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Socioeconomic Determinants of Primary School Drop Out: The Logistic Model Analysis

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Abstract

This paper attempts to examine the socioeconomic determinants of primary school dropout in Uganda with the aid of a logistic model analysis using the 2004 National Service Delivery Survey data. The Objectives were to establish the household socioeconomic factors that influence dropout of pupils given free education and any possible policy alternatives to curb dropout of pupils. Various logistic regressions of primary school dropout were estimated and these took the following dimensions; rural-urban, gender, and age-cohort. After model estimation, marginal effects for each of the models were obtained. The analysis of the various coefficients was done across all models. The results showed the insignificance of distance to school, gender of pupil, gender of household head and total average amount of school dues paid by students in influencing dropout of pupils thus showing the profound impact Universal Primary Education has had on both access to primary education and pupil dropout. Also the results vindicated the importance of parental education, household size and proportion of economically active household members in influencing the chances of pupil dropout. The study finally calls for government to; keep a keen eye on non-school fees payments by parents to schools as these have the potential to increase to unsustainable levels by most households especially in rural areas; roll-out adult education across the entire country; and expand free universal education to secondary and vocational levels as it would allow some of those who can not afford secondary education to continue with schooling. This has the effect of reducing the number of unproductive members in the household.

Keywords: determinants of primary school dropout, logistic model, Survey data, Uganda

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1 Introduction and Motivation of study

Education is a fundamental human right as well as a catalyst for economic growth and human development Okidi et al., (2004). In its bid to promote economic growth and human development, the government of Uganda in 1997 implemented the Universal Primary Education (UPE), initially for four pupils per family but later opened to every one of school going age or interested adults. The Ugandan government is committed to UPE, as reflected by the improved budgetary allocations to the education sector[44]. For instance, whereas in 1992/93 education comprised 12% of the total government expenditure, by 1998/99 it had reached 25% and stood at 23.3% in 2004/05[45].

The introduction of UPE accompanied by government commitment, including political leadership resulted into a surge in primary school enrolment from 2.7 million pupils in 1996 to 5.3 million in 1997 and to 7.1 million in 2005[46]. The ever increasing primary school enrolment has consequently led to improvements in Gross Enrollment Ratio (GER). Whereas GER in the decade preceding 1997[47] had increased by only 39%, by 2004 GER had risen by 104.42% (Bategeka et al., 2004). This suggests that Uganda is on the verge of attaining the UPE Millennium Development Goals (MDG) in as far as access is concerned.

However, much as primary school enrolment has been a success, the concern now is with regard to the internal efficiency[48] of primary education and in this particular case the ability to retain pupils until they graduate from primary school. The incidence of pupils dropping out of school is palpable in primary six and primary five which is 34.9 percent and 22.1 percent respectively (UBOS[49], 2004). The comprehensive evaluation of basic education in Uganda (MoES[50], 2005) asserted that UPE dropout has escalated from 4.7% in 2002 to 6.1% in 2005. It further notes that of the Net Enrollment Ratio (NER) for boys and girls is 93.01%, however 55% of boys and 54.6% of girls reach primary four, while 31.2% of the boys and 27.7% of girls reach primary seven.

The problem of dropout is thus disquieting to both policy makers and researchers in that regard therefore, a few studies have been undertaken in Uganda in an attempt to understand primary school dropout. These include: Kakuru, (2003); Kasente, (2003) and Nishimura et al., (2008). The limitation with these studies is with regard to their scope. For example Nishimura et al., (2008) by only looking at rural pupils besides excluding those in Northern Uganda constrains the possibility of drawing nationally representative policy recommendations. Furthermore, studies like Kasente, (2003) and Kakuru, (2003) do not explicitly seek to focus on understanding primary school drop out though mention is made of it. Therefore, this study seeks to understand primary school dropout using the 2004 National Household Service Delivery data collected by the Uganda Bureau of Statistics with over 17,681 households sampled as compared to say

[44] The Education Sector Investment Plan (ESIP) made it mandatory that not less than 65% of education budget is spent on primary education
[45] See Annual Budget Performance Report (MoFPED), several series.
[46] Education Statistical Abstract, several series
[47] Period 1986 to 1996, enrolment increased from 2,203,824 to 3,068,625 in 1996.
[48] Internal efficiency is measured by both dropout and repetition.
[49] Uganda Bureau of Statistics
[50] Ministry of Education and Sports

Nishimura et al., (2008) which sampled only 940 rural households. This has the advantage of studying primary school dropout from a national perspective irrespective of a household location. Furthermore, the study exploits the fact that the data was collected seven years after the adoption of UPE.

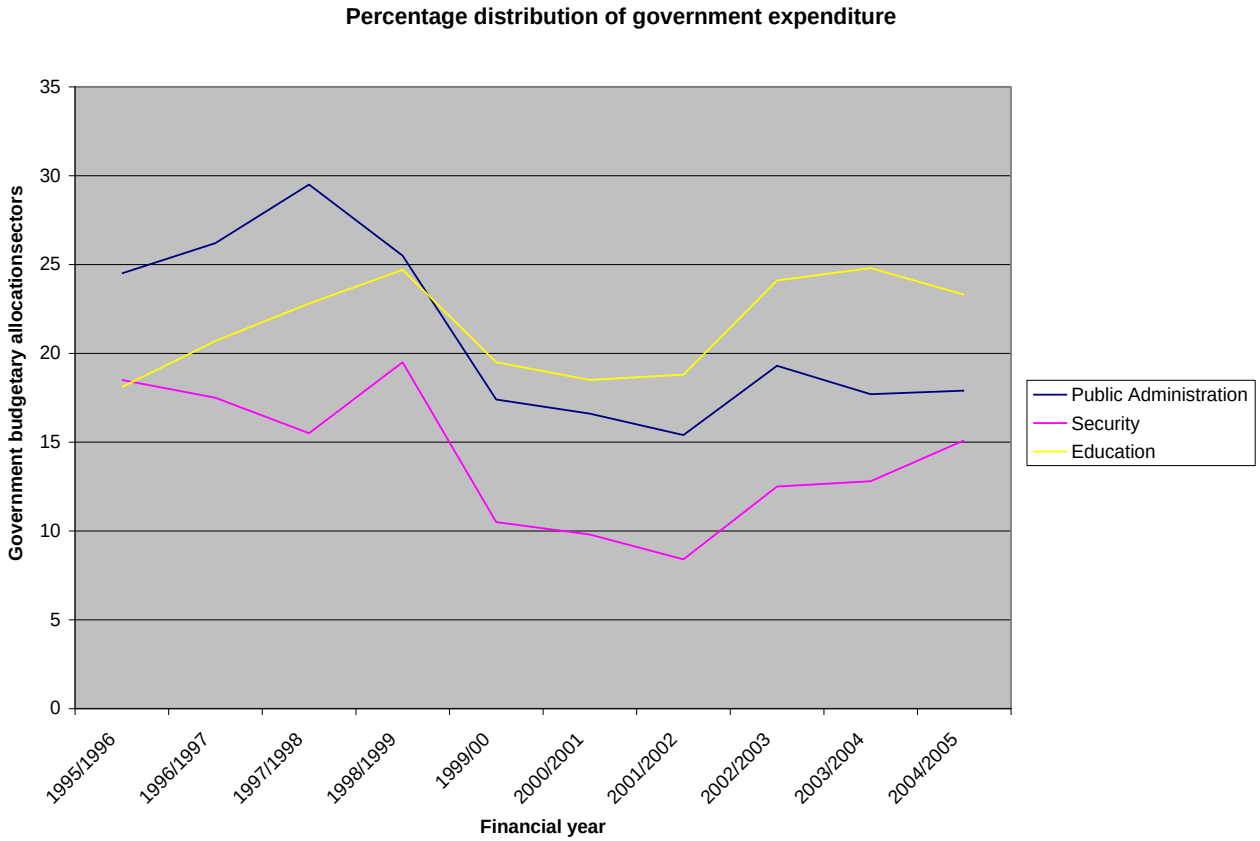
Note however that because of the limitations in the 2004 NSDS data such that defining primary school dropout from a service provider level (primary school level) was impossible, we focus this study on establishing the socio-economic factors that influence the probability of pupils dropping out of school. The study therefore sought to answer the following questions; What key household socioeconomic factors influence dropout of pupils given free education? What policy alternatives to curb dropout of pupils can be pursued?

