

NORWEGIAN UNIVERSITY OF LIFE SCIENCES



**The Decision for Secondary Education: The Case of Cocoa
Farmers' Children in Ghana's New Edubiase Cocoa District.**

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A cross section of students and tutors at the New Edubiase secondary school (2011)

Table of Contents

Dedication	i
Acknowledgements	ii
Acronyms.....	iii
List of tables	v
List of figures	vi
Abstract	vii
1. INTRODUCTION	1
1.1 Preamble	1
1.2 Problem Statement	3
1.3 Thesis Structure	5
2. BACKGROUND INFORMATION	6
2.1 Brief History of Education/Secondary Education in Ghana.....	6
2.2 The Cocoa Sector in Ghana	8
2.3 The Adansi South District Assembly	12
2.3.1 Education and Agriculture at the Adansi South District	13
2.3.2 The New Edubiase Cocoa District	14
3. LITERATURE REVIEW	16
3.1 The Importance of Secondary Education	16
3.2 Theoretical Backing for Child Work/School Decisions.....	17
3.3 Empirical Studies on Child Work/School Decisions	18
3.3.1 Extenal Assistance and Child Work/School Decisions	20
3.3.2 Household Characteristics and Child Work/School Decisions.....	22
3.3.3 Parent’s Characteristics and Child Work/School Decisions.....	22
3.3.4 Child Characteristics and Work/School Decisions by Parents	24
3.3.5 Community Characteristics and Child Work/School Decisions	25
3.4 Hypothesis	26
4. DATA AND METHOD	27
4.1 Selection of the New Edubiase Cocoa District.....	27
4.2 Data Collection Method.....	28
4.2.1 The Variables	29
4.3 Method	34
4.3.1 The Model.....	37
5. RESULTS AND DISCUSSIONS	40

5.1	General Descriptive Statistics of the Variables.....	40
5.1.1	Descriptive Statistics of The discrete variables	42
5.1.2	Dependent – Independent Variable Interactions.....	46
5.2	Econometric Model Results.....	52
5.2.1	Odds / Relative Risk Results Presentation.....	57
5.2.2	Marginal Effects after mlogit.....	61
5.2.3	Predicted Probabilities after mlogit.....	63
6.	CONCLUSIONS	66
6.1	Summary.....	66
6.2	Limitations and Opportunities for Future Studies.....	71
	References.....	72
	Appendix 2 mlogit compared with mprobit (same reference category).....	78
	Appendix 3 mlogit, using all the original variables.....	80
	Appendix 4 Pictures related to the cocoa plant (Theobroma cacao).....	81

Dedication

This Thesis is dedicated to my Dear wife, Anita Awuku and our lovely children James, John and Jemima Awuku.

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Unto The Lord God Almighty I give the ultimate Thanksgiving. His abundant grace has, as always, been sufficient unto me indeed.

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Acronyms

ASDA	Adansi South District Assembly
CCT	Conditional Cash Transfer
COCOBOD	Ghana Cocoa Board
CODAPEC	Cocoa Diseases and Pests Control Programme
DFID	Danish Fund for International Development
DO	District Officer
FABS	Food and Agricultural Budgetary Support
FBODF	Farmer Based Organization Development Fund
FCUBE	Free Compulsory Universal Basic Education
FOB	Freight On Board
GDP	Gross Domestic Product
GHC	Ghana Cedi
GPRS	Ghana Poverty Reduction Strategy
HDI	Human Development Index
HDR	Human Development Report
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ILO	International Labour Organization
IMF	International Monetary Fund
JHS	Junior High School

JSS	Junior Secondary School
LBC	Licensed Buying Company
LC	Light Crop
MC	Main Crop
MDA	Multivariate Descriiminant Analysis
MDG	Millennium Development Goal
MNL	Multinomial Logit Model
MNP	Multinomial Probit Mode
NESS	New Edubiase Secondary School
PC	Purchasing Clerk
PROGRESA	Programa de Educación, Salud y Alimentación
QCD	Quality Control Division
SHS	Senior High School
SSS	Senior Secondary School
USAID	United States Agency for International Development
USD	United States Dollar
WB	World Bank

List of tables

	Page
Table 2.1 Education delivery in Ghana, 2007-2009 (JHS and SHS levels).....	7
Table 2.2 Cocoa production levels, producer prices and percentages of FOB prices Paid to farmers in Ghana (2000/2001 to 2010/2011).....	10
Table 4.1 Sample distribution per communities in the New Edubiase district.....	30
Table 4.2 Summary of the independent variables.....	36
Table 5.1 Descriptive statistics of explanatory variables.....	42
Table 5.2 Analysis of the continuous variables.....	43
Table 5.3 Analysis of the discrete variables.....	44
Table 5.4 Multinomial logit model results.....	54
Table 5.5 Statistically significant variables from the mlogit model results.....	55
Table 5.6 mlogit results in odds/relative risks.....	59
Table 5.7 Odds with changing reference categories.....	61
Table 5.8 Marginal effects.....	62
Table 5.9 Predicted probabilities.....	64

List of figures

	Page
Fig 2.1 Districts in the Ashanti region of Ghana (ASDA arrowed).....	12
Fig 5.1 Education level of household head and wealth of household.....	46
Fig 5.2 Parents education and child work/school decisions.....	47
Fig 5.3 Gender of household head and work/school decisions.....	48
Fig 5.4 Gender of child and work/school decisions.....	49
Fig 5.5 Household wealth status and work/school decisions.....	49
Fig 5.6 Dependence on COCOBOD scholarship and work/school decisions.....	50
Fig 5.7 Origin status of farmer/dominant inhabitants of area and work/school decisions.....	51
Fig 5.8 Zone and work/school decisions.....	53

Abstract

Secondary (senior high) school is noted as an indispensable link between the basic and tertiary levels of education in Ghana. Financing a child's secondary education in Ghana however, is very challenging for the average Ghanaian, including the cocoa farmer. The tendency to use children extensively on the cocoa farm to the detriment of their secondary schooling appears to be very high. This study investigates the factors that influence the cocoa farmer in deciding for the child between secondary schooling and work on the cocoa farm. The study area is the New Edubiase cocoa district in Ghana. Survey results indicate that majority of the households in the study area use their secondary-school-going children on the farm, to various extents. Secondary school children not involved in farming generally stay with other relatives outside the study area for their education. All the children who qualified for secondary school but are currently involved in only working on the farms are from relatively poor households. A vicious cycle seems evident, in which the relatively poor households produce less educated children, who become relatively poor young adults and, in turn, become heads of relatively poor households. The multinomial logit model was used to capture the choice probabilities across work and/or school options. Results generally show that important factors explaining the child secondary school/work outcome include parent's education, gender of parents, gender and age of children, household wealth status, parent's level of confidence in external financial assistance and community characteristics.

Pragmatic efforts aimed at breaking the apparent cycle observed, are recommended.

Key words: cocoa farmer; secondary school; Ghana; multinomial logit.

CHAPTER ONE

1. INTRODUCTION

1.1 Preamble

Stagnant and sometimes reversing desired socio-economic indicators have characterized the economies of most developing countries especially in the Sub-Saharan African region, for some time now. Ghana's per capita income for instance fell by 30 percent during the 1970s and early 1980s. Inflation in 1983 was 120 percent. Ghana, like most developing economies had to adopt the Economic Recovery Programme (ERP) in 1983. (NDPC/UNDP 2010).

The Structural Adjustment Programmes (SAPs) such as the ERP designed by the International Monetary Fund (IMF) and the World Bank (WB) are reported to have a core component that requires governments to work towards reducing public sector expenditures. The adoption of the SAPs thus means decreasing the budget-shares of most sectors of the economy and shifting most cost elements hitherto borne by the central governments, to the individual households in the economy. The education sector is not exempted, especially the post-basic level of education in Ghana.

Efforts aimed at achieving the Millennium Development Goal 2 (MDG 2): “*Achieving universal primary education by 2015*” (UNDP 2000), have received substantial support from donor agencies and development partners. As (Palmer 2005) noted, in an effort to meet the demands of the Free Compulsory Universal Basic Education (FCUBE) idea, basic education in public schools in Ghana is free of tuition fees. Secondary education¹ in Ghana however, is reported not to be receiving similar supports and is thus very susceptible to the fall-outs from economic hardships. For instance, there are three main international bodies providing

¹ Secondary education, unless otherwise specified, refers to the level of education between the basic and tertiary levels of education in Ghana

assistance, both in cash and in kind, to the Ghanaian education sector. These are the World Bank (WB), Danish Fund for International Development (DFID) and United States Agency for International Development (USAID). Their supports in recent times are basically targeted at the basic level of education in Ghana. (Palmer 2005).

The budgetary allocation to the post-basic sector of education has been declining over the years. The Ghana Poverty Reduction Strategy (GPRS) advised some few years back, that the budget share of secondary education was to be reduced from 15.1% in 2000 to 13.8% in 2005. The educational reforms in 1986 required increase in cost-recovery at the post-basic levels of education in Ghana. Subsidies for boarding and feeding at the secondary level of education for instance, were removed by 1988. There is also full recovery for text book costs. (Palmer 2005). This trend in secondary education appears to be a disincentive to the poor, including the average cocoa farmer to send the child to secondary school in Ghana.

According to (NDPC/UNDP 2010), Ghana is on course to possibly achieve the targets of MDG 2. As progress is made towards universal primary school enrolment, and the basic schools turn out numerous graduates hoping to move on to secondary levels of education, the question is gradually emerging as to how quickly secondary schools should be expanded to improve on accessibility, both qualitatively and equitably to especially the poor including the cocoa farmer's child.

“There is no collateral for investment in human capital” (Schultz 2003, p 115). Getting financial assistance for tertiary education in Ghana is easier relative to the situation at the secondary level. There are for instance, the student loan scheme made available for university and polytechnic education and sponsorship packages for post-secondary Teacher Training programmes. Also in some cases prospective lenders may come to the aid of a student who has made it to the university. Even the most risk-averse lender seems to be quite optimistic of the chances of getting a well-remunerative job and hence paying back loans taken, after the tertiary level of education. However *“financial institutions will not provide the necessary long term credit for primary or secondary education as parents lack a commitment device that child education will pay for itself.”* (De Janvry, Finan et al. 2004 ,p 3).

So this bridge, as important as it is, between the ever-improving basic level of education and the tertiary level of education in Ghana is becoming a difficult one to cross. For the average Ghanaian parent including the cocoa farmer, it is probably becoming an impossible bridge to help the child to cross.

1.2 Problem Statement

The 1989 UN Convention on The Rights of the Child defines a child as an individual under the age of 18 years. The decision to work by children in developing countries is usually taken by the parents. Also the child makes his/her own decision on schooling or work only 8% of the time, usually. (Patrinos and Psacharopoulos 1995; Andvig, Canagarajah et al. 2001). It is therefore highly probable that whether or not the cocoa farmer's child attends Secondary school or work on the cocoa farm, very much depends on the decision of the household head.

After the Harkin-Engle protocol² a number of reports have been issued by researchers from both outside and within Ghana, on the labour composition on cocoa farms. Generally the conclusion is that the use of the child on cocoa farms in Ghana is a socio-cultural phenomenon. (Owusu and Kwarteye ; IITA 2002; Teal, Zeitlin et al. 2006; MMYE 2008). That is, the cocoa farmer believes that using the child on the farm is to train him/her for the family occupation. Most cocoa farms are operated as family farms in Ghana.

This 'on-the-job training' view of the farmer is backed by authors such as (Bekombo 1981; Grootaert and Kanbur 1995). Studies also show that most cocoa farmers will rather prefer their children to take education more seriously than helping on the farm. This view also has a strong academic backing from authors such as (Grootaert and Patrinos 2002; Heady 2003). Thus, the farmer faces decisions such as allowing the child to embark on: both secondary education and farm work, secondary education without farm work or solely work on the cocoa farm without secondary education.

Ghana is believed to be on track in achieving the MDG 1 target of reducing by half the proportion of the population living in extreme poverty, by 2015.³ However the 2009 Human Development Report (HDR) showed that inequality remains high, as is indicated by declining Human Development Index (HDI). (NDPC/UNDP 2010). It is becoming increasingly obvious that the apparent improvement at the macroeconomic level is yet to fully reflect in the lives of majority of the populace. The cocoa farmer, like the average rural dweller in Ghana generally continues to be poor. (Sowa and CEPA 2002).

² Signed in 2001, through the efforts of Sen. Harkin and Rep. Engle of the USA, to help combat child labour and worst forms of child labour on cocoa farms.

³ Proportion of the population living below the poverty line declined from 36.5% in 1991/92 to 18.2% in 2005/06. 2015 target is 19%. NDPC/UNDP (2010). "2008 Millenium Development Goals Report." 1-111.

Seasonal as cocoa farming is, the demand for labour usually far exceeds the supply during the peak of the cocoa season. Hired labour on cocoa farms is therefore relatively high in Ghana.⁴ According to the ILO minimum age convention, “...the age of admission to employment shall not be less than the age of completion of compulsory school and in any case, shall not be less than 15 years” (ILO 2010). Thus increasing the intensity at which the child is used on the cocoa farm during the ages of 15 and 18 may not attract much social condemnation. Secondary school age range in Ghana is generally between 15 and 18 years. Thus, the opportunity cost of the child going to secondary school and not devoting much time to working on the cocoa farm appears to be very high to the cocoa farmer.

Given the background of an expensive secondary education in Ghana, a generally-poor cocoa farmer and the relatively high opportunity cost of labour on cocoa farms, it would be expected that the farmer would rather use the child more on the cocoa farm and opt for less or even no secondary schooling time for the child.

This research therefore has the primary objective of investigating some of the major factors that possibly influence the Ghanaian cocoa farmer, in deciding on secondary education and/or work on the cocoa farm for the child.

The study consequently aims at answering the following research questions:

- *To what extent does the characteristics of the household head (gender, age, education level, origin status) influence the farmer’s decisions?*
- *Does the characteristics of the child (gender, age) have any influence on the decisions of the farmer?*
- *Are the household characteristics (size, wealth status, dependency ratio, cocoa production level) of much importance?*
- *Does the community characteristics (cocoa productivity in the area, area literacy, dominant tribe) matter much?*
- *To what extent does the possibility of getting financial assistance for child’s secondary education influence the farmer’s decisions?*

⁴ In the New Edubiase area, hired labour popularly known as ‘by day’ currently costs GHC 10 (USD 7) per day. Average minimum wage is around GHC 4 (approx USD 3).

Most of the work done in this field on Ghana focuses on farm work and education at the basic level. This study explores further, concentrating on farm work vis-à-vis secondary education of the child. It is hoped that this thesis will contribute positively to the understanding of the participative behavior of the household in the decision of whether to send a child to secondary school and/or to work on the cocoa farm. Hence, the efforts aimed at designing and implementing more appropriate policies related to education and labour that can help in the training of tomorrow's human resources, especially at the rural areas can be facilitated.

1.3 Thesis Structure

The thesis is organized into six chapters. Following this introductory chapter is the second chapter which provides some background information on especially secondary education in Ghana, the cocoa industry in Ghana and the study area, New Edubiase. Chapter three dwells on review of theoretical and empirical literature. The fourth chapter is on the data and method used. Chapter five deals with the major findings of the study, while the sixth chapter focuses on concluding remarks and recommendations.

CHAPTER TWO

2. BACKGROUND INFORMATION

2.1 Brief History of Education/Secondary Education in Ghana

Until 1987 the educational structure in Ghana was a 6-4-7-3 system: six years of primary, four years of middle, seven⁵ years of secondary and three years of university education. Currently, a 6-3-3-4 structure of education is found in Ghana. Thus starting at age six, there is six years of primary education, three years of Junior Secondary / High School (JSS / JHS)⁶, three⁷ years of Senior Secondary / High School (SSS / SHS)⁸ and four years of university course. The first nine years which make up the basic level of education in Ghana, are covered by the FCUBE policy. (Sackey 2008).

The British established the first secondary school in the then Gold Coast (now Ghana) in 1876 at Cape Coast, the then capital city. All other secondary schools opened after this were also at the urban centers. Regarding secondary education as ‘the lynchpin for educational progress, manpower development and overall national development’, the government of the first post-independence president had the objective of improving rural secondary education so as to make secondary education more accessible. By the last quarter of the twentieth century, both the number of secondary schools and secondary school enrolment had improved significantly. (Boateng 2007; Hancock 2007). Over the years efforts have continued to be made towards efficient education delivery in Ghana. Table 2.1 below for instance shows the improvements

⁵ The 7 years of secondary education consisted of five years of ordinary level (O’Level) and 2 years of advanced level (A’ Level / Sixth form).

⁶ JSS and JHS may be used interchangeably throughout this report.

⁷ The duration was increased to 4 years in 2006. It is now 3 years, starting with the 2010/2011 academic year.

⁸ SSS and SHS may be used interchangeably throughout this report.

made in both the number of schools established and enrolments at the JHS and SHS levels, over a period of one academic year between 2007/2008 and 2008/2009.

Table 2.1 Education delivery in Ghana, 2007-2009 (JHS and SHS levels)

<i>Level (public and private)</i>	<i>Number of schools</i>		<i>Enrolment</i>	
	<i>2007/08</i>	<i>2008/09</i>	<i>2007/08</i>	<i>2008/09</i>
JHS	9 723	10 213	1 224 010	1 285 577
SHS	678	700	437 771	490 334

Source: Computed by author from Minister of Education's meet the press speech, (Enyo 2010).

Table 2.1 shows that over a period of one academic year, the number of secondary schools increased by approximately 3%, with a corresponding appreciation in enrolments at the SHS level by around 12%.

Similar efforts aimed at improving the delivery of education and in particular, secondary education in Ghana have been made. For instance based on the generally accepted fact that most of the rural secondary schools lack the basic infrastructural facilities and thus fail to attract students and parents, efforts have been made to upgrade at least one SHS in each of the 110 administrative districts in Ghana. Also there is the establishment of the science resource centers project. Started in 1995, 110 SHSs were appreciably resourced throughout the country. They then served as resource centers for a number of satellite SHSs within a 40 km radius. "This project aimed at bridging the gap between schools with well-resourced science laboratories and those with little or no resources, to ensure equity in students' learning across the rural-urban divide." (Basic Education Unit 2004).

Upgrading of facilities at the senior secondary schools and other second-cycle institutions such as the Technical and Vocational Institutes⁹ are also on course to enhance accessibility to secondary education. For instance 3 Technical Institutes are being upgraded using a recent Austrian loan facility acquired while the Netherland's Orio Funds is being sought for assistance to upgrade 5 others. (Enyo 2010).

⁹ The Technical institutes, like the vocational institutions are also 'secondary levels' of education in Ghana. However they are more professional-oriented.

Recognizing that quality and dedicated teachers are crucial to the provision of quality education efforts are also on-going to adequately prepare and equip teachers for the task. These efforts according to (Enyo 2010) include the upgrading of the 38 Teacher Training Colleges into tertiary level institutions, with the aim of improving the content of courses offered and to strengthen the art of teaching. Moreover, there are improvements in the provision of study leave, distance education and sandwich courses for teachers. In the 2010 budget for instance provision was made for teachers in rural areas pursuing distance education to benefit from GHC 100 (USD 70) government subsidy annually. (Enyo 2010).

