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Cost-Effectiveness Analysis: Selected Programs in Ghana's Education Sector

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BACKGROUND

Educational research has linked an additional year of schooling to several outcomes. Education has been found to play a role in the ability of individuals to access the labor markets as well as to influence the level of wages that employers are willing to pay. There are studies that have attempted to link education to economic growth and poverty reduction through the human capital formation channel. According to the 1998/1999 World Development Report (WDR), about 25 percent of the increase in Gross Domestic Product (GDP) per capita in the United States of America, between the years 1939 and 1982, was attributed to education. In the neo-classical growth theory, human capital is seen as an important means of enhancing production, which combines with labor to yield the desired output. In the realm of political science, a literate citizenry has been associated with good electoral outcomes and demand for transparency and accountability. Moreover, education has been linked to other socio-economic outcomes such as better decision-making at the household level, including better family planning, improvement in the nutritional status of children, better health, a value system that promotes literacy and empowerment within the family, among others. A study in 45 developing countries found that on an average child mortality was about 144 per 1000 live births when a mother had no education, 106 per 1000 live births when she had primary education and about 68 per 1000 live births when she had some secondary education (WDR, 1998/1999).

The recognition of education as an important factor in delivering positive development outcomes is evident in the declaration that the focus of education should be on two out of the eight Millennium Development Goals (MDG 2 and 3).[1] However, despite this recognition, global estimates presented in September 2010 United Nations Education, Scientific and Cultural Organization (UNESCO) report about 69 million eligible children are still out of school. Current trends would result in about 56 million children staying out of school by 2015. As per the 2007 Education for All Global Monitoring Report, in the year 2004 about 1.4 million children in Ghana were out of school. A child labor survey conducted in 2001 also reveals that about 31.3 percent (1.98 million) of children aged 5 to 17 years are economically active, with about 1.27 million of them classified as child laborers.

The Ministry of Education in Ghana has the overall responsibility of providing educational services in the country. It does this through its departments and agencies such as the Ghana Education Service (GES) for policy formulation including planning, setting up and enforcing of educational standards. Education service delivery has been delegated by the ministry to its various agencies, in regions and districts. The Ghana Education Service is the agency that implements the basic and senior secondary education components, including technical and vocational institutes and Teacher Education Division. GES, by the virtue of being responsible for these sub-sectors, controls about four-fifth of the annual public-sector expenditure on education. Over the years the government has undertaken programs and policies to widen the access to education for many Ghanaian children. Some of the pro-poor programs to increase the enrolment levels in the country are the Capitation Grant Program and the

[1] MDG 2 calls for universal primary education by the year 2015 while MDG 3 calls for gender empowerment through the elimination of gender disparity at primary and secondary levels by 2005, and at all levels of education by 2015

Ghana School Feeding Program. The latter is spearheaded by the Ministry of Local Government and rural Development in collaboration with the Ministry of Education.

According to the progress report on the Millennium Development Goals, Ghana is on track to achieving the MDG 2 by 2015, which targets universal primary education. The current target of gross and net enrolments will be met. This could be attributed to the programs mentioned above. For instance there has been a tremendous increase in the number of schools as well as in enrolments. The number of kindergartens (KG) increased from 14,246 in 2006/07 to 15,449 in 2007/08, following government's policy of mandating each primary school to have a kindergarten attached to it. Also, the number of primary schools rose from 16,903 in 2006/2007 to 17,315 while the gross enrolment ratio increased from 93.7 percent to 95.2 percent over the same period. The question that arises is: could the increase in enrolment be achieved with only the capitation grant, or a combination of the capitation grant policy and the school feeding program? These programs are discussed briefly in the following section.

INTRODUCTION

The cost effectiveness analysis in education in Ghana is rare though many stakeholders are concerned about the huge budget allocated to run the public education system. Some schools perform poorly in the basic education certificate examination, though funding in the sector is rising. There are also infrastructure deficits in the sector, among others.

In this report, we attempt to estimate the cost effectiveness of the capitation grant policy in promoting enrolment in public primary schools and to compare this against a combination of the capitation grants policy and a school feeding program in achieving the same objective over a period of about 10 years.

