



Ashesi University

Impact of Poverty on Education in Ghana

By

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Supervised by: Dr. Edgar Cooke

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RELATIONSHIP BETWEEN EDUCATION AND POVERTY

DECLARATION

I hereby declare that this thesis is my original work and that no part has been presented for another degree in this University or elsewhere.

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Candidate's name: Gifty Sefakor Affum

Date: 27th April 2021

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of the thesis laid down by Ashesi University.

Supervisor's signature.....

Supervisor's name: Dr. Edgar Cooke

Date: 27th April 2021

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ABSTRACT

Ghana's government has implemented specific programs like FCUBE, capitation grant, school feeding, and free SHS. According to Osei-Fosu (2011), the school feeding program had a high positive and significant impact on school enrollment, attendance, and retention. Research by Tamanja & Pajibo (2019) also shows that the free SHS has led to a substantial enrollment increase. Some of the factors that affect access to education are household influence, financial cost, health, gender, and location. The theoretical framework used to support this thesis is the human capital theory. The study used a quantitative approach and secondary data from Ghana living standard survey round seven to answer the research question. The study used an ordinary least squares estimator in R studio to observe the variables' trends.

The main objective is to determine the relationship between education and poverty. If education can reduce an individual's poverty level in Ghana. The null hypothesis was rejected, which states that education has no effect on poverty in Ghana; it was rejected because the p-value was less than 0.05 or 5%. Holding all other variables constant, if the level of education of an individual increases, welfare is expected to increase by 0.355 or 35.5%. And the variables that are statistically significant to welfare are completed level of education, income, gender, household size, and rural/urban.

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LIST OF ABBREVIATIONS

FCUBE	Free Compulsory Universal Basic Education
MDG	Millennium Development Goal
JSS	Junior Secondary school
SHS	Senior High School
PTA	Parent Teacher Association
SFP	School Feeding Program
CG	Capitation grant
GLSS	Ghana Living Standard Survey
ISCED	International Standard Classification of Education
NMBs	Non-Monetary Benefits
UNICEF	United Nations International Children's Emergency Fund
BECE	Basic Education Certificate Examination
GES	Ghana Education service
SCRs	Student-Classroom ratio
STRs	Students-Teacher ratio
HCT	Human Capital Theory

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CHAPTER ONE: INTRODUCTION

1.1 Background

Education has many meanings; in standard terms, it is the skills an individual acquires, the knowledge he possesses, the things he can do, and the moral virtues he acts upon. In a large context, it denotes what he has become, the distinctive ways in which he functions, the background from which his character has developed (Ross, 1966). For decades, scholars and the world community have had, and still do have, a consensus that education is essential, and everyone should have the right to education (Tierney, 2015). However, poverty can be a stumbling block to the access to education, and education can increase poor households' income levels by improving their skills and efficiency (Awan *et al.*, 2011).

The human capital theory regards education as a critical instrument for poverty reduction (Kucharcikova, 2011). According to Mincer (1974), the human capital framework says there is a relationship between education and earnings (income). Education adds value to a person through skills and knowledge, which allows the individual to seek employment to become productive in their field of work to earn income that will better their welfare (Mincer, 1974; Tilak, 2002).

According to the Ghana Statistical Service (GSS), the poverty headcount ratio at national poverty lines is 23.4% (GSS, 2017). Although the country has managed to decrease the number of people living in poverty after independence, Ghana still has 23.4% of its population living in poverty. According to Palmer (2005), the GSS reveals that the probability of the poorest 10% of the population benefiting from public expenditure on either secondary or tertiary levels is low. Additionally, the study demonstrated that the poorest 45% of the country's population has no tertiary education access. Still, the wealthiest 1.5% of the population commands 55% of the public spending on tertiary education (Palmer, 2005).

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According to Palmer (2005), quantitative research evidence (Mincerian returns and regression analysis) from Ghana shows that formal education has the most considerable direct impact on income levels and poverty reduction. The evidence from the study suggests that individuals with higher education levels get a higher income than individuals with a lower level of education (Palmer, 2005).

1.2 Research problem

The Education Act of 1961 and FCUBE, mandated in article 39 of the Ghana constitution, have the following aim: to increase access to basic education throughout the country, to reduce the cases of student exclusion, promote efficient teaching and learning, and make sure schools have an adequate supply of materials that will support operations (Botts & Owusu, 2013; Abukari *et al.*, 2015). The low-income households that could access education through FCUBE could not pay transportation costs, Parent Teacher Association cost, and other fees. To support the FCUBE, the government, in 2004/05, established the CG and SFP.

