The impact of government funding on senior high enrolment in Ghana

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Successive governments, both military and civilian regimes, funded senior high school education in Ghana to increase access and improve quality since the nation attained independence on 6 March 1957. In the study reported on here we adopted a quantitative research method using secondary data from five public senior high schools in the Wa Municipality, as these schools are beneficiaries of government funding in Ghana. We used the generalised linear model to test the impact of government funding on student enrolment. The study reveals that government funding has a significant impact on increasing enrolment among girls but it is not statistically significant in increasing boys' enrolment.

Keywords: enrolment; government funding; senior high school; sustainable development goals

Introduction

Nowadays, governments around the world consider education as the most significant venture in improving their economic growth, equity, and development, and the general transformation of societies. Human capital plays a significant role in the economic growth and prosperity of nations around the world (Topel, 1999). This human capital can be nurtured and developed by equipping the people with the requisite skills and knowledge to ensure that the labour market succeeds in these countries. Education is paramount for Africa's development by serving as a key factor in preparing the required human resources needed to fill high level scientific, technical, professional and managerial jobs in both public and private sectors. In Ghana, investing in senior high education is greatly beneficial to the individual and society. It boosts economic growth and development to achieve the constitutional provision stated in the 1992 constitution (The Republic of Ghana, 1992), which states that secondary and higher education will be provided to all in a progressive form (Akyeampong, 2009; Breton, 2011).

This is in line with the United Nations Sustainable Development Goals, which cover a range of targets. It guarantees all children – regardless of their gender – free access to basic quality education. This leads to relevant and effective learning feedback and to ensure gender balance in education and equal access to all educational levels. This also includes the provision of vocational training to people with disabilities, indigenous persons and young children in peril situations by 2030 (United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute of Statistics, 2016).

In ensuring the sustainable economic growth of Ghana, successive governments in the past and present have put policies in place such as the government partial funding (progressive free senior high education policy) implemented in 2015, and the newly implemented free education policy (full funding) implemented in 2017. Since the attainment of Ghana's independence from British colonial rule, education has been prioritised by successive governments, which resulted in constant changes in an attempt to provide the country with a better-fit model that fulfils the expectations of the citizenry (Adu-Gyamfi, Donkoh & Addo, 2016).

The National Democratic Congress (NDC) government introduced the progressively free senior high school education policy in 2015. An amount totalling GH¢ 12,178,544.00 (about $4,050,000) was released to the Ministry of Education for the first term of the academic year in 2015/2016 to cover the cost of the examination, entertainment, library, Student's Representative Council (SRC), sports, culture, Science Development and Mathematics quiz (SDMQ), Information Communication Technology (ICT), and co-curricular fees for 320,488 day students in public senior high schools. This was to improve both access and quality in attaining education for

all. Meanwhile, the current government of Ghana introduced the free (full funding) education policy which was launched in 2017 at an estimated cost of GH¢400 million ($100 million) (Ministry of Education, Republic of Ghana, 2017). Apart from education, the policy also provides for a daily meal at school for all eligible day students. This is to reduce the burden on parents and to improve the economic growth of each family and the country at large. It is also to increase enrolment and to cut the dropout rate. Because of the huge sums of money invested, there has been great pressure from the government and the public on the management of senior high schools (Little, 2010). Therefore, there is the need to assess the impact of the huge funding in senior high schools. Little is known about studies that had been done on the effect of government funding on enrolment. In this study we investigated the impact of government funding on senior high school enrolment in the Wa Municipality, Ghana, as a case study.

Literature Review
Several studies have examined the importance of funding in improving access to education. Most of the studies were geared towards analysing the impact of funding in increasing enrolment. Dynarski and Scott-Clayton (2013) state that reducing the cost of education, like the free Ghanaian educational policy for senior high school education, either through grants, aid or other tuition subsidies, can improve completion.

Solis (2017) used national data and applied a regression discontinuity design to analyse the effects of financial aid on enrolment, persistence and graduation patterns of students in Chile. He found that making loans accessible to students has a formidable positive causal effect on enrolment, and that access to loans closed the enrolment gaps for the lowest income students.