The paper is organized in seven sections: the first section is the background and motivation of the study; section two is a description of Uganda's primary schooling situation; section three captures the literature review which explores research findings of similar studies; section four encompasses the methodology adopted; section five is a quantitative description of the data; the study findings are presented in section six while the conclusion and policy recommendations are in section seven.

2.0 The Uganda Primary Schooling Context

Primary education is run by both private and public schools. Note that while education is free in public schools, the reverse is true for private schools. UPE was instituted in public schools in January 1997 with following objectives to be achieved: establish, provide and maintaining quality education as a basis for promoting the necessary human resources; transform society in a fundamental and positive way; make basic education accessible to learners and relevant to their needs as well as meeting national goals; gender balance in education in order to eliminate disparities and inequities; enhance the affordability of education to the majority of Ugandans and; equipping every individual with basic knowledge with which to exploit the environment for both personal and national development, Bategeka et al., (2004).

In a bid to achieve the above objectives, there was a need to revise the budgetary allocations to the education sector. To this effect, we have seen the education sector over-ride other sectors (security, public administration, water, to mention but a few) with regard to budgetary allocations. For instance



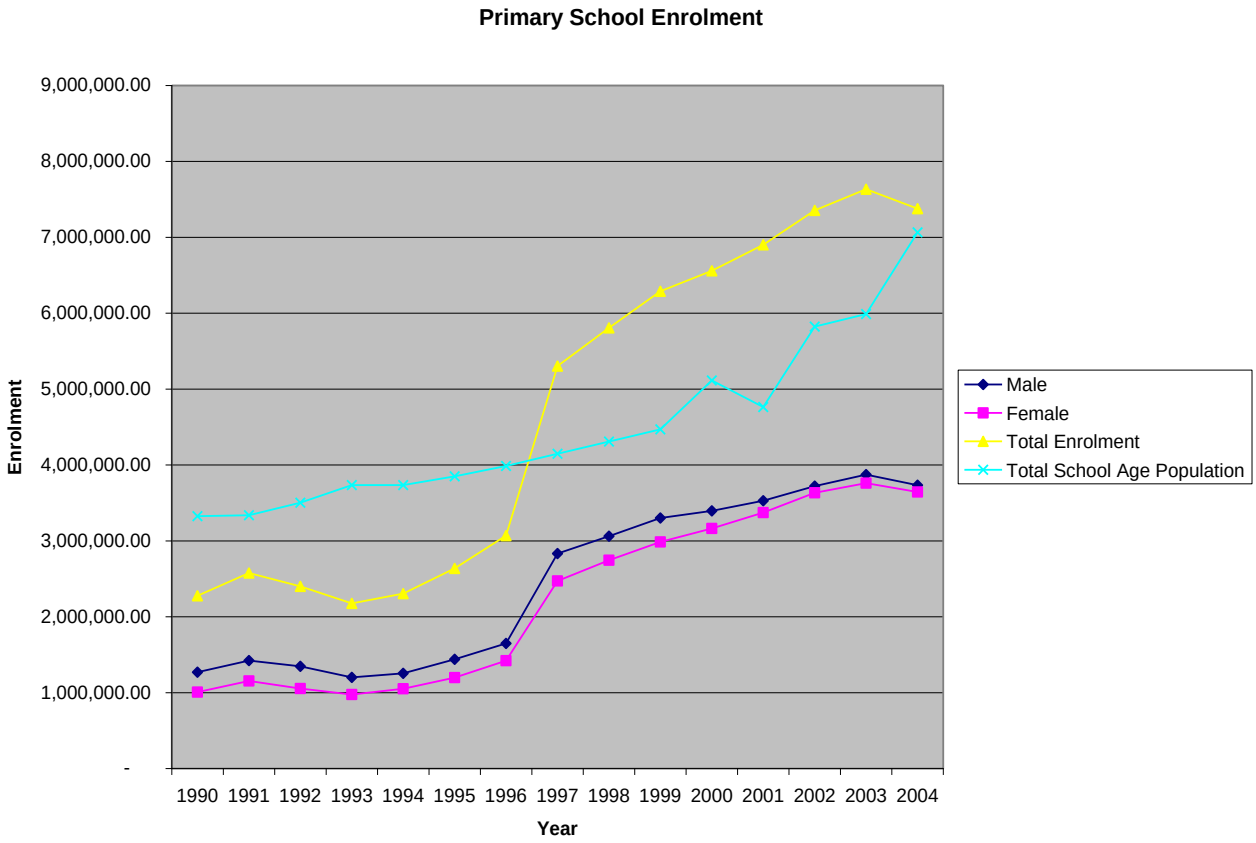
Source: Authors based on data from the Annual Budget Performance Report, Ministry of Finance Planning and Economic Development (Several series).

in reference to the figure 1 and in financial year 1995/96 security, public administration, and education sectors acquired 24.5 per cent, 18.5 per cent and 18.1 per cent respectively of government expenditure. However, the financial year 1996/1997 saw an increase in expenditure on the education sector (UPE was introduced) to the extent that by 1999/2000, it received the highest proportion of government budgetary allocation. Today the education sector still receives the highest proportion of government budget and in particular, the primary education receives over 60 percent of the education budgetary allocation, Okumu, (2006) with most of the resources going to classroom construction, purchase of textbooks and teacher salaries with the aim of improving primary school educational outcome.