Next is a brief account of the cocoa sector in Ghana.

2.2 The Cocoa Sector in Ghana

Agriculture employed around 60% of the labour force in Ghana during 2007, contributing 35% of GDP in that year. Cocoa¹⁰, introduced into Ghana in 1879 covered an area of 1.2 million hectares and employed around 800,000 farmers as well as numerous seasonal workers as at 2008. Representing around 30% of Ghana's total export earnings, cocoa is currently the single largest contributor to agricultural GDP in Ghana. (Quartey 2007; CSAE 2009).

There are two cocoa crop seasons in every cocoa year. The 'main crop season' (MC) usually starts in October and ends in June the following year.¹¹ The 'light crop season' (LC) usually starts in June/July and ends in September, most often just a few days before the next main crop season starts.¹² As the names imply cocoa production (measured by cocoa purchases) in the MC season usually far exceeds that of the LC season.

Ghana, after the 1977/78 cocoa season¹³ lost its position as the world's leading cocoa producer to Cote D'Ivoire. Pests and diseases attacks were blamed for the decline in production. Again, during the 1980's bush fires burnt a number of cocoa farms in Ghana. Coupled with poor producer prices to farmers Ghana moved to the third position, overtaken also by Indonesia at the second spot¹⁴. (MMYE 2008; CSAE 2009). Currently Ghana is at the

¹⁰ *Theobroma cacao* is the scientific name of the cocoa plant/tree. It produces the cocoa bean/seed from which products such as chocolate, cocoa butter, cocoa liquour and cocoa powder are obtained. (Appendix 4).

¹¹ The 2009/2010 main crop season ended on 3/6/10. The 2010/2011 main crop season started on 1/10/10.

¹² The 2010 light crop season started on 25/6/10 and closed on 9/9/10. (COCOBOD office, New Edubiase).

¹³ 'Cocoa season' usually refers to 'cocoa year' and basically to the MC. LC beans are not exported, generally.

¹⁴ Throughout the years however, Ghana has been exclusively receiving premium payments for the high quality nature of its cocoa beans on the international market. In terms of quality therefore Ghana has always been number 1. (COCOBOD district office, New Edubiase).

second spot, producing around 18% of world cocoa and re-changing places with Indonesia. Cote D'Ivoire, continues to hold onto the first position.

West African cocoa farmers supply about 70% of all cocoa exports in the world. Average income per household member for farmers in the region however ranges between \$30 and \$110 per annum. In other regions of the world around 90% of the Freight On Board (FOB) price of cocoa goes to cocoa farmers. West African cocoa farmers receive around half of that. (www.fairtrade.org.uk). There have been improvements in Ghana though over the years, in paying the cocoa farmers remunerative prices for their cocoa.

The cocoa sector reforms and later the cocoa sector development strategy were implemented in 1984 and 1999, respectively. As (Quartey 2007) noted:

“One of the key elements of the cocoa sector strategy document was that the producer price should increase from the level of 56% of the FOB price in the 1998/1999 cocoa season to a level of 60% of the FOB price beginning with the 1999/2000 cocoa season and there after increase annually to reach 70% of the FOB price by the cocoa year 2004/2005.”

Table 2.2 below shows how this policy objective has been shaping over the years.

Annual production levels have been alternating (Table 2.2). However, relative to the 1980s there have been significant improvements in production levels generally. The target for the 2004/2005 FOB price share of farmers was achieved. Also in nominal terms, cocoa prices nearly quadrupled between the 2002/03 and 2010/2011 cocoa seasons.

Some of the other policy interventions aimed at making cocoa farming more attractive include the establishment of the Cocoa Diseases and Pests Control Programme (CODAPEC). Known popularly as ‘mass spraying exercise’, it helped to reduce crop losses due to the black-pod disease and cocoa pest (capsid) attack. The programme is still being pursued. Cocoa farms are sprayed with insecticides and pesticides, with all costs borne by government. There was also the Cocoa ‘Hi Tech’ programme. This involved the application of fertilizers, provision of improved planting materials and the application of appropriate agrochemicals on cocoa farms. This intervention reportedly faced loan-recovery problems on the part of farmers and is not directly under government control currently.

Table 2.2 Cocoa production levels, producer prices and percentage of FOB price paid to farmers in Ghana (2002/2003 to 2010/2011).

Crop year	Production level(tonnes)	Producer price per tonne*		Percentage of FOB price
		GHC (approx)	USD*	
2002/03	496,846	850	570	68.11
2003/04	736,975	900	603	69.00
2004/05	599,308	900	603	73.01
2005/06	740,458	900	603	72.66
2006/07	614,532	915	613	72.19
2007/08	680,000	950	636	70.97
2008/09	703,000	1,632	1,093	N.A
2009/10	650,000	2,208	1,479	71.10
2010/11	N.A	3,200	2,144	N.A

Source: Author's compilations from (Quartey 2007; CSAE 2009) and COCOBOD office, New Edubiase data.
 *1 tonne = 16 bags of cocoa; 1 bag = 64kilograms; *1 USD = 1.49 GHC (Ghana Cedis), as at 18/01/11.

Bonus-payments to farmers was also instituted. This was aimed mainly at 'rewarding' farmers for their hard work at the end of the cocoa season. For instance, for the 2008/2009 MC season GHC 50 million (USD 33,456,010) was paid as bonuses by government to cocoa farmers. (Quartey 2007; CSAE 2009).

There is also the COCOBOD Scholarship Trust¹⁵ for the children of cocoa farmers who make it to the public secondary schools. In recent times around 2500 applicants receive the award for their children's secondary school education annually. Besides, there is the government scholarship scheme which is also accessible by cocoa farmers whose children make it to the secondary schools. It was established in 1957 for the 'brilliant-but-needy' students at the secondary school level. During a period of just 5 years (2003-2007) over 100,000 students, some of whom are cocoa farmers' children have benefited from the scheme. (MMYE 2008).

¹⁵ COCOBOD, an acronym for Ghana Cocoa Board is responsible for regulating the internal and external marketing of cocoa in Ghana. The scholarship trust was instituted in 1951. As at the 2007/2008 academic year over 70,000 recipients had been recorded by the scheme. (COCOBOD district office, New Edubiase).

Moreover, in recent times efforts are being made to establish a cocoa farmers' social security fund to improve on the 'retirement' livelihood of the cocoa farmer.

These and other numerous initiatives are primarily aimed at increasing cocoa productivity and reducing poverty among Ghanaian cocoa farmers. Generally however, the average cocoa farmer in Ghana is still said to be poor. (MMYE 2008) and (CSAE 2009) give accounts of some reasons for this phenomenon. To virtually all cocoa farmers in Ghana, cocoa farming is the dominant source of income. However the industry is dominated by small holder farmers, cultivating between 1 and 2 hectares of cocoa and producing between 4 and 18 bags of cocoa annually, on the average. Cocoa yields per hectare of land in Ghana are said to be among the lowest in the world. Low use of fertilizer and other purchased inputs have been cited as some of the main reasons.

Inaccessibility to credit facilities to purchase these inputs seems not to be the only problem. For instance, when the government-run 'cocoa Hi-Tech' programme faced loan recovery difficulties with the farmers a private fertilizer company, WIENCO (GH) Limited¹⁶ took the mantle in 2006 and it is performing basically the same functions as the 'Hi-Tech' programme. Recent studies by (CSAE 2009) on farmers dealing with the company showed that in terms of repayment of loans only 10% of farmers had difficulties. However of the 6,300 farmers in the 2007/08 season 2,400 did not enter for the 2008/09 season, indicating a drop-out rate of around 38%. This is how (CSAE 2009) sums it up :

“Inconsistent use of fertilizer and other inputs remains a common problem in the cocoa sector in Ghana. Previous studies show that Ghana's cocoa farmers stop using technologies such as fertilizers, even when these appear to be profitable on average.”

Thus only few cocoa farmers in Ghana are probably farming cocoa with some level of technical and/or allocative efficiency, contributing to the persistent poverty observed among majority of these farmers. Cocoa farmers in the New Edubiase district are believed to be among the majority who are still trying to farm cocoa with improved efficiency. The next section is devoted to this study area and the cocoa farmers.

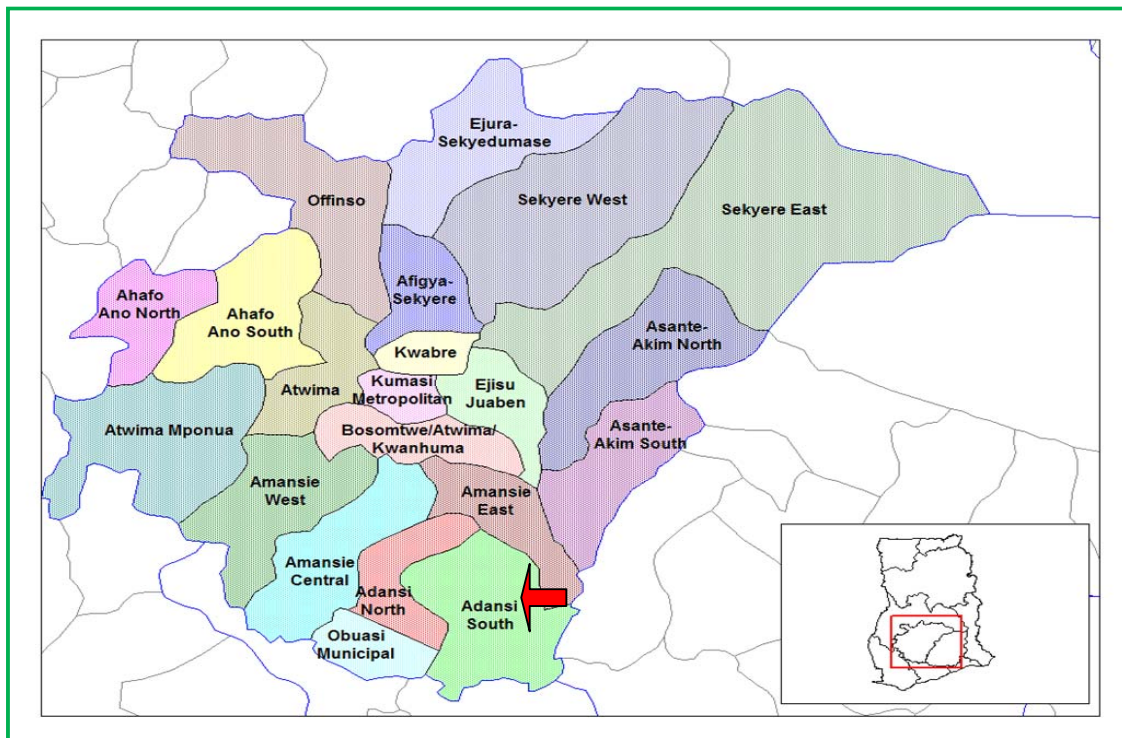
¹⁶ WIENCO established the Cocoa Abrabopa (good life) Association (CAA) in 2006. Farmers are grouped and are jointly liable for the repayment of all the loans within the group. Probably, a reason for the success story so far.

2.3 The Adansi South District Assembly

The following account in this section has the source as (Frempong ; ASDA 2007; ghanadistricts.com 2010). The Adansi South District Assembly (ASDA) is one of the administrative districts in the Ashanti region of Ghana. New Edubiase is the administrative capital of the district.

The district is bounded to the north, north-east and west, with Adansi North district, Amansie East district and Obuasi Municipal Assembly respectively, all in the Ashanti region. (Fig 2.1 below). To the east the boundary is with Birim North and South districts in the Eastern region of Ghana. The Assin North district in the Central region of Ghana shares boundaries with ASDA to the south. ASDA has an area of around 1,380 square kilometers.

Fig 2.1 Districts in the Ashanti region of Ghana (ASDA arrowed).



** Inset: map of Ghana Showing Ashanti region (box).*

During 2004 the district had a population of around 129,325. Rural-urban ratio was 92.5% : 7.5%. Male - Female ratio was 50.6% : 49.4%. Predominant household heads were men. Average household size was 4.6. Children below 14 years and adults above 65 years

formed around 48% and 3%, respectively. The working population/labour force (15-64 years) thus was around 50%.

New Edubiase is the main urban centre in the district. Semi-urban centres include Apagya, Atobiase and Adansi praso. The native Adansis constitute about 35% of the population. They reside basically in the urban/semi-urban areas. Of the settler population¹⁷ in the district, the Fantes form about 10%. Ewes, Ga-Dangbes, Akwapims and people from northern Ghana dissent together constitute around 55%. Among the settlers the Ewes dominate, forming around 70% with the settlers from northern Ghana forming a very small percentage.

The current vegetation cover of ASDA is primarily secondary forest though it lies within the forest zone of Ghana. The climatic conditions of the district is characterized by two distinct rainy seasons. These are the major season (April to July), and the minor season (September to November). Between November and March, there is usually a conspicuous dry season, characterized by the harmattan¹⁸ winds.

In terms of socio-economic infrastructure ASDA has one government hospital located at New Edubiase. The hospital is staffed with 1 medical officer, 2 medical assistants, 20 nurses and 10 midwives. Also, there is one post office at New Edubiase. The road networks joining New Edubiase township to the major cocoa-producing areas are primarily 'feeder roads'. The dominant religion in the Adansi south district is Christianity.

The rest of this chapter focuses on some background information on education and cocoa farming in ASDA. First the education sector.

2.3.1 Education and Agriculture at the Adansi South District

A brief insight into basic education in the district is given by (ASDA 2007). There are 65 basic level schools in the district. Pupil-Teacher ratio on the average is 48:1 (the national norm then was 45: 1). In 2003/2004 transition rate from primary to JHS was 91.1% (93% for girls and 89.8% for boys).

The New Edubiase Secondary (High) School (NESS) is the only secondary school in the district and is situated at New Edubiase. It was established as a training college in 1965.

¹⁷ Cocoa farmers from regions of Ghana with less favourable agro-climatic conditions for cocoa farming or (shortage of farmlands) usually migrate to areas such as ASDA to farm cocoa, in particular.

¹⁸ A dusty wind from the Sahara desert that blows toward the western coast of Africa during the dry season.

Four years later it was converted into a secondary school. The current (January 2011) student population is 1767 (946 male and 821 female). There are currently 22 students with COCOBOD scholarship¹⁹. There are also 20 students with the government scholarship. Also there are a few students receiving financial assistance from Anglogold-Ashanti, a gold mining company at nearby Obuasi municipality. (Administration, NESS).

The agricultural sector employs around 80% of the active labour force in the district. Cocoa is the main cash crop engaged in. Other cash crops include coffee and oil palm. Farming of food crops such as maize, cassava, rice, cocoyam, plantain as well as rearing of livestock are also carried out by the farmers in the district, basically on subsistence levels. (ASDA 2007).

Factors perceived to be contributing to farmers in the district being poor, according to (ASDA 2007) include unfavourable land tenure system, low rate of dissemination and adoption of improved technology and high post harvest losses. Others include capital/financial constraints due to imperfect/non-existent credit markets, non-existent markets for risk (insurance) and imperfect markets for inputs and outputs.

Some measures taken to address the problems in the agricultural sector include the establishment of the root and tuber improvement project. This seeks to help farmers acquire improved planting materials with the accompanying appropriate technologies. Also underway is the national livestock improvement project.

To address the problem of post-harvest losses, a farmer based organization development fund (FBODF) is in place to assist well-organised farmer groups in the acquisition of equipment used for the processing of cassava, oil palm, rice, maize and palm kernel. Again, there is the food and agricultural budgetary support (FABS) project, sponsored by the Canadian government. It aims at giving soft loans at 15% interest rates to farmers. (ASDA 2007).

2.3.2 The New Edubiase Cocoa District²⁰

The cocoa districts are different from the political/administrative districts in Ghana. They are strategically demarcated to facilitate the supervisory activities of COCOBOD in the cocoa industry in Ghana. There are 68 cocoa districts nationwide. The New Edubiase cocoa

¹⁹ Students who entered for the 2010/2011 academic year, were yet to apply for the scholarship.

²⁰ Information provided in this section is from the COCOBOD district office, New Edubiase.

district²¹ is one of them. It has the same boundaries as the Adansi South District Assembly (ASDA). However it extends a little further into the Adansi north district. The district has been the highest cocoa producing district in the Ashanti region for some years now. During the 2009/2010 main crop season cocoa production was 152,171 bags while the light crop yielded 9,852 bags.

The cocoa district office is at New Edubiase. COCOBOD is currently represented at the district level by its subsidiary, Quality Control Division (QCD), with the QCD district officer being in charge of the cocoa district. Apart from performing the supervisory activities the core activities performed by the COCOBOD officers in the district are the inspection, grading and sealing of cocoa purchased by the Licensed cocoa Buying Companies (LBCs) in the district.

There are currently 13 LBCs in the district. The LBCs have district cocoa warehouses (depots) basically within the vicinity of New Edubiase in which purchased cocoa is kept for QCD to work on. Each LBC has a district officer (DO), who supervises purchasing clerks (PCs). The PCs are in direct contact with the cocoa farmers from whom they buy the dried cocoa beans at the cocoa society level. A cocoa society is a community dominated by cocoa farmers. There are 84 cocoa societies in the New Edubiase cocoa district.

Appendix 1 shows representative cocoa societies in terms of highest, moderate and least cocoa production in the study area.

Chapter three follows next, with the review of literature.

²¹ *New Edubiase district* is used interchangeably with *New Edubiase Cocoa district* in this write up.

CHAPTER THREE

3. LITERATURE REVIEW

The chapter begins with summarized literature on the need for education in general and secondary education, in particular. Brief theoretical backing for why parents often have to choose between using a child for work and/or sending him/her to school and some empirical evidences supporting situations where such decisions have actually been made, then follows. The chapter concludes with the hypothesis to be tested in this study.

3.1 The Importance of Secondary Education

“Low literacy and numeracy skills impede farmers’ abilities to efficiently manage production and loans, negotiate agreements, understand the business aspects of cocoa farming, apply new technologies to increase crop yields, and understand costing and pricing calculations.” (CSAE 2009).

(Mankiw, Romer et al. 1992) demonstrated using international cross-sectional evidence that around 75% of the per capita income variations observed across national economies can be explained by the neoclassical (Solow) growth model if the steady state of this model were suitably augmented to allow for human capital accumulation. Basic education contributes mainly to the production of final output. Post basic education contributes to the adoption and innovation of technology, thus contributing more to the creation of effective labour. Basic education is necessary but not sufficient. (Curtin and Nelson 1999; Papageorgiou 2003).

Using longitudinal variations, a World Bank study established a positive relationship between secondary enrolment and GDP levels. Also, where secondary education improves income inequalities among individuals decline. (Holsinger and Cowell 2000, p77,99).

In Ghana studies showed during 1992 that an additional year of secondary schooling yielded a return of 7% and 7.3% for males and females, respectively. (Sackey 2008, p33).

