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Effects of Capitation Grant on Education Outcomes in Ghana

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Abstract

This study provides an assessment of how capitation grant is impacting on key education outcomes in Ghana. In particular it provides an empirical platform for assessing how this policy is contributing to the achievement of the MDGs, and more. The key education outcome indicators which form the basis of the study are gross enrolment rates at the Junior High school level, the pass rates for the national examinations at the Junior High school level and the gap in the examination performance of boys and girls. It employs an econometric estimation model to assess how capitation grant affects these variables. Using district level data over the period 2005-2007 and across the country, the study finds that capitation grant have not had any significant effect on these key educatio n outcomes. The study concludes by noting that although the results are not consistent with a priori expectations, the findings may reflect the fact that the capitation grant in Ghana only started in 2005 and so it is too early to begin to see its effects. The inability of the study to account for demand-side factors may also be contributing to the results. However the study notes that these results may be a pointer to the fact that capitation grant alone cannot deliver on important education outcomes as enshrined in the MDGs.

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List of Acronyms

BECE   Basic Education Certificate Examinations
ESP   Education Strategic Plan
FCUBE   Free Compulsory Universal Basic Education
FE   Fixed Effects
GES   Ghana Education Service
GHC   New Ghana Cedi
GPRS   Ghana Poverty Reduction Strategy
JHS   Junior High School
MDBS   Multi-Donor Budgetary Support
MDGs   Millennium Development Goals
MOESS   Ministry of Education, Science and Sports
OLS   Ordinary Least Squares
PTA   Parent Teacher Association
RE   Random Effects
SWAp   Sector-Wide Approach
UNICEF   United Nations Children's Fund
USAID   United States Agency for International Development

Introduction

Improving the quantity and quality of education remains an important goal for many countries including Ghana. This is in line with the country's subscription to the MDGs and also its own local constitutional requirement. Improving the quantity and quality of education requires that policy addresses both demand- and supply-side constraints of education. The provision of more textbooks, classroom blocks, trained teachers, etc tends to ease supply-side constraints to education. On the other hand policies such as the Capitation Grant and School Feeding Programme seek to ease the demand-side constraints to education. For instance, in the Ghana Education Service's (GES) guidelines for the distribution and utilization of Capitation Grants, it is argued that one of the reasons why children in Ghana do not attend school is that their parents cannot afford to pay the levies charged by the schools. It is in line with this that the Government of Ghana set up the capitation grant which commenced in the 2005/2006 academic year. Under the scheme every public primary school receives an amount of GH¢3 (US$3)[3] per pupil enrolled per year.

Understanding how such a policy contributes to the achievement of the MDGs, and more, is non-trivial. This is particularly so as the Capitation Grant can be expected to positively affect the quantity of education that is effectively provided (as will be captured by enrolment rates). However the effect on real education output (or the quality of education) is not clear. In this regard, this study will examine the extent to which the Capitation Grant in Ghana impacts the performance of schools in the national assessment examinations, and also bridge the gap in the examination performance of boys and girls.

Impact of Education Related Interventions: A Review of the Literature

Countries worldwide are making good and encouraging progress towards reducing the number of out-of-school children. Specifically Sub-Saharan Africa has witnessed an unprecedented 25% increase in enrolment between 1998/99 and 2002/03 (ADEA, 2007). Countries in Sub-Saharan Africa have been exploring ways of improving their education systems in order to achieve their commitment to education for all. Ensuring that children have access to free, compulsory and good quality primary education is receiving considerable attention from governments and aid agencies alike. Two main systems through which certain governments are using to achieve this aim are the abolition of school fees and the School Feeding Programme. Many studies have been conducted on the effects of these systems on education outcomes.

Abolition of School Fees and Education Outcomes

Abolition of school fees especially at the basic education level has been adopted by many countries as one of the key policy interventions for influencing education outcomes. Fees

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[3] This is based on a current exchange rate of GHC1=US$1

charged at schools especially public schools, have been identified as one of the main barriers to education access especially among the poor, orphaned, and vulnerable children within societies (USAID, 2007). There are two schools of thought on school fees' abolition in the literature.

Proponents of School Fees Abolition

The main argument advanced by proponents of school fees' abolition is that, school fees and other direct education related costs to households represent a significant obstacle to enrolment especially among the poor and vulnerable households (USAID, 2007). Abolishing school fees will therefore make it easier and less costly for children with these challenging backgrounds to enroll in schools and eventually help in achieving some of the education related goals within countries.

Malawi represents one of the first countries to adopt the policy of school fees abolition. Other countries in Africa that have also abolished school fees in the 2000s include Lesotho, Kenya, Tanzania, Zambia (Al-Sammarra et al., 2006) and Ghana. As a result of abolishing school fees in Malawi, enrolment rates is reported to have increased dramatically at both the primary and the secondary levels and the impact of this increment was very biased in favour of the poor (Al-Samarrai et al., 2006 and USAID, 2007). Abolition of the school fees in Uganda nearly led to a doubling in enrolment figures in the year after the abolition. Similar increases in enrolment rates following school fees abolition were also realized in Tanzania in 2001, Lesotho in 2000 and Cameroon 1999 (USAID, 2007). Of outmost importance within these enrolment figures are enrolment rates among the disadvantaged children (girls, orphans, and children in rural areas) which experienced rapid increases and thereby widening access to education.

Arguments Against School Fees Abolition

The other school of thought against school fees abolition states that abolishing school fees does contribute to reduction in the direct cost of education but does not necessarily reduce the costs to zero (USAID, 2007). There are other costs, aside school fees, that are still borne by households. These costs include those on transportation to and from school, contribution of households to construction of school buildings and other management costs, cost of textbooks and other support given to teachers by households. In line with this argument, any intervention should critically take into consideration the totality of all these costs borne by households and not only school fees.

Abolishing school fees, although identified to have a positive effect on enrolment, may have a negative effect on the quality of education (USAID, 2007). The increase in enrolment figures following school fees abolition are more likely to overwhelm the available supply of schools, teachers, and education materials available within schools. In Malawi for instance, after the abolition of school fees, the ratio of pupils to classroom increased to 119:1, the ratio of pupils to teachers also increased to 62:1 and the ratio of pupils to text books increased to 24:1. Similarly, expenditure per-pupil fell approximately by $12 per year for primary school students (USAID, 2007).

In most instances, the rise in enrolment figures resulting from school fees abolition is likely to increase the number of pupils per teacher or a phenomenal rise in the number of newly recruited and untrained or barely trained teachers. This is likely to affect the quality of teaching in the classroom.

Anecdotal evidence from Malawi indicates that elimination of school fees reduces the willingness of communities to provide voluntary support for local schools as local leaders interpret abolition of school fees as central government's assumption of full financial responsibility. Voluntary community support is a very important contribution to schools especially in the rural and deprived communities.

Education Policy Framework in Ghana

The 1992 Constitution of the Republic of Ghana under Article 25 (1) guarantees the right of all persons to equal educational opportunities and facilities by ensuring free, compulsory and universal basic education. The provision under the Constitution also ensures that secondary and higher education shall be made available and accessible to all by every appropriate means, and in particular, by progressive introduction of free education. Functional literacy is also ensured under the constitution and provision is made for resourcing schools at all levels with adequate facilities.

Aside the constitutional provisions, the Ghana Poverty Reduction Strategy (GPRS) II recognizes education as the key to moving the country towards a middle income status by 2015 and as a result, identifies the development of human capital as one the three thematic areas of the plan. Aside aiming to meet goal 2 of the MDGs, the GPRS II also aims to strengthen the quality of education especially at the basic level, improve the quality and efficiency in the delivery of education services and bridge the gender gap in terms of education access in the country.

In 2003, the Education Strategic plan (ESP) based on the Poverty Reduction Strategy came into force and it covered the period 2003-2005. The Strategic Plan operated within the framework of a sector wide approach (SWAp) for education and this was situated partly within the multi-donor budgetary support (MDBS) framework (Adam-Issah et al., 2007). The ESP which provided the framework or roadmap for achieving the education related MDGs was based on four key areas: equitable access, education management and Science and technology and Vocational education. There were ten policy goals to the ESP and this covered increasing access to and participation in education and training, improving the quality of teaching and learning for enhanced pupil/student achievement, promoting good health and environmental sanitation in schools and institutions, among others.