1.1 Capitation Grant Policy

In 2005, the Ministry of Education abolished school fees nationwide in basic education and introduced a capitation grant for all public basic schools after a pilot in 2004; the policy objective under this program was to remove cost barriers to education. Before the introduction of the grant, school fees were one of the major barriers to access. The grant demonstrated that eliminating the fees leads to an immediate and substantial impact on enrolment; there was nationwide increase in enrolment,[2] by about 16.6 percent (Ministry of Education, Youth and Sports, 2006).

At the kindergarten level, enrolment went up from about 500,000 students in 2004-2005 to more than 800,000 students in 2005-2006 — an increase of 67 percent. During the same period, the primary net enrolment rate increased from 59.1 percent to 68.8 percent, while net enrolment at the junior secondary level increased from 31.6 to 41.6 percent.

The increase in enrolment was higher in the case of girls than for boys, with further narrowing of the gender gap. The national primary gender parity index (GPI) improved, from 0.93 to 0.95. A similar trend was observed in the poorest and most remote areas, confirming that the abolition of school fees benefits the poor.

The increase in enrolment has, however, led to the emergence of a number of challenges, including the shortage of teachers (especially in remote areas), shortage of school infrastructure, and implications for financing that could negatively affect the quality of teaching and learning, and consequently the learning outcomes.

The Free Compulsory Universal Basic Education (FCUBE) program is a financial assistance mandated by the constitution, whereby an amount of money has to be paid for every school-going child in the public schools to reduce the burden of educational cost; the capitation grant too made certain provisions in the yearly budget to take care of the administrative and infrastructure development of school facilities in the country. Thus the core focus of the capitation grant policy is on reducing the cost of education that would

[2] Gross Enrollment Rate (GER) at pre-school, primary and junior high school increased by 36.6 percent, 14.2 percent and 10.3 percent respectively by the end of 2006 (World Bank, 2009)

have been borne by the people and also to ensure that children stay in school without any interruptions.

1.2 Ghana School Feeding Program

The Ghana School Feeding Program is being implemented as part of Ghana's efforts towards meeting the United Nations Millennium Development Goals vis-a-vis reducing hunger, malnutrition, poverty and achieving universal primary education. It is an initiative of the Comprehensive African Agriculture Development Programme (CAADP), Pillar 3 of the New Partnership for Africa's Development (NEPAD). According to the District Operations Manual, the immediate objectives of the GSFP include increasing enrolment, attendance and retention; reducing short-term hunger and malnutrition among primary and kindergarten pupils, and boosting domestic food production.

The program seeks to provide the targeted pupils with one hot, nutritious meal a day, using locally-grown foodstuffs. Its long-term goal is to contribute to poverty reduction and food security in Ghana. The program is also wholly consistent with major Government of Ghana (GoG) policies and strategies, including the Growth and Poverty Reduction Strategy, the Education Sector Plan, Imagine Ghana Free from Malnutrition, Food and Agriculture Sector Development Policy, National Social Protection Strategy and the National Decentralization Policy.

Towards the end of fiscal year 2010, about 670,000 children in public schools across the country were benefiting from the program (Ministry of Finance, 2010).

2.0 DESCRIPTION OF COST DATA

Costs described in this and other sections are relevant to primary education and represent the situation in public schools. Three scenarios are assessed at this level, namely:

(i) Total cost per user, without the capitation grants policy
(ii) Total cost per user with the capitation grants policy in place
(iii) Total cost per user with both the capitation grants policy and the school feeding program in place.

The term total cost covers these expenditures: personnel emoluments, administration, services and investment. It also includes funding by the Government of Ghana and other development partners. The three scenarios cover three different periods: when the capitation grants policy did not exist, when it was introduced throughout the country and finally, the period when the school feeding program was rolled out after a four-month pilot.

The cost data were collected at national and sub-national levels. The national level data was taken from the Ministry of Education Service, Ghana Education Service and the Ghana School Feeding Secretariat. Secondary data was also obtained from sector reports produced

by the aforementioned institutions. Sub-national level data was obtained from district assemblies, district education offices and schools.

2.1 Costs for Capitation Grants Policy

The capitation grants policy provided GH¢3.5 per female pupil and GH¢2.5 per male pupil during the pilot phase in the academic year 2004/2005. When the grant was rolled out to cover all schools during the 2005/2006 academic year, the amount was changed to GH¢3 per pupil. In the academic year 2009/2010, the capitation grant was increased from GH¢3 to GH¢4.5 per pupil (Ministry of Finance, 2009).