Education in general and secondary education in particular, confers good attributes in the lives of females relatively. (Holsinger and Cowell 2000, p80) noted that educating a woman results in a rise in the labour-force participation of women, improvement in maternal health status, decline in birth rates, decline in fertility rates by increasing time in school and/or marriage age, fewer and healthier babies and also improvement in the schooling of children.

(Schultz 2003, p113) reported on studies carried out on males who are 55 years and over. Where the mother had a secondary school education, the son was 67 times more likely to attend higher education than a son whose mother did not attend secondary school. Where the father attended secondary school, the son was 33 times more likely to attend higher education than a son whose father had no secondary education. Studies in 2002 showed that about 33% of households in Ghana have the heads being women. Also, in these female-led households the decline of poverty levels is relatively faster. (Sowa and CEPA 2002, p13).

3.2 Theoretical Backing for Child Work/School Decisions

Two theoretical propositions are presented in this section, in trying to explain why households usually make the observed decisions with regards to the child's work/school issues. Basically, the two theories are complementary to each other. They are the 'luxury axiom' and the 'liquidity constraint' proposition.

The luxury axiom was proposed by (Basu and Van 1999). According to this axiom, the use of the child for work is associated with an income constraint on parents, not due to their preference for child work. That is, though the household may be appreciably aware that the extensive use of children for work to the detriment of their education may adversely affect their human capital development and even sometimes compromise their future health as well, they usually have no other option but to use the child. Poverty causes the parent to use the working of the child to trade off higher current income against lower future child income.

(Coulombe 1997; MMYE 2008) have similar views. They also argue that since the likelihood of farmers' children committing more to education increases with household wealth, a greater use of the child for work rather than schooling is due primarily to poverty. Family labour is used to substitute for paid labour, knowing very well of the adverse

implications on the current and future wellbeing of the child. However, the farmer usually has no other alternative. The involvement therefore of children in helping on the farm is in most cases meant to be complementary to adult/hired labour but usually ends up serving as a substitute due to poverty. Grootaert et. al. (1995) also supported this view that the main reason why households will use a child extensively for income earning activities is poverty.

(Baland and Robinson 2000; De Janvry, Finan et al. 2004) however argue that the luxury axiom is necessary but not a sufficient ‘condition’ for the extensive use of children for work instead of schooling. They assert that due to liquidity constraint, arising from imperfect financial markets for instance, parents are not able to trade off current resources with old age/future income. Thus they believe households may not be asset-poor but the options available to liquidate assets when there is the need are usually limited. The implications of this is that a child who has been enrolled at the school could easily be withdrawn when the need to make certain timely transactions become difficult, though the parent may have an asset such as land which is not easily liquidated. This then may contribute in de-motivating the household and/or other households to even enrol the child into school in the first place. Where ex-ante risk-coping instruments do not adequately shield consumption from income shocks, child schooling could be sacrificed for more work to enhance risk-coping efforts.

Liquidity constraint, they continue to argue then becomes a sufficient reason for the option for more work at the expense of schooling of the child. Through a study on child labour in Cote D’Ivoire (Grootaert 1998) also indicated that poverty is not the major cause of the extensive use of children for income earning activities such as working on the farms. Rather low hourly earnings by parents played a major role. He also argued that *“households will allocate the time of children to wherever the perceived private return is highest, until the marginal return is equalized across all uses of the child time”*.

There are several empirical evidences supporting the liquidity constraint view, in particular. Next, a few of them are presented.

3.3 Empirical Studies on Child Work/School Decisions

Based on the ICRISAT India panel data it was shown that the use of children for more work at the expense of schooling increased when there is covariate unanticipated shocks and failures in financial markets. (Jacoby and Skoufias 1997). Studies in urban Mexico indicated

that whereas the schooling of boys is not significantly affected, girls schooling is negatively impacted on by idiosyncratic shocks such as parent's unemployment, illness and divorce. (Parker and Skoufias 2001).

In Guatemala (Guarcello, Mealli et al.) established that child's schooling was often temporarily halted (for risk-coping purposes). Usually the child would not return to school again. The trend was reversed when credit facilities and medical insurance were made available to parents. (Ray 2000) noted during studies in Peru that the use of the child, both male and female, for income earning activities recorded a significant decline as the adult wage paid to parents appreciated.

(Blunch, Canagarajah et al. 2002) made observations in Ghana that in the short run poverty has a strong influence on the use of the child for work but does not significantly influence the child's schooling decisions. In the long run it has no significant effect on child work decisions. The extent at which the child will be engaged in schooling however, is very much determined by the household's wealth status in the medium-long term. In Mexico (Robles-Vásquez and Abler 2000) noted that household income alone has little impact on child work/school decisions if other control variables are kept constant. When income was doubled, the likelihood of a rural child going to school only without working increased by only 0.01 (1%) and 0.03 (3%) for girls and boys respectively

(Jensen 2000) showed in Cote D'Ivoire that the extensive use of children for work rather than schooling was due primarily to uninsured shocks. In the event of the male household head becoming unemployed in Brazil, (Duryea, Lam et al. 2007) found out that the schooling of the child, especially for 16 year old girls would be sacrificed for more work. (Canagarajah, Coulombe et al. 1997) following a study on child labour in Ghana concluded that though poverty is significantly correlated with the decision to send the child to school, it is not the main culprit of child labour.

Also, among the poor and children in particular, periods of economic downturns have been found to result in declining school enrolments in Costa Rica, Indonesia and Argentina, among others. (Funkhouser 1999; Rucci 2003; Thomas, Beegle et al. 2004).

The subsections that follow below are basically a continuation of the empirical findings on child work/school decisions by households. This time however, efforts are made to group

them around the main variables of interest to this study: external assistance for child schooling, household characteristics, parents' characteristics, child's characteristics and community characteristics.

The provision of credit appears to be a quick way of solving the liquidity constraint problem. However, as (De Janvry, Finan et al. 2004) emphasize, even where credit facilities are available the provision of the necessary long term credit for pre-tertiary education in particular is usually non-existent. Due to lack of collateral for credit poor parents are usually rationed out of the credit market. Besides, they may voluntarily not participate in credit markets because they are not really convinced of the ability of child education to pay for itself. Conditional transfers, in-cash or in-kind, have been found to be effective in the attempt to solve income needs/liquidity constraint problems.

3.3.1 External Assistance and Child Work/School Decisions

Conditional Cash Transfer programmes (CCT, where in-cash) aim at reducing poverty by making welfare programmes conditional upon the receivers' actions. They are usually also classified to be social safety nets based on their poverty-alleviation objectives. When they involve education, the aim generally is to encourage child enrolment and attendance at schools. An external financial assistance to the poor cocoa farmer such as the COCOBOD farmers' scholarship trust may appropriately be viewed as a form of CCT in this regard. Why the assistance usually has to be 'conditional' is briefly explained below.

According to the wealth paradox, children of land-rich (wealthy) households are often more likely to work on the farm than the children of land-poor (less wealthy) households. (Bhalotra and Heady 2003). Increasing household income level may lead to the household expanding the size of the farm holdings. More labour may then be required on the farm. Family labour being relatively more flexible and cheaper may be the first labour option to the household in such a situation. The likelihood of the child being used on the farm extensively and hence relegating his/her education to the background is high, especially if there is not significant motivation on the part of the household head towards enhanced child education. Factors such as is implied by the wealth paradox suggest that income effects (due to improved income levels) may be weak in that the purpose to which assistance is given may not be achieved. In other words, direct assistance in cash especially may raise the income levels of households and yet fail to transmit into enhanced schooling chances for the child.

Therefore transfers could be transformed from an income into price effects by tying transfers to conditions on school assistance for instance, such as is the case with the COCOBOD and government scholarships. Thus, conditional transfers would not necessarily increase income levels of households directly, but yet helps them in meeting specified financial obligations that otherwise would be difficult to execute. The impact achieved, for instance on school enrolment could be much greater in this way. (Sadoulet and De Janvry 2004).

Conditional transfer programmes have been found to be successful in addressing problems such as weak poverty targeting. This is a situation where financial assistance gets to unintended hands. Several of the failures/imperfections associated with the provision of social assistance are also minimised using conditional transfers. These include disincentive effects and limited welfare impacts.

Conditional transfers can thus be useful in shielding the investments in children's human capital development from uninsured shocks in that they help to protect the child's schooling against idiosyncratic shocks (unemployment, illness, theft, etc.) and covariate shocks (natural disasters, pests and diseases attacks, etc.). Conditional transfer programmes in Honduras, Jamaica, Turkey, Colombia, Nicaragua and Mexico are some of the well-documented examples. (Rawlings and Rubio 2005).

(De Janvry, Finan et al. 2004) noted that in raising children's school achievements and improving their health conditions CCTs have been proven to be very effective. Mexico's PROGRESA, an in-cash conditional transfer programme for instance increased secondary enrolment from 3.5 to 5.8 percentage points for boys and from 7.2 to 9.3 percentage points for girls. Dropout rates at the secondary level was also projected to decline by 30%. (De Janvry, Finan et al. 2004; Duryea, Lam et al. 2007).

A conditional transfer programme, in-kind, in Costa Rica increased school attendance significantly though it did not have much impact on the continued use of children for work. In Colombia's *families en accion*, school enrolments/participation of 14 to 17 year old children increased by between 5 and 7 percentage points. (Attanasio, Fitzsimons et al. ; Duryea, Lam et al. 2007).

3.3.2 Household Characteristics and Child Work/School Decisions

Household characteristics such as wealth status, household size and other demographic characteristics, feature strongly in both the luxury axiom and the liquidity constraint ideas. (Glick and Sahn 2000) noted in Guinea that income, irrespective of its source can cause parents to invest largely in their children's education. Increase in household income, they found out influenced very little the schooling decisions involving boys. On the other hand it resulted in greater investment in girls' schooling.

In Tanzania (Beegle, Dehejia et al. 2003) found out that the provision of credit to farmers against agricultural shocks helped to increase school enrolments. Children's schooling, according to (Edmonds 2004) improved significantly as a result of injection of anticipated liquidity into poor households by the South African pension system. Based on analysis of data from rural households in Ethiopia, (Cockburn 2000) also noted that income when instrumented was negatively related to the decision to use the child for work. With regards to the schooling of the child it was found to have a very significant positive effect. That is as household income level increased, the schooling chances of the child increased relative to the likelihood of the child working.

Most studies that used house quality as a proxy for household welfare measure, found out that the probability of children living in well-to-do/quality houses working on farms as their only activity was very small compared with those living in low quality houses. (Coulombe 1998). Also, the bigger the household size the more likely the child will have more schooling time as there is likely to be other hands to fall on for work on the farm. The chances of the child working on the farm has also been found to be high because there is a high possibility of having more mouths to feed and therefore the need for more labour. That is, the greater the dependency ratio (consumer-worker ratio) the less likely will the child have adequate time for schooling. (Coulombe 1998; Grootaert 1998).

3.3.3 Parent's Characteristics and Child Work/School Decisions

Various empirical studies have documented a strong correlation between the characteristics of a parent/guardian of a child and the working/schooling decisions made concerning the child. The parental characteristics usually cited include the education level of the parent, the gender of the parent, the origin status of the parent (native, national migrant or international immigrant) and the age of the parent.

(Coulombe 1997) noted that the decision for the child to work or go to school is heavily influenced by the father's education level. However, the impact is greater on girls than on boys in that the girl-child has greater chances of schooling if the father is educated than the male-child. The author also asserts that parents with no or low education are more likely to choose work, rather than education options for their children relative to parents with better education levels. Hence, the trans-generational aspect of lack of schooling usually observed. A child with a parent having low level of education in most cases ends up having low level of education also and the likelihood of his/her child following suit is very high.

In Pakistan it has been observed that children are more likely to be sent to school irrespective of gender where the parents, especially mothers are appreciably educated. Thus, the usually acclaimed discrimination against girl's schooling is minimal if the parents are educated. (Khan and Ali 2005). In rural Cote D'Ivoire a father with higher education increases the chance of his daughter going to school, while a mother's education lowers the school-going chances of her daughter. (Grootaert 1998). Also touching on the influence of the gender of the household head, the author noted that generally the chances of a child going to school and not working is significantly decreased if the main decision-maker in the house is a female. In Ghana, the higher the education of the father, the higher the chances of the child going to school. The effect is stronger for girls than for boys. Generally however, the schooling chances of the child improves if the parent is educated. (Canagarajah, Coulombe et al. 1997).

The education of the Brazilian mother has also been found to have greater influence on the girl-child's education. (Emerson and Souza 2001) found out that daughters in Brazil are more likely to be sent to school where the mother, especially has more education. (Glick and Sahn 2000) have also made observations in Guinea that mothers' education have larger effect on daughters education than on son's schooling. Fathers' education on the other hand have been observed to affect son's education more than their daughters' education.

Contributions in this direction have also been made by (Handa, Simler et al. 2004). They found out that Levels of education attained by adults in a household, especially female adults tend to influence very much the initial decision to enrol a child and also the child's performance in school. (Ray 2000) also found out that in both Pakistan and Peru the tendency to use the child for work rather than schooling declined sharply with increasing education level of the parent. The impact, he found out, is more significant in Pakistan than in Peru.

There have also been empirical documentations on the effect of the age of the household decision-maker on the child work/school possibilities. An older household head in rural Cote D'Ivoire for instance, was found to increase the likelihood of a work-school combination option for the child. (Grootaert 1998). Female household heads who are relatively old are more likely to have male children who are into working than schooling, as established in Brazil by (Emerson and Souza 2001).

Some empirical studies have also established that children living under the control of a native farmer are more likely to attend school and less likely to work. Migrants in rural Cote D'Ivoire are more likely to use children for work and less likely to enrol children in school. (Coulombe 1998).

3.3.4 Child Characteristics and Work/School Decisions by Parents

The decision by the parent to commit the child to schooling and/or working is believed to be highly influenced by the characteristics of the child. These include the gender of the child, the status of the child (biological or non-biological) and the age of the child.

(Bock 2002) found out in Botswana that if the children in a household are similar in terms of gender and age, the likelihood of each child irrespective of gender, taking part in a particular work (on the farm) declines, while the chances of each child getting more schooling time increases. That is two boys for instance, may do a specified 'male-child job' that otherwise one boy would do, and in that way saving time for schooling.

Traditional beliefs, practices and sayings perpetuate gender imbalance in terms of educational attainments. The girl-child is usually discriminated against, when parents have to take a decision on the funding of their wards education. (Fant 2008) indicated that the educational needs and interests of the girl-child are usually marginalized due to educational policies and intra-families priorities. That is, where there is limited educational opportunities for instance the needs of the male-child are prioritized over the needs of the girl-child.

Economic, social and cultural factors that shape the attitude of households sometimes results in gender bias in child schooling. Commenting on findings in Pakistan (Khan and Ali 2005) argue that since the attitude of households are influenced in different ways, the attitudes towards female education are also diverse. In general however low value is attached to female education in most societies and/or households. Adult illiteracy, poverty and large

family sizes are some of the important socio-cultural factors shaping attitudes concerning education of females. The authors also touched on a common belief within households that sons even after marriage, can still provide economic support to the parents and siblings compared to daughters and therefore the usual prioritization of boys' education over girls'.

According to (Emerson and Souza 2001) a study in Brazil revealed that most households believe the opportunity cost of sending a daughter to school relative to that of a son is very high. Also, the returns from girls education is believed to be relatively lower. Both parents in most households were thus found to favour son's education attainment over a daughter's.

(Handa, Simler et al. 2004) also noted in Mozambique that in most rural areas, the enrolments and retentions of boys were higher than those of girls. In rural Cote D'Ivoire, (Grootaert 1998) found out that boys are 15 percentage points more likely to go to school than girls. (Canagarajah, Coulombe et al. 1997) observed in Ghana that boys are more likely to go to school than girls.

(Grootaert 1998) in addition found out that the decision to send the child to school in rural Cote D'Ivoire is not significantly influenced by his/her age. However, the likelihood of the child working on full-time basis rises with age. (Robles-Vásquez and Abler 2000) found out in Mexico that older children are more likely to work than younger children. For instance the probability of rural girls engaging in school-only as their age increased by one more year declined by 0.19 while for urban boys the corresponding decline was 0.11. In Ghana, (Canagarajah, Coulombe et al. 1997) confirmed that older children were more likely to engage in both schooling and working.

Some empirical studies have also confirmed that a child under guardianship is disadvantaged in terms of schooling opportunities. (Ainsworth 1996). Also (Cockburn 2000) observed with cocoa farmers in rural Ethiopia that the biological child has far greater chances of being sent to school than the foster child. Furthermore, the latter even if enrolled in school is more likely to engage in work-school combination than the former.

3.3.5 Community Characteristics and Child Work/School Decisions

Numerous empirical studies have documented a strong relationship between the distance to school and school enrolment. Studies by (Frenette 2006) in Canada revealed that where a university is within walking distance to a community, enrolment from the community is

relatively higher than where the two are far apart. (Khan and Ali 2005) found out in rural Pakistan that where schools are not available in the immediate vicinity most households have reservations about the girl-child travelling to attend school.

In rural Cote D'Ivoire, (Grootaert 1998) noted that the probability of a child going to school or working and going to school declined by 18 percentage points, if the school is over 1.5 kilometres away. (Fentiman, Hall et al. 1999) observed in rural Ghana that distance from school discouraged school enrolments and/or attendance, especially for girls.

Other characteristics of the community from which the child is have also been found to have significant influence on work/school decisions. In Pakistan, for instance (Burney and Irfan 1995) indicated that area literacy influences significantly the decision to send the child to school. If there are more educated people in the community, it has virtually a contagious effect on the citizenry. Households are usually motivated to follow suit by giving their children more schooling time.

3.4 Hypothesis

Based on the theoretical arguments and the empirical presentations above, the hypothesis that will be tested in this study is:

The probability of a child attending secondary school and/or working on the cocoa farm is a function of characteristics of the parent, the child, the household and the community as well as the possibility of getting external assistance for the child's secondary education.

The stage is now set for us to find out what we can also establish through this study. Chapter four follows next with the data and the method needed for this exploration.

CHAPTER FOUR

4. DATA AND METHOD

4.1 Selection of the New Edubiase Cocoa District

One of the main reasons New Edubiase cocoa district is selected as the study area is that this cocoa district is highly diverse in terms of ethnicity. As noted in chapter two the Ewes are the dominant settlers in the study area. They are well known for their commitment to education and high patronage in cocoa farming. The Akwapims, another group of settlers share similar attributes with the Ewes. In fact, cocoa farming started in the Eastern Region of Ghana from where the Akwapims come. The Fantes are from the Central Region of Ghana from where both basic and post-basic education started in Ghana. Apart from the high patronage in education they have also taken to cocoa farming extensively.

The Ga-Adambges are from the ‘capital region’ of Ghana, the Greater Accra Region where education is taken very seriously. Sharing boundaries with the Akwapims has resulted in so many cocoa farmers also coming from this region. The native Adansis, are from the Ashanti Region, notably known as the ‘migrants-home’. The citizens of this region hardly migrate to other regions for farming purposes. They generally serve as hosts to majority of the migrant farmers, as landlords and landladies. They equally take education very seriously. Hence they serve as the ‘control’ group for ‘the landlord cocoa farmers’ in this study.