The Government of Ghana in 2004 came out with a White Paper on Education Reforms which outlines reforms and objectives spanning the entire education sector. This catalogue of reforms and objectives are to be implemented from 2007 and the major targets identified are to be realized in 2015 and 2020. The White Paper on Education

Reform has two key objectives. First it builds on the commitments of the ESP as well as ensures that high quality education is provided to children at the basic level. Secondly, it aims at ensuring that all second cycle education is made more inclusive and appropriate to the needs of young people and the demands of the Ghanaian economy (Ministry Of Education Science and Sports [MOESS], 2005).

Under the Government of Ghana White Paper on Education Reform, basic education was expanded to include 2 years of kindergarten as well as the existing 6 years of primary education and 3 years of Junior High School education. The entire basic education will continue to be free and compulsory and will receive highest priority of all sub-sectors. The White Paper also pledges the government's full support for basic education funding. The central target is to reach 100 percent completion rates for both males and females at all basic levels by 2015.

The White Paper in building upon the ESP indicators identifies new areas which will facilitate the achievement of the education sector goals. As a result, some of the education sector targets in the ESP due to be achieved in the year 2015 are set to be achieved earlier in 2012. For instance, in relation to the Greater Accra Region entry into Primary 1, was originally projected to reach 100 percent by 2010 in the ESP, had been revised and was now expected to be achieved in 2006/2007. Also, Primary 6 completion rate originally expected to reach 100 percent by 2015 is now expected to be achieved by 2010. Finally, Gross Enrolment for Primary education is now scheduled to reach 107.4 percent by 2012 (MOESS, 2006).

Recent Education Related Interventions in Ghana

Ghana has been able to make some strides in its education system through certain policy initiatives. These initiatives have goals that have been expressed in policy frameworks and reports like the GPRS I & II and the Education Strategic Plan (ESP). The Government of Ghana has also committed itself to the achievement of Universal Primary Education (MDG 2) by ensuring that by 2015 children everywhere, boys and girls alike, will be able to complete a full course of primary schooling. The government's commitment towards achieving the educational goal is reflected in these policy frameworks. In accordance with these frameworks, certain policy strategies like the capitation grant and the school feeding program, early childhood development and gender parity were adopted. In accordance with the constitution of the Fourth Republic of Ghana, the Free Compulsory Universal Basic Education (FCUBE) was implemented.

As laudable as this intervention was it has not been able to make the expected impact because of the cost sharing principles that went with it. Fees and levies were still being charged under the FCUBE program. The charging of these fees was thought to be impacting negatively the attendance of school children at the basic level. The Ministry of Education therefore decided to implement the Capitation Grant Scheme to increase access to education. The policy of school fees abolition in the form of giving grants to schools is known as the capitation grant in Ghana.

The Capitation Grant

In recent years, there has been a worldwide momentum in which more developing countries are moving to sustain and reinforce the renewed progress toward Universal Primary Education through bolder, accelerated and scaled strategies. School fees abolition is becoming increasingly acknowledged as one of these strategies and as a key measure to achieving children's right to education. In view of this, the World Bank and UNICEF in 2005 launched the School Fee Abolition Initiative which aimed to disseminate lessons from the experience of countries that have abolished fees and provide context-specific advice to countries that are seeking to do so. Experience in several countries shows that the private costs of schooling are a major barrier that prevent many children from accessing and completing a quality basic education. They are especially burdensome in countries where poverty imposes tough choices on families and households about how many and which children to send to school, and for how long. School fees represent a regressive taxation on poor families, and the enrolment of poor, excluded and vulnerable children is very sensitive to fees, even when these are small.

School fee abolition is not just about "tuition fees" (which do not necessarily constitute the main bulk of fees). School fee abolition must take into consideration the wide range of the costs of schooling to families and households. This means any direct and indirect costs/charges (tuition fees, costs of text books, supplies and uniforms, PTA contributions, costs related to sports and other school activities, costs related to transportation, contributions to teachers' salaries, etc.) as well as opportunity costs and other burdens on poor families. Countries that have taken the bold step to eliminate school fees and other indirect education costs saw a surge in total enrolment in the year following the abolition – 11% in Lesotho (2001), 12% in Mozambique (2005), 14% in Ghana (2006), 18% in Kenya (2004), 23% in Ethiopia (1996), 23% in Tanzania (2002), 26% in Cameroon (2000), 51% in Malawi (1995) and 68% in Uganda (1998) (ADEA, 2007).

To meet the MDG goals for education and national targets established in the 2003-2015 Education Strategic Plan, the Government of Ghana has taken a bold step forward by abolishing all fees charged by schools and also providing schools with a small grant for each pupil enrolled. The programme was first piloted (with World Bank support) in Ghana's 40 most deprived districts in 2004. Overall enrolment rose by an impressive 14.5 per cent; enrolment gains for pre-school were particularly significant (over 36 per cent). This success led to the nationwide adoption of what is known as the 'Capitation Grant' system in early 2005. Under this system, every public kindergarten, primary school and junior secondary school receives a grant of about $3.30 per pupil per year. Schools are therefore not permitted to charge any fees to parents. Table 1 shows the increase in enrolment by level in the 40 pilot districts.

Table 1: Increase in Enrolment by Level in 40 Pilot Districts

Level	2003/2004	2004/2005	Increase	% increase
Pre-School	138,175	184,706	46,531	33.68
Primary	700,006	779,786	79,780	11.40
JSS	175,106	196,430	21,324	12.18
Total	**1,013,287**	**1,160,920**	**147,635**	**14.57**

Source: Ghana Education Service, 2008

After a year of implementing the capitation grant scheme, total enrolment in the 40 selected districts increased by about 15%.

Effects of Capitation Grant on Education Outcomes

The decision to replace school fees with capitation grants has yielded some dividends by impacting positively on many enrolment-related figures during the 2005/06 school year. Some of the benefits that are highlighted by a UNICEF working paper in 2007 are as follows:

- Primary school gross enrolment rose by nearly 10 per cent, bringing total primary enrolment to 92.4 per cent nationwide. Primary net enrolment increased from 62 percent to 69 per cent.
- Every region in the country experienced a rise in enrolment; Northern Region (where rates were lowest) experienced the largest increase.
- Overall enrolment in basic school increased by 16.7 per cent in the 2005/06 school year compared to 2004/05.
  Enrolment of girls increased slightly more than that of boys (18.1 per cent vs. 15.3 percent).

Possible challenges: Capitation Grant in Ghana

Critics of the capitation grant argue that this strategy may not have the desired impact on the quality of education. Most country experiences in school fee abolition raise questions about its impact on education quality. It is argued that when classes become overcrowded and when the meager resources provided through fees to schools (usually for learning materials) are no longer available, the result can reverse hard-earned gains and de-motivate teachers, parents and students. Enrolling children in school is one thing, but keeping them there (attendance) is the more important challenge. Furthermore, in most Sub Saharan African countries like Ghana, education quality is generally low to start with and any deterioration in the conditions of learning resulting from a surge in enrolment is likely to have a dramatic negative effect on completion and achievement.

The Ghana Education Service has indicated that the capitation grant scheme is not devoid of challenges. Some of the challenges identified by the GES include the following:
- Increased demand for additional classrooms.

- Demand for additional teachers.

- Demand for additional textbooks and other teaching and learning materials.

- Difficulty of sustaining community participation.

- Revision of the capitation grants and proportion between Kindergarten, Primary, JSS or between boys and girls.

- Even though actual release of funds has been smooth and effective, timely release of funds to districts and schools remains an issue.

- Inadequate level of transparency at school level.

Approach and Data Sources

The analysis is done using econometric techniques to try and establish the effects of the education grants on education outcomes. In Ghana, the capitation grant started in the 2005/2006 academic year.