With regard to enrolment moreso after the adoption of UPE, Uganda experienced a surge in primary school enrolment. Figure 2[51] below shows that, the enactment of the UPE policy in 1997 led to a tremendous increase in primary school enrolment for both boys and girls. Note worth that pupil enrolment increased to the extent it overshadowed the primary school age population.

[51] Total in the figure two implies the total number of children enrolled in primary education while total-2 means the total number of children of primary school going age that are actually in school.

This is evident right from the year 1997 implying that even persons either below six years or above 12 years enrolled for Primary education and since then the status quo has been maintained.



Source: Authors based on data from Uganda Statistical Abstract (several series).

Owing to the over 100 per cent GER, it necessitated an enhancement in primary school inputs (that is, teachers, classrooms and textbooks) so as to ensure optimal outcomes. With regard to classrooms, against a total requirement of say 135,134 classrooms by 2003/4, a total of 102,507 classrooms have been constructed. With reference to only government aided schools, a total of 85,902 classrooms have been constructed with a corresponding pupil classroom ratio of 78 which is 18 points above appropriate ratio of 60, MoES (2006). Referring to the teacher-pupil ratio, the appropriate ratio is 46. Note that after the lifting of the teacher recruitment ban in December 2000, recruitment of teachers increased immensely; however, as of 2006, with the teacher-pupil ratio in government schools was 52 which is till 6 points above the standard, MoES (2006).

Note worth that much as teacher recruitment is increasing, those exiting and remaining reluctant to teach in rural areas erode its gains. Furthermore, with the erroneous deletions of the teachers from the payroll and the deployment of others in schools without vacancies thus denying then entry onto the payroll, this negates government efforts to attain the appropriate teacher-pupil ratio. On a good note however, the proportion of primary teachers with the required academic

qualifications and the teacher attrition ratio has increased. This is attributed to the sound education and training at Primary Teacher Training Colleges to make them effective, competent and professional in their service, Bategeka et al., (2004).

With Reference to the pupil-textbook ratio, moreso since the early 80's when parents started buying text books for their children; Uganda experienced a surge in the pupil-text book ratio Bategeka et al., 2004). However upon government rolling out the UPE programme it restocked government aided primary schools with text books to the tune of 2.2 million books Appleton, (2002). Given that development however, the pupil-text book ratio is still high; for instance, English, Agriculture, Science, Mathematics, Kiswahili and Religion to but a few have 1.9, 3.6, 2, 1.8, 241.5 and 9 respectively MoES, (2006). Worse still other some pupils do not have access to the books because the school administration keeps in lockers and some even damaged by cockroaches, rats and termites as result of poor storage Bategeka et al., (2004).

With regard to repetition and dropout rates, the former has on average been just over 10 per cent. This could be attributed to the government policy of non-repetition PEAP, (2004/2005). Furthermore, the issue of dropout is still evident and that the incidence of children leaving school is mostly seen in primary six and primary five which boost of 34.9 per cent and 22.1 per cent dropout rates respectively. It is noted that the major reasons sited by households that result in children dropping out of school are; marriage, pregnancies, insecurity, harassment at school, indiscipline and being expelled to mention but a few UBOS, (2004). Note that much as UBOS, (2004) identifies the various factors explaining the prevalence of primary school dropout inspite of the fact that there is UPE, their significances is not explained which is the cornerstone of this study from rather a household level.

3.0 Review of Literature

In almost all developing countries, school dropout or low completion rates have been a subject of interest to academics, researchers, and policy makers for a long time. According to the poverty status report MoFPED, (2005), the phenomenon of high school dropout rate continues to pose a big challenge to the successful implementation of national policies. Although the findings of various studies differ depending on the peculiar country specific situations, rural-urban divide, gender bias, and distance to school appear to be the most common elements in all the studies. In this section we review the findings of some of the studies pertaining to drop out rates at various grade levels at household levels with greater emphasis on Uganda.

3.1 Household level factors

The study by Holmes (2003) found out that overall; females receive less education than males, and they tend to dropout, or are withdrawn earlier for both economic and social-cultural reasons. The study furthers argues that the opportunity cost of sending female children to school in rural areas, where girls are married quite early, is high because benefits of their schooling will not accrue to their parental household. Similarly Kasente, (2003), Kakuru, (2003) explain how early marriages influence children's dropping out of school especially as regards the girl child as it is perceived by parents that marrying off the girl child is an escape route from poverty. Uganda

Participatory Poverty Assessment (UPPAP, 2000) indicates that marrying off girls would benefit her family in terms of attaining bride price.

Odaga and Heneveld (1995), further note that parents worry about wasting money on the education of girls because there are most likely to get pregnant or married before completing their schooling and that once married, girls become part of another family and the parental investment in them is lost this therefore perpetuates parents discouraging the girl child from continuing with school.

Findings with regard to the impact of parent's education on schooling of children show that the children of more educated parents are more likely to be enrolled and more likely to progress further through school. Holmes, (2003) shows that this impact differs by gender, the education of the father increases the expected level of school retention of boys, and that of the mother's enhances the educational attainment of girls. Similarly other studies by Behrman *et al.,* (1999) and Swada and Lokshin (2001) reported a consistently positive and significant coefficient of father's and mother's education at all levels of education except at secondary school level.

United Nations Children Education Fund (UNICEF, 1999); MoES (1995); Government of Uganda (GOU, 1999) and Horn (1992); all demonstrate that Parental decisions do affect retention at school. Students whose parents monitor and regulate their activities, provide emotional support, encourage independent decision making and are generally more involved in their schooling are less likely to dropout of school (Astone and McLanalan, 1991; Rumberger *et al*., 1990; Rumberger 1995; Odaga and Heneveld, 1995; and Rumberger, 2001). Taking into account the gender dimension of dropouts, UNICEF, (2005) notes that girls are more likely to dropout of school than boys and that pupils whose mother's have not attained any level of education will most likely dropout of school.

Rumberger, (2001); Bickel and Pagaiannis, (1988); Clark, (1992); and Rumberger, (1983) demonstrate that communities can influence dropout rates by providing employment opportunities during school. While some researchers have found out that work can contribute to a student dropping out, others have showed that student employment begins to correlate with dropping out when the student regularly works over 14 hours per week (Mann 1986, 1989).