2.2 Costs for School Feeding Program

Since its pilot phase in 2005, the Ghana School Feeding Program has adopted two systems for delivering food to pupils: the cook system and the caterer system. Before the year 2008, a cook system was administered to deliver food to beneficiary schools. Under this system, the Ghana School Feeding Secretariat was responsible for purchasing and supplying inputs (foodstuffs, utensils, cutlery, among others) to all the beneficiary schools, while the District Assembly was expected to appoint cooks and to monitor their work. They were also expected to provide other support to the program such as the construction of structures (kitchens or sheds) to facilitate the implementation of the program. Due to several difficulties associated with this system, including nepotism in the appointment of cooks, cases of misappropriation of funds and the inability to secure adequate local content in the supply of inputs, the cook system was abolished. A new system referred to as the caterer system was introduced.

Under this new system, a contract was awarded to a caterer to provide food to a pre-determined number of beneficiaries in each school. Payment made to the caterer was based on the number of school children fed.

In both these systems, a feeding grant was given to the beneficiary school. Initially, the amount was GH¢0.3 per pupil per day for an average of 65 days within any school year. The amount was, however, increased to GH¢0.4 per pupil per day.

3.0 METHODOLOGY: HOW COSTS WERE CALCULATED OR ESTIMATED

3.1 Costs with and without capitation grants policy

Data on the total expenditure on primary education was taken from various editions of the Ministry of Education's Preliminary Education Sector Annual Review Report (PESAR). In the case of total expenditure before the introduction of capitation grants policy, the academic year 2003/2004 was selected. Total enrolment in public primary schools was also obtained from the 2006 PESAR. The total education expenditure and the gross enrolment enabled us to calculate the total cost per pupil per year in the absence of the capitation grants program. Similarly, since the capitation grants policy was rolled out country-wide during the

academic year 2005/2006, we used the total expenditure and total public primary enrolment to calculate the total cost per user for that year. The table below captures the computations described above.

Table 1: Total cost per user per year with and without capitation grant policy

Year: 2003/2004 No capitation grant		**2004/2005 Pilot capitation grant introduced**		**2005/2006 Capitation grant extended to all public schools**	
Total education Expenditure (GH¢)	296,587,168	Total education Expenditure (GH¢)	356,567,946	Total education Expenditure (GH¢)	483,379,895
Primary school expenditure	133,770,730	Primary school expenditure	154,712,483	Primary school expenditure	194,362,371
Primary school enrolment (public)	1,847,377	Primary school enrolment (public)	2,066,796	Primary school enrolment (public)	2,407,980
Total cost per pupil (GH¢)	72.411	**Total cost per pupil**(GH¢)	74.856	**Total cost per pupil** (GH¢)	80.716

Source: PESAR, various issues; Author-generated, 2011.

3.2 Costs with School Feeding Program

We computed the total cost per pupil for the implementation of the Capitation Grants Policy as well as the Ghana School Feeding Program. As already noted, a pilot school feeding program began in September 2005 in 10 public schools, which during the 2006/2007 academic year was expanded to reach about 234,800 beneficiaries at the primary school level. Table 2 shows the number of beneficiaries from the time the program was set up.

Table 2: Beneficiaries of the Ghana School Feeding Program

	No of schools	**No of districts**	**No of beneficiaries**
2005	10	10	
2006	598	138	234,800
2007	987	138	476,083
2008	1698		596,501
2009			
2010			700,202

Source: GSFP Annual Operational Plan, 2009; Interview at GSFP, 2011

From the time of the expansion of the school feeding program during the academic year 2006/2007, we use the feeding cost of GH¢0.3 per pupil per day for an average of 65 days in an academic year. Other items of expenditure considered for this academic year, based on the Ghana School Feeding Program's 2008 expenditure are salaries, service, and investment expenditure. We used the proportion spent, as shown in Table 3, to compute the amount spent on these items during the academic year 2006/2007.

Table 3: Ghana School Feeding Program expenditure in 2008

Item	Amount (GH¢)	Percent (%)
Personnel Emolument	119,420	0.35
Administration	139,596	0.41
Service (Operation)	21,195	0.06
Investment	118,197	0.35
Feeding cost	32,973,070	98.8
Total cost	**33,371,478**	

Source: GSFP Annual Operational Plan, 2009

Using the above information as well as the number of beneficiaries reached, we computed the total cost per pupil per year for implementing the program.