As a result, the year 2005 will be used as the baseline in terms of discussing trends in capitation grants. However the trend for the whole period for which there is data (2003 to 2007) will be observed for conclusions in this study. The primary indicators of performance that have been identified include pupil-teacher ratio, class size, enrollment rate and persistence to grade five. These indicators are expected to impact the Basic Education Certificate Examination (BECE) pass rate. The impact of the capitation grant on the BECE results is determined by making BECE pass rate a function of the capitation grant realized (or received) and the other indicators. The conceptual model used is:

Figure 1: Conceptual Relationship between Capitation Grant and BECE Results
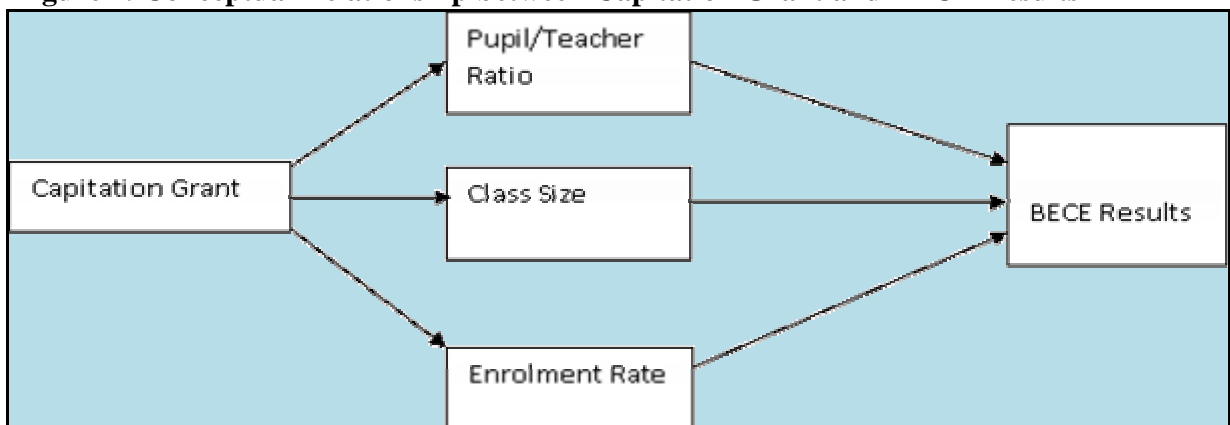
The statistical model estimated is:

$$BECE_{it} = a_i + b_1 CG_{it} + b_2 PT_{it} + b_3 CS_{it} + b_4 ER_{it} + b_5 PTXT_{it} + b_6 TT_{it} + u_{it}$$

Where $i = 1,2,...,N$; $t = 1,2,...,T$ and $u_{it} = m_i + e_{it}$.
Also

m_i	Unobservable district specific effect
e_{it}	The disturbance term
$BECE_{it}$	BECE Pass Rate for district i at time t
CG	Capitation Grant
PT	Pupil/Teacher Ratio
CS	Class Size
ER	Enrollment Ratio
$PTXT$	Pupil to textbook ratio
TT	Proportion of trained teachers in the district
$?_i$	coefficients

The vector of disturbance terms v_{it} is assumed to be uncorrelated with the regressors and the α_i's have zero mean and constant variance. The pooled OLS estimation of the model restricts the coefficients on the regressors to be common across i and t. A less restrictive estimation technique allows the slope to vary over time and across districts. If the group-specific effect is assumed constant (but allowed to differ across units) the model is estimated as a fixed effects (FE) model. The random effects (RE) model is estimated by assuming heterogeneity in the group-specific effects. Although there are tests which guide the choice of the appropriateness of the estimation techniques, in this paper we merely estimate all as a way of checking the robustness of the results obtained.

Variants of the model are also estimated with the gross enrollment rates and the difference in the BECE pass rates as dependent variables. The model is estimated as a panel over the 138 districts of Ghana and over the years 2005 (2005/2006 academic year) to 2007 (2007/2008 academic year).

Data for the estimation was obtained from the Ghana Education Service of the Ministry of Education. The model is estimated using data for all the districts of Ghana. The model allows us to tell whether the amount of capitation grant received in a district has any effect on the pass rate of the district. This is estimated for different years to see if the effect of the capitation grant on BECE pass rates is changing over time.

Among the different variants of the model estimated are the following:
- The model is estimated for female versus male BECE pass rates. It is also estimated for differences in pass rates for males and females. This allows us to tell whether a gap exists between the male and female pass rates, whether this gap is changing, and whether the capitation grant is contributing to any such change.
- The paper also uses the difference between private schools and public schools pass rate as the dependent variable. We then estimate the model keeping the right hand side variables and using panel data estimation techniques. For this variant of

the model one expects the capitation grant to have a negative effect on the dependent variable. In other words the performance levels between the private and public schools should be improving with the capitation grant, bearing in mind that the capitation grant is only for the public schools.

- We also estimate a model in which the gross enrolment rate is the dependent variable and the capitation grant plus other variables at the right hand side variables.

Some of the key hypotheses that is tested are the following

- Capitation grant impacts positively on enrolment rates
- Capitation grants impacts positively on the quality of education indicators such as the examination pass rates
- Capitation grant is helping to bridge the gender gap in education

Limitations of the Study Approach

Determinants of examination pass-rates and enrolment rates include both supply and demand factors of education. Supply-side factors that influence pass rates and enrolment include capitation grants, which are disbursed by the Ghana Education Service (GES) to schools, proportion of trained teachers available per school, text books, pupil to teacher ratio and availability of classrooms. On the other hand, demand side factors include the educational background of parents, distance from home to school, household size and household income. Unfortunately data limitations do not permit the inclusion of some of these demand-side factors. However it is also true that capitation grants seeks to mitigate some of the demand-side constraints. While a possible extension to this study will be to use household (or individual level) data for the analysis, such data are not readily available and impossible to gather within the time frame of this study.

Results

Table 2 shows the capitation amount that was due for all the regions. According to this table, the grant increased from the 2005 level of about GHC93, 889 to the 2007 level of about GHC109, 916 – an increase of about 17%. This can be attributed to an increase in enrollment between this period. From Table 2 it is seen that the Upper East region recorded the highest increase (26.1%) in the capitation amount due whilst the Upper West region had a decrease of 13.5%.

Table 2: Capitation Amount Due

Region	2005 (GHc)	2006 (GHc)	2007 (GHc)
ASHANTI	109,195	122,637.67	128,856.17
BRONG AHAFO	75,468.46	85,388.08	89,802.00
CENTRAL	82,582.75	94,801.00	99,936.25
EASTERN	100,191.20	110,941.40	118,093.60
GREATER ACCRA	87,579.60	94,164.60	101,665.80
NORTHERN	139,704.23	146,376.46	155,021.08
UPPER EAST	59,538.50	66,664.00	75,051.50
UPPER WEST	89,497.80	67,308.00	77,434.80
VOLTA	91,871.75	103,855.00	113,528.25
WESTERN	66,018.55	81,469.36	82,716.55
Total	93889.99	103381.09	109,916.21

Source: Ghana Education Service, 2008

Table 3: Capitation Amount Released

Region	2005	2006	2007
ASHANTI	79,588.09	89,385.94	93,918.37
BRONG AHAFO	55,469.56	62,762.34	66,006.73
CENTRAL	61,022.27	70,049.90	73,843.74
EASTERN	74,356.25	82,329.55	87,639.19
GREATER ACCRA	65,114.09	70,009.95	75,586.97
NORTHERN	103,400.6	108,328.40	114,723.50
UPPER EAST	41,204.17	46,135.44	51,940.09
UPPER WEST	61,937.78	46,581.13	53,589.47
VOLTA	64,964.45	73,442.98	80,278.61
WESTERN	48,483.91	59859.68	60,762.1
Total	68553.54	75,529.16	80272.59

Source: Ghana Education Service, 2008

Table 4: Gross Enrolment for Primary School

Region	2003	2004	2005	2006	2007
ASHANTI	79.68	84.41	------	81.83	95.29
BRONG AHAFO	80.36	85.31	------	80.19	95.09
CENTRAL	89.63	94.22	------	83.73	98.99
EASTERN	87.50	88.53	------	92.27	106.64
GREATER ACCRA	80.36	85.56	------	78.72	95.46
NORTHERN	64.64	69.81	------	84.66	100.51
UPPER EAST	81.05	85.17	------	61.82	88.18
UPPER WEST	73.12	79.04	------	65.94	92.06
VOLTA	82.56	84.66	------	70.4	93.9
WESTERN	78.58	85.45	------	69.96	96.35
Total	80.15	84.40	------	79.21	97.26