The CG, SEP, and free SHS are established to help poor parents reduce the cost associated with primary and senior high education and improve the children's nutrition, especially those from poor homes. The World Bank in 2009 identified some of the challenges associated with CG and SEP policies: corruption, leakages, poor record-keeping, misappropriation of resources, and the free SHS also has its problems (Ampratwum & Armah-Attah, 2010).

Since most of the policies initiated by the governments of Ghana are not working effectively, as discussed above, this is a problematic situation that needs critical policy review because education is a crucial key factor as agreed by scholars. And the human capital theory states that education can have a positive impact on poverty. However, Ghana has issues with its

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educational systems. Therefore, with the educational drawbacks in Ghana, is there a positive relationship between welfare and education in Ghana, as stated by the human capital theory?

1.3 Research question and objective

Evidence from several studies shows that poverty can be a setback for children in underprivileged households in accessing education. A higher education level can also improve their living standard by increasing their income level (Palmer, 2005; Tilak, 2002). *Thus, this thesis seeks to determine whether education can reduce the poverty level in Ghana?*

The objective of the research is to examine if education can reduce the poverty level of an individual in Ghana.

1.5 Significance of the study

Although the government has implemented policies like the 1961 Education Act, FCUBE, CG, SEP, and free SHS policies to support poor households in getting access to education, one of the reasons children drop out of school or do not get enrolled in school is poverty. Ampiah and Adu-Yeboah (2009) showed that children also drop out of school due to poor performance, corporal punishment, sickness, early child pregnancy, early child marriage, death, child labor, and poverty. The attention of this study would be on poverty (Ampiah & Adu-Yeboah, 2009).

This study is important because it will assess how government educational policies to increase education access benefit poor households in Ghana. This study will be of value to Ghana's education policymakers and education research community. It will inform them to help the government to make policies that target the poor and the vulnerable. Therefore, the government will be concerned about the percentage of benefits that accrue to the poor households when implementing policies. Additionally, this study provides a comprehensive examination of the role

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of education in determining welfare and poverty by adopting a quantitative perspective that will show whether there is a significant impact of education on poverty in Ghana.

1.6 Overview of research methodology

The data needed to answer the research question are secondary data obtained from GLSS round 7. The information or data would be on income, schooling, and other household characteristics. And since the research will generalize from a large population in Ghana, the thesis would use a quantitative method.

1.7 Organization of the study

The thesis contains five chapters: the introduction, literature review, methodology, results, conclusions, and recommendations. Chapter one consists of background, research problem, research question, objective, the significance of the study, organization of the research, and the methodology. The second chapter includes reviewing other literature on education and poverty. Chapter three gives the steps involved in achieving the study's objective, and chapter four will depict the findings from the research. The last chapter offers conclusions and recommendations based on the results.

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CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature review section consists of scholarly papers or materials that apply to this thesis and the theoretical framework used to support the study, the human capital theory, and critiques. The chapter would discuss some factors like gender, location, household influence, financial cost, and health that affect access to education. And the role of the government to remove some of these factors that affect access to education. An overview of poverty and the benefits of education are detailed below. This chapter also shows whether the poor or the rich gain from education more.

2.2 Theoretical framework

The research would use human capital theory (HCT) to show the value of education in a person's life or population (Blaug, 1976). The theory assumes that human capital is the stock of basic intelligence, including habits, knowledge, skills, and social qualities expressed in labor's capacity to generate economic value and achieve innovation efficiently. The human capital theory says that investment in education would increase a person's skills, allowing them to boost their productivity and gain higher income. The theory is strongly focused on the premise that education is essential and appropriate for the growth and enhancement of a population's productiveness (Blaug, 1976).

HCT is a good choice for this study because it helps the study to evaluate the relationship between education and social benefits. And this will enable the study to examine the relationship between education and poverty. HCT also provides a useful lens that would help the research to incentivize individuals to invest in their education.

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2.2.1 Critiques of human capital theory

One of the limitations of the human capital theory is that it is bounded by statistical analysis and organic realities; meaning that it assumes that education increases productivity in the workplace, resulting in higher wages. But earnings are affected by varying customs and hierarchies in professions and workplaces. It is delusional to seek to measure or compare the quantity, quality, or productivity of education programs, institutions, or systems based on the private return rates or the graduates' employment rate. Secondly, HCT equations unify higher education and work at the cost of suppressing their distinctive characteristics. It imposes a single linear pathway on the complex passage between heterogeneous education and work. Lastly, non-homogenous and non-linear material: HCT failed the realism test due to method weaknesses, using a single theoretical lens and closed system modeling (Marginson, 2017; Wößmann, 2003).