The only cocoa producing regions in Ghana that are not adequately represented by farmers in the New Edubiase cocoa district are the Western and Brong Ahafo regions. However in these regions also cocoa farming is dominated by migrants, mainly from the same regions as those

in the New Edubiase cocoa district. This is especially the case with the Western region which is currently the highest cocoa producing region in Ghana.

It is therefore perceived that the New Edubiase cocoa farmer is an adequate representative of cocoa farmers in Ghana, who very often have to choose between working on the cocoa farm and/or secondary education for their children.

4.2 Data Collection Method

Structured questionnaire was used to collect primary data from 158 households. Data collected were on variables grouped under five sections. These sections are the characteristics of parent (household head), child, household and community as well as the level of dependence on external assistance (scholarship) for child's secondary education. Additionally, secondary data was obtained through informal interview sections. Sources included New Edubiase COCOBOD district office, the administration of New Edubiase Secondary School and Adansi South District Assembly.

During a farmers forum²² at New Edubiase, record was taken of households with children who qualified for secondary school since 2008 in the various cocoa farming communities. Thus households with such children who eventually made it to the secondary school or who did not though they qualified were included in the sample frame. Each community had at least, one of such households. Guided by information on cocoa production levels in the various communities from the COCOBOD district office, 3 groups were then formed out of the communities with relatively high numbers of the prospective respondent households. Each group consisted of 14 communities/cocoa societies with similar annual average cocoa production levels. Five (5) communities were randomly selected from each group to form 3 zones²³ from which the respondents eventually came. Zone 1, zone 2 and zone 3 are respectively the least, moderate and highest cocoa producing areas selected. Table 4.1 below shows the zones, communities and the sample sizes obtained in each community.

²² Organized by COCOBOD and *Hope For Humanity*, an NGO affiliated to International Cocoa Organization (ICO), to sensitize cocoa farmers on cocoa quality and child labour issues.

²³ The expected number of respondents out of the 15 communities was 192 which was deemed to be quite appropriate for the analysis. Hence, the selection of only 5 communities per zone.

Table 4.1 Sample distribution per communities in the New Edubiase District

Zone 1		Zone 2		Zone 3		
<i>Community</i>	<i>Sample</i>	<i>Community</i>	<i>Sample</i>	<i>Community</i>	<i>Sample</i>	
N. Subiriso	6	A. Mankata	12	Oyankrom	14	
Mensakrom	9	Achiasewa	11	Fumso	16	
K. Minti	4	W. Aboabo	8	Biakwaso	11	
Apagya	16	Anwona	11	Agravi	13	
S. Kwakye	6	Obuobikrom	9	Bepoase	12	Total
TOTAL	41		51		66	158

- Cocoa production levels increase along communities in each zone. On the average for instance, annual cocoa production in Mensakrom is higher than it is in N. Subiriso, in zone 1.

Since the expected number of respondents per community was not quite high, no limit was set for the number of households the questionnaire was to be administered to.

4.2.1 The Variables

Different characteristics of the parent, the child, the household, the community as well as the possibility of getting a scholarship for the child's schooling have been suggested through previous studies, to influence the work/school decisions of parents on behalf of their children. These factors are consequently assumed to be important determinants of work/school participation in this study. Included in the empirical model are 14 explanatory variables. Below, the discussion and justification of these variables are provided.

Parent characteristics

headage measures the age of the household head. The older parent has the tendency of using the child more on the farm, probably to complement for his/her labour shortfall due to old age and also to prepare the child for possible inheritance of the farm. On the other hand, old age might have provided the parent substantial experience on the advantages of giving the child more schooling time. Hence, it is hypothesized that *headage* is positively related to both work and school.

Combining secondary schooling and work on the farm is also a high possibility if the parent is relatively old compared to a relatively younger parent, indicating a likely positive relationship between the variable and secondary school-work combination.

headmale is the gender dummy of the household head. 1= male; 0 = female. Households headed by females may need the labour input of the child on the farm much more than the male counterparts. (Grootaert 1998) found out in Cote D'Ivoire that children in households headed by female were more likely to engage in work rather than school. This is more so with an older, less educated female. (Emerson and Souza 2001). It is thus expected that *headmale* is positively related to school and negatively to work.

Also the male parent is less likely to choose the school-work combination for the child than the female parent. Hence the relationship between *headmale* and school-work combination is expected to be negative.

educhead measures the level of education of the household head (1= no formal education; 2= primary education; 3= middle/JSS; 4= O/A level/SSS; 5= post-secondary education). Numerous empirical studies have shown that generally the more educated a household head is the more likely the child will engage in more schooling than working. It is therefore hypothesized that this variable is negatively related to work and positively related to school.

Furthermore, the more educated parent is likely to minimise the possibility of the secondary-school-going-child working extensively on the farm. The relationship between *educhead* and secondary school-work combination is thus expected to be negative.

mighead is a binary variable which indexes whether the farmer is a native or a settler in the study area. It takes the value 1 for a migrant and 0 otherwise. Migrants are less likely to have access to much land. They also usually face unfavourable land tenure contracts. To maintain an acceptable level of production therefore, migrants will need more inputs. The child, especially at the secondary school age might thus be used more on the farm. It is hence expected that children in migrant households will have a lower probability of secondary school enrolment and/or attendance. *mighead* is hypothesized to be negatively related to school and positively related to work.

Likewise the tendency for the child from the migrant household to engage in farming whiles schooling appears to be higher relative to a child of a native parent. A positive relationship is thus expected between this variable and secondary-work combination.

Child characteristics

childmale indexes the gender of the child. 1= male; 0= female. Various empirical findings suggest that the male child is more likely to be used on the farm than the girl child. Other findings point to the fact that boys are more likely to go to school than girls. With migrant farmers dominating in the study area however, it is expected that the male child will be used more on the farm to help improve farm productivity since they are relatively more physically-endowed for the tasks usually performed on the cocoa farm. It is therefore expected that *childmale* is positively related to work and negatively related to school.

For the same reasons, the male child is more likely to combine secondary schooling with cocoa farming than the female child. A positive relationship is expected also between *childmale* and secondary-work combination.

childage measures the child's age in years. Generally in rural Ghana enrolment in school is delayed. It is thus more likely that older children will be enrolled into secondary school. Also physically-demanding as most of the activities on cocoa farms are, it is more likely that older children will be more involved in work on cocoa farms than younger ones. It is therefore hypothesized that *childage* is positively related to both school and work. *childagesq* is included to account for any nonlinearity in the relationship.

The older child is also more likely to be able to combine schooling and farming than the younger child. The relationship between *childage* and secondary-work combination is hence expected to be positive.

Household characteristics

hsize measures the size of the household family. Generally large households may be faced with more problems (the need for food, health, shelter, etc), leaving them with insufficient capital to send all the children to school. Also a child in a large household may be freed for more schooling time as there may be readily available substitutes for work on the farm. It is expected that *hsize* is related negatively to both school and work. To control for nonlinearity in the relationship *hsizesq* is included in the model.

Furthermore, a positive relationship is expected between *hsize* and school-work combination as the tendency for the child to combine schooling and working is likely to increase with larger household sizes compared to relatively smaller household sizes.

depenratio represents the share of the household members who are less than 6 years and older than 55 years of age. The greater the number of non-working members of a household the more likely the pressure on those working. The child in such a household is likely to be used more for work rather than schooling. It is expected that *depenratio* is positively related to work, school-work combination and negatively related to schooling.

hsequal measures the housing quality of the main household building. It is a proxy for household welfare. 1= low (houses with fragile/mud walls and straw/bamboo-leaves roof); 2= medium score (solid walls, solid roof); 3= (bricks wall, solid roof). Children living in well-to-do houses are less likely to work on cocoa farms as their only activity, as has been established by several empirical observations. It is hypothesized that *hsequal* is negatively related to work and positively related to school.

Furthermore, in a well-to-do household the likelihood of the child combining secondary schooling with work on the cocoa farm is expected to be less compared to the situation in a relatively less worthy household. A negative relationship is thus expected between *hsequal* and the secondary-work combination option.

cocopdn measures the level of cocoa productivity, based on the bags of cocoa sold per year. 1= low (up to 12 bags); 2= medium (13-22 bags)²⁴; 3= high (above 22 bags). The services of the child may be needed on the high productivity cocoa farm most of the time. This is because farmers having high cocoa productivity are usually those using inputs such as pesticides, insecticides and fertilizers that generally require enhanced use of labour on the cocoa farm. On the other side of the coin however, making expenditures involving children such as payment of school fees may not be too much of a problem to the high productivity cocoa farmer. *cocopdn* is therefore hypothesized to be positively related to both work and school.

Likewise, a positive relationship is anticipated between *cocopdn* the secondary-work combination.

²⁴ Cocoa productivity on the average cocoa farm in Ghana is within this range.

Community characteristics

Zone represents a cluster of cocoa communities having similar cocoa production levels. 1= low production areas; 2= medium production areas; 3= high production areas. The opportunity cost of labour is expected to be relatively high in a high production area as high cocoa production farmers may demand more labour. Households may then choose to use the labour of the child on the farm since that is a more flexible and cheaper source of labour, relatively. Also, households in high production areas may take a cue from one another and thus send the child to school. *zone* is hypothesized to be positively related to both schooling and work as well as secondary-work combination.

dominha measures the dominant ethnic group in the community. Since the settlers dominate in virtually all the communities, 1= natives (few); 2= settlers (many). Generally, the natives are relatively well-to-do. They have more secured rights over assets such as land. Their children are more likely to devote more time to schooling than working on the cocoa farms. As found in Pakistan (Burney and Irfan 1995), area literacy usually influences the decision to send the child to school. It is therefore expected that *dominha* is negatively related to school and positively related to work and/or school-work combination. That is, more settlers imply less school and more work.

Dependence on external support

depencoco is a measure of the level of confidence the parent has in getting the COCOBOD scholarship for the child's secondary education. 1= low; 2= high; 3= very high. The greater the hope of getting the scholarship, the more likely the child will be giving more schooling time. It is expected that this variable is positively related to school and negatively related to work as well as secondary school-work combination.

depengov measures the level of confidence the parent places in getting the government scholarship for the child's secondary education. 1= low; 2= high; 3= very high. *depengov* is also expected to be positively related to school and negatively related to work and/or school-work combination.

Dependent variables

The questionnaire was also used to generate three categorical variables which form the basis for the dependent variable in the model.

sec represents child at secondary school only, without working on the cocoa farm.
1= yes; 0=no

secwork stands for child attending secondary school and also working on the cocoa farm.
1= yes; 0= no

work denotes child who though qualified for the secondary school, is working only on the cocoa farm. 1= yes; 0= no

choice stands for the farmer's choice involving the child work/school options. It is constructed from the 3 categorical variables above. That is, *choice* = 1 if *work*; *choice* = 2 if *sec*; and *choice* = 3 if *secwork*. Thus *choice* is the dependent variable in this model with *work*, *sec* and *secwork* as the three categories.

Table 4.2 below presents the list of the independent variables with descriptions, coding and the expected signs on *sec*, *work* and *secwork*.

4.3 Method

The influence of socioeconomic variables on child work/school decisions have received several numerical empirical investigations. In most cases the farmer's decision is assumed to be of a dichotomous nature. That is the decision is between either child's schooling or child work. The analyses in such instances generally involve the use of the probit, logit or bivariate probit models. (Andvig, Canagarajah et al. 2001). Sequential/ordered probit/logit models are also sometimes used. The probabilities obtained in such models are conditional upon the outcome of the previous choice. For instance in some cases the participative decision-making process is assumed to be sequential such that the decision to participate in work follows the decision to engage in schooling. (Grootaert and Patrinos 1999).

Table 4.2 Summary of the independent variables

No.	variable name	Description	Code	Expected sign		
				<i>Sec</i>	<i>work</i>	<i>secwork</i>
1	headmale	Gender dummy of the household head	1=male 0=female	+	-	-
2	headage	Age of the household head in years	Continuous variable	+	+	+
3	educhead	Household head's education level	1=no formal, 2=primary, 3=middle/JSS, 4=O/A level/SSS, 5=post secondary	+	-	-
4	mighead	Dummy for whether the household head is a migrant in the district	1= yes, 0= no	-	+	+
5	childmale	Gender dummy of the child	1 = male 0 = female	-	+	+
6	childage	Age of the child in years	Continuous variable	+	+	+
7	hsequal	House quality	1=low (fragile wall, straw roof), 2=medium score (solid wall, solid roof), 3=highest score (bricks wall, solid roof)	+	-	-
8	hsize	Number of household members	Continuous variable	-	-	+
9	depenratio	Share of household members <6 and >55	Continuous variable	-	+	+
10	cocopdn	Bags of cocoa sold per year	1=low (up to 12), 2=medium (13-22), 3= high (above 22)	+	+	+
11	zone	Cluster of cocoa communities based on cocoa productivity	1= low production areas 2=medium production areas 3= high production areas	+	+	+
12	dominha	Dominant inhabitants	1= natives, 2= settlers	-	+	+
13	depercoco	Level of dependence on COCOBOD scholarship	1= low 2= high 3= very high	+	-	-
14	depengov	Level of dependence on government scholarship	1= low 2= high 3= very high	+	-	-

A more detailed descriptive statistics of the variables will be presented in the next chapter.

The cocoa farmer in this study makes a decision based on three available options. These are:

1. Child working on cocoa farm only, '*work*'.
2. Child attending secondary school only '*sec*'.
3. Child combining secondary school and work on cocoa farm '*secwork*'.

A model that considers more than two response variables (a polytomous response model) is thus more appropriate for the econometric analysis in this study. Multiple Discriminant Analysis (MDA), Multinomial Probit model (MNP) and Multinomial Logit model (MNL) are some of the models that readily come into mind.

MDA is an appropriate multivariate technique of profiling, differentiation and classification of groups. (Ahmann 1955). Thus MDA minimally satisfies the main goal of this study which is more about description, inference and prediction based on the model results. MNP and MNL facilitate polychotomous choice framework in that they permit the analysis of decisions across more than two categories. Also since it is assumed that there exists neither an intrinsic nor natural sequence amongst the response categories, unconditional and simultaneously determined probabilities are obtainable using MNP or MNL. (McFadden 1978; Maddala 1986; Cramer 1991).

Commenting on why MNL is usually used instead of MNP, (Liao 1994) noted that "the probit counterpart of a multinomial logit model involves solving multiple integration related to the multivariate normal distribution and thus is computationally difficult in estimation and rarely used". Availability of statistical packages has lessened the computational difficulties associated with MNP though. However MNL is chosen over MNP as the model in this study mainly because the former is more familiar than the latter and also the two models yield basically the same results²⁵ (Appendix 2).

Unlike the sequential logit model, the categories *work*, *sec* and *secwork* are not treated in any continuous order in the multinomial logit model. That is there is no monotonic relationship between the underlying latent variable of the willingness of the cocoa farmer to use the child

²⁵ According to Greene et al. (2003), the multinomial probit model (MNP) is a natural alternative model that relaxes the Independent of Irrelevant Alternatives (IIA) assumption in the multinomial logit model (MNL). The results from MNP model is compared with results from MNL model run with the same reference category. (Appendix 2). The results are basically the same. The MNL model however has better model fit based on the chi-square and pseudo-R-squared values than the MNP model.

for school and/or work on the cocoa farm, and the actual decision (observed outcome) made by the cocoa farmer. (Amemiya 1981; Verbeek 2008).

Authors who have also used the multinomial logit model in similar analyses include (McFadden 1973; Schmidt and Strauss 1975; Grootaert 1998; Bratti 2003; Bradley and Nguyen 2004).

4.3.1 The Model

Unordered-choice models such as is in this study can be built on the basis of the random utility model. (Greene and Zhang 2003). Assuming that the w th cocoa farmer faces M options, the satisfaction/utility obtainable to the farmer by going for option m is given by

$$U_{wm} = \mu_{wm} + \varepsilon_{wm},$$

μ_{wm} is a function of observable variables that influence the farmer's decision-making process. That is, $\mu_{wm} = \mathbf{x}'_w \beta_m$, where \mathbf{x}_w is a K -dimensional vector containing the characteristics of individual w (including an intercept term) and β_m represents a vector of alternative-specific coefficients. ε_{wm} is an unobservable error term.

For the cocoa farmer to opt for choice m in particular indicates implicitly that option m provides more satisfaction/utility relative to the other options. That is given that choice m is made, then

$$\text{Prob}(U_{wm} > U_{wk}) \quad \text{for all other } k \neq m.$$

Let Y_w be a random variable that indicates the choice made by the farmer. According to McFadden (1973) if (and only if) the M disturbances are independent and identically distributed with type 1 extreme value (Gumbel) distribution, $F(\varepsilon_{wm}) = \exp(-e^{-\varepsilon_{wm}})$, then

$$\text{Prob}(Y_w = m) = \frac{\exp(\mu_{wm})}{\exp(\mu_{w1}) + \exp(\mu_{w2}) + \dots + \exp(\mu_{wM})}$$

To obtain the 'reference state' one of the options/categories is normalized. That is the utility level associated with one of the options, say option 1 is normalized to zero: $\mu_{w1}=0$. For a random sample of cocoa farmers, $w = 1, 2, 3, \dots, W$ the multinomial logit model for choice across the M states ($m = 1, 2, 3$ in this study) can be specified as

$$\text{Prob}(Y_w = m) = \frac{\exp(\mathbf{x}'_w \beta_m)}{1 + \exp(\mathbf{x}'_w \beta_2) + \dots + \exp(\mathbf{x}'_w \beta_M)}, \quad m = 1, 2, \dots, M$$

Thus except for the reference category estimates of the slope coefficients of all the alternatives are obtained together with an intercept term. In other words, for a dependent variable with M categories (3, in this study) $M-1$ (2, in this case) equations are calculated, one for each category relative to the reference category. Hence the probability of membership in other categories/alternatives is compared to the probability of membership in the reference category. (Borooah 2002). The implication is that the two other outcomes in this study are modelled in relation to the base/reference outcome/category (category 1).

If option 1 is the reference category, $\mu_{w1} = \mathbf{x}'_w \beta_m = 0$ and $\exp(0) = 1$.

Then the model becomes:

$$\text{Prob}(Y_w = 1) = \frac{1}{1 + \exp(\mathbf{x}'_w \beta_2) + \dots + \exp(\mathbf{x}'_w \beta_M)}, \quad m = 2, 3, \dots, M$$

The parameters (β s) are estimated using the statistical package, STATA in this study.

Category 1, *work* is chosen as the reference category in this paper. The field survey data revealed that majority of the decisions made by households in the study involved the other two options, *sec* and *secwork*. It is deemed appropriate therefore to compare these options with the work-only option in order to effectively capture their relatively influential status in this thesis.