Source: Ghana Education Service, 2008

Table 5: Gross Enrolment for JHS

Region	2003	2004	2005	2006	2007
ASHANTI	66.65	70.72	------	53.71	82.28
BRONG AHAFO	60.69	64.88	------	50.96	76.46
CENTRAL	76.38	82.60	------	51.04	74.48
EASTERN	69.40	70.71	------	62.25	89.26
GREATER ACCRA	71.20	76.04	------	50.08	76.54
NORTHERN	40.38	46.39	------	53.92	84.15
UPPER EAST	48.02	52.50	------	28.58	53.40
UPPER WEST	50.32	59.68	------	36.14	61.18
VOLTA	68.19	70.00	------	34.94	66.26
WESTERN	62.06	67.99	------	38.81	66.71
Total	62.44	66.84		48.41	75.81

Source: Ghana Education Service, 2008

Table 3 outlines the amount of the capitation grant that was disbursed by the Ghana Education Service. The capitation grant amounts actually released in all the regions fell short of the amounts due to each of the regions over all the years. What this means is that even though the enrolment is increasing (for reasons that may very well include the capitation grant) the schools are not getting all the amounts due. Undoubtedly, this imposes a challenge to these schools in terms of delivering on some of the key educational outcomes.

Tables 4 and 5 show gross enrolments for both primary and Junior High Schools in all the regions. On the whole, gross enrollment increased for both primary and junior high schools across all the regions between 2003 and 2007. From Table 4 it is seen that enrolment for junior high schools in the northern region recorded the highest increase from 40.4% in 2003 to 84.2% in 2007. This increase in the enrollment rates is consistent with what one will expect with the coming into force of the capitation grant.

Table 6: Pupil-Teacher Ratio for Public Schools (Primary)

Region	2003	2004	2005	2006	2007
ASHANTI	32.39	32.78	18.39	16.89	32.11
BRONG AHAFO	30.08	30.54	18.00	17.15	32.38
CENTRAL	34.33	35.75	18.17	16.75	32.50
EASTERN	29.33	30.00	17.67	16.00	35.13
GREATER ACCRA	36.20	36.80	16.80	16.20	29.20
NORTHERN	43.77	45.85	19.31	17.77	34.08
UPPER EAST	65.50	59.67	24.83	19.50	37.00
UPPER WEST	49.80	52.20	26.60	21.80	36.20
VOLTA	30.83	31.92	24.08	20.50	37.67
WESTERN	34.45	36.64	22.45	17.91	42.55
Total	36.06	36.83	20.01	17.72	34.80

Source: Ministry of Education, Science and Sports, 2008

Table 6 shows the pupil/teacher ratio for public primary schools. A smaller pupil/teacher ratio is good for the quality of education needed. Fewer pupils for one teacher means that the teacher will be able to have more one-on-one time with his/her pupils. From the table it is seen that the ratios decreased in 2005 and 2006 in all the regions of the country. In 2007, however, the ratio for one region (Ashanti) remained about the same while those of five regions decreased in the year 2007, compared with 2003. The most significant

reduction in pupil teacher ratio over the period 2005 and 2006 can be noticed in the three Northern regions (Northern, Upper East and Upper West). For the four regions that experienced an increase, the Western region experienced the most dramatic increment from 17.91:1 in 2006 to 42.55:1 in 2007 which is above the national average (34.80:1). A similar trend is true for Table 7 which shows pupil/teacher ratio for private primary schools. However, on the whole and as expected, pupil/teacher ratio within private schools across all the regions is generally lower compared to that of public primary schools as can be seen in Table 8.

Table 7: Pupil-Teacher Ratio for Private Schools (Primary)

Region	2003	2004	2005	2006	2007
ASHANTI	26.83	26.89	16.00	14.72	23.89
BRONG AHAFO	27.00	26.46	15.69	15.15	27.62
CENTRAL	27.17	27.42	17.00	15.17	23.75
EASTERN	25.33	24.47	16.33	14.47	25.27
GREATER ACCRA	24.20	24.60	15.80	11.80	22.40
NORTHERN	36.92	44.15	13.69	13.38	24.00
UPPER EAST	33.00	42.33	1.00	2.33	21.33
UPPER WEST	8.00	15.60	0.00	0.00	20.00
VOLTA	25.75	26.25	5.83	4.50	23.75
WESTERN	28.64	29.45	4.64	2.82	20.82
Total	27.30	29.02	12.05	10.85	23.81

Source: Ministry of Education, Science and Sports, 2008

Table 8: Pupil/Teacher Ratio for Public Schools (JHS)

Region	2003	2004	2005	2006	2007
ASHANTI	18.00	17.89	37.22	35.11	16.39
BRONG AHAFO	16.69	17.08	32.46	31.87	16.77
CENTRAL	17.42	18.00	34.00	33.50	16.75
EASTERN	16.73	16.80	38.33	35.80	16.07
GREATER ACCRA	20.80	20.80	31.80	30.20	14.80
NORTHERN	26.78	27.38	38.08	37.92	17.38
UPPER EAST	27.17	26.67	30.67	33.33	19.33
UPPER WEST	21.80	26.20	38.00	38.00	22.20
VOLTA	16.92	17.33	40.08	40.58	20.75
WESTERN	20.09	20.91	50.36	43.45	18.27
Total	19.54	20.01	37.62	36.22	17.56

Source: Ministry of Education, Science and Sports, 2008

Tables 8 and 9 show pupil/teacher ratios for both public and private junior high schools in all regions for the period 2003 – 2007. The trends in these two tables are different but partly mimic those of Tables 6 and 7 for primary schools in both sectors. The ratios increased in 2005 for all the regions, save the Upper East Region for private JHSs where the figures remained unchanged, reduced minimally in 2006 for all but Northern and Western Regions for private JHSs, and plummeted for all regions and for both sectors in 2007 over the 2006 levels; barely making any gains over the 2003 levels for the vast majority of regions, for both sectors.

Table 9: Pupil/Teacher Ratio for Private Schools (JHS)

Region	2003	2004	2005	2006	2007
ASHANTI	14.89	16.33	31.56	25.28	13.61
BRONG AHAFO	15.85	16.00	31.46	29.85	14.46
CENTRAL	15.00	15.17	33.33	26.58	12.67
EASTERN	15.13	14.67	30.40	25.80	13.93
GREATER ACCRA	12.00	11.80	32.80	21.60	13.80
NORTHERN	9.23	11.08	26.15	25.54	14.23
UPPER EAST	31.50	30.67	30.67	20.50	3.33
UPPER WEST	7.40	10.20	23.60	27.00	1.20
VOLTA	12.50	13.00	33.75	27.92	4.00
WESTERN	15.82	17.09	9.73	17.45	4.82
Total	14.65	15.33	28.65	25.22	10.68

Source: Ministry of Education, Science and Sports, 2008

Table 10: BECE Pass Rate (Male)

Region	2003	2004	2005	2006	2007
ASHANTI	58.22	74.26	35.89	32.78	74.30
BRONG AHAFO	61.90	78.98	33.69	30.46	73.00
CENTRAL	50.27	69.28	35.33	31.50	69.65
EASTERN	51.68	68.84	37.87	34.27	66.07
GREATER ACCRA	67.56	81.94	33.60	30.60	65.28
NORTHERN	55.56	76.26	36.08	33.77	75.16
UPPER EAST	59.45	80.37	42.67	37.50	63.93
UPPER WEST	66.78	83.38	46.40	36.00	61.66
VOLTA	48.6	68.32	48.42	37.00	70.40
WESTERN	59.98	77.84	48.27	38.00	77.25
Total	56.59	74.58	39.21	33.97	70.94

Source: Ministry of Education, Science and Sports, 2008

Table 11: BECE Pass Rate (Female)

Region	Year				
	2003	**2004**	**2005**	**2006**	**2007**
ASHANTI	39.83	52.47	27.78	25.06	61.28
BRONG AHAFO	36.15	50.17	26.46	27.69	57.51
CENTRAL	35.56	51.28	26.42	26.42	54.22
EASTERN	36.03	51.29	27.20	25.80	61.11
GREATER ACCRA	57.06	71.92	22.60	21.80	166.30
NORTHERN	20.69	30.74	23.78	24.00	65.12
UPPER EAST	40.58	60.87	18.67	25.17	39.60
UPPER WEST	32.92	49.74	20.00	24.20	46.48
VOLTA	29.68	45.26	29.33	27.42	51.42
WESTERN	38.43	53.00	21.18	19.18	62.70
Total	35.41	49.82	25.35	24.98	62.48

Source: Ministry of Education, Science and Sports, 2008

At the national level, the pupil/teacher ratio at the public JHSs increased from a cumulative rate of 19.54:1 in 2003 to 37.63:1 in 2005 before decreasing to 17.56 in 2007 (Table 9). The increase in pupil/teacher ratio over the period 2005-2006 could be attributed to the introduction of the capitation grant over the same period which contributed to significant increase in enrolment rates, as stated earlier.