2.3 Overview of poverty

Poverty may have a detrimental effect on education by making it difficult for the poor to access education. Still, for others, education can be a way out of poverty because studies have shown that education is strongly linked to poverty reduction (Pauline & Dyer, 2008). According to Pauline and Dyer (2008), research has shown that exclusion of the poor from school is due to reasons or factors that are sometimes beyond the government's control. Although the government may eliminate financial costs as a barrier to education, there are still some factors outside its influence, such as poor performance, teenage pregnancy, illness, and child labor. Some cultural practices such as early child marriage, dowry, and trokosi have been found to exclude poor children from accessing education despite government efforts (Ampiah & Adu-Yeboah, 2009; Pauline & Dyer, 2008).

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2.4 The benefits of education

Traditionally, economists have regarded education as an investment in human capital that directly affects the educated individual and benefits society. This means that the economic achievement of highly educated people is better than those with less education. Like many other elements, such as innate skills and family history, it would be naive to believe that schooling causes all the measurable differences between individuals in society. But according to Vila (2000), research has shown that better-educated individuals usually have better employment and higher wages than those with less schooling (Vila, 2000).

A study by Mincer (1989) suggested that educated workers with rapid productivity growth relative to wages increase compared to less educated (Mincer, 1989). Adjasi and Osei (2007) indicated that poverty is lower in households where the parents have some education level. Further, a family that receives income from other sources enjoys better welfare status; similarly, welfare increases with education, thereby decreasing poverty. Households are comparatively better off in managerial and administrative-economic groupings, while those in services, sales, and agriculture are worse off (Adjasi and Osei, 2007). A regression modeling by Rolleston (2009) suggested that a strong association is found between households' welfare and household heads' qualification level. This implies that contrary to households where the head has never been to school, households with educated heads have become increasingly better. Therefore, better-educated households become increasingly privileged (Rolleston, 2009).

In the economics of education literature, one of the fundamental problems was evaluating education's economic value. Economists have classified the non-monetary benefits (NMBs) of education in their efforts to build a complete image of the effects or impacts of education. Factors such as longitudinal effects and perception of the effects are used. Applicable to economic analysis,

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the NMBs of schooling are classified into private or social benefits. According to Vila (2000), some of these benefits are health benefits, fertility benefits, benefits for the children, occupational benefits, benefits related to consumption and savings, distributive benefits, and social structures' stability. The NMBs of education have attracted economists' attention because they represent positive effects or advantages that did not reflect traditional economic measures. Education has many beneficial impacts on people's lives, and other effects can be realized in different ways than wages alone. These impacts are the monetary and non-monetary components (Vila, 2000).

2.5 Factors that affect access to education.

This section would discuss the various factors that hinder access to education. According to other scholarly papers, some of these factors are gender, location, health issues, household influence, and financial cost.

2.5.1 Gender

Gender disparity is one of the main factors that hinder access to education across many African countries, including Ghana. Society is aware of the problem, but not much research has been done until recently (Tuwor & Sossou, 2008). A study conducted by Shabaya and Koonadu-Agyemang (2004) suggested that one in three women has no education in Ghana, compared to one in five males. The results of the study indicate that Ghanaian females have less education than men. And this is particularly evident in rural areas and in some regions like Upper West, Upper East, and Northern regions where 89% of all females have no education (Shabaya & Koonadu-Agyemang, 2004).

Qualitative research by Fentiman, Hall and Bundy (2010) suggested that females are more disadvantaged than boys in basic education. Issues like sexual abuse, early pregnancy, early marriage, cultural discrimination, and female teachers' shortage to serve as role models are also

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significant barriers to female education, restricting girls' educational opportunities (Fentiman *et al.*, 2010). Most of the time, in rural areas, girls are responsible for most household chores; little time is spent on school and homework. If the two become too much to juggle or handle, school is the last priority. In Ghana, a survey discovered that girls work 14-16 hours a day if they are not enrolled in school (Bardley, 2000).