Finally, we added the total cost per pupil for implementing the GSFP to the total cost per pupil for implementing the capitation grants policy. Table 4 summarizes the computations.

Table 4: Total cost (per pupil) of implementing both capitation grant and school feeding program

Year: 2006/2007 Cost in Ghana Cedi (GH¢)	
Number of beneficiaries	234,800
Total feeding cost (based on GH¢0.3 per day per pupil for 65 days)	4,578,600
Total cost of SFP	4,634,210.53
(1) Total SFP cost per pupil per year	19.74
Total primary school education expenditure	262,627,200
Total public primary school enrolment	2,870,656
(2) Total cost per primary school pupil	91.49
Total cost per primary school pupil enjoying SFP (1 + 2)	111.22

Source: Author's computation, 2011

3.3 Measuring the cost effectiveness of alternative interventions

In measuring the cost effectiveness of the alternative programs, we estimate the cost per pupil (to the government) to implement either program up to the year 2020, as envisaged in the latest Education Strategic Plan (2010 – 2020). The 2010/2011 academic year is chosen as the starting year. The estimated total cost per pupil per year with the capitation grants policy for 2010/2011 is based on the figure for 2005/2006 but adjusted using the respective GDP deflators. We did not compute the total cost per user for 2010/2011 using the cost figures for that period as there have been other interventions such as the distribution of free uniforms and exercise books — measures geared towards improving school enrolment. Similarly, the 2010/2011 total cost per user with both capitation grant and school feeding program is based on the figures for the academic year 2006/2007. The estimate was also adjusted using the respective GDP deflators.

Estimates of annual inflation are further used to adjust the cost figures for each year up to the academic year 2020/2021.

4.0 DESCRIPTION OF THE EFFECTIVENESS DATA

The effectiveness data is gross enrolment rate before and after the introduction of these education interventions.

5.0 METHODOLOGY: HOW EFFECTIVENESS WAS MEASURED OR ESTIMATED

In measuring the effectiveness of the capitation grants policy as against a combination of this policy and the school feeding program, we assess the difference in the gross enrolment growth patterns between the two alternatives.

In assessing the cost effectiveness of the two alternatives, we estimate the level of gross enrolment achievable by the year 2020 (using the 2010/2011 academic year as the starting year) and compare this with the total cost per pupil per year that is likely to be incurred in the implementation of the alternative programs by that year (in nominal and present value terms). The estimate of the year-to-year gross enrolment rate under the capitation grants policy is based on the 2011 PESAR estimate of gross enrolment trends in the last three years. We use an average growth rate of 3.5 percent per annum. We find no immediate reason to dispute the figures put out by the Ghana Education Service except that the reported rates are not just a result of the capitation grants policy but also of other educational interventions such as various enrolment drives. We employ other rates[3] for the purposes of a sensitivity analysis of the results. While acknowledging that the cost of education cannot be said to account for all the changes in enrolment, it is has been proven to be a very important explanatory variable (Deininger 2003; Nishimura 2005). Kremer (2003) also finds that school participation is "quite elastic" to the cost of education. Furthermore, Bold et al. (2010) find that fee-free education has resulted in an increase in enrolment among poor households.

In the case of the combination of the capitation grants policy and the school feeding program, we use the government's Annual Operation Plan (2009) target of 5 percent as the rate of growth of gross enrolment in public primary schools and assume that all these schools are benefitting from the intervention. For the population of children aged between 6 and 11 years (eligible age for primary school education), we make use of a population growth rate of 2.4 percent as recommended by the 2011 PESAR.

On reviewing six empirical studies on the effectiveness of SFPs, Levinger (1986) found most of them to be inconclusive. Evidence from Levinger (1986) and Ahmed (2004),[4] however, suggests that SFPs are usually effective in settings characterized by low school attendance and poor socioeconomic indices, such as rural settings. The former notes that there are only a few such studies that are believable. Adelman et al. (2007) also laments about limited

[3] Between 1993/1994 and 1999/2000 when Malawi implemented its fee-free education policy, the annual average rate of primary school gross enrolment was about 7 percent per annum. For the six-year period leading to 1999, the annual average rate of gross enrolment in the whole of Sub-Saharan Africa was 5.2 percent (World Bank, 2009).