Table 10 shows the BECE pass rate**s** for males in all the regions from 2003 to 2007. It can be observed from the table that the pass rates dropped significantly across all regions in 2005 with a further decrease in 2006 before increasing in 2007. The pass rate for females follows a similar trend to that of the males as can be seen in Table 11. However, the pass rates for males were higher than those for females in all the years across all regions. This indicates that males are doing relatively better compared to females.

Generally the pattern that emerges from these trends indicate that the increased capitation grant over the period from 2005/2006 to 2007/2008 academic years has been associated with increased enrollment rates, increased pupil-teacher ratio and increased pass rates. However from these tables alone, one is not able to make any inferences about causation or whether the degree of association is significant when the effects of other variables are taken into account. We try to address some of these questions in the next section using panel data regression analysis.

Regression Analysis

Basic Education Certificate Examination Pass rates

Tables 12 to 23 show the regression results for BECE pass rates and enrollment rates over the period 2005 to 2007. The right-hand-side variables in the equations are given as follows:

capamtreleased2	:	Capitation Amount Released
ptrprimpub	:	Pupil/Teacher Ratio for Public Primary
ptrjhspub	:	Pupil/Teacher Ratio for Public JHS
acsprimpub	:	Average Class Size for Public Primary
acsjhspub	:	Average Class Size for Public JHS
ptxtrprimpub	:	Pupil to Text Book Ratio for Public Primary
ptxtrjhspub	:	Pupil to Text Book Ratio for Public JHS
ttjhspubm	:	Percentage Trained Male Teachers in Public JHS
ttjhspubf	:	Percentage Trained Female Teachers in Public JHS

We note from Table 12 that the coefficient of pupil/teacher ratio at junior high school level is negative and significant. This means that as pupil/teacher ratio increases, the pass rates for males also decreases. This is in line with *apriori* expectations since a high pupil/teacher ratio is expected to lower the quality of education and thus adversely affect the pass rates. This result can however not be generalized as this equation is only for the males. Indeed it is possible that enrollment is biased towards males. In that case we could have a situation where the number of females passing the exam grows at a faster rate than the growth in the number of males enrolling. This can lead to a negative and significant relationship between the pupil/teacher ratio and the BECE pass rates for males.

The coefficient on average class size for junior high school from Tables 12 is positive and significant. This suggests that smaller class sizes at the junior high school level are associated with poor performance for males, which is contrary to *apriori* expectations. The coefficient on pupil/textbook ratio for public junior high schools is significant and has the expected negative sign. In other words districts that are providing relatively more textbooks per pupil are doing better in the BECE examinations. Teacher training is also found to impact positively on pass rates as the proportion of trained teachers has a positive and significant effect on the pass rates for males. This is very evident in all three methods.

We also test whether the effect of the capitation grant is different for the three poorest regions (Northern, Upper East and Upper West regions) in Ghana. We do this by allowing a northern dummy to interact with the capitation grants variable. The results show that the effect of the capitation grants on male pass rate in the northern region is not different from that of the other regions. It is also noted that carrying out the estimations using three different methods yielded similar results (See Appendix A1 and A2).

Table 12: Pooled Model: BECE Pass Rates for Males, 2005 – 2007

VARIABLES	Eqn 1	Eqn 2	Eqn 3	Eqn 4	Eqn 5	Eqn 6
capamtreleased2	-0.141	-0.037	-0.030	-0.036	-0.039	-0.053
	(0.086)	(0.085)	(0.065)	(0.066)	(0.066)	(0.069)
capamtreleased2(-1)	0.154*	0.070	0.052	0.058	0.053	0.063
	(0.091)	(0.089)	(0.068)	(0.069)	(0.070)	(0.072)
Ttjhspubm	0.588***	0.440***	0.164***	0.162***	0.161***	0.182***
	(0.037)	(0.046)	(0.041)	(0.041)	(0.041)	(0.043)
Ttjhspubf	0.363***	0.270***	0.233***	0.235***	0.233***	0.209***
	(0.071)	(0.070)	(0.054)	(0.055)	(0.055)	(0.057)
Ptrjhspub		-0.524***	-0.072	-0.066	-0.067	-0.069
		(0.101)	(0.085)	(0.085)	(0.085)	(0.090)
Acsjhspub			0.594***	0.597***	0.599***	
			(0.044)	(0.044)	(0.044)	
Northdum				-0.746	-2.212	-1.142
				(1.451)	(2.259)	(2.345)
intdumNorth					0.018	0.010
					(0.022)	(0.023)
Ptxtrjhspub						-0.672***
						(0.055)
Constant	27.803***	45.636***	32.456***	32.435***	33.056***	56.821***
	(1.706)	(3.803)	(3.089)	(3.094)	(3.181)	(3.296)
Observations	276	276	276	276	276	276
R-squared	0.651	0.683	0.812	0.812	0.813	0.797

Standard errors in parentheses

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

Table 13: Pooled Model: BECE Pass Rates for Females, 2005 – 2007

VARIABLES	Eqn 1	Eqn 2	Eqn 3	Eqn 4	Eqn 5	Eqn 6
capamtreleased2	-0.025	0.139	0.142	0.112	0.099	0.090
	(0.276)	(0.281)	(0.280)	(0.284)	(0.285)	(0.285)
capamtreleased2(-1)	0.017	-0.116	-0.126	-0.093	-0.110	-0.103
	(0.292)	(0.295)	(0.293)	(0.297)	(0.299)	(0.299)
Ttjhspubm	0.508***	0.274*	0.120	0.107	0.105	0.106
	(0.120)	(0.152)	(0.175)	(0.176)	(0.176)	(0.176)
Ttjhspubf	0.591**	0.446*	0.425*	0.437*	0.431*	0.413*
	(0.229)	(0.234)	(0.234)	(0.235)	(0.235)	(0.235)
Ptrjhspub		-0.827**	-0.574	-0.542	-0.544	-0.524
		(0.336)	(0.364)	(0.367)	(0.367)	(0.371)
Acsjhspub			0.333*	0.353*	0.359*	
			(0.188)	(0.190)	(0.190)	
Northdum				-4.340	-9.523	-9.012
				(6.232)	(9.705)	(9.673)
intdumNorth					0.065	0.060
					(0.093)	(0.093)
Ptxtrjhspub						-0.433*
						(0.228)
Constant	20.497***	48.672***	41.278***	41.162***	43.356***	58.090***
	(5.474)	(12.653)	(13.274)	(13.287)	(13.667)	(13.598)
Observations	276	276	276	276	276	276
R-squared	0.156	0.175	0.184	0.186	0.187	0.188

Standard errors in parentheses

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table 13 reports the estimation of BECE pass rates for females over the period 2005 to 2007. The results are similar in most aspects to that of males. In particular we note that training for teachers is very important for education performance. This is also true when the model is estimated using the fixed and random effects techniques reported in Appendix A3 and A4. The proportion of trained teachers is positive and significant for most variants in the equation. In addition we note that the average class size is significant in some but not all the equations and does not have the expected positive sign. The coefficient on the pupil/textbook ratio for all the three different estimations were found to be negative and significant. Thus schools that had many textbooks for its pupil did well in the BECE exam. Finally we also observe that the effect of the capitation grant on pass rates is not different for the three most deprived regions of Ghana.

Bridging the Gender Gap

We try to get a sense of whether the capitation grant is bridging the gap between the education outcomes for males and females. We note from Figure 2 that the difference between the pass rates for males and females generally declined over the period 2003 to 2007. In other words the gender situation in terms of this particular education outcome improved over the study years. We therefore try to understand whether there is any significant association between this and the increase in capitation grants over this period.