2.5.2 Location

The distance can be another factor that will make access to education difficult for students in Ghana. Transportation cost associated with schooling might deter parents from sending their children to school, especially in rural areas. The parents who enroll their children in school under this circumstance might lose interest in education due to long-distance walk to school every morning and might prefer quitting school altogether. In Ghana, distance is a very significant issue in education due to the rainy season. Using variables recorded from the weather chart, Osei-Fosu (2011) suggested that the rainy season negatively influences school attendance due to the distance some pupils commute to school on foot (Osei-Fosu, 2011).

2.5.3 Households influence

Akyeampong, Djangmah, Oduro, Seidu, and Hunt (2007) suggested that the probability of children's enrollment is dependent on a complex of factors, including parents' level of education, the ability to pay costs associated with schooling, and the kind of livelihoods that households are seeking. Other factors influencing child enrollment include how families structure their home and how time is spent. The types of assets they choose to invest their resources or money, whether human capital or not (Akyeampong *et al.*, 2007).

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2.5.4 Financial cost

Individuals from poor households face financial costs as a factor that hinders their education. Low-income families cannot afford the cost associated with schoolings, such as tuition fees, textbooks, uniforms, transportation costs, and other learning materials. These costs deter parents from sending their children to school (Lewin, 2008). According to Akyeampong *et al.* (2007), various research conducted in the 1990s and early 2000 suggested that a significant obstacle to educational access was financial cost (Akyeampong *et al.*, 2007).

2.5.5 Health

The education of children from poor financial backgrounds is distorted if both parents succumb to health problems, extended family resources are limited, or where children have health issues or conditions requiring diagnosis and treatments that families cannot afford (Nielsen, 2009).

2.6 The role of government in education in Ghana

Ghana's government has initiated specific programs to boost Ghana's access to education for citizens, especially individuals from impoverished backgrounds. Some of these programs are FCUBE, capitation grant, school feeding program, and free SHS.

2.6.1 Free Compulsory Universal Basic Education

The FCUBE policy intended to increase school demand by making schooling from the basic stage for children at the age of 5-13 years free, compulsory, and universal for all school-age children by eliminating school fees. The goal of the FCUBE could be achieved by improving the quality of teaching and learning, enhancing management efficiency, and improving access and participation. Those three goals were targeted because 22% of school-age children from primary one to six were not in school, and 29% of JSS students were not in school. There were fewer

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vacancies for students who qualify to enter SSS after JSS (Nudzor, 2013). FCUBE concentrated on two major activities: on the demand side, decreasing fees and levies, enhancing headteachers' management skills, and improving school supervision. On the supply side, expenditure centered mainly on developing physical facilities and raising the number of school spaces through the large-scale development of new classrooms and schools.

The mandatory aspect of the FCUBE indicated a commitment to place pressure on parents to enroll their children for the entire period of basic education. But with the reduction of income for schools due to the elimination of fees, schools instituted indirect levies, and parents who refused to pay had their children sent home by the headteachers. Consequently, FCUBE sent contradictory signals about free education and left schools with a revenue hole, and some parents felt reluctant to pay fees. This created a gap in quality provision between urban and rural areas. The gap in quality provision was because trained teachers in the deprived districts declined from 55% in 2003/04 to 37% in 2007 (Akyeampong, 2009; Nudzor, 2013).

2.6.2 Capitation Grant

The capitation grant concept began in 2005 and was established to abolish fees to reinforce the existing FCUBE policy by attracting and retaining children in school. The abolition of school fees is not only for "tuition fees" the abolition of school fees brings into account the wide variety of education expenses for families. The fee abolition may include any direct and indirect charges like tuition fees, supplies, uniforms, PTA contributions, sports expenses, costs associated with textbooks, and many related costs (Okamura & Yoshida, 2010). Table 1 below shows countries that abolish fees and their percentage increase in enrollment (ADEA, 2007).

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Table 1: Increased enrolment due to abolishment of fees

Countries that abolished fees and the increased enrollment	
Lesotho	11%
Mozambique	12%
Ghana	14%
Kenya	18%
Ethiopia	23%
Cameroon	26%
Malawi	51%
Uganda	68%

Source: Association for the Development of Education in Africa (2007).

To meet the MDG goal for education and its strategic education plan, Ghana's government took a bold step to abolish fees and give schools grants for each pupil enrolled. Every public kindergarten, primary school, and the junior secondary school received about \$3.30 per pupil per year. Therefore, schools are not permitted to charge any fees to parents. The program was first piloted with the World Bank's help in Ghana's 40 most deprived districts. And total enrollment as of 2005/06 increased by 14.57% (Osei et al., 2009).