Limitation of the multinomial logit model

The assumption of 'Independence from Irrelevant Alternatives' (IIA) is one important issue in the use of multinomial logit models (MNL). The IIA property holds that the ratio of the choice probabilities of any two alternatives (odds ratios) for a particular observation is not influenced systematically by any other alternatives. That is, the relative odds for any two alternatives are independent of the attributes, or even the availability of any other alternatives. This follows from the independence and homoskedasticities assumptions of the disturbances

in the original model. For choice problems in particular this property can be shown to be implausible. (Liao 1994; Greene and Zhang 2003).

(Hausman and McFadden 1984), in testing for the validity of the IIA assumption suggest that the parameter estimates will not change systematically by omitting a subset of the choice set which is in actual fact irrelevant, from the model altogether. The parameter estimates will still remain consistent, though their efficiency will be adversely affected due to the exclusion of the ‘truly-irrelevant’ alternatives. If the remaining odds ratios are however not truly independent from these excluded choices then the parameter estimates will be inconsistent.

Another issue with the MNL model is that it requires relatively large sample sizes for a more efficient and consistent estimates. The “multinomial regression requires relatively larger sample size (than ordinal or binary logistic regressions) because apart from using the maximum likelihood estimation method, it also uses multiple equations”. (Hendrickx 2000).

We now proceed to the next phase of this write-up, chapter five. Detailed discussions of the field survey report and the econometric model results will be presented in the chapter.

CHAPTER FIVE

5. RESULTS AND DISCUSSIONS

5.1 General Descriptive Statistics of the Variables

The field survey results are presented in this first half of the chapter.

Table 5.1 below presents the general descriptive statistics of all the independent variables discussed in chapter four. The discussions based on this table will generally go hand in hand with the information provided in Table 5.2 on the continuous variables.

As observed from Table 5.1, the ages of the respondent household heads ranges from 42 to 63 with the average age being around 50 years. The minimum and maximum ages are both associated with only one respondent, a male and a female respectively. Table 5.2 below also shows that household heads with ages up to 49 years and above 49 years respectively formed around 48% and 52% of the sample, depicting a relatively aging respondent cocoa farmers. Also the male parents involved in the survey were found to be generally older than the female counterparts. Likewise, the average age of the migrants was found to be higher than that of the natives.

It is observed also from Table 5.1 that the mean age of the focus-group children is around 17 years. Majority of them (56%) have ages ranging from this mean value and above as shown in Table 5.2. In rural Ghana especially, usually children start school late. Hence majority of the first year students for instance are 16 years instead of the 15 years generally observed in the urban areas. The 15 year olds are only 3 (4%) in the sample. It was also revealed from the survey that male children are generally older than their female counterparts.

Table 5.1 Descriptive statistics of explanatory variables

Variable	Mean	Std. Dev	Min	max
headmale	0.791	0.408	0	1
headage	50.133	3.960	42	63
educhead	2.310	0.996	1	5
mighead	0.671	0.471	0	1
childmale	0.576	0.496	0	1
childage	16.703	0.761	15	18
childagesq	279.551	25.613	225	324
hsequal	2.392	0.595	1	3
hsize	5.994	1.176	3	9
hsize ²	37.297	14.221	9	81
depenratio	0.246	0.133	0	0.5
cocopdn	2.241	0.735	1	3
depen _{coco}	2.101	0.823	1	3
depen _{gov}	1.5	0.626	1	3
dominha	1.709	0.456	1	2
zone	2.158	0.810	1	3

***Number of observations (N) = 158**

Members of households in the sample are on the average, around 6. (Table 5.1). Having large household sizes by most rural dwellers in Ghana is usually believed to have both cultural and socio-economic connotations. Culturally, it is a source of prestige to have more children. Socio-economically, since family labour is relatively cheaper and flexible it enhances labour supply on farms and in that way serves as a risk-coping instrument. Around 64% of the households have more than 5 members. (Table 5.2).

Table 5.2 Analysis of the continuous variables

Variable	Headage		Childage		Hsesize		Depenratio	
	Up to 49	above 49	Less than 17	from 17	Up to 5	above 5	Below 0.25	above 0.25
Observations	76	82	70	88	57	101	71	87
Percentage	48	52	44	56	36	64	45	55

Closely linked to the household sizes are the dependency ratios. From Table 5.1 the average dependency ratio is around 0.25. That is on the average for say, 100 respondents only 75 of them engage in active income earning activities/farming to cater for the needs of all, including the 25 who do not work. Table 5.2 shows that around 55% of the households have dependency ratios above the average.

Generally the low cocoa production households have higher dependency ratios. The field survey also revealed that households with relatively large sizes tend to have higher dependency ratios. The migrant households, it was also observed, tend to have larger household sizes and subsequently higher dependency ratios compared to the native households. This may be due to the fact that the migrant cocoa farmer relatively may need more of the services of family labour in order to improve on cocoa productivity.

5.1.1 Descriptive Statistics of The discrete variables

As mentioned in chapter two, cocoa farming in Ghana is dominated by males and settler farmers. Table 5.3 below shows that around 79% of the sampled household heads are males. Also, 67% are migrants. Female-headed households constitute only 5% of the migrant households. Females in Ghana seldom migrate to other regions with the primary purpose of farming. They form the majority of the native farmers (54%) though. This is due mainly to farms and/or lands that are usually bequeathed to them. Secondary data/information gathered suggested that virtually all of these female household heads have husbands or partners who are migrant farmers. However due to the entrenched matrilineal inheritance system among the indigenes of the study area, the Adansis, such women generally have substantial influence on household decisions-making. They control greater proportions of household assets.

Table 5.3 Analysis of the discrete variables

Var	Headmale		Mighead		Eduthead					Childmale		
	Male	Female	migrants	natives	None	Primary	jss	sss	postsec	Male	Female	
Obs	125	33	106	52	44	36	65	11	2	91	67	
%	79	21	67	33	28	23	41	7	1	58	42	
Var	Hsequal			Cocopdn			Depencoco			Depengov		
	Low	med	High	Low	Med	high	Low	High	Very high	Low	High	Very high
Obs	9	78	71	28	64	66	46	50	62	90	57	11
%	6	49	45	18	40	42	29	32	39	57	36	7

As portrayed in Table 5.3 above, only 2 (1%) of the respondents have post-secondary education qualification. They are both head teachers of local basic schools who also double up as cocoa farmers. One is a native female and the other a male migrant.

Majority of the respondents (41%) have JSS/middle school qualifications. 52% of the female heads and 38% of the males fall into this category. Also 42% and 41% of the natives and settlers respectively, have this qualification.

86% of the 44 household heads with no formal education are males. Among this gender group 30% fall into this category. The corresponding percentage for the females is 18%. Also 30% and 23% of the migrants and natives respectively, have no formal education. It appears from these observations that the female and native household heads are generally more educated, relative to their male and migrant counterparts.

Out of the 91 male children, 61% and 62% respectively are from male-headed and migrant-headed households. With the relatively low levels of education associated with these groups of parents discussed above, it is quite probable that the secondary education of the male child will be adversely influenced. On the other hand, 55% and 52% respectively of the female-headed and native-headed households have the children being females. This again suggests that the girl-child is likely to have a slight edge over the male counterpart, in terms of education/secondary education.

Majority of the respondent households, according to Table 5.3 lie within the 2nd (13-22bags) and 3rd (above 22 bags) categories in terms of cocoa production. Ghanaian cocoa farmers are reported to produce between 12 and 22 bags of cocoa annually, on the average. With the introduction of the cocoa ‘Hi-Tech’ exercise most cocoa farmers in Ghana are now reported to be producing above 22 bags.

House quality is a proxy for household wealth status in this study. Households with houses built with mud/fragile wall and straw roof are designated as ‘below-average’ in terms of wealth status. Owners of houses with solid walls (usually mud walls, but plastered with cement) and solid roof (mainly aluminium roofing sheets) are ‘average’ households. Those with brick-walls and solid roof are ‘above-average’ households.

All the 9 below-average households are found in zone 1, the lowest cocoa production zone. 4% and 7% of the natives and migrants respectively belong to the below-average group. 25% and 61% of the natives and migrants respectively are in the average group. 71% and 32% respectively, of the natives and migrants belong to the above-average group. Thus it appears the migrants are generally less worthy than the natives based on the welfare proxy used in this study. Also (since majority of the natives are females), 61% of the households headed by females are found in the above-average group as against 41% of the male-headed households.

Due to perceived poor financial management on the part of the average cocoa farmer, a high cocoa producing household may not necessarily have an appreciable wealth status. In this study however 78% of the below-average households are low cocoa producers. 52% of the above-average households belong to the highest cocoa producing group. None of the below-average households is found in this group of high cocoa producers.

The link between household wealth status and the education level of the household head is worth-noting. From fig 5.1 below 56% and 18% of the below and above average households, respectively are headed by heads with no formal education. The rest of the below-average households (44%) are all headed by heads with primary education as the highest level of education. 68% of the above average households have heads who have gone through at least JSS/middle school levels of education. It appears therefore from these observations that household head’s education level is closely linked to household’s wealth status (and cocoa productivity) to some extent.

Fig 5.1 Education level of household head and wealth of household

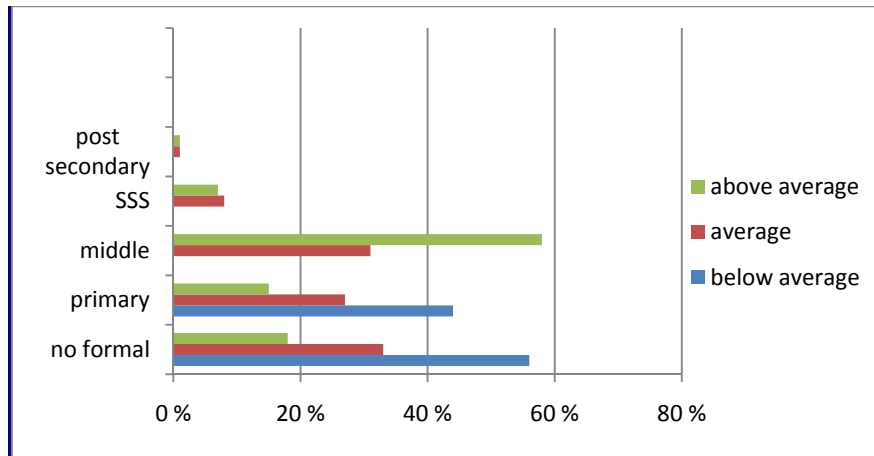


Table 5.3 also shows that 39% of the respondents rate the COCOBOD scholarship trust ‘very high’. Interestingly this rating is giving by 45% of the above-average households as against only 21% of the below-average households. In fact 68% of the latter rate the scholarship scheme as ‘low’. The probable loss of confidence in the scheme by this group of households could be due to the fact that, as is usually reported, seldom does a child from the below-average households receive the scholarship award. Academic performance of the farmer’s child at the basic level of education is said to be one the main criteria for awarding the scholarship. Being relatively disadvantaged economically, children from the below-average households may have low-quality basic education. Hence their basic education final examinations results may not favourably compare with those of the children from relatively worthy households and therefore generally do not get the scholarship award.

57% of the households rate the Government scholarship as low as seen from Table 5.3. (For the COCOBOD scholarship the corresponding figure was 29%). Only 7% rate it as very high, compared to the 39% who give the same rating to the COCOBOD scholarship. Also 68% and 53% respectively, of the below and above average households rate the government scholarship scheme ‘low’. Observations made though suggest that majority of the respondents know very little about the existence of this scholarship scheme, making it difficult to draw appropriate conclusions.

5.1.2 Dependent – Independent Variable Interactions

Efforts are made in this section to descriptively present the relationships between the three outcome variables, (*work, sec and secwork*) and the various regressors.

28 (18%) of the households have children who though qualified for secondary education since 2008, are currently only working on the family cocoa farms. 42 (26%) of the households have children who are only pursuing secondary education. Children who are concurrently working on cocoa farms and attending secondary school are found in 88 (56%) of the households.

Figure 5.2 Parent's education and child work/school decisions

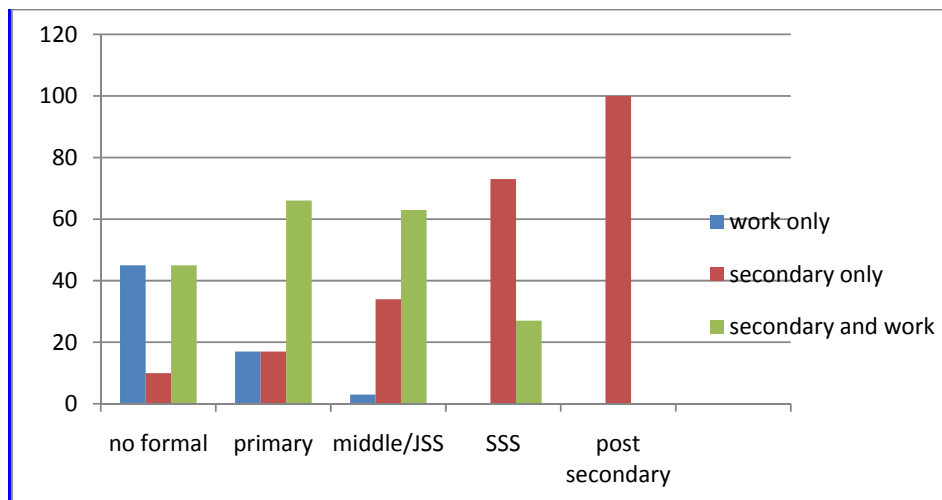
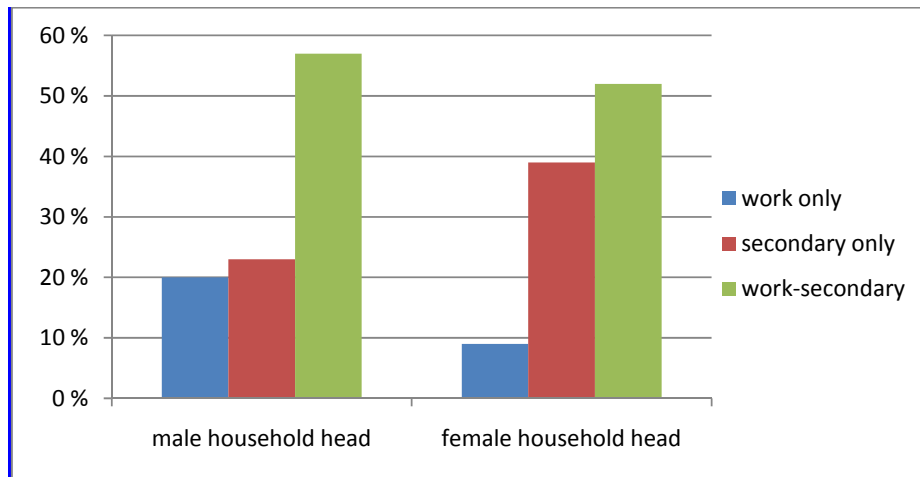


Figure 5.2 above shows that 45%, 10% and 45% of the children who work only, attend secondary school only or combine secondary school and work, respectively are found in households with the heads having no formal education. The corresponding percentages found in households with heads having primary education are 17%, 17% and 66%. Also 63% of the households with heads having JSS/middle school education will engage their children in secondary-work combinations. Only 3% of these households will opt for work only for their children. 73% and 27% of the household heads having SSS/O/A levels of education will have their children to rather follow only secondary education or secondary-work combinations, respectively. None of the children found in these households has work as the only activity. Children belonging to the households of the only two post-secondary education level household heads will have secondary education as the only activity.

Fig 5.3 Gender of household head and work/school decisions



It is observed from fig 5.3 above that 20% of the households headed by males have the children working only on the family cocoa farms. The corresponding percentage for the female-headed households is only 9%. Of the children combining secondary schooling and farm work, 52% and 57% of the female-headed and male-headed households respectively, are associated with them. 39% of the female-headed households as against 23% of the male-headed households have the children engaged in only secondary education. Generally therefore it appears that coming from a female-headed household relatively predisposes the child to having more access to secondary schooling time than if the parent is a male.

From fig 5.4 below, 10% of the male children and 49% of the female children pursue only secondary education. According to the parents, virtually all of these secondary school-only-children are staying with relatives in the cities for their secondary educations. They do not frequent the communities as they usually embark on 'holiday classes' during the vacation periods. As noted earlier, majority of these children are from the households headed by native females and the above-average households.

Fig 5.4 Gender of child and work/school decisions

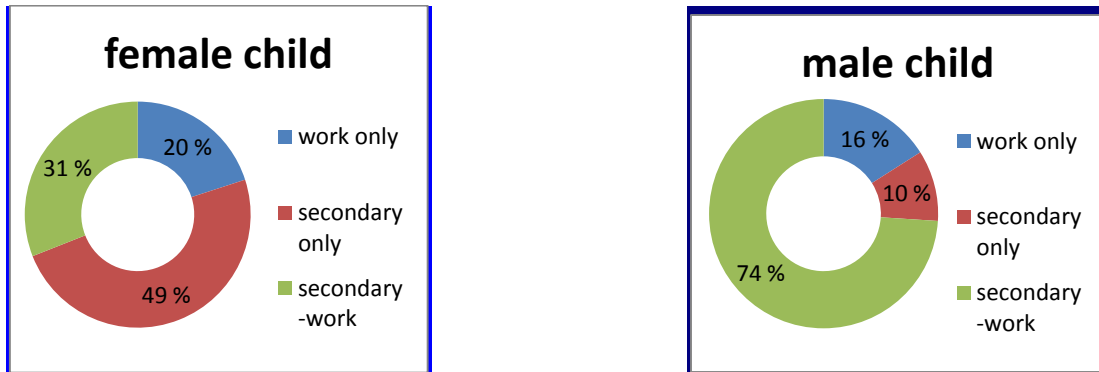


Fig 5.4 also shows that 74% and 31% the male and female children, respectively combine secondary education and working on the cocoa farms. They are reported to be mainly students at the New Edubiase secondary school. Virtually all the males are ‘day students’ plying daily between the communities and the Edubiase town for their secondary education. Virtually all the children having work as the only activity are from the below-average and migrant households.