[4] Enrolment in Bangladesh increased by about 14 percent while school attendance increased by 6 percent

empirical evidence that is of high quality. In recent times, the number of studies on the impact of SFP has been on the rise. Evidence from a randomized controlled field experiment in Kenya showed that on an average, there was no significant impact of SFP on enrolment.

However, enrolment for those aged between 6 and 9 years (primary school pupils), who were previously out of school, increased by 12.4 percentage points (World Bank/World Food Program, 2009). The study also reveals that SFPs directly motivate children to attend school and also significantly impact their nutritional status. The latter has been confirmed by several other studies in Kenya, Philippines, Bangladesh, South Africa and Jamaica.

6.0 COST EFFECTIVENESS RATIO RESULTS

The tables 5 show the cost effectiveness results for the alternative programs.

Table 5: Cost effectiveness results for the alternative programs

With Capitation Grant	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
GER growth with capitation (2011 Prelim ESAR)	3.50%	3.50%	3.50%	3.50%	3.50%	**3.50%**	3.50%	**3.50%**	3.50%	3.50%	3.50%
Enrolment with capitation grant	3,289,107	3,404,226	3,523,374	3,646,692	3,774,326	**3,906,427**	4,043,152	**4,184,663**	4,331,126	4,482,715	4,639,610
Projected annual average inflation	9%	9%	9%	8%	8%	**8%**	7%	**7%**	7%	5%	5%
Cost per pupil	158.40	172.66	188.20	203.25	219.51	**237.07**	253.67	**271.43**	290.43	304.95	320.20
Present value (@10% discount rate)						**133.82**					**112.23**
Capitation Grant and School Feeding Program											
Rate of growth (cap+SFP)	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**
Enrolment with capitation grant and SFP	**3,289,107**	**3,453,562**	**3,626,240**	**3,807,552**	**3,997,930**	**4,197,827**	**4,407,718**	**4,628,104**	**4,859,509**	**5,102,484**	**5,357,609**
Projected annual average inflation	**9%**	**9%**	**9%**	**8%**	**8%**	**8%**	**7%**	**7%**	**7%**	**5%**	**5%**
Cost per pupil	**194.60**	**212.11**	**231.20**	**249.70**	**269.68**	**291.25**	**311.64**	**333.45**	**356.79**	**374.63**	**393.37**
Present value (@10% discount rate)						**164.40**					**137.87**
Population of children 6-11yrs	**4,110,767**	**4,209,425**	**4,310,452**	**4,413,902**	**4,502,181**	**4,592,224**	**4,684,069**	**4,777,750**	**4,873,305**	**4,970,771**	**5,070,186**

Source: Author's computation, 2011

7.0 DISCUSSION OF PRELIMINARY RESULTS

It is important to state at the outset that the projected primary gross enrolment rate (GER) for the alternative programs is much lower when compared to the current primary GER of 96.4 percent. This is because the rate used for the simulation does not take into account several educational interventions that have been introduced in recent times to increase the GER. The usefulness of the results is in the fact that it allows us to build two scenarios in an experimental fashion in order to appreciate the effectiveness with which each alternative delivers the goal of increasing the gross enrolment.

Going by the results in the Tables, if government were to only focus on providing capitation grant (in addition to other recurrent and capital costs that were already being incurred before the policy was introduced), gross public primary school enrolment would increase by about 41 percent in the 10-year period leading up to the academic year 2020/2021. This would bring the gross primary enrolment rate to 92 percent at a cost of GH¢ 112.23 in present value terms (the per capita cost in 2020/2021 will be GH¢ 320.20 in nominal terms).

In the case of the combination of the capitation grant and school feeding program, gross public primary school enrolment would increase by about 63 percent in the year 2020, thus resulting in a gross enrolment rate of about 106 percent in public primary schools. This achievement would be realized at a cost of GH¢ 137.87 in present value terms (per capita cost in 2020/2021 will be GH¢ 393.37 in nominal terms).

