.244	0.241	0.443	0.499	0.550

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.
Source: Author's own computation based on DHS 2006 and 2012

Table 21 displays the results for children living in rural areas and in the younger cohort 2. Indeed, table 21 discloses that the years of schooling of boys have significantly increased by 3.07 years for poor households and 1.87 for wealthy households. The effect is similar in urban areas. The outcomes imply that the children in poor households have gained the most of the FPE. In fact, they are able to attend school longer than before the policy. It shows the influence of the school fees on attendance. Surprisingly, the disparities in income, for girls in rural areas, have not changed. Indeed, the years of schooling completed of girls in rural areas have significantly

increased by 2.37 years for poor households and 3.17 for wealthy households. The girls in rural areas and of rich households have more gained of the FPE than girls in poor households. In rural areas, these outcomes corroborate that girls are more affected by the household income than boys. It is possible that the elimination of school fees is not enough to affect the attendance of girls in rural areas. It might exist other schooling costs or factors that impede on girls' attendance in rural areas. This is not the case in urban areas.

The results imply that the inequalities in income have reduced after the implementation of the FPE, except for girls in rural areas. It is plausible that the school's attendance of girls living in rural areas is influenced by other factors and not only the household income. These results corroborate the findings of Colcough et al. (2000). Indeed, in some settings, the cultural practices could more explain the choice of parents to maintain a boy in school to the detriment of a girl. It is also possible that the opportunity costs of maintaining a girl in school are higher than the costs of maintaining a boy in school.

5.3 Impact of FPE and heterogeneity in districts

The estimations per districts suggest that the years of schooling have significantly increased in every district.

Table 22 presents the results for children in rural areas and in the younger cohort 1. Yet, the results are similar for children in the younger cohort 2. This table denotes that the girls' years of schooling have significantly increased by 2.96 years in districts with "low" statistics and by 2.02 years in districts with "high" statistics. Expectedly, the girls in the districts with "low" statistics on the school environment have gained the most of the FPE. It implies that the upgrading of the school environment of the FPE has encouraged the girls' attendance. They stayed on average two more years in school. Boys' years of schooling completed has also significantly increased by 1.49 years in districts with "low" statistics on school environment and by 2.74 in districts with "high" statistics. In opposition, for boys in rural areas, the districts with the "high" statistics have gained more of the policy. It means that the disparities across regions have not improved for boys in rural areas. Indeed, it is plausible that the level of enhancement of the school environment might not be enough to influence boys' attendance. This result is in concordance with previous literature that girls are more affected by the school environment than boys (Lloyd et al. 2000;

Huisman and Smits, 2009). This could explain why girls have more benefitted of the FPE than boys in terms of years of schooling.

Table 10: Linear regression of years of schooling completed for children living in rural areas, according to the regions (2006/2011)

	Girls living in rural areas			Boys living in rural areas		
VARIABLES	(1) Districts Low	(2) Districts Middle	(3) Districts High	(1) Districts Low	(2) Districts Middle	(3) Districts High
Treatment variable : Years of schooling *Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012* *Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012*						
Dummy2012	-0.729	0.0210	1.027*	1.133	0.227	0.321
	(0.922)	(0.722)	(0.563)	(0.927)	(0.608)	(0.504)
Younger cohort 1	-4.046***	-4.399***	-3.912***	-5.373***	-5.364***	-5.367***
	(0.347)	(0.264)	(0.227)	(0.303)	(0.283)	(0.198)
Younger cohort 1*dummy2012	2.968***	2.686***	2.028***	1.496**	2.066***	2.740***
	(0.531)	(0.472)	(0.361)	(0.708)	(0.464)	(0.377)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.003***	6.132***	5.778***	7.598***	7.922***	7.948***
	(0.733)	(0.434)	(0.401)	(0.467)	(0.384)	(0.355)
Observations	612	947	1,404	776	1,144	1,893
R-squared	0.490	0.497	0.480	0.598	0.551	0.541

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.
Source: Author's own computation based on DHS 2006 and 2012

5.4 Impact of FPE and heterogeneity in ethnicity and religion

In general the inequalities in years of schooling completed, according to the ethnicity of religion, do not change with the FPE.