We use the results from a regression of the difference in pass rates for males and females on selected variables including the capitation grants as the basis of the analysis. We note from Table 14 that interestingly all the variables did not have any significant effect on the differences in male and female pass rate. Using the fixed and random effects method of estimation, similar results was realized (See Appendix A5 and A6). The key conclusion here is that we do not find the capitation grant to be significant in this set of regressions.

Figure 2:   Differences in Male-Female BECE Pass rates for Public Schools, 2003/2004 to 2007/2008 National Averages
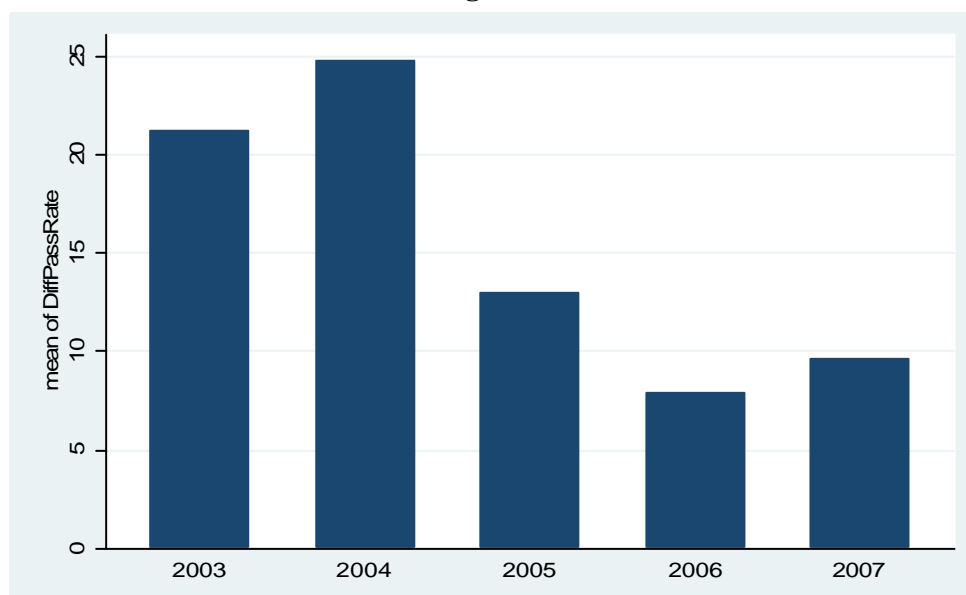
Source: Ministry of Education, Science and Sports, 2008

Table 134: Pooled Model: Difference in Male and Female Pass Rates, 2005 – 2007

VARIABLES	Eqn 1	Eqn 2	Eqn 3	Eqn 4	Eqn 5	Eqn 6
capamtreleased2	-0.115	-0.176	-0.173	-0.147	-0.138	-0.142
	(0.271)	(0.279)	(0.278)	(0.282)	(0.283)	(0.284)
capamtreleased2(-1)	0.137	0.186	0.178	0.151	0.163	0.166
	(0.287)	(0.292)	(0.292)	(0.296)	(0.297)	(0.297)
Ttjhspubm	0.079	0.165	0.044	0.055	0.056	0.076
	(0.118)	(0.151)	(0.174)	(0.175)	(0.175)	(0.175)
Ttjhspubf	-0.229	-0.175	-0.192	-0.202	-0.197	-0.205
	(0.225)	(0.232)	(0.232)	(0.233)	(0.234)	(0.234)
Ptrjhspub		0.304	0.502	0.476	0.477	0.455
		(0.333)	(0.361)	(0.365)	(0.365)	(0.369)
Acsjhspub			0.261	0.244	0.240	
			(0.186)	(0.189)	(0.189)	
Northdum				3.594	7.311	7.869
				(6.195)	(9.651)	(9.628)
intdumNorth					-0.047	-0.050
					(0.093)	(0.093)
Ptxtrjhspub						-0.239
						(0.227)
Constant	7.306	-3.036	-8.823	-8.726	-10.300	-1.269
	(5.376)	(12.546)	(13.190)	(13.207)	(13.591)	(13.536)
Observations	276	276	276	276	276	276
R-squared	0.004	0.008	0.015	0.016	0.017	0.015

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Gross Enrolment Rates

In this sub-section we provide an analysis of the association between the level of capitation grant that a district gets and the gross enrollment rates. The results for the estimated equations are given in Tables 14 (Also see Appendix A7 and A8). Unfortunately we do not have data for 2005 and so the equation is estimated for the period 2006 and 2007. We note that for the pooled and random effects estimations, the capitation grant does not have a significant effect on gross enrolment rates. However, in the model estimated using the fixed effects technique, the capitation grant was found to have a positive and significant effect on enrollment rates. Variables that seem to have some effect (i.e. significant) on the gross enrollment rates are the proportion of trained teachers at the primary level and the BECE pass rate.

It is seen that trained teachers have a positive and significant effect on enrolment rates; ie. more trained teachers in a district lead to an increase in enrolment rate since there will be enough teachers to handle increases in the number of pupils. The BECE pass rate for

males was found to have a positive and significant effect on gross enrolment rate. The coefficient on pass rate for females was positive but not significant. An interactive dummy was added to the equation to capture the effect of deprived regions on enrollment rate. The coefficient on this variable was negative and significant. This means that enrolment rate in these deprived regions is adversely affected by how deprived the region is. Both of these sets of variables have a positive association with the gross enrollment rates. We also note that even though the capitation grant is not significant in the regression, its effect is significantly lower in the three Northern regions compared to the remaining 7 regions. This is true for all variants of the equations.

Table 15: Pooled Model: Gross Enrolment Rates, 2006 – 2007

VARIABLES	Eqn 1	Eqn 2	Eqn 3	Eqn 4	Eqn 5	Eqn 6
capamtreleased2	0.080	0.093	0.121	0.104	0.117	0.091
	(0.106)	(0.106)	(0.105)	(0.106)	(0.106)	(0.107)
capamtreleased2(-1)	-0.067	-0.081	-0.130	-0.112	-0.093	-0.044
	(0.112)	(0.112)	(0.112)	(0.113)	(0.113)	(0.113)
Beceprm	0.385***	0.243***	0.109	0.101	0.112	0.224**
	(0.050)	(0.089)	(0.100)	(0.100)	(0.099)	(0.104)
Beceprm(-1)	-0.452***	-0.535***	-0.465***	-0.457***	-0.456***	-0.502***
	(0.118)	(0.125)	(0.136)	(0.136)	(0.135)	(0.133)
Beceprf	0.007	0.008	-0.002	-0.003	-0.001	0.008
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Beceprf(-1)	0.190*	0.172*	0.180*	0.165	0.175*	0.167
	(0.101)	(0.101)	(0.103)	(0.103)	(0.103)	(0.102)
Ptrprimpub		0.331*	0.368**	0.387**	0.362**	0.285
		(0.171)	(0.176)	(0.176)	(0.176)	(0.183)
Ttprimpubm			0.060	0.050	0.046	
			(0.100)	(0.100)	(0.099)	
Ttprimpubf			0.205**	0.215***	0.216***	
			(0.080)	(0.080)	(0.080)	
Northdum				-2.788	2.948	3.401
				(2.380)	(3.693)	(3.741)
intdumNorth					-0.071**	-0.072**
					(0.035)	(0.036)
Ptxtrjhspub						-0.048
						(0.107)
Constant	77.744***	79.926***	81.151***	81.764***	79.237***	79.805***
	(5.610)	(5.694)	(5.847)	(5.866)	(5.964)	(7.518)
Observations	276	276	276	276	276	276
R-squared	0.292	0.302	0.323	0.326	0.337	0.315

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Conclusions

This study had a simple aim to provide an assessment of how the capitation grants has impacted on key education outcomes in Ghana. Among the key education outcome indicators discussed in this paper are the BECE pass rates, gross enrolment ratios and gender differences in pass rates. Other outcome indicators also investigated include pupil-teacher ratio, pupil-textbook ratio, average class size and proportion of trained teachers at the basic level. The three main hypotheses tested in the study centres around the impact of the capitation grant on BECE pass rates, enrolment rates and in bridging the gender gap in education. The study used data from the Ghana Education Service for all 138 districts in Ghana and over the period 2003 to 2007. Regression analysis was used mainly. The key findings of the study are summarized as follows:

First, the study found little support for the three key hypotheses tested. We found that the capitation grant has not had any significant impact on the BECE pass rates in Ghana. Rather, in terms of the BECE pass rates, the proportion of trained teachers seemed to have impacted positively and significantly on the pass rates. In terms of the hypothesis that looks at the relationship between the capitation grant and enrollment rates, we also found no significant effect. Furthermore, we found that the capitation grant has not had any significant effect on the bridging of the gap between the BECE pass rates for males and females.