Meneses and Blanco (2010) used national 2006 data about 10th graders to assess the impact of financial aid on higher education enrolment in Chilean institutions and found that the probability of attendance at a 4-year institution increased by 30%. Dinkelman and Martínez (2012) support the argument that availability of combinations of grants, loans and aid increase enrolment and the likelihood of staying in school in Chile. Boatman and Long (2016) also indicated that financial aid could be an influencing factor in aiding students to enrol in college. This is supported by the study of the Organisation for Economic Co-operation and Development (OECD, 2012), which found that students in Chile who benefited from grants and loans were more likely to persist in their education.

Blimpo, Gajigo and Pugatch (2015) evaluated the effect of the Gambian girls' scholarship programme on the composition, measure, and achievement of secondary school students. Their approach was on difference-in-differences estimation, comparing regions that benefited from the programme early on to those that benefited from the programme later. They found that the number of students sitting for the high school exit examination rose due to the girls' scholarship programme. This result is in line with an earlier study which showed that the enrolment of girls between the ages of 13 and 18 increased due to the scholarship programme in Gambia (Gajigo, 2016). In a similar pursuit, Muralidharan and Prakash (2013) conducted a study on a programme that substantially decreased girls' cost of attending secondary school by providing the girls with bicycles. As a result, girl's enrolments increased by 30% and reduced the gender education gap by 40%. Bicycles served as motivation for the girls due to the long distances that they had to travel to school.

Bettinger (2004) and Cameron and Taber (2004) highlight that financial aid makes it less expensive for students to enrol and stay in education. It may cut the risk of dropout and may also increase the time to completion. In standard human capital models, educational attainment is a one-shot decision where financial aid will lower the cost of education and increase in educational attainment. Student loans offered to students in Columbia resulted in increased enrolment and a decreased dropout rate of students from low-income households (Melguizo, Sanchez Torres & Jaime, 2011). This corresponds with the idea that, after controlling other factors, loans and work-study aid are associated with increased enrolment and mitigating the rate of school dropout (Chen & Desjardins, 2008).

Hossler (2000) and Singell (2004) demonstrate that financial aid has a significant effect on increasing student enrolment, as well as improving student retention. Typically, in Rwanda in 2009, an abolition of school fees increased student enrolment by 25% in one year (UNESCO, 2013). Curs (2008) argues that financial aid has significant positive effects on students' enrolment. Dill and Soo (2005) also state that tuition discounts for academic merit, for example, can attract exceptional students to school.

Financial aid is a critical lever for increasing post-secondary education achievement in the United States of America (USA). It is perhaps the most important and useful tool for increasing college accessibility and choice among Hispanics, Blacks, low-income students, and other groups underrepresented in higher education. Perna (2009) states that each year, federal and state governments, colleges, universities, foundations, and other organisations invest more in programmes designed to get rid of financial challenges to college enrolment. To get students from all backgrounds to take part in college education, in the 2007/2008 academic year alone, a sum of $162.5 billion was

invested into higher education assistance programmes to reduce student educational expenditures. However, even with this investment, the enrolment rate for college students continues to increase with family income and this phenomenon is observed to be higher among Whites than for Blacks and Hispanics.

In Africa, the Kenyan government's introduction of free day secondary education (FDSE), like the progressively free (partial funding) and free senior high education policy (full funding), led to an increase of 50% in secondary school enrolment over the past years (Ohba, 2011). Similarly, the universal secondary school policy in Uganda led to an increase in gender enrolment in public schools (Asankha & Takashi, 2011).

In addition to the studies that have examined the effect of financial aid on enrolment, Pascarella, Pierson, Wolniak and Terenzini (2004) and Reyes (2008) researched different types of families and concluded that financial aid has a significant impact on enrolment. In another study, Pacey (1982) applied a regression-discontinuity approach on a representative sample of women athletes attending two National Association of Intercollegiate Athletics (NAIA) institutions in various divisions to determine whether grants have had any impact on increasing enrolment of students. Among other results, she concluded that grant dollars increased athletic opportunities for women in college athletic programmes. Financial aid is a significant factor in determining the number of females participating in intercollegiate sports. This confirms the aid-related results mentioned before, such as the positive impact of loans, scholarships, and receipt of grants on enrolment at first-choice institutions (Ohba, 2011; Pacey, 1982).

However, several studies have delivered contradictory results. Garlick (2013) found that the provision of free education had an insignificant impact on enrolment in poverty stricken areas in South Africa. Branson, Hofmeyr and Lam (2015) found no impact of the no-fee programme on enrolment of students completing secondary school at age 20 in South Africa. In a similar pursuit, Nielsen, Sørensen and Taber (2008) found that effect reforms in student aid in Denmark had a very weak impact on enrolment rates of students into higher education.