Fig 5.5 Household wealth status and work/school decisions

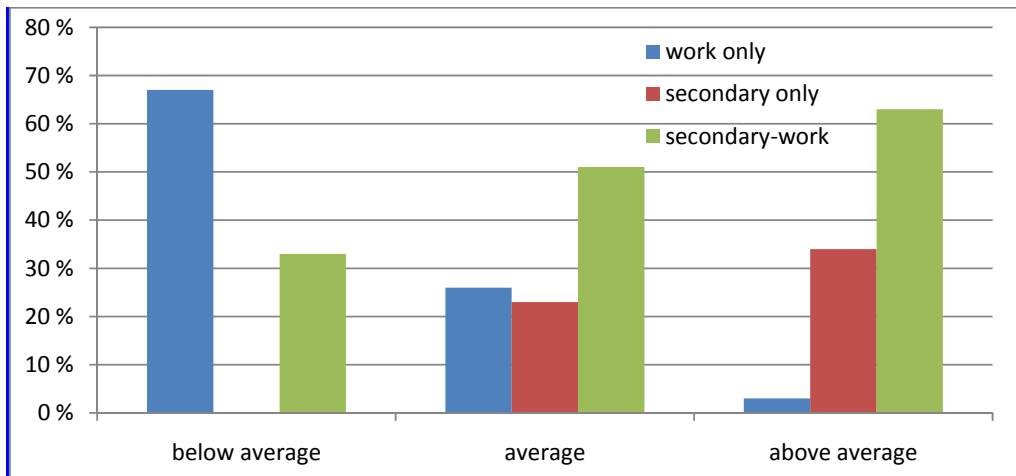
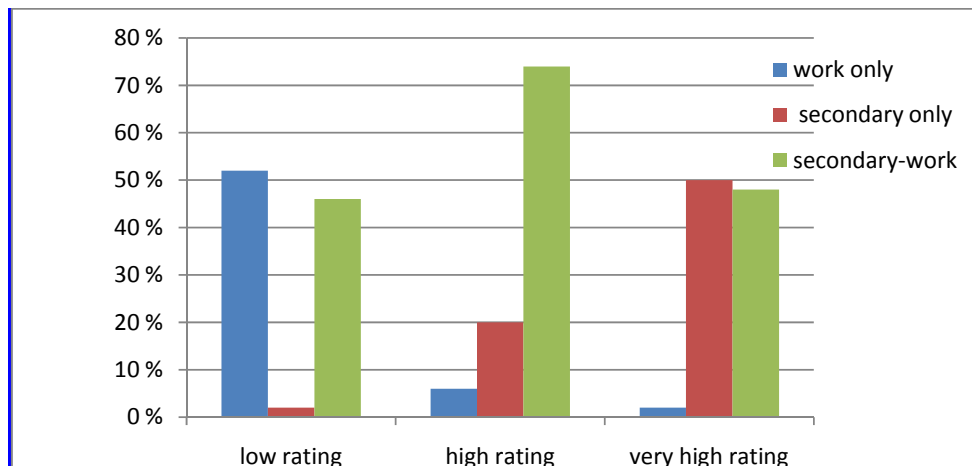


Fig 5.5 above presents the household wealth status and how descriptively, this variable is related to the child work/school decisions. The figure shows that 67% and 33% of the below-average households will opt for work only and secondary-work combinations, respectively for their children. None of these households will choose the secondary only option.

Majority of the average households (51%) and the above-average households (63%) will also opt for the secondary-work combination. For the secondary only option, the above-average households dominate (34%). The probable influence of household wealth status on the secondary education of the child is further emphasised by these observations.

Fig 5.6 below shows that 52% of the households that have relatively low confidence that they can possibly get assistance from the COCOBOD scholarship scheme for their children's secondary education, will rather have their children working only, on the cocoa farms. Only 2% will select the secondary only option, with the rest (46%) likely to settle for the secondary-work combination for their children. For most of these households it is reported that there has never been any recipient of this scholarship scheme who is from their families since the scheme was instituted.

Fig 5.6 Dependence on COCOBOD scholarship and work/school decisions

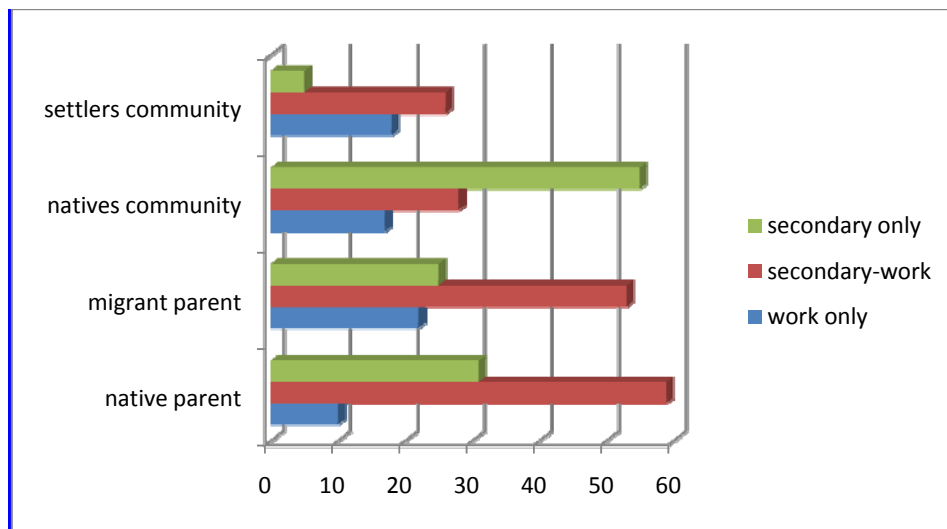


Majority (74%) of those who give the COCOBOD scholarship scheme a 'high rating' will decide on secondary-work options for their children. 20% and 6%, respectively will go for the secondary only and work only options. One-half (50%) of the households who perceive the

scholarship scheme as a very possible means of financial assistance for the child's secondary education will encourage the child to pursue only secondary education. The work only option is a last choice for these households. Only 2% will settle for that. The rest (48%) will rather go for the secondary-work combination.

Next we consider the two variables, *mighead* and *dominha*²⁶. The two are presented side by side in figure 5.7 below.

Fig 5.7 Origin status of farmer/dominant inhabitants of area and work/school decisions



With regards to the origin status of the farmer, fig 5.6 shows that a significant number of the migrant farmers will settle for the work only option for their children. 22% of them, as against 10% of the native parents will do that. This is also substantiated by the statistics on these groups of households in the other two choice categories. 59% and 53% respectively, of the native parents and settler farmers will choose the secondary-work combination. For the secondary-only option, 31% of the native household heads, compared to 25% of the migrant parents will settle for that.

²⁶ As a reminder, the variable *mighead* concerns only the individual household head. That is, whether the parent originates from the study area or migrated from another region of Ghana. *dominha*, on the other hand refers to the dominant inhabitants in the community and thus concerns the community as a whole. That is, a migrant household head could also be found in a community dominated by the natives, and vice-versa.

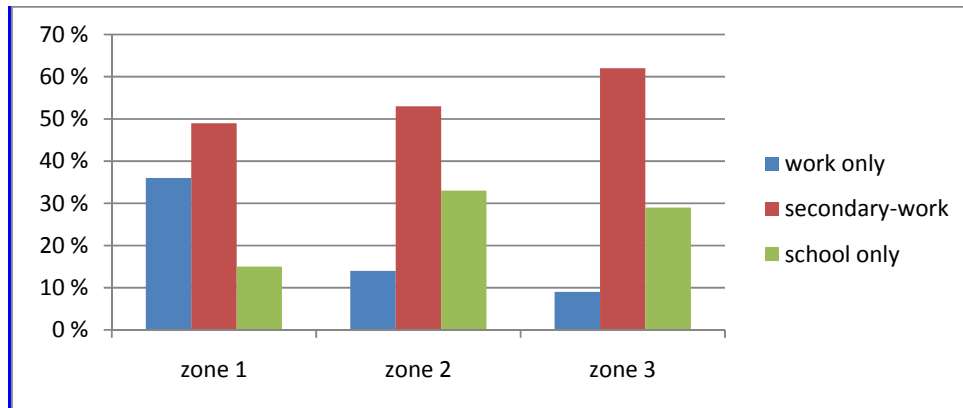
Among the communities involved in the study, the natives dominate in those which are closest to the New Edubiase town. Proximity to the only secondary school in the district, the New Edubiase secondary school could thus be a factor in explaining the observations made above. Also the natives generally happen to be the landlords/landladies of the migrants. The tendency to use a child in the tenant household to complement or substitute for hired labour on the cocoa farm is reportedly higher than in the case of the landlord household. (Coulombe 1998). The child in the latter household is thus more likely to be 'released' for more secondary schooling time than the counterpart from the former household.

11 out of the 15 communities involved in the survey were dominated by settler/migrant cocoa farmers. 112 (71%) of the total households of 158 were found in migrant-dominated communities. The rest, 46 (29%) were found in communities dominated by the native Adansis. This underpines the fact that cocoa farming in the study area, as is generally the case in Ghana, is dominated by settler farmers.

Fig 5.7 above also shows that of the households found in the native-dominated communities, 17%, 55% and 28% will opt for work-only, secondary-work combination or secondary-only respectively, for their children. The corresponding percentages for the households found in the settler-dominated communities are 18%, 56% and 26% respectively. Thus there are not substantial differences between the native-dominated and settler-dominated communities in these aspects. Residing in a community dominated by either the settlers or natives seems to have very little impact on the child work/school decisions by parents. Area influence (Burney and Irfan 1995), appears to have little meaning in this case.

Finally, in this section we consider the zone from which a household is found. (Fig 5.8). Out of the 41 households in zone 1, 15 (36%) will on the average opt for work-only for their children. 14% of the 51 households in zone 2 will on the average go for the work-only option, while 9% of the 66 households in zone 3 will on the average, do the same. On the average, more cocoa farmers in zone 3 will opt for the secondary-work combination. 62% of them will do that as against 53% and 49% in zones 2 and 1, respectively. Cocoa farm households in zone 2, however dominate in terms of preference for the secondary-only option. 33% on the average will decide on that option, while 29% and 15% of households in zones 3 and 1 respectively, will on the average do the same.

Fig 5.8 Zone and work/school decisions



There appears to be a high possibility from these observations that combining secondary schooling with work on the cocoa farm is inevitable for the average secondary school-going child in the study area. This especially appears to be the case if the child is staying with a cocoa farming parent while attending the secondary school.

5.2 Econometric Model Results

Below, the results from the model for work/school is presented in Table 5.4.

The pseudo-R-squared, a measure of the change in terms of log-likelihood from the intercept-only model to the current model in this study is quite high. According to (Washington, Karlaftis et al. 2009), the better the model if this measure (goodness of fit) is high. Furthermore, another measure of model fit, the chi-square value is quite high and also highly statistically significant based on the corresponding p-value.

Three household characteristic variables, *hsize* (and *hsize^{sq}*), *depenratio* and *cocopdn* were excluded from the final model for various reasons explained briefly below²⁷.

²⁷ Authors such as Coulombe (1998) have noted the potential risk of endogeneity associated with these variables. Running the mlogit model with all of these variables results in lowered significant levels of the major variables (Appendix 3), relative to the model without them. Besides, given the sample size, reducing the number of regressors is likely to yield better model results. Hence, only the relatively more significant household characteristic variable, *hsequal*, is included in the model. It is presumed that assessing income directly is more risky, in terms of endogeneity than using house quality as a proxy for household wealth. The role of the excluded variables is thus basically reduced to the provision of qualitative information.

Table 5.4 Multinomial logit model results

Variable	Secondary only		Secondary & work	
	coefficient	t-ratio	coefficient	t-ratio
headage	.059341	0.41	.1126014	0.96
educhead	3.875053***	3.93	2.711078***	3.15
mighead	-.9919469	-0.53	-1.563321	-1.10
headmale	-4.997105**	-2.20	-2.869482*	-1.43
childmale	-3.821183***	-2.75	.4256731	0.45
childage	107.1439 **	2.14	14.70628	0.40
childagesq	-3.232063**	-2.17	-.4692404	-0.43
hsequal	3.932997**	2.45	3.655088**	2.58
depencoco	6.105238***	4.77	3.538084***	3.21
depengov	.7186573	0.65	-.4335597	-0.45
zone	1.061915*	1.39	.614078	1.02
dominha	.1342694	0.10	.1684293	0.16

Number of obs = 158

LR chi2(24) = 200.96

Prob > chi2 = 0.0000

Pseudo R2 = 0.6458

Significant at 1% : ***; significant at 5% : **; significant at 10% : *

- **work** is the reference category

7 out of the 11 predictor variables included in the final econometric model were found to have significant effects in explaining secondary school/work decisions (*childagesq* is not considered as a separate regressor). Next, we take a closer view at these results.

In Table 5.5 below only the statistically significant variables (from Table 5.4) are presented. It is observed that the sign was wrongly predicted on *headmale* with regards to *sec*. The ‘unexpected signs’ obtained on *educhead*, *hsequal* and *depencoco* with regards to *secwork* is likely due to the fact that the variable *work* is used as the reference category in the multinomial logit model. In predicting the signs in Table 4.2 for *educhead* for instance, the emphasis was on ‘how the relatively more educated parent, as against the relatively less

educated one decides on school-work combination for the child'. The former parent in this case was predicted to decide on less school-work combination than the latter parent. Hence the negative sign. The positive sign on *educhead* in Table 5.5 with regards to *secwork* however indicates that relative to work-only, the more educated parent will choose secondary-work combination on behalf of the child. Similar analyses apply to *hsequal* and *depencoco*.

Table 5.5 Statistically significant variables from the mlogit model results

Variable	Secondary only (<i>sec</i>)		Secondary & work (<i>secwork</i>)	
	coefficient	predicted sign	coefficient	predicted sign
educhead	3.875053***	+	2.711078***	-
headmale	-4.997105**	+	-2.869482*	-
childmale	-3.821183***	-	.4256731	+
childage	107.1439 **	+	14.70628	+
hsequal	3.932997**	+	3.655088**	-
depencoco	6.105238***	+	3.538084***	-
zone	1.061915*	+	.614078	+

* The actual signs related to *work* are not captured in the table above since it is used as the reference category.

Household head's characteristics

The *education of the household head* has the expected positive sign on the secondary school-only option and is highly statistically significant at 1% level of significance on both the secondary-only option and the secondary-work combination option.

As noted by (Grootaert 1998) also, this suggests that educated parents know and appreciate the benefits of education better. The child with such parents appears to have a greater likelihood of getting more secondary-schooling time as against working only on the farm.

The *gender of the household head* has an unexpected negative effect on the secondary-only option at 5% significance level. Also, it is expectedly related to the secondary-work combination at 10% level of significance.

Thus the tendency for a child to engage in secondary schooling only (relative to work only) is lower if the household head is a male instead of a female. As discussed under section 5.1.1,

majority of the heads are male-migrants who have relatively low levels of education. With the significant impact of parental education documented earlier on, this outcome seems to be a possibility. (Schultz 2003) indicated that educated female parents enhance the chances of their children and in particular their sons, attaining higher levels of education than educated male household heads do. Being a male parent also decreases the likelihood of the child combining secondary schooling with work on the cocoa farm (relative to only working on the farm). It appears therefore from these observations that having a male parent very much reduces the chances of pursuing secondary education relative to working on the cocoa farm.

Child characteristics

The *gender of the child*, as expected is negatively related to the school-only option at 1% significance level.

The indication is that being a male child reduces the chances of embarking on secondary schooling only, without working on the farm. This contradicts with the findings of (Canagarajah, Coulombe et al. 1997) in Ghana and (Coulombe 1998) in Cote D'Ivoire. Their studies however concentrated on children below the secondary school age group.

The implication of the finding here is also that the girl-child is in a more favourable position to have secondary schooling as the only activity. Physically-demanding as most of the activities on cocoa farms are, the male child is more likely to be used than the female counterpart on the farm. (Psacharopoulos and Arriagada 1989) found similar results supporting the fact that the male child is more likely to be involved in work rather than school.

This child characteristic variable however has no statistical significance with regards to the secondary-work combination option.

childage expectedly, influences the secondary school-only option positively at 5% level of significance.

This suggests that the older the child, the more likely he/she will spend more time for secondary education than working on the family cocoa farm. With age not on their sides, parents of such children may encourage them to focus more on schooling once they qualify for the secondary education. This may be necessary in order to facilitate their getting appreciable grades once-and-for-all without having to re-write the final exams several times,

as is gradually becoming the norm in most parts of rural Ghana. (Canagarajah, Coulombe et al. 1997) also established during a study on child labour and schooling in Ghana that child's age positively influences both schooling and working.

However the exceptionally large coefficient on this variable may give a cause for concern. It appears that there is a non-linear relationship between child's age and the secondary-school only option. This presumption is supported by the fact that *childagesq* is negatively related to the school- only option, also at 5% (Table 5.4). Thus it appears that at higher age levels the effect of the child's age on the secondary-only option declines.

The variable *childage* and its quadratic form, *childagesq* both have no statistical influence with regards to the decision as to whether or not to let the child combine secondary schooling and farm work.

Household characteristics

hsequal, the only household characteristic variable has the expected positive sign in the secondary-only option and is statistically significant at 5% level of significance with regards to both secondary-only option and the secondary-work option.

With house quality as a proxy for household wealth status, there is an indication from this result that children from well-to-do houses are more likely to embark on secondary schooling only. They will at worst combine secondary schooling and work instead of only working on the cocoa farm.

This finding corroborates the suggestions by (Andvig 2000) that the extensive use of the child for work at the expense of schooling is usually associated with the poorer households. During a study on child labour and schooling in Ghana (Canagarajah, Coulombe et al. 1997) also established that household welfare has a strong positive effect on child school participation.

Community characteristics

The *zone* from which a household comes expectedly but rather weakly, affects the secondary-only option positively at 10% level of significance. With regards to sec-work this variable is statistically insignificant.

As observed in the field survey data, the more wealthy the households in a zone are on the average the greater the number of children who engage in secondary school-only. Area influence (Burney and Irfan 1995) is likely to cause households to emulate each other, enhancing the child's chances of following more secondary schooling than working.

Dependence on external support

The dependence on the COCOBOD scholarship variable, *depencoco* is as expected positive and highly significant at 1% level of significance with regards to the secondary-only option. It is also significant at the same significance level with regards to the secondary-work combination option.

Over the years, children that get the scholarship reportedly come from the relatively high cocoa production/wealthy households as mentioned. These children have relatively better results at the basic school final examinations, one of the main criteria said to be used to give the award than their counterparts from relatively less wealthy households. This might explain the relatively high confidence on the part of these households in the COCOBOD scholarship as was observed in the field survey data.

The econometric model result here thus substantiate the fact that cocoa farming households that perceive this scholarship scheme as a possible source of financial assistance for the child's secondary school education are more likely to encourage more secondary schooling time for the child relative to work on the cocoa farm.

Next, efforts are made to present varying forms of the multinomial logit model results in order to help elaborate further on the econometric analyses of this study.

5.2.1 Odds / Relative Risk Results Presentation

The results can also be interpreted in terms of relative risks, RRR (odds). This is the ratio of the probability of choosing one category over the probability of choosing the reference category. Based on the multinomial logit model presented in section 4.3.1 the *log-odds ratios* can be computed as follows:

If the reference category is *work* (category 1), then

$$\ln \frac{\text{Prob}(Y_w = m)}{\text{Prob}(Y_w = 1)} = \mathbf{x}'_w (\beta_m - \beta_1) = \mathbf{x}'_w \beta_m, \quad \text{since } \beta_1 = 0$$

Hence for each case there will be $M-1$ predicted log-odds ratios, one for each category relative to the reference category. In this study for instance, there are two predicted log-odds ratios for a particular explanatory variable, one each for *sec* and *secwork*, relative to *work*. The null hypothesis for significance tests is that the odds ratio is 1. That is, a marginal change in an explanatory variable causes same marginal change in the probability of opting for a category m and the probability of opting for the reference category (*work*, in this case). An odds ratio greater than 1 suggests that the probability of choosing option m increases relative to the probability of choosing the reference category when there is a marginal change in an explanatory variable. The reverse statement holds true if the odds ratio is less than 1.