All schools benefitting from the capitation grant also benefit from the school feeding program. It is thus not surprising that the combination of the two policies yields higher enrolment results. While the unit cost of implementing a joint capitation and school feeding program is about GH¢73.2 higher than that of the capitation grant policy alone, the joint program delivers an additional 14 percentage point increase in gross enrolment for the additional amount spent. Taking a decision as to which alternative would be more suitable would, however, depend on several factors. These would include time-specific policy goals of government. For instance a government that is passionate about achieving a GER of 106 percent by 2020 in a bid to fulfill political promises may be more open to rolling additional programs such as the SFP. Other governments and donors may shy away from programs such as SFPs due to complex challenges associated with its implementation. If it is a targeted program then the challenges would include poor targeting, administrative requirements, high costs and ensuring value for money for all interventions. Other challenges have to do with dealing with coordination problems among key stakeholders and poor financial management (leakages and corruption).

In 2008, for instance, the Netherlands government decided to withdraw support to the implementation of the SFP in Ghana due to some of the challenges enumerated above. The decision was inspired by an audit commissioned jointly by the Ghanaian and Dutch governments. Support from the Dutch government is, however, expected to continue as the Ghanaian government has taken steps to address some of the issues.

It is important to mention here that increases in enrolment should not be seen as an end in themselves. Successes chalked out in this area should be juxtaposed with completion and transition rates, quality of teaching and learning and other relevant educational outcomes. This would help avoid what has sometimes seemed like lack of a well-thought-out strategy to deal with the challenges associated with enrolment growth, often resulting in undue pressure on school facilities. Ghana, Malawi and several other countries have experienced this. Alsammarai and Hassan (2000) cite Kenya[5] and Tanzania as examples of countries that have in recent times introduced measures to avert undue pressure on educational resources as a result of the abolition of school fees. The strategy was to introduce a time lag between deciding and implementing a fee-free policy. The lag makes it possible for governments to mobilize resources, train teachers, expand facilities and to provide adequate information on the policy.

7.1 Sensitivity Analysis of results

This chapter re-examines the robustness of the evidence presented above by subjecting the results to a sensitivity analysis of the rate of enrolment growth under the alternatives.

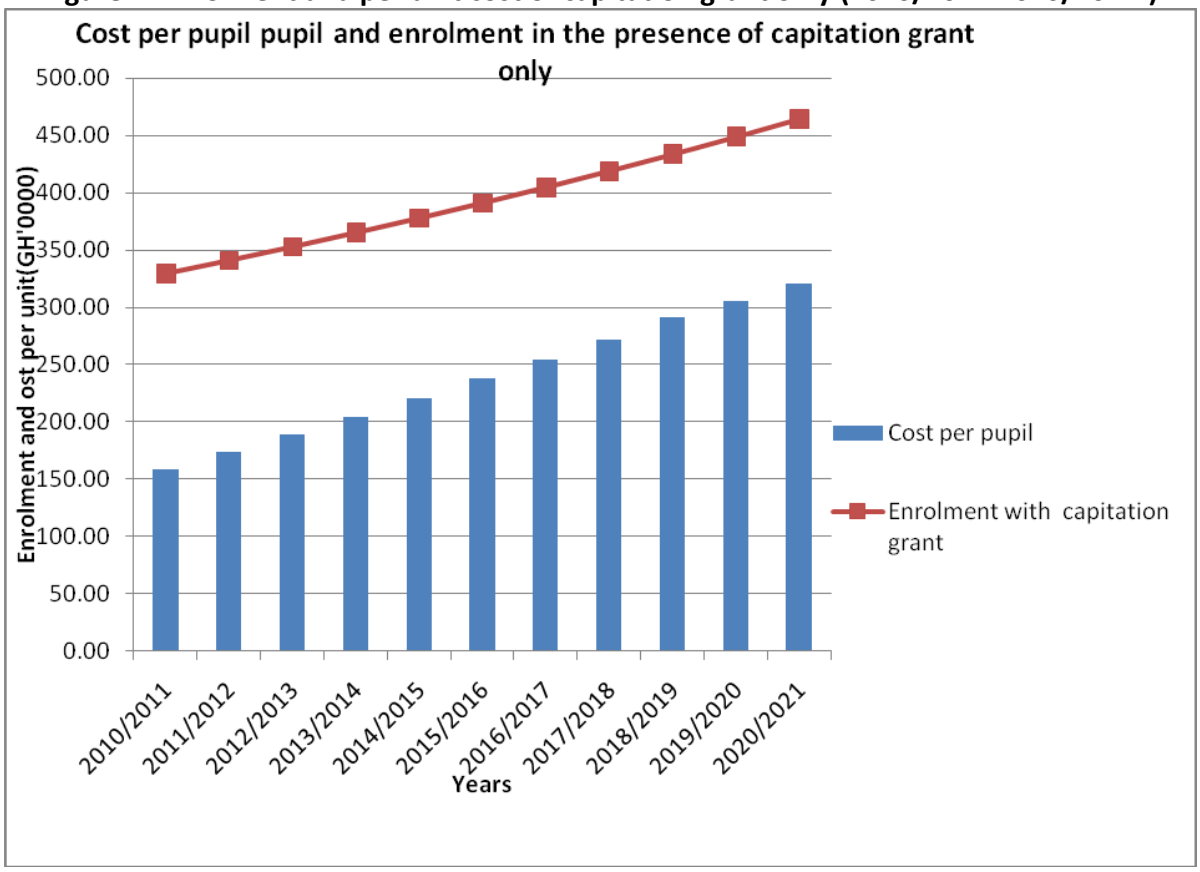
7.1.1 Measuring the impact of fee abolition