Using a simple difference-in-difference approach, Baumgartner and Steiner (2005) used Social Economic Panel (SOEP) data and concluded that educational funding had no significant impact on enrolment rates in Germany. In a later study, Baumgartner and Steiner (2006) still could not find a significant impact on student enrolment rates even though funds to students were increased by 10%.

Theoretical Framework
In this study, we attempted to investigate government funding and its impact on gender enrolment at the senior high school level in the Wa Municipality of the Upper West region in Ghana. This signifies an education production function (EPF) that underlies all quantitative research on the effects of school resources. An EPF is the relationship between school and student inputs and a measure of school output. The EPF is rooted in the economic theory of production and is defined as all the combinations of inputs (government funding) that produce any given set of school outputs (gender enrolment). The production function shows the relationship between input changes and output changes. It also shows the maximum amount of output that can be obtained by the school from a fixed quantity of resources.

In this paper, we build on Hanushek's (1986) argument that since budget differences do not account for an increase in gender enrolment, the incentives that determine how well the budget is spent must play an important role. Relative overspending on inputs that are of direct concern to students is so pervasive that it is consistent only with a model of the allocation of education spending in which student welfare influences spending, over and above its impact on school quality.

When gender enrolment is more a function of incentives than of spending, the policy implications are less obvious. While in some cases merely increasing the budget is the appropriate educational policy, it is increasingly recognized that in many other situations more fundamental reforms that enhance the importance of gender enrolment in education spending decisions are necessary.

In this study, therefore, the given set of output or the desirable output is to increase enrolment at the senior high school. The theory demonstrates that educational outputs are produced by school inputs such as government expenditure and the environment. The choice of this framework justifies the research question for this study. It is also a classic theory of education production, which is extensively discussed in Hanushek's (1986) work. It is, therefore, helpful in the analysis of the research concept under study.

Method
The Wa Municipality is in the Upper West Region of Ghana. According to the Population and Housing Census report, the current inhabitants of the Municipality stand at 127,284, – 61,826 men and 65,458 women. The Municipality has an urbanised population of 71,051 (Ghana Statistical Service, 2014), representing 66.3% of the urban population of the Upper West Region as a whole. The urban population growth rate of the Municipality is 4% compared to the national urban growth rate of 3.4%.

The structure of the population shows 49% youths compared to 4% aged citizens. The female population is 51% of the total population. The population density of the Municipality is 542 persons per square kilometre. Because of the rapid urbanisation in the Wa Municipality, it has problems with development in the areas of education, housing, health facilities and water supply. There are six senior high schools in the Municipality. The total number of senior high school students was 4,753 in 2014 (Ghana Statistical Service, 2014).

In this study we adopted the quantitative research method. Data from five of the six public senior high schools in the Wa Municipality were collected and analysed. As it was a private school, the sixth school was not included in the study. Annual enrolment figures were collected through the Ghana Education Management Information System (EMIS) for a period of 10 years (2008–2018). The total number of students from 2008 to 2018 was 64,646 – 42,369 boys and 22,277 girls.

The Statistical Package for Social Sciences (SPSS) software was used to analyse the data collected in the study. Because of its ability to handle more complex situations and analyse the simultaneous effects of multiple variables, the generalised linear model was used to check the impact of government funding (progressive free and free senior high policies) on enrolment.

The hypotheses of the study were:

H_o: There is no significant difference in students' enrolment in gender across various years.

H_1: There is a significant difference in students' enrolment in gender across various years.

Table 1 illustrates the average yearly enrolment by gender for 10 years.

Table 1 Descriptive statistics of the yearly enrolment by gender

	Year	*M*	*SD*	*N*
Boys	2008	510.5000	344.33075	4
	2009	516.2000	321.01277	5
	2010	509.0000	376.75987	4
	2011	748.0000	402.60899	5
	2012	820.2000	414.01171	5
	2013	757.2500	174.35476	4
	2014	949.2000	427.84542	5
	2015	982.0000	360.74576	5
	2016	1115.2000	373.39818	5
	2017	1009.0000	282.71364	5
	2018	912.6000	232.84931	5
	Total	814.7885	373.36905	52
Girls	2008	184.7500	91.43440	4
	2009	187.0000	94.82088	5
	2010	225.0000	55.21473	4
	2011	350.2000	162.24426	5
	2012	417.2000	176.92286	5
	2013	491.2500	210.98874	4
	2014	541.2000	281.24402	5
	2015	490.4000	380.54868	5
	2016	642.4000	237.56536	5
	2017	550.0000	141.06559	5
	2018	556.2000	159.86619	5
	Total	428.4038	240.35164	52