In another study by MoES (2001), the rates of drop out[52] in all government-aided schools for girls and boys are almost equal. The total number of male dropouts for 2001 was 164,986 (50.6%), while that of females was 160,932 (49.4%) giving a national total of 325,918. In an account for the gender disparity in primary school drop out, Nyanzi (2001) put forward that marriage, pregnancy and sickness are major causes of drop out among girl children while amongst the boys, they include; jobs, lack of interest dismissal and fees.

The reviewed literature above identifies variables affecting primary school dropout at the household level. Most studies have not been based on large samples and data that is representative of the whole country, and others where conducted a few years into the

[52] School dropout is derived as the difference between the number of pupils/students enrolled at the beginning of the year and the number who enrolled at the end of the year' (MGLSD, 2000, 12).

implementation of UPE. This study utilizes a national representative sample of all regions of Uganda, data collected in 2004, 7 years after implementation of UPE, as such at a time when the first cohort of UPE completed their primary level.

4.0 Research Methodology

4.1 Conceptualization of the Study

The dropout of pupils from school over a given period of time reflects the impact of various socioeconomic factors, originating from the community and homes/families of the pupils. The socio-economic variables can broadly be categorized into pre-primary learning of the pupil, the pupil's family background, pupil's personality and community based factors.

Note that community factors as a composed of security, accessibility to public infrastructure such as schools, health facilities may explain child's academic outcome that is as to whether they will remain in school or not. Also because of the fact that community factors shape a child's personal characteristics, for instance by virtue of urban locations having better educational and health facilities we would expect better child academic outcomes thereby translating into higher child retention levels in school.

Furthermore, referring to parental background as reflected in say the educational attainment of the parents, family income, parental attitudes to mention but a few. We argue that these may not only affect a child's personal characteristics such as discipline, health status, school attendance but also the pre-primary learning of a child. We note that the better the parental background the more likely will the child's personal characteristics be good enough to enhance not only school outcomes but also school attendance.

Taken together we note that socioeconomic variables not only directly affect the likelihood of child dropping out of school but also impact a child's academic outcomes. The effect on a child's academic outcomes for instance academic performance, school attendance may as well translate into increased school retention or dropout. Note that primary school dropout is likely to translate into reduced progression of children to secondary school, higher fertility rates, illiteracy, and unemployment to mention but a few which ultimately enhance the likelihood of household poverty.

4.2 Data Source

The study utilized data collected by Uganda Bureau of Statistics (UBOS) in 2004 for the National Service Delivery survey (NSDS). The household survey questionnaire collected information on social-economic variables of households in relation to service delivery based on four regions of Uganda, namely Northern, Eastern, Central and Western Uganda using stratified sampling. The sample size was 17,681 household, covering all the regions of the country. The central region had 4,533 households, drawn from 13 districts of Kalangala, Kampala, Kiboga, Luwero, Masaka, Mpigi, Mubende, Mukono, Nakasongola, Rakai, Sembabule, Kayunga and Wakiso. The eastern region had 4,699 households, drawn from 13 districts of Bugiri, Busia Iganga, Kamuli, Jinja, Kapchorwa, Katakwi, Kumi Mbale Pallisa Tororo Mayuge and Sironko. The northern region had 3,749 households, drawn from 15 districts of Soroti, Kaberamaido, Adjumani, Apac, Arua, Gulu, Kitgum, Kotido, Lira, Moroto, Moyo, Nebbi, Nakapiripiriti, Pader,

Yumbe. The western region had 4,700 households, drawn from 15 districts of Bundibugyo, Bushenyi, Hoima, Kabala, Kabarole, Kasese, Kibaale, Kisoro, Masindi, Mbarara, Ntungamo, Rukungiri, Kamwenge, Kanungu and Kyenjojo.

4.3 Model Specification

To examine the determinants of dropout using household level information, we use a dummy variable, HDij, which takes on the value one if child i of household j dropped out of school and zero otherwise. The logistic model is adopted not only because of the dichotomous nature of the dependent variable but also when compared to the Linear Probability model (LP), the latter would produce spurious results since its estimated probabilities can be greater than 1 or less than 0 which can be a problem if the predicted values are used in a subsequent analysis. However, the logistic regression model which is a non-linear transformation of the linear regression constrains the estimated probabilities between 0 and 1. When compared to other binary categorical models like probit models, logistic models discriminate better than probit models for high and low potencies and are therefore more appropriate when the binary dependent is seen as representing an underlying equal distribution (large tails) Finney (1971). Generally, the logistic model was estimated as:

$$\Pr ob(HD_{ij} = 1) = f(C_{ij}, H_j, X_j, X_{cj}) \quad (1)$$

Where

HD_{ij} = dropout of a pupil, where $HD_i = 1$ if a child was reported to have dropped out of school before completing primary seven; else $HD_i = 0$. This is the dependent variable of the model

Cij is a set of characteristics of child i of household j

Hij is a set of household head characteristics of child i of household j;

Xij is a set of household characteristics of child i of household j

Xc_j is a set of community characteristics/factors where household j resides

The child characteristics Cij, include:

Age of the child in completed years, which is categorized in three categories namely age1 taking value 1 if age of pupil is between 5 and 8, and zero else where; age2 taking value 1 if age of pupil is between 9 and 12, and zero else where; age3 taking value 1 if age of pupil is between 13 and 17, and zero else where.

Orphanage of a child as a result of death of a mother and father; orp_father being orphanage due to death of a father and takes a value of 1 if father of a child died, otherwise zero is assigned; orp_mother being orphanage due to death of a mother and takes a value of 1 if mother of a child died, otherwise zero is assigned. A dummy variable for gender of a child; G_pupil takes a value of 1 if pupil is male and zero for female.

The household head characteristics, Hj, include:

Age of household head; Age_hh being age of household head in completed year. A dummy variable for the gender of the household head, g_hh=1 if male and zero for female. Education

level of father and mother; Accfather being number of years of schooling for father while Accmother being number of years of schooling for mother. Marital status of household head is captured by three variables; hh_maried=1 if household head is married and zero otherwise; hh_dev=1 if household head is divorced and zero otherwise; hh_wid=1 if household head is widowed and zero otherwise.

The household characteristics, Xj, include:
Household size; hhsize= number of persons in the household. Proportion of economically active members of household; eco_act= number of persons between 18 and 64 years of age in a household divided by total number of persons in the household. Amount of money paid to the school annually for child I, measured by the average amount paid per pupil per enumeration area.

Community characteristics/factors where household j resides Xc_j includes:
Distance to school, measured by the average distance in kilometers to the nearest primary school per enumeration area A dummy variable for rural or urban; ruralu=1 for rural households and takes value 0 for urban households.