Although these results may be surprising, particularly with respect to the enrollment rates, it is not so much the case for the BECE pass rates. As discussed earlier in this paper the literature remains inconclusive on how capitation grants impact on education quality indicators. This is because any increase in enrollment which results from these education subsidies puts added pressure on existing school facilities with adverse implications for education quality. In our results, although we did not find any significant effect of the capitation grant on enrollments, we note that enrollments did increase over the study period.

Second, we observed from the study that from about 2005 when the capitation grant started in Ghana, the grant has increased over the years. However there are shortfalls in what is promised and what the schools actually get from the Ghana Education Service. In other words there is a consistent deficit in what is due and what is realized. This does not augur well for education outcomes as it imposes a strain on the schools. In other words an increase in enrollment comes with added financial responsibility for the schools. Therefore if disbursements fall short of commitments, the schools have to take other measures to be able to meet their obligations. This may be in the form of a reduction in key expenditure line items.

Finally, we observed that over the study period, there was an increase in the Gross Enrollment Ratio at both the primary and JHS levels. However in terms of other indicators such as the pupil/teacher ratio and pupil/textbook ratio, the results were mixed. For instance, the pupil/teacher ratio generally increased up to 2006/2007 and then declined sharply in 2007/2008. In addition we observed that the pupil-teacher ratio for private schools has been consistently lower than that for public schools. Clearly, the need

for policies that addresses some of these shortfalls in the public schools cannot be over-emphasized.

We conclude by noting that although the results are somewhat surprising, it may be a result of the fact that it is too early to begin to see the effects of the capitation grants. This is so because the capitation grants policy was only started in Ghana in 2005. A longer period of time is needed to observe a more consistent effect of the capitation grant on educational indicators in Ghana. Additionally, the degree of uncertainty/unpredictability of the disbursed amount of the capitation grants may also be contributing to the insignificance of the results. Uncertainty affects planning by the schools and therefore could have implications for education outcomes. Finally, we alluded to the inability of this study to account for the demand-side factors that influence educational outcomes. Caveats notwithstanding, these results suggest that education policy needs to be holistic to derive maximum benefits for the country. In other words, the capitation grant alone cannot deliver on important education outcomes as enshrined in the MDGs. The in-built test for the robustness in our analysis underscores the strength of our findings.

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Appendix

Table A1: Fixed Effects: BECE Pass Rates for Males

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	0.488**	0.098	-0.001	-0.001	0.079	0.056
	(0.218)	(0.200)	(0.198)	(0.198)	(0.205)	(0.200)
capamtreleased2(-1)	0.481***	0.165	0.161	0.161	0.132	0.119
	(0.118)	(0.114)	(0.111)	(0.111)	(0.112)	(0.110)
ttjhspubm	0.578***	0.372***	0.272***	0.272***	0.267***	0.194***
	(0.044)	(0.050)	(0.060)	(0.060)	(0.060)	(0.066)
ttjhspubf	0.451***	0.218**	0.250***	0.250***	0.268***	0.190**
	(0.089)	(0.086)	(0.084)	(0.084)	(0.085)	(0.083)
ptrjhspub		-0.935***	-0.570***	-0.570***	-0.576***	-0.726***
		(0.143)	(0.189)	(0.189)	(0.189)	(0.148)
acsjhspub			0.270***	0.270***	0.277***	
			(0.094)	(0.094)	(0.094)	
Northdum				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)
intdumNorth					-0.532	-0.258
					(0.365)	(0.361)
ptxtrjhspub						-0.359***
						(0.093)
Constant	-45.455**	41.934*	38.077*	38.077*	41.625*	59.514***
	(19.358)	(21.592)	(21.077)	(21.077)	(21.128)	(20.977)
Observations	276	276	276	276	276	276
R-squared	0.852	0.888	0.895	0.895	0.896	0.901
Number of id	138	138	138	138	138	138

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

Standard errors in parentheses

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A2: Random Effects: BECE Pass Rates for Males

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	-0.141	-0.037	-0.030	-0.036	-0.039	-0.053
	(0.086)	(0.085)	(0.065)	(0.066)	(0.066)	(0.069)
capamtreleased2 (-1)	0.154*	0.070	0.052	0.058	0.053	0.063
	(0.091)	(0.089)	(0.068)	(0.069)	(0.070)	(0.072)
ttjhspubm	0.588***	0.440***	0.164***	0.162***	0.161***	0.182***
	(0.037)	(0.046)	(0.041)	(0.041)	(0.041)	(0.043)
ttjhspubf	0.363***	0.270***	0.233***	0.235***	0.233***	0.209***
	(0.071)	(0.070)	(0.054)	(0.055)	(0.055)	(0.057)
ptrjhspub		-0.524***	-0.072	-0.066	-0.067	-0.069
		(0.101)	(0.085)	(0.085)	(0.085)	(0.090)
acsjhspub			0.594***	0.597***	0.599***	
			(0.044)	(0.044)	(0.044)	
Northdum				-0.746	-2.212	-1.142
				(1.451)	(2.259)	(2.345)
intdumNorth					0.018	0.010
					(0.022)	(0.023)
ptxtrjhspub						-0.672***
						(0.055)
Constant	27.803***	45.636***	32.456***	32.435***	33.056***	56.821***
	(1.706)	(3.803)	(3.089)	(3.094)	(3.181)	(3.296)
Observations	276	276	276	276	276	276
R-squared	.	.	.	.	.	.
Number of id	138	138	138	138	138	138

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A3: Fixed Effects: BECE Pass Rates for Females

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	0.999	0.537	0.557	0.557	0.717	0.452
	(0.796)	(0.827)	(0.843)	(0.843)	(0.877)	(0.864)
capamtreleased2(-1)	0.354	-0.021	-0.021	-0.021	-0.079	-0.123
	(0.430)	(0.471)	(0.473)	(0.473)	(0.481)	(0.475)
ttjhspubm	0.412**	0.167	0.188	0.188	0.177	-0.218
	(0.160)	(0.206)	(0.254)	(0.254)	(0.255)	(0.284)
ttjhspubf	0.676**	0.401	0.394	0.394	0.430	0.340
	(0.325)	(0.354)	(0.359)	(0.359)	(0.363)	(0.358)
ptrjhspub		-1.110*	-1.184	-1.184	-1.197	-0.658
		(0.593)	(0.807)	(0.807)	(0.809)	(0.641)
acsjhspub			-0.055	-0.055	-0.041	
			(0.402)	(0.402)	(0.404)	
Northdum				0.000	0.000	0.000
intdumNorth					-1.064	-0.600
					(1.566)	(1.561)
ptxtrjhspub						-0.778*
						(0.403)
Constant	-81.384	22.366	23.155	23.155	30.244	60.769
	(70.593)	(89.265)	(89.780)	(89.780)	(90.567)	(90.597)
Observations	276	276	276	276	276	276
R-squared	0.288	0.306	0.306	0.306	0.308	0.327
Number of id	138	138	138	138	138	138

Standard errors in parentheses

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A4: Random Effects: BECE Pass Rates for Females