Results

The Levene's test of equal variance (see Table 3) and Box's test of equal covariance matrices (see Table 2) show the test of the null hypothesis that there are equal variance and covariance against the alternative hypothesis where there are no equal variance and covariance. We, therefore, failed to reject the null hypothesis against the alternative since the significant value is greater than alpha value.

Table 2 Box's test of equality of covariance matrices

Box's M	30.520
F	790
*df*1	30
*df*2	3429.181
Sig.	.785

Note. Sig. = significance.

Table 3 Levene's test of equality of error variances

	f	*df*1	*df*2	Sig.
Boys	.436	10	41	.920
Girls	2.643	10	41	.410

As indicated in Table 4, there was no significant difference in enrolment among boys across the years which had a significant value ($p = 0.098$) greater than the alpha value of 0.05. As a result, we failed to reject the null hypothesis (boys). Hence we can conclusively infer and report that the enrolment of boys was not significantly different across all the academic years in the public senior high schools in the Wa Municipality; despite the inception of funding in the forms of the progressive free and the free senior high school policies within the period under study. This is confirmed in Table 5 as the average enrolment among boys was not markedly different across various years. The data in Table 5 reveal that in the 2015/2016 and 2016/2017 academic years the highest enrolment – which falls within the period of government funding (progressive free senior high school) – was recorded, although it was not statistically significant across various years under consideration.

Table 4 Tests of between-subject effects

Source	Dependent variable	Type III *SS*	*df*	*MS*	*f*	Sig.
Corrected model	Boys	2143652.523	10	214365.252	1.770	.098
	Girls	1208737.419	10	120873.742	2.852	.009
Intercept	Boys	33171867.967	1	33171867.967	273.873	.000
	Girls	9144164.834	1	9144164.834	215.779	.000
Year	Boys	2143652.523	10	214365.252	1.770	.098
	Girls	1208737.419	10	120873.742	2.852	.009
Error	Boys	4965974.150	41	121121.321		
	Girls	1737477.100	41	42377.490		
Total	Boys	41631399.000	52			
	Girls	12489767.000	52			
Corrected Total	Boys	7109626.673	51			
	Girls	2946214.519	51			

Table 5 Descriptive statistics of the mean enrolment by gender on a yearly basis

Dependent variable	Year	*M*	*SE*	95% CI L.B.	95% CI U.B.
Boys	2008	510.500	174.012	159.075	861.925
	2009	516.200	155.641	201.876	830.524
	2010	509.000	174.012	157.575	860.425
	2011	748.000	155.641	433.676	1062.324
	2012	820.200	155.641	505.876	1134.524
	2013	757.250	174.012	405.825	1108.675
	2014	949.200	155.641	634.876	1263.524
	2015	982.000	155.641	667.676	1296.324
	2016	1115.200	155.641	800.876	1429.524
	2017	1009.000	155.641	694.676	1323.324
	2018	912.600	155.641	598.276	1226.924
Girls	2008	184.750	102.929	-23.119	392.619
	2009	187.000	92.062	1.076	372.924
	2010	225.000	102.929	17.131	432.869
	2011	350.200	92.062	164.276	536.124
	2012	417.200	92.062	231.276	603.124
	2013	491.250	102.929	283.381	699.119
	2014	541.200	92.062	355.276	727.124
	2015	490.400	92.062	304.476	676.324
	2016	642.400	92.062	456.476	828.324
	2017	550.000	92.062	364.076	735.924
	2018	556.200	92.062	370.276	742.124

Note. L.B. = lower bound, U.B. = upper bound.

However, the data in Table 4 indicate that there was a highly significant difference in student enrolment among girls across the years with a significant value ($p = 0.009$) less than the alpha value of 0.05. In this regard, we failed to accept the null hypothesis as there was a significant difference in students' enrolment among girls due to government funding in the Wa Municipality.