We estimated equation (1) above for children aged 5 to 17, as the general model. We also estimated separate models for boys and girls separately to capture the gender dimension. We further estimate separate models for the rural households and urban households. While estimating the models, only pupils in the age bracket of 5 and 17 years were considered in the analysis, to cater for even those who started school late or repeated some classes. We go further to capture the age dimension by estimating three different models, one for the age bracket 5-8 years, 9-12 years and 13-17 years. For each of these categories, a separate model, one for boys and the other for girls are estimated.

Note further that the coefficients in the logistic models are odds ratios. An odds ratio is the probability of the dropout divided by the probability of the no dropout. Also upon running a logistic model, we ran a corresponding model to establish the marginal effects. Marginal Effects capture the impact of say increasing X_i by one unit on prob(dp=1) and they are important because of the difficult in intuitively appreciating odds ratios.

5.0 Description of the data

We summarized the data description by obtaining frequencies for categorical variables and means for continuous variables in the data set, which are presented 1 below

Table 1: Frequency of Categorical variables

Factor	Categories	Frequency	Percent
Rural/urban divide	Urban	21,058	22.87
	Rural	71,000	77.13
Gender of household head	Male	73,806	80.58
	Female	17,787	19.42
Gender of pupil	Male	45,454	51.11
	Female	43,477	48.89
Marital Status	Married	73,954	80.33
	Widowed	8,920	9.69
	Divorced	3,610	3.92
	Single	3,907	4.26
	Others	1,354	1.48
Orphanage of Pupil	Mother died	4,586	6.71
	Father died	8,943	13.21

Table 2: Averages of continuous variables

Variable	Mean
Age of household	42.4850
Age of pupil	10.4280
Academic attainment of father	4.8744
Academic attainment of mother	4.7357
Distance to school (km)	2.1028
Total amount per child paid to school per year	11689.41
Household size	6.6204
Proportion of economically active persons in household	0.4252

Furthermore, we test the equality of means on variables in the estimated models between pupils who were reported to have dropped out of schools and those that were still schooling at the time of the survey and the findings are summarized in the table 3 below. From table 3, all variables except gender of pupil, orphanage due to death of a mother and distance to school are significant.

Table 3: Equality of means on variables in the estimated models

Variables		Obs	Mean	t statistic
Rural-Urban	Non-dropout	44127	0.770435	4.7006
	Dropout	26587	0.754955	
Gender household Head	Non-dropout	43905	0.786163	-14.5804
	Dropout	26497	0.831188	
Gender of pupil	Non-dropout	44068	0.512322	-0.2085
	Dropout	26500	0.513132	
Age household Head	Non-dropout	43859	44.26936	16.6182
	Dropout	26417	42.55438	
Orphanage due to death of mother	Non-dropout	42842	0.06685	-0.2793
	Dropout	25548	0.067403	
Orphanage due to death of father	Non-dropout	42442	0.138848	6.7553
	Dropout	25273	0.120682	
Age of pupil	Non-dropout	44127	10.47635	4.5943
	Dropout	26587	10.34761	
Academic attainment of Father	Non-dropout	26368	4.796875	12.3456
	Dropout	16524	4.383745	
Distance to school	Non-dropout	44062	2.044541	0.3129
	Dropout	26351	2.039626	
Total amount of dues paid to school per pupil	Non-dropout	44127	11543.67	-3.739
	Dropout	26454	12235.93	
Household size	Non-dropout	44127	7.577356	29.3821
	Dropout	26587	6.983488	
Proportion of economically active persons	Non-dropout	43367	0.356005	-37.8509
	Dropout	26398	0.397452	

6.0 Presentation and Discussion of Findings

This section presents the findings and discussion of the regression analysis of household level factors influencing the probability of pupils dropping out of school. During the discussions, reference is made to the tables of regression results and marginal effects in appendix 1 and 2. To investigate the influence of household level factors on primary school dropout, we considered the gender dimension, location dimension and the age-cohorts of the primary school children, as detailed in appendix 1. Similarly, appendix 2 presents the marginal effects for the estimated models. The definitions of the models in the table are as below:

Model 1: Household Model for all pupils in the sample
Model 2: Household Model for only pupils from rural households
Model 3: Household Model for only girls in rural households
Model 4: Household Model for only the boy child in rural households
Model 5: Household Model for only pupils from urban households
Model 6: Household Model for only the girl child in urban settings
Model 7: Household Model for only the boy child in urban settings
Model 8: Household Model for only children in the age cohort 5 to 8
Model 9: Household Model for only the girl child of age-cohort 5 to 8
Model 10: Household Model for only the boy child of age-cohort 5 to 8
Model 11: Household Model for only children in the age cohort 9 to 12
Model 12: Household Model for only the girl child of age-cohort 9 to 12
Model 13: Household Model for only the boy child of age-cohort 9 to 12
Model 14: Household Model for only children in the age cohort 13 to 17
Model 15: Household Model for only the girl child of age-cohort 13 to 17
Model 16: Household Model for only the boy child of age-cohort 13 to 17

Below is the discussion of findings with respect to the various variables.

Rural-Urban divide

Results of the general model for all pupils in the sample indicate that the probability of a child dropping out from primary school reduces as one moves from rural to urban areas, which is statistically significant at 5%. This could perhaps be attributed to the fact that it is easier to access schools in urban areas as compared to rural areas. Across all the models, the odds ratios are negative implying that the likelihood that a child will drop out of school as one moves from rural to urban areas reduces. However, results of age-cohort models reveal statistical significance of the rural-urban dummy variable, the significance drops as a child grows older. This implies that at older ages, the influence of locality to the probability of a child dropping out of school reduces, as also attested by the decreasing marginal effects. Considering the gender of pupil in the rural-urban dimension, the odds ratios for the rural-urban dimension are insignificant for girls except for the 13-17 age cohorts. We associate this to the high chances of girls to marry, get pregnant or be married off by parents as they grow older in rural areas as compared to urban areas. Noteworthy however is that the marginal effects associated with the rural-urban dummy variable are insignificant across all dimensions of analysis. The largest effect is with boys in the age cohort 5-8 years, where the probability of dropping out increases by 6% as the dummy variable changes from urban to rural setting.

Gender of Household Head and of Pupil

The gender of household head was found to be insignificant across all the models except for age cohort 5-8 and age cohort 9-12 years for girls only. This finding is contrary to the general belief that female headed households are more likely to experience school dropout. This could be attributed to the fact that primary school education is largely free, as such even female headed households with limited finances can also afford to sustain their children in school. The marginal effects for the gender of a household dummy variable are insignificant except for children in the 5-8 age bracket (with the probability of dropping out increases by 7% as the dummy variable changes from female to male) and girl child of 9-12 age cohort (with the probability of dropping out decreases by 9% as the dummy variable changes from female to male).