Al-Samarrai and Hassan (2000) report that in the six years following the abolition of fees in Malawi, gross enrolment rate at the primary level grew from 1.9 million pupils in the academic year 1993/1994 to 2.9 million pupils in 1999/2000. This constitutes an annual average gross enrolment rate of 7 percent per annum. In Uganda, primary enrolment increased from 2.8 million in 1997 to 7.6 million pupils in 2004 (Nishimura et al. 2005), constituting an average gross enrolment rate of about 15 percent per annum. Shultz (2001), cited in Duflo and Kremer (2003) found that the provision of conditional cash transfers to women in Mexico (which lowered the cost barrier to education) brought about a 3.4 percent increase in the average enrolment of pupils in stages 1 to 8.

The increases in enrolment recorded for Malawi and Uganda are high and we cannot form reasonable assumptions for projecting enrolment growth in Ghana. One major reason is the fact that there are many unaccounted confounding factors that contributed to the enrolment figures, and not just the abolition of fees. In the case of Malawi, for instance, there were deliberate attempts to stimulate the demand for basic education through awareness creation exercises. Although the figure recorded for the randomized trials in Mexico is similar to the rate used for Ghana's base case (i.e. 3.5 percent) the program interventions are not the same. RCT) literatures that isolate the effect of capitation grant policy on enrolment are hard to come by. Therefore, for the sensitivity analysis, we adopt the World Bank's (2009) 5.2 percent average annual enrolment growth recorded for the whole of Sub-Saharan Africa.

[5] World Bank, 2009, however, notes that there was limited prior planning in the abolition of the fee policy in Kenya. Instead, they cite Ethiopia and Malawi as examples of countries that allowed some time between decision-making and the implementation of the fee-free policy.

Figure 1: Enrolment and per unit cost of capitation grant only (2010/2011-2020/2021[6])