Table 11: Linear regression of years of schooling completed for girls, according to the ethnicity and religion (2006/2012)

	Girls in rural areas	Girls in urban areas
	(2)	(2)
VARIABLES	OLS	OLS
Treatment variable : Years of schooling *Treatment sample: population aged 6 to 8 in 2006 and 11 to 13 in 2012* *Control sample: population aged 18 to 20 in 2006 and 23 to 25 in 2012*		
Dummy2012	0.915**	0.910**
	(0.376)	(0.420)
Younger cohort 1	-4.047***	-5.422***
	(0.138)	(0.148)
Younger cohort 1*dummy2012	2.379***	2.310***
	(0.240)	(0.258)
Younger cohort 1*Dummy for Adja	-0.0668	-0.142
	(0.109)	(0.123)
Younger cohort 1* Dummy for Adja *dummy2012	0.335*	0.339
	(0.188)	(0.252)
Younger cohort 1*Dummy for Bariba	0.143	0.111
	(0.220)	(0.254)
Younger cohort 1* Dummy for Bariba *dummy2012	0.413	-0.135
	(0.363)	(0.359)
Younger cohort 1*Dummy for Dendi	0.161	-0.0739
	(0.449)	(0.208)
Younger cohort 1* Dummy for Dendi *dummy2012	-0.343	-0.493
	(0.630)	(0.365)
Younger cohort 1*Dummy for Yoa	-0.184*	-0.114
	(0.100)	(0.203)
Younger cohort 1* Dummy for Yoa *dummy2012	-0.126	-0.336
	(0.265)	(0.455)
Younger cohort 1*Dummy for Betamari	0.267	0.0863
	(0.219)	(0.219)
Younger cohort 1* Dummy for Betamari *dummy2012	-0.645	-0.391
	(0.399)	(0.432)
Younger cohort 1*Dummy for Peulh	0.394	-0.0244
	(0.331)	(0.327)
Younger cohort 1* Dummy for Peulh *dummy2012	-0.868**	-1.264***
	(0.427)	(0.450)
Younger cohort 1*Dummy for Yoruba	-0.137	0.166
	(0.123)	(0.121)
Younger cohort 1* Dummy for Yoruba *dummy2012	0.0796	-0.179
	(0.205)	(0.282)
Other control variables	Yes	Yes
Constant	6.128***	7.347***
	(0.244)	(0.277)
Observations	3,750	3,313
R-squared	0.505	0.568

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at

5%, *Significant at 10%.
Source: Author's own computation based on DHS 2006 and 2012

Table 23 displays the outcomes for girls of the younger cohort 1. In this table, the years of schooling completed have significantly increased by 0.33 years for girls of ethnicity Adja and related. However, the years of schooling have significantly reduced by 0.86 years for girls of ethnicity Peulh and related. These outcomes signify that the differences in ethnicities have not changed. Indeed, the children of ethnicity Peulh have the lowest schooling rates as displayed in Table 13. In urban areas, there is no significant difference between girls of different ethnicities expect for the ethnicity Peulh. The years of schooling of girls of ethnicity Peulh has also significantly decreased by 1.26 years. Despite the overall improvement in years of schooling completed, there are still some inequalities between ethnicities and religion.

In conclusion, the FPE has significantly bettered the years of schooling completed for children already enrolled. On average, they attend two more years of schooling following the launch of the policy. Nevertheless, the heterogeneity analyses reveal that the years of schooling have more increased for children of poor households than for children of wealthy households, except for girls in rural areas. On the contrary, the years of schooling have improved more for girls in rural areas and in districts with "low" statistics on school environment than in other districts. Consequently, the upgrading of the school environment of the FPE has influenced girls' attendance. There is no significant change in dissimilarities in ethnicity and religion.

6. Robustness checks

The outcomes presented above have shown an improvement in enrollment and years of schooling following the launch of the second FPE. The strategies to identify the impact of the FPE could be weakened by the lack of appropriate control groups. In fact, the FPE in 2006 was national and the control groups used are the birth cohorts before the execution of the policy. It is possible that the older cohort 3 used as control group has also benefited of the policy. The older cohort 3 is children aged 18 to 20 in 2006. Normally, they are not registered in primary schools and are thus not eligible for the FPE. It is rare that children that older still be in primary schools. Yet, it could be a mistake to not control this hypothesis.

One of the ways to investigate the robustness of the results is by means of additional control groups. The additional control group is the older cohort 4. It is children aged 21 to 23, born

between 1983 and 1985. A placebo experiment was performed to check that the cohorts were not subjected to other policies than the second FPE. The placebo experiment consists of comparing the older cohort 3 to the older cohort 4 before and after the FPE.

Table 24 presents the results of this placebo experiment. Mainly, the FPE has no significant impact on the older cohort 3. The outcomes are similar for every group and for the years of schooling completed as well. It means that the older cohort 3 is an adequate control group for the policy because children of this birth cohort have not gained from the program.