Similarly, the odds ratios and marginal effects of gender of pupil were found to be insignificant across all models. This is in agreement with findings by MoES (2001) and comprehensive evaluation of basic education in Uganda report (2005), with findings that the dropout rate of both girls and boys is almost the same. This is also contrary to theory that the girl child is more likely to drop out of schools than the boys, as argued by Holmes(2003), Odaga & Heneveld (1995). This could be attributed to UPE, which has reduced the opportunity cost to parents of sustaining both boys and girls in schools.

Age of the household head

The odds ratio for age of household head is generally negative except for models 5, 7 and 14. This suggests that as the household head age increases, the probability of a child dropping out of school reduces. The relationship is statistically significant in the general model and in rural areas except for boys. Equally, the marginal effects are significant although very small. These findings point to the role of parental decisions in influencing children remaining in schools. Aged parents often appreciate the importance of education and influence their children to stay at school especially young ones. But as children grow older, they begin to take on their own decisions and the influence of parents tends to reduce.

Household Size

Across all models, it is clearly evident that children in larger households are less likely to dropout of school than children living in smaller households and the relationships are statistically significant. Equally, the marginal effects are large and significant, with the probability of dropping out reducing by up to 27% for girls in the 13-17 age brackets. Though this finding is contrary to the general belief, Chernichovsky (1985) and Gomes (1984) too agree with our finding. These interesting findings could perhaps be attributed to the fact that other household members either substitute for child labor so that the children could take advantage of UPE or contribute part of their earnings to educating younger members of the household. On the other hand in smaller households, children are more likely to be diverted to offer family labor or stand-in in case of family shocks like sickness. Secondly, it could be that UPE has lessened the school fees burden, which could have been a major contributor to pupil dropout for larger family sizes.

Academic achievement of mother and father

High academic attainment of a mother and father significantly reduce chances of primary school dropout for both girls and boys in rural and urban areas. Equally, the marginal effects are

significant across all dimensions of analysis. For a mother, this phenomenon could perhaps be attributed to the fact that: educated mothers reduce the time spent doing household chores while increasing the time spent with their children than their uneducated counterparts; also, educated mothers are more effective in helping their children in academic work in doing so, they are also able to monitor and supervise their children's academic progress[53]. While for fathers it's attributed to the fact that educated fathers are also interested in the academic progress of their children thus they would be willing to spend more time helping their children in academic problems. Also, as suggested by Leclercq (2001), educated parents are more aware of the possible returns to their children's education and they are more likely to have access to information and social networks necessary for their children to engage into relatively human capital intensive activities yielding high returns to education. In conclusion, the academic attainment of parents enhances positive attitudinal change towards children's education.

Distance to school

The odds that a pupil will dropout of primary school increases with increase in the distance a pupil moves to school[54]. Pupils traveling long distances to school are more likely to dropout of school. Whereas distance was found to be insignificant in influencing dropout for urban households, it is generally significant in rural areas except for girls. This phenomenon could be attributed to the easier access to schools in urban areas as compared to rural areas. The influence of distance to school on the chances of dropout is more pronounced among the younger boys in the 5-8 and 9-12 age brackets, with probabilities of 1.2 percent and 0.7 percent respectively.

School fees payment

The effect of fees payments across all model specifications is positive though insignificant except for girls in rural areas and 9-12 age bracket. This positiveness and insignificance of school fees could largely be attributed to the presence of UPE which in away reduces the school fees burden.

Economically active members

Across all dimensions of analysis, it is evident that as the proportion of economically active[55] household members increases, the odds that a pupil will dropout of school increase. The relationship is positive and statistically significant across all the models. Looking at the marginal effects, with an increment in the economically active household members in a particular household the probability that a child will dropout of school is 39 percent and 41 percent in rural areas for girls and boys respectively. For urban areas, it is 37 percent and 42 percent for girls and boys respectively. With reference to age-cohorts, the likelihood of dropout is 59 percent, 45 percent and 31 percent for age-sets 5-8, 9-12, and 13-17 respectively. This finding suggests that a large percentage of the economically active are economically unproductive[56] thereby vindicating households' dependence burden. This squeezes out the households resources resulting into pupils

[53] See Suet-Ling Pong (1996)
[54] It is in agreement with the finding by UPPA (2000)
[55] Proportion of economically active members was measured by the ratio of household members between 18-64 years to the total number of household members.
[56] These in the end become dependants thereby further constraining the household expenditure, including education expenditure which exacerbates school dropout of school children of the particular household.

in the family dropping out of school. This finding is also a reflection of the current unemployment situation, especially amongst the youth in Uganda.

7.0 Policy implications and conclusions

The study findings indicate that UPE has had a profound impact on access to primary school education and dropout of pupils from school for both rural and urban households. This is clearly evident given the insignificance of distance to school and total average amount of school dues paid by students in influencing dropout of pupils. Note that the effect of fees paid is insignificant because of the low economic burden of primary school education a result of the UPE policy. To sustain such a benefit, it is imperative for the government to maintain a close eye on non-school fees payments by parents to schools as these have a potential to increase to unsustainable levels for most households especially in rural areas where the majority of the poor live and urban areas where 35 per cent of households still pay primary education fees.

The study further reveals that, the academic attainment of parents is a key factor that influences the chances of a child dropping out of school in both rural and urban areas, and across all age cohorts. This thus implies that the UPE policy or put differently reducing the household primary school fees burden alone is not sufficient but rather, government ought to partner with other development agencies with a common interest in promoting of adult education and that it should be rolled out across the entire country. It is envisaged that adult education shall aide in enhancing attitudinal change among illiterate and ignorant parents in favor of child education.

As the number of the economically active members of a household increases, the likelihood of primary school dropout increases other factors held unchanged. This suggests that a good number of the economically active people are actually unproductive. This finding points to the need to expand employment opportunities, especially for the youth. Policies and programs aimed at enhancing productivity capacities at household levels could go a long way in curtailing this problem. This also suggests that expanding free universal education to secondary and vocational levels is important, as it would allow some of those who can not afford secondary education to continue with schooling. This has the effect of reducing the number of unproductive members in the household.

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Appendix 1: Logistic Model results for determinants of Primary School Dropout.