Having realised that there was a significant difference in girls' enrolment across various years, we moved to determine how each year contributed to the difference in the enrolment of girls into senior high school. This was achieved by conducting a post hoc test using Tukey's honest significance difference test (HSD) by considering the following hypotheses:

$H_o: \mu_1 > \mu_2 > \mu_3 > \mu_4 \ldots\ldots\ldots\ldots\ldots \mu_p$

$H_1: \mu = 0$

$H_o: \mu_1 > \mu_2 > \mu_3 > \mu_4 \ldots\ldots\ldots\ldots\ldots \mu_p$

$: \quad > \quad > \quad > \quad \ldots\ldots\ldots\ldots\ldots$

Where μ_1 is the mean for first-year enrolment of girls; μ_2 the mean for the second-year enrolment of girls; μ_3 the mean for third-year enrolment of girls, in that order to μ_p, the mean for the last-year enrolment of girls.

$H_1 : \mu = 0$ shows that all the means were the same across all years for girls, for instance, $\mu_1 = 2$, and $\mu_2 = 2$ so, therefore, $\mu_1 - \mu_2 = 0$, thus 2-2=0.

Table 6 indicates the pairwise comparison and results later summarised in Table 7. The data from Table 6 shows a significant difference in girls' enrolment between 2009 and 2016 (*p*-value = 0.04). From Table 5 it is clear that high enrolment among girls occurred in 2016.

Table 6 Summary multiple comparisons of the yearly enrolment by gender (girls)

Dependent variable					95% CI	
(I) Year	(J) Year	Mean difference (I-J)	*SE*	Sig.	L.B.	U.B.
	2009	-2.2500	138.09370	1.000	-472.6019	468.1019
	2010	-40.2500	145.56354	1.000	-536.0444	455.5444
	2011	-165.4500	138.09370	.979	-635.8019	304.9019
	2012	-232.4500	138.09370	.835	-702.8019	237.9019
	2013	-306.5000	145.56354	.580	-802.2944	189.2944
Girls 2008	2014	-356.4500	138.09370	.291	-826.8019	113.9019
	2015	-305.6500	138.09370	.509	-776.0019	164.7019
	2016	-457.6500	138.09370	.063	-928.0019	12.7019
	2017	-365.2500	138.09370	.260	-835.6019	105.1019
	2018	-371.4500	138.09370	.240	-841.8019	98.9019
	2008	2.2500	138.09370	1.000	-468.1019	472.6019
	2010	-38.0000	138.09370	1.000	-508.3519	432.3519
	2011	-163.2000	130.19599	.972	-606.6520	280.2520
	2012	-230.2000	130.19599	.791	-673.6520	213.2520
	2013	-304.2500	138.09370	.516	-774.6019	166.1019
Girls 2009	2014	-354.2000	130.19599	.226	-797.6520	89.2520
	2015	-303.4000	130.19599	.434	-746.8520	140.0520
	2016	-455.4000	130.19599	.040	-898.8520	-11.9480
	2017	-363.0000	130.19599	.199	-806.4520	80.4520
	2018	-369.2000	130.19599	.181	-812.6520	74.2520
	2008	40.2500	145.56354	1.000	-455.5444	536.0444
	2009	38.0000	138.09370	1.000	-432.3519	508.3519
	2011	-125.2000	138.09370	.998	-595.5519	345.1519
	2012	-192.2000	138.09370	.944	-662.5519	278.1519
	2013	-266.2500	145.56354	.756	-762.0444	229.5444
Girls 2010	2014	-316.2000	138.09370	.459	-786.5519	154.1519
	2015	-265.4000	138.09370	.700	-735.7519	204.9519
	2016	-417.4000	138.09370	.122	-887.7519	52.9519
	2017	-325.0000	138.09370	.420	-795.3519	145.3519
	2018	-331.2000	138.09370	.392	-801.5519	139.1519
Girls 2011	2008	165.4500	138.09370	.979	-304.9019	635.8019
	2009	163.2000	130.19599	.972	-280.2520	606.6520
	2011	125.2000	138.09370	.998	-345.1519	595.5519
	2012	-67.0000	130.19599	1.000	-510.4520	376.4520
	2013	-141.0500	138.09370	.994	-611.4019	776.0019
	2014	-191.0000	130.19599	.922	-634.4520	252.4520
	2015	-140.2000	130.19599	.990	-583.6520	303.2520
	2016	-292.2000	130.19599	.489	-735.6520	151.2520
	2017	-199.8000	130.19599	.899	-643.2520	243.6520
	2018	-206.0000	130.19599	.881	-649.4520	237.4520
2011	2008	232.4500	138.09370	.835	-237.9019	702.8019
	2009	230.2000	130.19599	.791	-213.2520	673.6520
	2010	192.2000	138.09370	.944	-278.1519	662.5519
	2012	67.0000	130.19599	1.000	-376.4520	510.4520
	2013	-74.0500	138.09370	1.000	-544.4019	396.3019
	2014	-124.0000	130.19599	.996	-567.4520	319.4520
Girls 2012	2015	-73.2000	130.19599	1.000	-516.6520	370.2520
	2016	-225.2000	130.19599	.812	-668.6520	218.2520
	2017	-132.8000	130.19599	.994	-576.2520	310.6520
	2018	-139.0000	130.19599	.991	-582.4520	582.4520