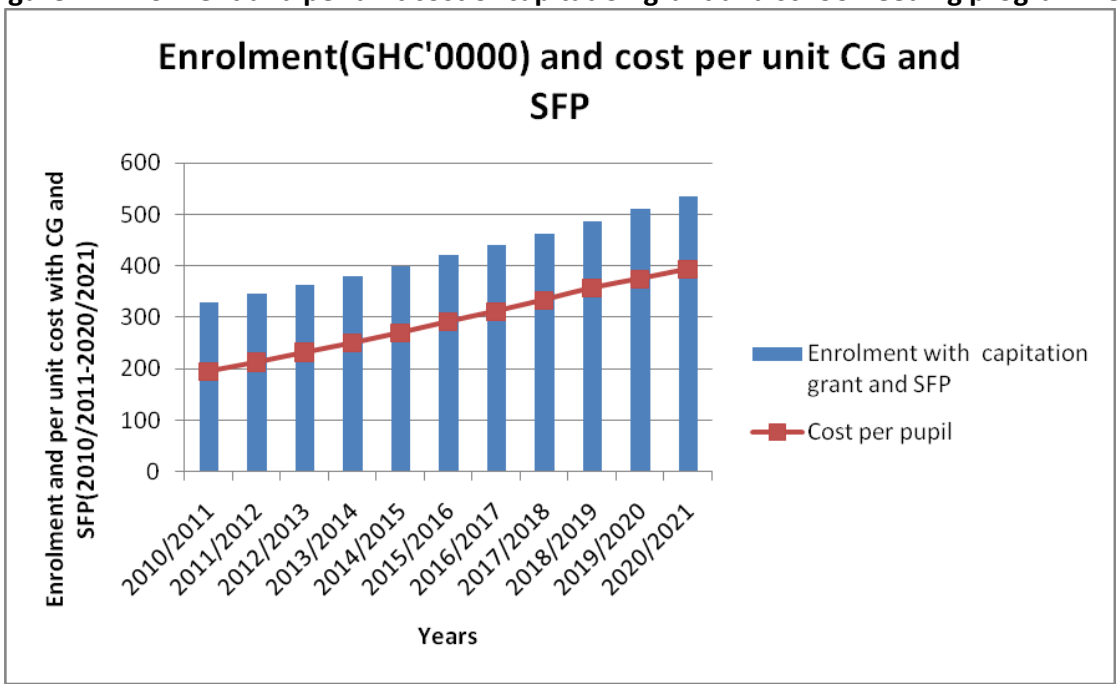
Source: Author generated from Table 5

7.1.2 Measuring the combined impact of school feeding program and fee abolition

Vermeersch and Kremer (2004) find that the provision of school meals in Western Kenya increased primary school participation in treatment schools by 30 percent more than in schools that did not have the feeding program. For the sensitivity analysis we apply the rate of 30 percent to the average annual rate of gross enrolment for Sub-Saharan Africa (i.e. 1.3 * 5.2 percent = 6.8 percent). The result becomes the projected rate of increases in enrolment — the effect of a combination of the capitation grants policy and the SFP.

[6] Enrolment figures are in GH'0000 to ensure they match with per unit cost.

Figure 2: Enrolment and per unit cost of capitation grant and school feeding programme[7]



Source: Author generated from Table 5

7.1.3 Results of sensitivity analysis

Maintaining the same cost structure but using different enrolment growth rates under the alternative program, as described in the two sections above, does not change the base results. That is, a higher gross enrolment rate is recorded for a combination of the capitation grants policy and the school feeding program as compared to the capitation grant policy alone (see Appendix 1). The policy implication may, however, differ depending on the preference function of the government. For example, a capitation grants policy could still achieve an over 100 percent gross enrolment rate by 2020, but at a lower cost. This could, though, negatively impact the ability to attract an additional 800,000 pupils over the 10-year period.

8.0 PLANS FOR EXTENSIONS OR MODIFICATIONS IN THE NEXT DRAFT

Once we lay our hands on new data, our goal would be to expand the sensitivity analysis. For instance, instead of relying on the 2008 non-feeding cost structure of the Ghana School Feeding Programme Secretariat, the team will be more interested current figures.

[7] Enrolment figures are in GH'0000 to ensure they match with per unit cost

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Appendix 1.0 Sensitivity Analysis of results

With Capitation Grant	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Projected GER growth with capitation		0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
Projected Enrolment with capitation grant	3289107	3460141	3640067.87	3829351.4	4028477.68	4237958.51	4458332.36	4690165.6	4934054.3	5190625.1	5460537.6
Projected increases in cost based on inflation	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.05	0.05
Projected cost per pupil	158.4021	172.6583	188.197539	203.253342	219.513609	237.074698	253.669927	271.42682	290.4267	304.94803	320.19544
Present value (@10% discount rate)											112.22655
Capitation Grant and School Feeding Program											
Projected GER (combined capitatio and SFP)		0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
Projected enrolment with capitation grant and SFP	3289107	3512766	3751634.38	4006745.52	4279204.22	4570190.1	4880963.03	5212868.5	5567343.6	5945922.9	6350245.7
Projected annual increases in cost based on inflation	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.05	0.05
Projected cost per pupil	194.6	212.114	231.20426	249.700601	269.676649	291.250781	311.638335	333.45302	356.79473	374.63447	393.36619
Present value (@10% discount rate)											137.87245
Population of children 6-11yrs	4110767	4209425	4310451.62	4413902.46	4502180.51	4592224.12	4684068.6	4777750	4873305	4970771.1	5070186.5