Finally, the impacts observed in the main evaluation are actually due to the second FPE.

Table 12: Linear regression of current enrollment for older cohorts of children

	Girls in rural areas	Girls in urban areas	Boys in rural areas	Boys in urban areas
	(1)	(2)	(3)	(4)
VARIABLES	OLS	OLS	OLS	OLS
Treatment variable: Enrollment *Treatment sample: population aged 1 to 20 in 2006 and 23 to 25 in 2012* *Control sample: population aged 21 to 23 in 2006 and 26 to 28 in 2012*				
Dummy2012	-1.555	-0.400	11.32***	25.86***
	(1.214)	(0.283)	(2.440)	(2.890)
Older cohort 3	-0.0352	-0.0645*	-0.0709	-0.0524
	(0.0223)	(0.0368)	(0.0453)	(0.0524)
Older cohort 3*dummy2012	0.0226	0.0354	0.0125	-0.0507
	(0.0228)	(0.0386)	(0.0468)	(0.0536)
Other variables	Yes	Yes	Yes	Yes
Constant	4.160***	1.222***	1.441	-1.591
	(1.016)	(0.253)	(1.691)	(1.940)
Observations	4,729	3,650	3,322	3,005
R-squared	0.200	0.259	0.314	0.324

Standard errors in parentheses adjusted robust for clustering in the Primary Sampling Unit (PSU). The other variables are the household's age, a dummy for female headed households, the dummies for the household head education, the dummies for the quintile of wealth, dummies for the region fixed effects, the number of children under five years old in the households. *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Source: Author's own computation based on DHS 2006 and 2012

7. Conclusion

This study aimed to assess the impact of a demand-and-supply side policy on schooling outcomes in Benin, West Africa. Mainly, the second FPE has improved enrollment and attendance of children in almost every setting. Actually, the probability of current enrollment has increased by around 30% for girls and 60% for boys in rural areas. The years of schooling completed for children already enrolled has significantly increased by about two years for both genders. The outcomes imply that the gender disparities have not quite diminished. Indeed, the inequalities in access to education have remained.

Moreover, the heterogeneity analyses give remarkable arguments for the persistent of the gender gap. Firstly, the disparities in schooling, according to the level of income, might have diminished in terms of attendance but not enrollment. For the attendance, the evaluation has been performed on children that have completed at least one year of schooling. The parents of those children were able to pay for the school fees to enroll their child. Thus, the second FPE, by abolishing school fees and upgrading the school environment, allowed them to maintain their children in school. The main difference with the variable "current enrollment" is the restriction to children already enrolled. The majority of children in the main sample has less than one year of schooling. They might have never been enrolled in primary school. The school fees gave them the opportunity to be enrolled in primary schools. However, there seems to be two levels of income involved. The parents that have enrolled their child at least once might have a higher level of income compared to the other parents. Hence, the level of costs is still an impediment. That could explain why there is no change in the inequalities in income for the current enrollment. Secondly, the dissimilarities across regions due to the school environment have significantly changed for attendance and not for enrollment of girls in rural areas. This result confirms that the school environment could influence more the attendance than the enrollment. The second FPE of Benin was a construction of classrooms and recruitment of teachers to go along with the removal of school fees. The enhancement of the school environment was beneficial for every district, especially for districts with "low" statistics on the school environment. Indeed, the girls of these districts stayed longer in school than girls of other districts following the FPE. However, there is no change for boys in urban areas. These outcomes imply that the school environment has an effect on girls' attendance in rural areas. Thirdly, there is a reduction of the differences in ethnicity and religion in urban areas compared to rural areas. The

second FPE was also accompanied by sensitization campaigns to promote education across the country. The expectations were that the second FPE could influence the ethnic and religious differences in schooling. In fact, some cultural beliefs and norms could hinder the enrollment and attendance of children. The results show that sensitization and urbanization can help reduce gender disparities.

Public policies on education might sometimes neglect the supply side of education. This study corroborates previous studies on demand-and-supply side policies (Handa, 2002). The second FPE was successful on enrollment and attendance. It reveals that in developing countries, where some remote areas lack schools and teachers, demand-and-supply side policies might be more appropriate. It is necessary to install prerequisites for education before or whilst initiating any reform on costs. With the launch of an elimination of costs it would be of great use to help reduce additional school costs. Also, the opportunity costs of the child's time could be a major determinant in education particularly in less privileged settings. In those particular cases, a subsidy for education could be of help to improve children's and especially girls' attendance.

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