Logistic regression	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Number of observations	29944	22265	10606	11721	7679	3931	3766	10269
LR chi	(17) 1327.11	(16) 924.09	(15) 499.92	(14) 490.78	(16) 426.88	(15) 254.08	(15) 217.44	(15) 592.48
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.0335	0.0315	0.0358	0.0317	0.0418	0.0487	0.431	0.0433
Log likelihood	-19129.875	-14219	-6736.676	-7506	-4897.013	-2480.05	-2411.24	-6545.95
	dpout	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**
ruralu	0.879							0.838
	(4.29)**							(3.38)**
g_hh	1.029	1.156	1.283	1.074	0.863	1.006	0.778	1.359
	(0.36)	(1.42)	(1.69)	(0.50)	(1.18)	(0.03)	(1.41)	(2.00)*
G_pupil	1.027	1.022			1.038			1.010
	(1.10)	(0.77)			(0.77)			(0.24)
age_hh	0.997	0.996	0.994	0.998	1.001	0.994	1.007	0.992
	(2.73)**	(3.04)**	(3.40)**	(1.45)	(0.29)	(1.83)	(1.99)*	(4.11)**
hh_maried	1.524	1.395	2.133	1.008	2.119	1.870	2.111	1.255
	(4.19)**	(2.91)**	(4.11)**	(0.05)	(3.50)**	(2.18)*	(2.46)*	(1.43)
hh_dev	1.163	1.077	1.950	0.374	1.207	1.006	1.298	1.282
	(0.38)	(0.15)	(0.87)	(1.64)	(0.27)	(0.00)	(0.30)	(0.36)
hh_wid	0.548	0.167	1.255		1.139	5.560	0.459	0.868
	(1.30)	(1.71)	(0.19)		(0.23)	(1.95)	(0.94)	(0.17)
orp_mother	1.128	1.212	1.407	1.054	0.963	0.851	1.090	1.284
	(1.82)	(2.45)*	(2.88)**	(0.50)	(0.30)	(0.87)	(0.51)	(1.82)
orp_father	1.047	1.086	0.905	1.304	0.990	0.975	1.054	0.955
	(0.75)	(1.13)	(0.90)	(2.74)**	(0.09)	(0.16)	(0.35)	(0.35)
age1	0.954				0.928	0.798	1.061	
	(1.52)				(1.21)	(2.64)**	(0.67)	
age2	0.937	0.987	0.956	1.032	0.902	0.796	0.989	
	(2.12)*	(0.37)	(0.90)	(0.65)	(1.72)	(2.65)**	(0.13)	
accfather	0.941	0.944	0.936	0.950	0.936	0.925	0.946	0.921
	(15.32)**	(11.68)**	(9.24)**	(7.39)**	(9.97)**	(8.23)**	(5.97)**	(12.29)**
accmother	0.988	0.986	0.989	0.983	0.991	0.988	0.993	0.979
	(9.56)**	(8.62)**	(4.46)**	(7.67)**	(4.21)**	(3.99)**	(2.30)*	(8.79)**
dis	1.014	1.020	1.002	1.037	1.001	0.984	1.011	1.022
	(2.27)*	(2.64)**	(0.17)	(3.54)**	(0.05)	(0.86)	(0.72)	(1.82)
sch_fees	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(1.39)	(1.31)	(2.33)*	(0.38)	(0.78)	(0.82)	(0.78)	(0.66)
Loghhsize	0.457	0.486	0.458	0.501	0.394	0.428	0.349	0.599
	(18.81)**	(14.50)**	(10.81)**	(10.22)**	(11.76)**	(7.57)**	(9.44)**	(6.77)**
eco_act	5.430	5.745	5.491	5.895	4.785	6.273	4.006	12.267
	(16.90)**	(14.75)**	(9.63)**	(11.07)**	(8.30)**	(6.75)**	(5.24)**	(12.50)**
age3		1.038	1.036	1.054				
		(1.03)	(0.67)	(1.06)				

Appendix 1: Continues…..

Logistic regression	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Number of observations	5141	5146	9806	4787	5026	9852	4599	5301
LR chi	(13) 346.87	(14) 286.07	(15) 373.43	(13) 245.47	(13) 176.08	(14) 469.06	(13) 263.50	(12) 273.17
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.0507	0.0417	0.0000	0.0392	0.0265	0.0361	0.0434	0.0389
Log likelihood	-3250.34	-3289.73	-6258.72	-3005.57	-3236.50	-6259.50	-2900.58	-3371.44
	dpout	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**	**dpout**
ruralu	0.921	0.773	0.893	0.924	0.876	0.895	0.836	0.943
	(1.13)	(3.43)**	(2.18)*	(1.04)	(1.82)	(2.11)*	(2.36)*	(0.80)
g_hh	2.526	0.870	0.966	0.661	1.344	0.897	1.083	0.767
	(3.73)**	(0.67)	(0.26)	(2.12)*	(1.54)	(0.85)	(0.45)	(1.45)
age_hh	0.987	0.996	0.997	0.996	0.998	1.001	0.998	1.003
	(4.44)**	(1.52)	(1.62)	(1.28)	(0.95)	(0.68)	(0.82)	(1.03)
hh_maried	1.212	1.320	1.677	4.176	1.039	1.792	3.163	1.153
	(0.90)	(1.17)	(2.69)**	(3.71)**	(0.16)	(3.24)**	(3.77)**	(0.64)
hh_dev	0.938	0.447	2.038	9.633	1.126	0.613	2.877	
	(0.05)	(1.06)	(1.05)	(1.54)	(0.16)	(0.62)	(1.20)	
orp_mother	1.089	1.420	1.179	1.284	1.042	1.040	1.177	0.922
	(0.40)	(1.92)	(1.38)	(1.42)	(0.25)	(0.39)	(1.07)	(0.61)
orp_father	0.997	0.941	0.735	0.541	0.985	1.361	1.167	1.591
	(0.02)	(0.35)	(2.75)**	(3.58)**	(0.10)	(3.47)**	(1.15)	(3.92)**
accfather	0.920	0.922	0.934	0.910	0.955	0.964	0.957	0.972
	(8.77)**	(8.64)**	(9.40)**	(9.03)**	(4.61)**	(5.26)**	(4.34)**	(3.02)**
accmother	0.976	0.981	0.990	0.996	0.984	0.991	0.992	0.990
	(6.90)**	(5.62)**	(4.39)**	(1.32)	(4.99)**	(4.31)**	(2.58)**	(3.51)**
dis	0.981	1.055	1.018	1.004	1.033	1.003	0.997	1.007
	(1.09)	(3.27)**	(1.77)	(0.28)	(2.36)*	(0.28)	(0.15)	(0.53)
sch_fees	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(1.26)	(0.82)	(1.54)	(2.41)*	(0.24)	(0.08)	(0.21)	(0.15)
loghhsize	0.654	0.566	0.506	0.490	0.516	0.348	0.310	0.349
	(3.95)**	(5.35)**	(9.33)**	(6.64)**	(6.58)**	(14.85)**	(11.38)**	(11.11)**
eco_act	18.854	8.517	4.526	3.577	5.405	3.788	3.681	3.758
	(10.00)**	(7.74)**	(8.20)**	(4.76)**	(6.58)**	(8.84)**	(5.72)**	(6.57)**
hh_wid		1.168	5.130					
		(0.17)	(2.06)*					
G_pupil			1.072			1.011		
			(1.63)			(0.26)		