Dependent variable					95% CI	
(I) Year	(J) Year	Mean difference (I-J)	*SE*	Sig.	L.B.	U.B.
	2008	306.5000	145.56354	.580	-189.2944	802.2944
	2009	304.2500	138.09370	.516	-166.1019	774.6019
	2010	266.2500	145.56354	.756	-229.5444	762.0444
	2011	141.0500	138.09370	.994	-329.3019	611.4019
	2013	74.0500	138.09370	1.000	-396.3019	544.4019
	2014	-49.9500	138.09370	1.000	520.3019	420.4019
Girls 2013	2015	.8500	138.09370	1.000	-469.5019	471.2019
	2016	-151.1500	138.09370	.989	-621.5019	319.2019
	2017	-58.7500	138.09370	1.000	-529.1019	411.6019
	2018	-64.9500	138.09370	1.000	-535.3019	405.4019
	2008	356.4500	138.09370	.291	-113.9019	826.8019
	2009	354.2000	130.19599	.226	-89.2520	797.6520
	2010	316.2000	138.09370	.459	-154.1519	786.5519
	2011	191.0000	130.19599	.922	-252.4520	634.4520
Girls 2014	2012	124.0000	130.19599	.996	-319.4520	567.4520
	2014	49.9500	138.09370	1.000	-420.4019	520.3019
	2015	50.8000	130.19599	1.000	-392.6520	494.2520
	2016	-101.2000	130.19599	.999	-544.6520	342.2520
	2017	-8.8000	130.19599	1.000	-452.2520	434.6520
	2018	-15.0000	130.19599	1.000	-458.4520	428.4520
	2008	305.6500	138.09370	.509	-164.7019	776.0019
	2009	303.4000	130.19599	.434	-140.0520	746.8520
	2010	265.4000	138.09370	.700	-204.9519	735.7519
	2011	140.2000	130.19599	.990	-303.2520	583.6520
	2012	73.2000	130.19599	1.000	-370.2520	516.6520
	2013	-.8500	138.09370	1.000	-471.2019	469.5019
Girls 2015	2015	-50.8000	130.19599	1.000	-494.2520	392.6520
	2016	-152.0000	130.19599	.983	-595.4520	291.4520
	2017	-59.6000	130.19599	1.000	-503.0520	383.8520
	2018	-65.8000	130.19599	1.000	-509.2520	377.6520
	2008	457.6500	138.09370	.063	-12.7019	928.0019
	2009	455.4000	130.19599	.040	11.9480	898.8520
	2010	417.4000	138.09370	.122	-52.9519	887.7519
	2011	292.2000	130.19599	.489	-151.2520	735.6520
	2012	225.2000	130.19599	.812	-218.2520	668.6520
	2013	151.1500	138.09370	.989	-319.2019	621.5019
Girls 2016	2014	101.2000	130.19599	.999	-342.2520	544.6520
	2015	152.0000	130.19599	.983	-291.4520	595.4520
	2017	92.4000	130.19599	1.000	-351.0520	535.8520
	2018	86.2000	130.19599	1.000	-357.2520	529.6520
	2008	365.2500	138.09370	.260	-105.1019	835.6019
	2009	363.0000	130.19599	.199	-80.4520	806.4520
	2010	325.0000	138.09370	.420	-145.3519	795.3519
	2011	199.8000	130.19599	.899	-243.6520	-243.6520
	2012	132.8000	130.19599	.994	-310.6520	576.2520
	2013	58.7500	138.09370	1.000	-411.6019	529.1019
Girls 2017	2014	8.8000	130.19599	1.000	-434.6520	452.2520
	2015	59.6000	130.19599	1.000	-383.8520	503.0520
	2016	-92.4000	130.19599	1.000	-535.8520	351.0520
	2018	-6.2000	130.19599	1.000	-449.6520	437.2520
	2008	371.4500	138.09370	.240	-98.9019	841.8019
Girls 2018	2009	369.2000	130.19599	.181	-74.2520	812.6520
	2010	331.2000	138.09370	.392	-139.1519	801.5519
	2011	206.0000	130.19599	.881	-237.4520	649.4520
	2012	139.0000	130.19599	.991	-304.4520	582.4520
	2013	64.9500	138.09370	1.000	-405.4019	535.3019
	2014	15.0000	130.19599	1.000	428.4520	458.4520
	2015	65.8000	130.19599	1.000	-377.6520	509.2520
	2016	-86.2000	130.19599	1.000	-529.6520	357.2520
	2017	6.2000	130.19599	1.000	-437.2520	449.6520