Table 5.6 mlogit results in odds/relative risks

variable	School only		School-work	
	Odds	t-ratio	Odds	t-ratio
educhead	48.185***	3.93	15.046***	3.15
headmale	.007 **	-2.20	0.563*	-1.43
childmale	.022***	-2.75	1.531	0.45
hsequal	51.060**	2.45	48.671**	2.58
depencoco	448.199***	4.77	34.401***	3.21

The exponent of the log-odds ratio (from Table 5.4 or 5.5) is taken in order to obtain the relative risk/odds. The observations in Table 5.6 above for instance suggests that a one unit change in the explanatory variable *educhead*, increases the relative risk of choosing the secondary-only option over the work-only option by $\exp(3.875) = 48.185$.

Thus it is confirmed also in this case (Table 5.6) that the odds of opting for the secondary-only or the secondary-work combination, relative to the work-only option increases with the education level of the household head.

The variable *headmale* has a relative risk of 0.007 and 0.053 in the secondary-only and secondary-work options, respectively. This suggests that the odds of embarking on secondary schooling only or secondary-work combinations relative to work-only as an option declines if the child is from a male-headed household.

Also the odds of choosing secondary schooling only relative to work only declines by about 0.022 points if the child is a male. This supports the earlier observation made based on the descriptive statistics that the girl-child is more likely to get appreciable secondary schooling time than the male counterpart.

Coming from a relatively wealthy household increases the odds of engaging in schooling only or schooling-working combination, relative to working only on the farm by around 51.06 and 48.67 points respectively. Again, the observation made with the descriptive statistics is substantiated by these findings. Increasing household wealth status enhances the child's secondary schooling chances.

The possibility of getting the COCOBOD scholarship for the child's secondary education increases the relative risk for the child to involve in secondary only or secondary-work combination, relative to work only by about 448.2 and 34.4 points respectively. Thus relative to working only on the cocoa farm, there is a very high possibility that the parent will give the child more secondary schooling time if the hope of getting external financial assistance for this cause is high. The exceptionally high value of the odds associated with the secondary-only option is worth-noting. Majority of cocoa farmers, it appears, are likely to encourage their children to focus more on secondary education rather than working on the cocoa farm if external financial assistance such as the COCOBOD scholarship scheme are made more accessible.

Odds with rotational reference categories

The above discussions can be extended to situations where the reference categories are 'rotated' among the various outcome categories. (Table 5.7). That is for each explanatory variable all the three response variables *work*, *sec* and *secwork* are used as reference categories in turn. For instance if school-only (or school-work combination option) is the reference category instead of work-only, what will be the relative risk of opting for the work-only option when there is a marginal change in an explanatory variable?

Table 5.7 Odds with changing reference categories

Outcome category	School-only	Work-only	Sch-work	Work-only	School-only	Sch-work
Reference category	Work-only	School-only	Work-only	Sch-work	Sch-work	School-only
educhead	48.185***	0.021***	15.046***	0.067***	3.203**	0.312**
headmale	0.007**	147.98**	0.0567*	17.628*	0.119**	8.395**
childmale	0.022***	45.66***	1.531	0.653	0.014***	69.885***
hsequal	51.060**	0.02**	38.671**	0.026**	1.320	0.757
depencoco	448.199***	0.002***	34.401***	0.029***	13.028***	0.077***

Table 5.7 indicates that the odds of opting for the work-only choice relative to the school-only or school-work options declines by 0.021 and 0.067 respectively as the *education level of the household head* appreciates by one unit. This is expected based on the observations made earlier on in this study. The parent's education level also causes an increase in the relative risk of opting for school-only rather than school-work combination by 3.203, and thus results in the decline of the probability of choosing the latter over the former by 0.312. Thus the relatively educated parent is more likely to refrain from engaging the secondary-school-going child extensively in cocoa farming activities.

Being a *male household head* results in a high increase in the relative risk of choosing the work-only option rather than the school-only or school-work options for the child. It appears the male parent will rarely opt for the secondary-only option for the child. This assertion is supported by the fact that the school-work combination also has a greater probability of being chosen rather than the school-only option if the head of the household is a male. (Table 5.7).

The *child being a male* significantly increases the chances of working only on the farm rather than schooling only. The impact on the odds of choosing the work-only option relative to the school-work option and vice versa, however is statistically insignificant. The probability of combining school and work relative to school-only greatly increases if the child is a male, as is indicated by the odds value of 69.885. The male-child's chances of having secondary schooling as the only activity thus appears to be very low.

If a child is from a relatively *well-to-do household*, the odds of working only rather than schooling only or combining schooling and working declines by almost the same margin

(0.02 and 0.026 respectively). This confirms the earlier observation made about the significant influence of household wealth status on the cocoa farmer's child's secondary school education. The odds involving school-only relative to school-work, and vice versa is however not statistically significant.

Dependence on the COCOBOD scholarship very much reduces the relative risk of working only as against schooling only or schooling and working. The highly influential role external financial assistance can have on the secondary education chances of the farmer's child is once again confirmed here. This fact is further elaborated by the result that the odds of the child combining secondary schooling and farm work relative to attending secondary school only also decreases as the prospects of accessing the scholarship is further raised.

5.2.2 Marginal Effects after mlogit

The change in probability for an event (a category) when one of the explanatory variables changes by one unit is the marginal effect. They are computed at specified levels of the explanatory variables. (By default STATA computes for the average values of the regressors). The results of the marginal effects computed after running the mlogit model are presented below in Table 5.8

Table 5.8 Marginal effects

variable	Secondary only	Secondary-work	Work only
educhead	.0646374**	-.0583531*	-.0062843
headmale	-.2132514	.209231	.0040204
childmale	-.4080055***	.407804***	.0002015
childage	5.106544**	-5.061008**	-.0455378
hsequal	.0158326	-.0075318	-.0083008
depencoco	.1422337***	-.1338931**	-.0083406
depengov	.0635701*	-.0643972*	.0008271

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

From Table 5.8, keeping the other variables at their average levels a one unit increase in the variable *educhead* from its average level will increase the probability of the school-only option by about 0.065 units (6.5%) and decrease the probability of the secondary-work option by around 0.058 (5.8%). The level of education of the parent is thus confirmed as increasing child secondary schooling options and decreasing possibilities of the child combining schooling and working. As is the case for all the other variables in Table 5.7, the education variable is not statistically significant in the work-only option, with regards to marginal effects (*work* is the reference category in the original mlogit model).

Marginal effects also helps us to establish that being a *male child* decreases and increases the probabilities of the secondary-only option and the secondary-work option, respectively by almost the same margins. Again, it is substantiated here that the male child is disadvantaged in terms of opportunities for secondary education relative to his female counterpart.

Increasing child's age causes an increase in the probability of the secondary-only option and a decline in the probability of the school-work option by almost the same margins. This emphasises the positive effect that child's age has on the availability of secondary schooling time for the cocoa farmer's child.

Like *headmale*, *hsequal* is not statistically significant in all the outcome variables with regards to marginal effects.

The dependence on the COCOBOD scholarship by the household for the child's secondary education increases the probabilities of the child engaging in secondary school only and decreases the school-work combination probabilities. Again it appears there is a high likelihood that the cocoa farmer's child will have more secondary schooling time if there is a greater possibility of getting financial assistance through the COCOBOD scholarship scheme.

The level of the household's dependence on the government scholarship for the child's secondary education has marginal effects of virtually the same magnitudes but opposite signs in the secondary-only and secondary-work options. Thus like *depencoco* it appears the child will be giving more secondary schooling time than working, if the prospects of getting the government scholarship for the child's education increases. The effect is however relatively larger with *depencoco*.

5.2.3 Predicted Probabilities after mlogit

The direction of impacts has been the focus of the analysis so far. The regression results can also be presented in terms of predicted probabilities (Table 5.9). This helps in capturing the magnitude of impacts. Generally, other variables are fixed at their mean levels while the probability of choosing a particular outcome category is calculated for a specified independent variable.

The influential role played by the parent's level of education on the secondary school/work decisions is again confirmed in Table 5.9 below. The probability of a child from a household where the parent has no formal education involving in secondary education as the only activity is as low as 0.01 (1%). That of a child from a household with the parent having post-secondary level of education is as high as 0.59 (59%). This is also reflected in the work-only category. The probability of a child from the latter household engaging in work only is actually zero. That of a child from the former household is around 0.08(8%).

Table 5.9 Predicted probabilities

variable		School only	School-work	Work only
educhead	No formal	0.0124	0.9109	0.0767
	Primary	0.0415	0.9532	0.0053
	Middle	0.1223	0.8773	0.0003
	Secondary	0.3087	0.6913	0.0000
	Post-sec	0.5885	0.4115	0.0000
headmale	Male	0.0384	0.9574	0.0042
	Female	0.2516	0.7482	0.0002
childmale	Male	0.0102	0.9878	0.0020
	Female	0.4182	0.5800	0.0018
hsequal	Below ave	0.0296	0.6973	0.2731
	Average	0.0525	0.9380	0.0095
	Above ave	0.0689	0.9309	0.0002
depencoco	Low	0.0033	0.8909	0.1058
	High	0.0458	0.9509	0.0033
	Very high	0.3856	0.6144	0.0001

Generally, the predicted probabilities of a child indulging in both secondary schooling and working is high, irrespective of the household head's level of education. The decline in probability as the education level of the parent improves is however obvious: 0.91 for the no-formal education parent's child to 0.41 for the child with a post-secondary education parent. That is, the child from the former household is more likely to also combine secondary schooling with work on the cocoa farm than the counterpart from the latter household.

A female-headed household is also seen to have a greater likelihood of deciding for more secondary schooling time for the child. The probability of the child engaging in only work on the cocoa farm is almost zero if the parent is a female. There is however about 0.25 (25%) likelihood that the child will be schooling only. The respective probabilities for a child from a household headed by a male are 0.0042 (0.4%) and 0.04 (4%). The probability of the child combining secondary schooling and work is again, generally high irrespective of the gender of the parent. However, the male household head has a greater probability of opting for this combination for the child than his female counterpart.

For a male child, the probability of being involved in only farming (0.002) is less than the probability of being engaged in secondary schooling only (0.01). There is however about 0.42 (42%) likelihood that the female child will be attending secondary school only rather than working only on the farm (0.1%). Again, irrespective of their gender both the male and female children have a relatively high probability of combining secondary education with working on the cocoa farm, with the probability for the male-child being higher. Again, it appears the female child of the cocoa farmer has an edge over the male child in terms of opportunities for secondary education.

A child from a house built with relatively low-quality material such as mud (for the wall) and straw (for the roof), has a low probability (0.03) of engaging in only secondary education. The chances of such a child having cocoa farming as the only activity is as high as 0.27. As the household wealth status improves (based on house quality as a proxy), the likelihood of the child engaging in work-only declines whiles that of schooling-only increases. Again, there is a general increase in the probability of combining schooling and working irrespective of the household wealth status. However, even in this category the likelihood for

the child from the below-average household is relatively smaller. It appears a child from such a household will have very little to do with secondary education.

Household heads who seem to believe that there is very little chance of ever getting the COCOBOD scholarship for the child's secondary education will most likely opt for work-only or secondary-work combination for the child, rather than schooling only. A child from a household where the scholarship scheme is viewed as a very potential source of financial assistance has almost zero probability of working only on the cocoa farm without attending secondary school. The predicted probability of such a child concentrating only on secondary education is as high as 0.39 (39%). Once again, the importance of this scholarship scheme to the secondary education of the cocoa farmer's child seems to be confirmed.

CHAPTER SIX

6. CONCLUSIONS

6.1 Summary

This study set out to investigate some of the factors believed to have influence on cocoa farm households' decisions on the child's secondary education, vis-à-vis work on the cocoa farm. That is, why will the cocoa farmer encourage the child to work only on the farm, to combine working on the farm with secondary schooling or to concentrate only on secondary schooling?

Conclusions based on field survey data

A survey involving 158 cocoa farm households in the New Edubiase cocoa district of Ghana reveals that children in 18% of the households included in the study are only working on the cocoa farms though they qualified for secondary school, 56% are combining secondary education with working on the farms while 26% are only attending secondary school. Whereas none of the children who work only on the cocoa farm comes from a household headed by a parent with at least secondary education, 45% of them are under the guardianship of parents having no formal education. Parents with secondary levels of education are in custody of 73% of the secondary-only children. The extraordinary role played by the parent's level of education in child work/school decisions is thus confirmed in this study.

As high as 91% of the female household heads will not allow the children to engage in only work on the cocoa farm. 80% of the male counterparts will also do the same. The child from a household headed by a female thus has a greater chance of pursuing secondary education than the one from a male-headed household. This signals the important role played by the gender of the decision-maker in a household, with regards to child work/school choices.

Only 10% of the male children have secondary schooling as the sole activity. This contrasts sharply with the 49% of the female children in the same category. Overall however, 84% of the male children as against 80% of the female children will not be involved in work as the only activity. Thus, according to these observations the advantages of the female child over the male child in terms of opportunities for secondary education may not be that vast.

Only 3% of the relatively wealthy households will permit their children to only work on the cocoa farm without attending secondary school. As high as 67% of the below average households will do the same. No child from the households designated as relatively poor in this study, will have secondary schooling as the only activity. Children from 34% of the above-average households will fall into the secondary-only category. These observations portray the burden of schooling expenses on relatively less wealthy farm households. The socio-economic disposition of a household thus seems to influence very much child work/school decisions.

Only 2% of the households which have relatively very high hopes of ever getting the COCOBOD scholarship for their children's secondary education will allow the children to engage in cocoa farming only. 52% of the households with relatively low confidence in the scholarship scheme will permit their children to help them on the cocoa farm instead of schooling. Children from only 2% of this latter group of households are likely to engage in secondary schooling as the sole activity. 50% of the former group of households will allow the children to concentrate on only secondary education.

It appears from this observations that most cocoa farmers whose children have the prospects of making it beyond the basic level of education view the COCOBOD scholarship trust as a key and potential source of financial assistance for the child's secondary education.

On the average, children from households in a group of communities with relatively high cocoa productivity are observed to have more secondary schooling time compared to their counterparts from low cocoa productivity communities. Area influence from these observations, appear to have appreciable impact on the child/work school decisions by cocoa farm households.

Conclusions from econometric analysis

The field survey observations are substantiated by the results in the econometric model.

Generally, the econometric analysis indicated that:

➤ ***(secondary school only)***

Children of educated parents, children from female-headed households, female children, older children, children from relatively wealthy households, children from households with high confidence in the COCOBOD scholarship, and children from high cocoa production communities are more likely to be going to secondary school and not working on cocoa farms.

➤ ***(secondary and work)***

Children of educated parents, children from female-headed households, children from relatively wealthy households, and children from households with high confidence in the COCOBOD scholarship are more likely to be combining secondary school and work on the cocoa farms.

The study concludes with the general observation that the average secondary-school-going child in the study area is very likely to combine secondary schooling with work on the cocoa farm, especially if he/she stays with (or spends non-schooling-days with) the cocoa farming household.

Recommendations

1. Interventions may consider improvement of parental education through *adult education* programmes and other informal educational outreach initiatives. This recommendation is motivated by the apparent observation made in this study that parental education level highly influences child work/school decisions.
2. A major observation made during the field survey is that most cocoa farmers seem to be ignorant of the adverse implications of using the child extensively on the farm. The sensitization of the cocoa farmers on the adverse effects of extensive use of the child on the cocoa farm at the expense of his/her education therefore deserves

intensification. Non-governmental organisations may emulate the efforts being made by others such as *Hope For Humanity* based at New Edubiase, to complement government's efforts in this direction.

3. Efforts aimed at systematically improving the farmer's share of the FOB price are laudable and worth pursuing. Also the cocoa farmer can be assisted to know and appreciate better the business aspect of cocoa farming rather than regarding it as a simple subsistent activity. Extension services and the use of the mass media are some of the means through which this can be achieved.

This can help in the adoption and sustained adherence to production-enhancing innovations on the part of the farmer. Furthermore, it can contribute positively in developing a more prudent approach to how financial and other resources are managed by the cocoa farmer.

4. Existing educational policies and socio-cultural practices that tend to discriminate against the girl-child's education should be given a critical review. As a priority, appropriate incentives should be made available to promote girls secondary schooling in particular and the education of the child in general. Over the years efforts in this direction have been encouraging and need to be enhanced.
5. The number of the annual recipients of the COCOBOD farmers' scholarship trust (and the government scholarship) possibly need to be increased. Thus the funds allocated for this very important initiative can be reviewed upwards. Also the criteria used for the selection of recipients can be reviewed to enhance expanded accessibility by more farmers for their children.
6. Possibly, an additional secondary school can be established at a location that capture majority of the communities that are far away from the Edubiase secondary school. A general improvement in accessibility to secondary school education is a major policy recommendation. This requires increase in the number of secondary schools nationwide. Also they could be strategically located with the rural masses especially, as the targets.

Canagarajah et al. (1997) noted in Ghana that the child usually engages in work in order to finance his/her education or entirely stays out of school due to poverty. With the gradual improvement on the macroeconomic front in Ghana, secondary education needs to be made more affordable to the average Ghanaian including the cocoa farming household members.

Furthermore, subsequent education reforms need to consider the quality of education in general and secondary education in particular in order to tailor it to the challenges of the evolving labour market. (Glewwe and Jacoby 1993) noted in Ghana that the decision to further children's schooling is equally influenced highly by the nature of the job prospects education is perceived to create for the child after schooling.

Thus, the failures and/or imperfections in the education market need to be addressed simultaneously with efforts aimed at reducing extensive child work on the cocoa farm. As summed up by Grootaet (1998),

“The efforts at decreasing the use of the child for work should be complemented with more accessible quality education. Otherwise, a policy ban on the use of a child for work (on the cocoa farm) will end up making the child neither able to work nor attend school.”

Re-quoting the statement by Dr. Kwame Nkrumah, the first post-colonial president of Ghana *“Secondary education is the lynchpin for educational progress, manpower development and overall national development.”* Hence, it is appropriate that government intervenes directly and/or indirectly through requisite legislation and incentive provision to enhance secondary school enrolment and attendance at the national level and especially by the poor farmer's child. Ghana and humanity as a whole are the ultimate beneficiaries if tomorrow's human resources are adequately prepared today for the challenges ahead.

6.2 Limitations and Opportunities for Future Studies

The relatively small sample size used for the analysis in this study can be a source of limitation. As noted earlier, for a multinomial logit model, a sample size of 158 could still be too small for more efficient and/or consistent estimates. Besides, a larger sample size may be more appropriate to adequately represent the over 800,000 cocoa farming population in Ghana. A larger sample size is highly recommended for further studies that may have a similar theme as is in this research.