Note.
Absolute value of z statistics in parentheses
*Significant at 5%; ** significant at 1%

Appendix 2: Marginal effects After Logistic

Logistic regression	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
ruralu	-.0301246							-.0418286
	(-1.01)							-0.80
g_hh	.0066315	.033592	.0576887	.0165469	-.0350431	.0013752	-.0608755	.0721747
	0.36	1.42	1.69	0.50	-0.28	0.01	-0.34	2.00
G_pupil	.0062784	.0050925			.0087094			.0023963
	0.26	0.18			0.18			0.06
age_hh	-.0006898	-.0008672	-.0014267	-.0005693	.0001625	-.0014621	.0015362	-.0019102
	-2.73	-3.04	-3.40	-1.45	0.29	-1.83	1.99	-4.12
hh_maried	.0919362	.073358	.1532038	.0018937	.1556713	.1315683	.1572891	.0517409
	0.91	0.64	0.83	0.01	0.73	0.46	0.52	0.33
hh_dev	.0358148	.0173125	.1633842	-.1896994	.0451046	.0013069	.0632042	.0599574
	0.09	0.04	0.21	-0.32	0.07	0.00	0.07	0.09
hh_wid	-.1263428	-.2781219	.0540679		.0309742	.3957265	-.1619014	-.0325591
	-0.27	-0.27	0.05		0.05	0.45	-0.20	-0.04
orp_mother	.0284881	.0455253	.0818303	.012319	-.008803	-.0369626	.0204949	.0601919
	0.43	0.58	0.69	0.12	-0.07	-0.20	0.12	0.44
orp_father	.0106504	.0193716	-.0227936	.06342	-.0023409	-.0058459	.0124188	-.0107405
	0.18	0.27	-0.21	0.66	-0.02	-0.04	0.08	-0.08
age1	-.0109906				-.0174096	-.0519236	.0141376	
	-0.35				-0.28	-0.61	0.16	
age2	-.0150984	-.0029435	-.0103931	.0072819	-.024188	-.052445	-.0026531	
	-0.49	-0.08	-0.21	0.15	-0.40	-0.61	-0.03	
Age3		.0086689	.0082433	.0121815				
		0.24	0.16	0.25				
accfather	-.0140996	-.0134605	-.0153922	-.0118437	-.0155149	-.0181802	-.0131405	-.0192628
	-15.34	-11.70	-9.26	-7.39	-9.99	-8.26	-5.97	-12.32
accmother	-.0028961	-.0033186	-.0024929	-.0040943	-.0021156	-.0028563	-.0016381	-.004985
	-9.57	-8.63	-4.47	-7.68	-4.21	-3.99	-2.30	-8.80
dis	.0033325	.0046873	.000452	.0084217	.0001435	-.0037787	.002534	.0050454
	2.27	2.64	0.17	3.54	0.05	-0.86	0.72	1.82
sch_fees	1.74e-07	2.67e-07	6.72e-07	-1.12e-07	1.25e-07	1.74e-07	1.75e-07	1.40e-07
	1.39	1.31	2.33	-0.38	0.78	0.82	0.78	0.66
Loghhsize	-.1823697	-.1672639	-.1806534	-.161003	-.2187696	-.1977973	-.2491343	-.1202619
	-18.83	-14.51	-10.82	-10.23	-11.78	-7.58	-9.46	-6.77
eco_act	.3937482	.4054988	.3941101	.4133071	.3675145	.427958	.3285833	.5891658
	16.92	14.76	9.64	11.08	8.30	6.76	5.24	12.52

Appendix 2: Continues….

Logistic regression	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
ruralu	-.0193203	-.0615254	-.0263952	-.0180368	-.0310456	-.0258059	-.0418338	-.0137212
	-0.27	-0.82	-0.51	-0.24	-0.43	-0.49	-0.55	-0.19
g_hh	.1846509	-.0327703	-.0079587	-.0945799	.069024	-.0254831	.0181736	-.063643
	0.74	-0.67	-0.26	-2.12	1.54	-0.20	0.10	-0.35
age_hh	-.0029728	-.0009864	-.0007192	-.0008408	-.0005791	.0002903	-.0005172	.0006097
	-4.44	-1.52	-1.62	-1.28	-0.95	0.68	-0.82	1.03
hh_maried	.044007	.0630512	.1095502	.2392788	.0089074	.1226502	.2128879	.0324886
	0.20	0.26	0.57	0.62	0.04	0.68	0.70	0.15
hh_dev	-.0149136	-.1650792	.1742067	.4876137	.0281144	-.1045952	.2581298	
	-0.01	-0.22	0.26	0.33	0.04	-0.13	0.29	
hh_wid		.0372889	.3823665					
		0.04	0.48					
orp_mother	.0202136	.0852495	.0388121	.0586602	.0095702	.0091462	.0383296	-.0187685
	0.09	0.47	0.32	0.33	0.06	0.09	0.25	-0.14
orp_father	-.0008137	-.0143407	-.0681206	-.1267368	-.0035246	.0735938	.0363797	.1123767
	-0.00	-0.08	-0.61	-0.74	-0.02	0.83	0.27	0.95
accfather	-.0195355	-.0191148	-.0156951	-.0216355	-.0108256	-.0083854	-.0101246	-.0066623
	-8.79	-8.66	-9.42	-9.07	-4.61	-5.26	-4.34	-3.02
accmother	-.0056748	-.0044336	-.0023483	-.0010078	-.003784	-.002116	-.0018472	-.0023845
	-6.91	-5.63	-4.39	-1.32	-5.00	-4.31	-2.58	-3.51
dis	-.0045293	.0125259	.0041867	.0009672	.0076167	.0007091	-.0006102	.001703
	-1.09	3.27	1.77	0.28	2.36	0.28	-0.15	0.53
sch_fees	3.48e-07	2.28e-07	3.08e-07	6.93e-07	-6.60e-08	-2.03e-08	-7.19e-08	-5.91e-08
	1.26	0.82	1.54	2.41	-0.24	-0.08	-0.21	-0.15
loghhsize	-.0995955	-.1341373	-.1572427	-.1625411	-.1543069	-.2449003	-.2709266	-.2453416
	-3.95	-5.35	-9.34	-6.65	-6.59	-14.88	-11.40	-11.13
eco_act	.6884588	.5046117	.3486427	.2907521	.3935571	.3086411	.3016902	.3086171
	10.03	7.75	8.20	4.77	6.59	8.85	5.72	6.57
G_pupil			.0160589			.0026293		
			0.38			0.06		

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Note.

Figures immediately below dy/dx are values of z statistics