Table 7 Pairwise comparison results for girls (TUKEY's HSD)

Year	N	Subset 1
2008	4	184.7500
2009	5	187.0000
2010	4	225.0000
2011	5	350.2000
2012	5	417.2000
2015	5	490.4000
2013	4	491.2500
2014	5	541.2000
2017	5	550.0000
2018	5	556.2000
2016	5	642.4000
Sig.		.050

Discussion

Taking into consideration the clear evidence from the results of the study, we can logically conclude that government funding in the forms of progressive free senior high education and free senior high education policies had a more significant impact on girls' enrolment for the period of study than for boys' enrolment. This corresponds with the conclusion of earlier research carried out by Asankha and Takashi (2011). They stated that the universal secondary school policy in Uganda in the year 2007 had led to increased enrolment of students – especially girls in public secondary schools. Bearing in mind that funding is a key player in determining the number of women participating in intercollegiate sports may confirm the result of this study that government funding contributed positively on enrolment of girls in public senior high schools in the Wa Municipality. Similar results were found in studies by Blimpo et al. (2015), Gajigo (2012) and Muralidharan and Prakash (2013).

We conclude that government funding has a strong correlation to an increase in enrolment of students in the Wa Municipality. This favours girls more than boys in senior high schools. Girls' enrolment rate was lower without funding. However, during the funding period, the girls' enrolment rate increased in all public senior high schools within the Municipality. The impact of government funding in this study raises a critical issue on how the gender educational gap can be breached by providing funding to schools in deprived areas in the Upper West Region.

In an earlier study conducted by Muralidharan and Prakash (2013) on a programme in which girls' cost of attending secondary school was decreased through the provision of bicycles, resulted in a 30% increase in girls' enrolment, which reduced the gender education gap by 40%. In our view, this phenomenon (if continuously applied) can have a long-term effect in empowering girls, reducing child marriage among girls, reducing the risk of girls contracting HIV and equipping girls to resist all forms of discrimination and gender-based violence that are prevalent in the Wa Municipality and most societies in Africa.

Conclusion

In the 2014/2015 academic year the Ghanaian government implemented the progressively free senior high (partial funding) and the free senior high school policies (full funding) implemented in 2017. This was to create opportunities for all qualifying students from junior high school to enter into senior high school with either lower fees or no fees. We used enrolment figures of all five public senior high schools in the Wa Municipality for a period of 10 years to check the impact of government funding on enrolment with the generalised linear model. We found that government funding had increased student enrolment in public senior high schools in the Wa Municipality. Females benefited more from government funding than their male counterparts. However, we could not find a statistically significant increment in boys' enrolment into public senior high school across all years. The study reveals that in the 2015/2016 and 2016/2017 academic year the highest enrolment for boys was recorded. The period falls within the progressive free senior high school period, although it was not statistically significant across various years under consideration. The limitation of the study was that it only covered public senior high schools in the Wa Municipality and, therefore, future research should be conducted to cover all senior high schools in the Upper West Region.

Authors' Contributions

NA wrote the manuscript, LA collected the data, both NA and AA analysed the data, II did the proofreading of the manuscript. Both ZR and WM supervised the entire research.

Notes

i.   The article is based on the master's thesis by Nurudeen Abdul-Rahaman.
ii. Published under a Creative Commons Attribution Licence.

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