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	-0.025	0.139	0.142	0.112	0.099	0.090
	(0.276)	(0.281)	(0.280)	(0.284)	(0.285)	(0.285)
capamtreleased2 (-1)	0.017	-0.116	-0.126	-0.093	-0.110	-0.103
	(0.292)	(0.295)	(0.293)	(0.297)	(0.299)	(0.299)
ttjhspubm	0.508***	0.274*	0.120	0.107	0.105	0.106
	(0.120)	(0.152)	(0.175)	(0.176)	(0.176)	(0.176)
ttjhspubf	0.591***	0.446*	0.425*	0.437*	0.431*	0.413*
	(0.229)	(0.234)	(0.234)	(0.235)	(0.235)	(0.235)
ptrjhspub		-0.827**	-0.574	-0.542	-0.544	-0.524
		(0.336)	(0.364)	(0.367)	(0.367)	(0.371)
acsjhspub			0.333*	0.353*	0.359*	
			(0.188)	(0.190)	(0.190)	
Northdum				-4.340	-9.523	-9.012
				(6.232)	(9.705)	(9.673)
intdumNorth					0.065	0.060
					(0.093)	(0.093)
ptxtrjhspub						-0.433*
						(0.228)
Constant	20.497***	48.672***	41.278***	41.162***	43.356***	58.090***
	(5.474)	(12.653)	(13.274)	(13.287)	(13.667)	(13.598)
Observations	276	276	276	276	276	276
R-squared	.	.	.	.	.	.
Number of id	138	138	138	138	138	138

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A5: Fixed Effects: Difference in Male and Female Pass Rates

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	-0.511	-0.438	-0.558	-0.558	-0.638	-0.396
	(0.775)	(0.815)	(0.829)	(0.829)	(0.863)	(0.861)
capamtreleased2(-1)	0.128	0.187	0.181	0.181	0.210	0.242
	(0.418)	(0.464)	(0.465)	(0.465)	(0.474)	(0.473)
ttjhspubm	0.166	0.204	0.084	0.084	0.089	0.412
	(0.156)	(0.203)	(0.250)	(0.250)	(0.251)	(0.283)
ttjhspubf	-0.226	-0.182	-0.144	-0.144	-0.162	-0.150
	(0.316)	(0.349)	(0.353)	(0.353)	(0.358)	(0.357)
ptrjhspub		0.175	0.615	0.615	0.621	-0.068
		(0.585)	(0.793)	(0.793)	(0.796)	(0.639)
acsjhspub			0.325	0.325	0.318	
			(0.395)	(0.395)	(0.397)	
Northdum				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)
intdumNorth					0.531	0.342
					(1.542)	(1.556)
ptxtrjhspub						0.419
						(0.402)
Constant	35.929	19.568	14.922	14.922	11.381	-1.255
	(68.725)	(88.009)	(88.298)	(88.298)	(89.188)	(90.321)
Observations	276	276	276	276	276	276
R-squared	0.012	0.013	0.018	0.018	0.019	0.022
Number of id	138	138	138	138	138	138

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A6: Random Effects: Difference in Male and Female Pass Rates

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	-0.117	-0.176	-0.173	-0.149	-0.139	-0.142
	(0.270)	(0.279)	(0.278)	(0.282)	(0.283)	(0.283)
capamtreleased2(-1)	0.139	0.187	0.179	0.152	0.164	0.167
	(0.286)	(0.292)	(0.291)	(0.295)	(0.297)	(0.297)
ttjhspubm	0.080	0.166	0.044	0.055	0.056	0.076
	(0.117)	(0.151)	(0.173)	(0.175)	(0.175)	(0.175)
ttjhspubf	-0.229	-0.175	-0.192	-0.201	-0.197	-0.205
	(0.225)	(0.232)	(0.232)	(0.233)	(0.234)	(0.234)
ptrjhspub		0.303	0.503	0.477	0.478	0.454
		(0.333)	(0.362)	(0.365)	(0.366)	(0.369)
acsjhspub			0.261	0.244	0.240	
			(0.187)	(0.189)	(0.190)	
Northdum				3.589	7.305	7.873
				(6.217)	(9.684)	(9.642)
intdumNorth					-0.047	-0.050
					(0.093)	(0.093)
ptxtrjhspub						-0.238
						(0.227)
Constant	7.278	-3.033	-8.844	-8.756	-10.326	-1.285
	(5.386)	(12.553)	(13.203)	(13.226)	(13.610)	(13.542)
Observations	276	276	276	276	276	276
Number of id	138	138	138	138	138	138
R-squared	.	.	.	.	.	.

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A7: Fixed Effects: Gross Enrolment Rates

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	0.417***	0.252**	0.288***	0.288***	0.187*	0.145
	(0.105)	(0.106)	(0.101)	(0.101)	(0.101)	(0.102)
capamtreleased2 (-1)	0.174***	0.072	0.094	0.094	0.123**	0.119**
	(0.060)	(0.062)	(0.058)	(0.058)	(0.057)	(0.057)
beceprm	0.217***	0.133***	0.126***	0.126***	0.139***	0.026
	(0.031)	(0.035)	(0.041)	(0.041)	(0.040)	(0.040)
Beceprm(-1)	-	-	-	-	-	-
	0.948***	0.751***	0.646***	0.646***	0.612***	0.786***
	(0.110)	(0.113)	(0.122)	(0.122)	(0.117)	(0.104)
beceprf	0.019	0.017	0.015	0.015	0.016	0.013
	(0.012)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
Beceprf(-1)	0.095	0.117	0.101	0.101	0.044	0.063
	(0.109)	(0.103)	(0.098)	(0.098)	(0.096)	(0.095)
ptrprimpub		0.365***	0.300***	0.300***	0.279***	0.186**
		(0.085)	(0.086)	(0.086)	(0.083)	(0.086)
ttprimpubm			0.159***	0.159***	0.176***	
			(0.045)	(0.045)	(0.043)	
ttprimpubf			-0.088**	-0.088**	-	
					0.125***	
			(0.039)	(0.039)	(0.039)	
Northdum				0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)
intdumNorth					0.631***	0.469***
					(0.183)	(0.178)
ptxtrjhspub						-
						0.202***
						(0.043)
Constant	62.600***	70.142***	62.364***	62.364***	59.206***	84.932***
	(10.491)	(10.011)	(10.114)	(10.114)	(9.757)	(9.718)
Observations	276	276	276	276	276	276
R-squared	0.864	0.881	0.895	0.895	0.904	0.901
Number of id	138	138	138	138	138	138

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008

Table A8: Random Effects: Gross Enrolment Rates

VARIABLES	(1) Eqn 1	(2) Eqn 2	(3) Eqn 3	(4) Eqn 4	(5) Eqn 5	(6) Eqn 6
capamtreleased2	0.037	0.052	0.055	0.055	0.071	0.050
	(0.049)	(0.045)	(0.044)	(0.044)	(0.047)	(0.047)
capamtreleased2 (-1)	0.005	-0.025	-0.019	-0.019	-0.015	0.002
	(0.049)	(0.045)	(0.044)	(0.044)	(0.044)	(0.043)
beceprm	0.320***	0.154***	0.138***	0.139***	0.138***	0.062
	(0.024)	(0.034)	(0.040)	(0.040)	(0.040)	(0.039)
Beceprm(-1)	-0.754***	-0.647***	-0.580***	-0.577***	-0.582***	-0.639***
	(0.096)	(0.091)	(0.095)	(0.095)	(0.094)	(0.087)
beceprf	0.017	0.016	0.013	0.013	0.013	0.012
	(0.012)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
Beceprf(-1)	0.118	0.130	0.112	0.108	0.112	0.120
	(0.091)	(0.084)	(0.083)	(0.083)	(0.083)	(0.081)
ptrprimpub		0.452***	0.392***	0.393***	0.390***	0.325***
		(0.071)	(0.073)	(0.074)	(0.073)	(0.074)
ttprimpubm			0.144***	0.143***	0.143***	
			(0.044)	(0.045)	(0.044)	
ttprimpubf			-0.056	-0.056	-0.056	
			(0.036)	(0.036)	(0.036)	
Northdum				-2.135	1.373	0.954
				(3.202)	(5.061)	(5.123)
intdumNorth					-0.043	-0.045
					(0.048)	(0.048)
ptxtrjhspub						-0.171***
						(0.043)
Constant	91.682***	85.425***	82.985***	83.282***	81.977***	95.271***
	(4.967)	(4.757)	(5.033)	(5.058)	(5.252)	(5.608)
Observations	276	276	276	276	276	276
Number of id	138	138	138	138	138	138
R-squared	.	.	.	.	.	.

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

Source: Estimated using data from Ministry of Education, Science and Sports, 2008