Also, the randomness of the sampling procedure is suspect, probably due to the ‘narrow nature’ of the focus group of the study. Due mainly to the relatively short duration of the survey period, only cocoa farmers whose children have qualified for secondary school since 2008 were considered in the study. More appropriately farmers whose children are at least at the JSS level of education could be included in the sample. Additionally, households with children who have already gone through secondary education some few years preceding 2008 could appropriately be involved. It is recommended that a more-random-sample, collected over a relatively larger proportion of cocoa farmers in Ghana should be collected for future studies in this direction.

Cocoa farmers in the New Edubiase town itself were not captured in this study. Generally, they are said to be involved in other income-earning activities (teaching, hospital works, petty trading, etc) whiles doubling as cocoa farmers. They either farm themselves or have farms manned mainly by migrant farmers. A potential further study area may be to find out whether they are influenced by (and the extent) similar factors that have been established in this study, when it comes to deciding between work on the farm and secondary education for the child.

The impact of the COCOBOD scholarship trust on the child secondary schooling/work decisions of parents could be captured better if the study has this very important scheme as the primary focus. This is a highly recommended further study area.

References

- Ahmann, J. (1955). "An application of Fisher's discriminant function in the classification of students." Journal of Educational Psychology **46**(3): 184-188.
- Ainsworth, M. (1996). "Economic aspects of child fostering in Cote d'Ivoire." Research in population economics **8**: 25.
- Amemiya, T. (1981). "Qualitative response models: a survey." Journal of economic literature **19**(4): 1483-1536.
- Andvig, J. (2000). An essay on child labor in Sub-Saharan Africa: A bargaining approach, NUPI.
- Andvig, J., S. Canagarajah, et al. (2001). "Africa Region Human Development." Human Development.
- ASDA (2007). "Adansi South District Data Base."
- Attanasio, O., E. Fitzsimons, et al. "Child education and work choices in the presence of a conditional cash transfer programme in rural Colombia."
- Baland, J. and J. Robinson (2000). "Is child labor inefficient?" Journal of Political Economy **108**(4): 663-679.
- Basic Education Unit, G. (2004). "The Development of Education National Report of Ghana."
- Basu, K. and P. Van (1999). "The economics of child labor: Reply." American Economic Review **89**(5): 1386-1388.
- Beegle, K., R. Dehejia, et al. (2003). "Child labor, income shocks, and access to credit." World.
- Bekombo, M. (1981). "The child in Africa: Socialisation, education and work." 1981: 113-129.
- Bhalotra, S. and C. Heady (2003). "Child farm labor: The wealth paradox." The World Bank Economic Review **17**(2): 197.
- Blunch, N. H., S. Canagarajah, et al. (2002). "Short-and Long-term Impacts of Economic Policies on Child Labor and Schooling in Ghana." Social Protection Discussion Papers.
- Boateng, B. (2007). Technology in education: A critical social examination of a rural secondary school in Ghana, Ohio University.
- Bock, J. (2002). "Evolutionary demography and intrahousehold time allocation: School attendance and child labor among the Okavango Delta Peoples of Botswana." American Journal of Human Biology **14**(2): 206-221.
- Borooah, V. K. (2002). Logit and probit: Ordered and multinomial models, Sage Publications, Inc.
- Bradley, S. and A. Nguyen (2004). "The school-to-work transition." Interational Handbook on the Economics of Education. Edward Elgar Cheltenham, UK Northampton, MA: 484-521.
- Bratti, M. (2003). "Labour force participation and marital fertility of Italian women: the role of education." Journal of Population economics **16**(3): 525-554.

- Burney, N. and M. Irfan (1995). "Determinants of child school enrolment: evidence from LDCs using choice-theoretic approach." International Journal of Social Economics **22**(1): 24-40.
- Canagarajah, S., H. Coulombe, et al. (1997). Child labor and schooling in Ghana, World Bank, Human Development Technical Family, Africa Region.
- Cockburn, J. (2000). "Child labour versus education: Poverty constraints or income opportunities." Center for the study of African Economics and Nuttfield College at Oxford University.
- Coulombe, H. (1997). "Child Labor and Schooling."
- Coulombe, H. (1998). "Child Labor and Education in Cote-d'Ivoire." Background paper. World Bank: Washington DC.
- Cramer, J. (1991). The logit model for economists, Edward Arnold London.
- CSAE (2009). "Fertile Ground: Boosting Cocoa Production Among Ghanaian Smallholders." 3.
- Curtin, T. and E. Nelson (1999). "Economic and health efficiency of education funding policy." Social Science & Medicine **48**(11): 1599-1611.
- De Janvry, A., F. Finan, et al. (2004). "Can conditional cash transfers serve as safety nets to keep children at school and out of the labor market?"
- Duryea, S., D. Lam, et al. (2007). "Effects of economic shocks on children's employment and schooling in Brazil." Journal of development Economics **84**(1): 188-214.
- Edmonds, E. (2004). "Does illiquidity alter child labor and schooling decisions? evidence from household responses to anticipated cash transfers in South Africa." NBER Working Paper.
- Emerson, P. and A. Souza (2001). Bargaining over Sons and Daughters: Child labor, school attendance and intra-household gender bias in Brazil, Working Paper.
- Enyo, H. A. T. (2010). "Presentation By Hon. Alex Tettey-Enyo, Minister For Education At Meet The Press Session"
- Fant, E. (2008). "Education and girl-child empowerment: the case of Bunkpurugu/Yunyoo district in Northern Ghana."
- Fentiman, A., A. Hall, et al. (1999). "School enrolment patterns in rural Ghana: a comparative study of the impact of location, gender, age and health on children's access to basic schooling." Comparative education **35**(3): 331-349.
- Frempong, A. "Codesria's Multinational Working Group on Citizenship and Identity in Contemporary Africa, 2005-2006."
- Frenette, M. (2006). "Too far to go on? Distance to school and university participation." Education Economics **14**(1): 31-58.
- Funkhouser, E. (1999). "Cyclical economic conditions and school attendance in Costa Rica." Economics of Education Review **18**(1): 31-50.
- ghanadistricts.com (2010). "A repository of all districts in the republic of Ghana."
- Glewwe, P. and H. Jacoby (1993). Delayed primary school enrollment and childhood malnutrition in Ghana: An economic analysis, World Bank Publications.

- Glick, P. and D. Sahn (2000). "Schooling of girls and boys in a West African country: the effects of parental education, income, and household structure." Economics of Education Review **19**(1): 63-87.
- Greene, W. H. and C. Zhang (2003). Econometric analysis, prentice Hall Upper Saddle River, NJ.
- Grootaert, C. (1998). Child labor in Cote d'Ivoire: incidence and determinants, World Bank Publications.
- Grootaert, C. and R. Kanbur (1995). "Child labour: an economic perspective." International Labour Review **134**(2): 187-204.
- Grootaert, C. and H. Patrinos (1999). The policy analysis of child labor: a comparative study, Palgrave Macmillan.
- Grootaert, C. and H. Patrinos (2002). A four-country comparative study of child labor.
- Guarcello, L., F. Mealli, et al. "Household vulnerability and child labor: the effect of shocks, credit rationing, and insurance." Journal of Population economics **23**(1): 169-198.
- Hancock, C. (2007). Emerging Themes in Educational Reforms in Ghana as Seen Through Education Reforms in The United States, The Ohio State University.
- Handa, S., K. Simler, et al. (2004). Human capital, household welfare, and children's schooling in Mozambique, Intl Food Policy Research Inst.
- Hausman, J. and D. McFadden (1984). "Specification tests for the multinomial logit model." Econometrica: Journal of the Econometric Society **52**(5): 1219-1240.
- Heady, C. (2003). "The Effect of Child Labor on Learning Achievement* 1." World Development **31**(2): 385-398.
- Hendrickx, J. (2000). "Special restrictions in multinomial logistic regression." Stata Technical Bulletin **56**: 18-26.
- Holsinger, D. and R. Cowell (2000). "Positioning secondary school education in developing countries." Series Policies and Strategies for Secondary education, International Institute for Educational Planning, UNESCO, Paris.
- IITA (2002). "Child Labour in the cocoa sector of West Africa, A synthesis of findings in Cameroon, Cote D' Ivoire, Ghana and Nigeria."
- ILO (2010). "International programme on the elimination of child labour."
- Jacoby, H. and E. Skoufias (1997). "Risk, financial markets, and human capital in a developing country." The Review of Economic Studies: 311-335.
- Jensen, R. (2000). "Agricultural volatility and investments in children." American Economic Review **90**(2): 399-404.
- Khan, R. and K. Ali (2005). Bargaining Over Sons' and Daughters' Schooling: Probit Analysis of Household Behavior in Pakistan, Working Paper 01-05, Department of Economics, Islamia University, Bahawalpur, Pakistan.
- Liao, T. (1994). Interpreting probability models: Logit, probit, and other generalized linear models, Sage Publications, Inc.
- Maddala, G. (1986). Limited-dependent and qualitative variables in econometrics, Cambridge Univ Pr.
- Mankiw, N., D. Romer, et al. (1992). "A contribution to the empirics of economic growth." The quarterly journal of economics **107**(2): 407-437.

- McFadden, D. (1973). "Conditional logit analysis of qualitative choice behavior." Berkeley, Institute of Urban Regional Department, University of California.
- McFadden, D. (1978). Modelling the choice of residential location, Institute of Transportation Studies, University of California.
- MMYE, N. (2008). "Cocoa Labour Survey in Ghana " (298).
- NDPC/UNDP (2010). "2008 Millenium Development Goals Report." 1-111.
- Owusu, V. and A. Kwarteye "An Empirical Analysis on the Determinants of Child Labor in Cocoa Production in Ghana."
- Palmer, R. (2005). "Beyond the basics: post-basic education, training and poverty reduction in Ghana." Post-Basic Education and Training Working Paper Series 4.
- Papageorgiou, C. (2003). "Distinguishing between the effects of primary and post-primary education on economic growth." Review of Development Economics 7(4): 622-635.
- Parker, S. and E. Skoufias (2001). Parental Unemployment, Marital Status Changes and Child Human Capital: Evidence from Urban Mexico, Centro de Investigación y Docencia Económicas.
- Patrinos, H. and G. Psacharopoulos (1995). "Educational performance and child labor in Paraguay* 1." International Journal of Educational Development 15(1): 47-60.
- Psacharopoulos, G. and A. Arriagada (1989). "The determinants of early age human capital formation: Evidence from Brazil." Economic Development and Cultural Change 37(4): 683-708.
- Quartey, E. (2007). "COCOBOD Presentation." Research Department, COCOBOD: 1-5.
- Rawlings, L. and G. Rubio (2005). "Evaluating the impact of conditional cash transfer programs." The World Bank Research Observer 20(1): 29.
- Ray, R. (2000). "Analysis of child labour in Peru and Pakistan: A comparative study." Journal of Population economics 13(1): 3-19.
- Robles-Vásquez, H. and D. G. Abler (2000). Education and Labor Force Participation by Mexican Children during Structural Adjustment: A Microeconomic Analysis.
- Rucci, G. (2003). "Macro shocks and schooling decisions: the case of Argentina." Economics Department, University of California at Los Angeles. <http://econweb.sscnet.ucla.edu/placement/2003/Rucci.pdf>.
- Sackey, H. (2008). "Private returns to education in Ghana: implications for investments in Schooling and migration." AERC Research Paper/African Economic Research Consortium, Nairobi.
- Sadoulet, E. and A. De Janvry (2004). "Making conditional cash transfer programs more efficient." ARE: University of California at Berkeley.
- Schmidt, P. and R. Strauss (1975). "The prediction of occupation using multiple logit models." International Economic Review 16(2): 471-486.
- Schultz, T. (2003). "Higher education in Africa: Monitoring efficiency and improving equity." African Higher Education: Implications for Development: 93.
- Sowa, N. and A. CEPA (2002). "An Assessment of Poverty Reducing Policies and Programmes in Ghana." IDRC, Rabat.
- Teal, F., A. Zeitlin, et al. (2006). "Ghana Cocoa Farmers Survey 2004: Report to Ghana Cocoa Board." Centre for the Study of African Economies. University of Oxford and Haruna Maamah ECAM Consultancy, Ltd. Accra. Ghana.

- Thomas, D., K. Beegle, et al. (2004). "Education in a Crisis." Journal of development Economics **74**(1): 53-85.
- UNDP (2000). "Millennium Goals."
- Verbeek, M. (2008). A guide to modern econometrics, Wiley.
- Washington, S., M. Karlaftis, et al. (2009). Statistical and Econometric Methods for Transportation Data Analysis. 2003, Chapman and Hall/CRC Press.

Appendix 1 Representative cocoa societies in the New Edubiase cocoa district

<i>Highest</i>	<i>moderate</i>	<i>lowest</i>
Onyan krom	Ayaa mankata	Nsata subiriso
Agravi	Anwona	K. minti
Fumso	Achiasewa	Mensah krom
Bepoase	Obuobikrom	Apagya
Biakwaso	W. Aboabo	Sasa kwakye
Oyan	Adansi Praso	Atobiase
Obonsu	Nyamebekyere	Bronikrom
Aboi	Fahiakobo	Kwame Adu
Mankron	Suhyen	Prekesease
Adansi Koforidua	Breketete	Ahomahoma

Source: COCOBOD district office, New Edubiase

mprobit

Multinomial probit regression

Number of obs = 158

Wald chi2(24) = 45.94

Log likelihood = -55.508836

Prob > chi2 = 0.0045

choice	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_outcome_1						
headage	-.0955558	.0907303	-1.05	0.292	-.273384	.0822723
educhead	-2.12876	.6350757	-3.35	0.001	-3.373485	-.8840341
mi ghead	1.216879	1.024802	1.19	0.235	-.7916966	3.225454
headmal e	2.259956	1.556167	1.45	0.146	-.7900759	5.309988
chi lmal e	-.3032446	.7391612	-0.41	0.682	-1.751974	1.145485
chi l dage	-5.296975	27.19625	-0.19	0.846	-58.60065	48.0067
chi l dagesq	.1824676	.8077622	0.23	0.821	-1.400717	1.765653
hsequal	-2.860759	1.104992	-2.59	0.010	-5.026504	-.6950151
depencoco	-2.689117	.8104441	-3.32	0.001	-4.277558	-1.100676
depengov	.3149726	.7457584	0.42	0.673	-1.146687	1.776632
zone	-.5225005	.4583816	-1.14	0.254	-1.420912	.3759109
domi nha	-.0767092	.8632783	-0.09	0.929	-1.768704	1.615285
_cons	53.3839	229.3165	0.23	0.816	-396.0681	502.8359
_outcome_2						
headage	-.0259779	.0716863	-0.36	0.717	-.1664805	.1145247
educhead	.9560853	.3725185	2.57	0.010	.2259625	1.686208
mi ghead	.3860365	.902448	0.43	0.669	-1.382729	2.154802
headmal e	-1.658568	.8834661	-1.88	0.060	-3.39013	.0729935
chi lmal e	-3.154289	.6931157	-4.55	0.000	-4.512771	-1.795807
chi l dage	63.38123	24.61161	2.58	0.010	15.14336	111.6191
chi l dagesq	-1.896974	.7325041	-2.59	0.010	-3.332655	-.4612918
hsequal	.03078	.5807788	0.05	0.958	-1.107525	1.169085
depencoco	1.916849	.4790583	4.00	0.000	.9779121	2.855786
depengov	.760267	.422508	1.80	0.072	-.0678334	1.588367
zone	.3610555	.3906611	0.92	0.355	-.4046263	1.126737
domi nha	-.0302597	.6617787	-0.05	0.964	-1.327322	1.266803
_cons	-534.383	206.9058	-2.58	0.010	-939.911	-128.855

(choice=3 is the base outcome)

Appendix 3 mlogit, using all the original variables

Multinomial logistic regression	Number of obs =	158
	LR chi2(32) =	228.37
	Prob > chi2 =	0.0000
Log likelihood = -41.417631	Pseudo R2 =	0.7338

choice	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
2						
headage	.3196532	.2983703	1.07	0.284	-.2651419	.9044483
eduhead	8.83244	3.838598	2.30	0.021	1.308927	16.35595
mi ghead	3.246721	3.33283	0.97	0.330	-3.285506	9.778947
headmal e	-17.83036	8.779436	-2.03	0.042	-35.03774	-.6229813
chil dmal e	-1.082463	3.072567	-0.35	0.725	-7.104585	4.939658
chil dage	198.3031	95.15215	2.08	0.037	11.80829	384.7979
chil dagesq	-5.991831	2.843452	-2.11	0.035	-11.56489	-.4187679
hsequal	11.4844	5.261331	2.18	0.029	1.172381	21.79642
hsesi ze	-5.558745	8.948478	-0.62	0.534	-23.09744	11.97995
hsesi zesq	.3532906	.7022358	0.50	0.615	-1.023066	1.729647
depenratio	-33.09206	12.83545	-2.58	0.010	-58.24908	-7.935034
cocopdn	-1.044434	2.638783	-0.40	0.692	-6.216354	4.127486
depencoco	12.28406	4.710975	2.61	0.009	3.050718	21.5174
depengov	-3.817897	2.969835	-1.29	0.199	-9.638667	2.002872
zone	4.024649	2.280787	1.76	0.078	-.4456121	8.49491
domi nha	3.935124	3.128048	1.26	0.208	-2.195738	10.06599
_cons	-1679.057	807.4341	-2.08	0.038	-3261.599	-96.51559
3						
headage	.346589	.2830662	1.22	0.221	-.2082106	.9013886
eduhead	7.683783	3.807294	2.02	0.044	.2216229	15.14594
mi ghead	2.409896	3.1023	0.78	0.437	-3.670501	8.490294
headmal e	-15.06364	8.6879	-1.73	0.083	-32.09161	1.964331
chil dmal e	3.575516	2.811907	1.27	0.204	-1.93572	9.086752
chil dage	93.83166	86.75184	1.08	0.279	-76.19883	263.8622
chil dagesq	-2.881063	2.595353	-1.11	0.267	-7.967861	2.205734
hsequal	10.66475	5.197885	2.05	0.040	.4770835	20.85242
hsesi ze	-5.355155	8.387383	-0.64	0.523	-21.79412	11.08381
hsesi zesq	.3395701	.6559569	0.52	0.605	-.9460817	1.625222
depenratio	-24.9426	12.24296	-2.04	0.042	-48.93835	-.946849
cocopdn	-1.516447	2.444883	-0.62	0.535	-6.30833	3.275435
depencoco	9.540966	4.648139	2.05	0.040	.4307798	18.65115
depengov	-4.892288	2.898409	-1.69	0.091	-10.57307	.7884882
zone	3.673874	2.1203	1.73	0.083	-.4818376	7.829586
domi nha	4.210386	2.967588	1.42	0.156	-1.60598	10.02675
_cons	-795.1807	737.3954	-1.08	0.281	-2240.449	650.0877

(choice==1 is the base outcome)

Appendix 4 Pictures related to the cocoa plant (Theobroma cacao)

* Cocoa tree with matured (and some) ripe pod



* Harvested cocoa pods (below)



* Cocoa butter, from which a product such as chocolate (on top) is made