Osei *et al.* (2009) used an econometric technique to analyze the education grant effects on education outcomes. Three key hypotheses were tested, and the findings from the result show that the CG has not had any significant impact on the BECE pass rates in Ghana. No significant effect was observed between the CG and enrollment rates, although enrollments increased over the study period. The authors also discovered that the CG had no considerable impact on bridging the gap between males and females BECE pass rates (Osei *et al.*, 2009). Osei-Fosu (2011) also did a regression analysis to test CG on education outcomes. The result showed that the CG is positively

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related to enrollment, but not statistically significant, meaning that capitation grant does not significantly influence enrollment (Osei *et al.*, 2009; Osei-Fosu, 2011).

2.6.3 School Feeding Program

The Ghana School Feeding Program (GSFP) also began in 2005 to aid the capitation grant to achieve its goal. GSFPs' objectives are decreasing hunger and malnutrition, increasing school enrollment, retention, attendance, and boosting local food output. With support from the Dutch government, Ghana's government implemented the school feeding program (ECASARD/SNV, 2009). Research conducted by Osei-Fosu (2011) shows that the school feeding program had a high positive and significant impact on school enrollment, attendance, and retention. The study also showed that the program's positive influence was affected by PTA fees (Osei-Fosu, 2011).

2.6.4 Free Senior High School

Ghana's government established the free SHS policy to reduce poverty by eliminating the financial burdens parents face in paying their ward's fees. The free SHS ensures that tuition fees, admission, and examination fees are waived, free boarding facilities, free meals, and textbooks are provided (Abdul-Rahaman *et al.*, 2018). The implementation of free SHS has led to an enrollment increase of 17% and 31% in 2017 and 2018, respectively, and the increase happened because the government has absorbed the main barrier to high school (Tamanja & Pajibo, 2019).

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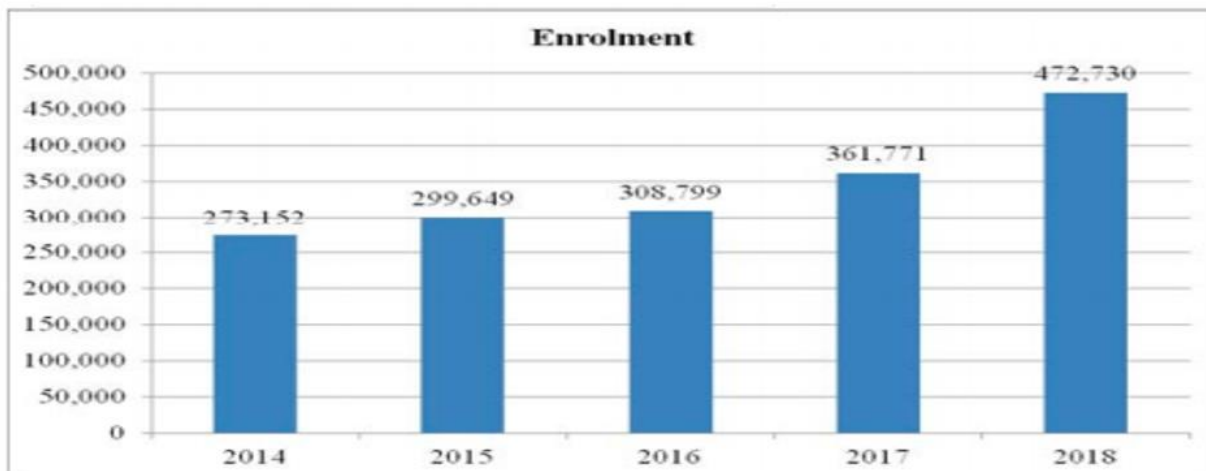


Figure 1 S.H.S enrollment level (2014 - 2018)

Source: (Tamanja & Pajibo, 2019)

From *figure 1* above, the free SHS increased enrollment. These rises, however, come with their challenges. As a result, increased students' number has exacerbated other issues, such as heavy teaching loads, insufficient teachers, and inadequate instructional materials. The infrastructure issue prompted the government to set up the double-track system in 2018. A double-track system creates space to accommodate increased enrollment, minimize class size to prevent overcrowding, and increase contact hours. The double-track system caused high schools in Ghana to increase student admissions by 31% in 2018. Due to the double-track system, the increment also puts pressure on resources, logistics, and students' mode of selection to the tracks (Tamanja & Pajibo, 2019).

Research conducted by Mohammed and Kuyini (2020) suggested that free SHS increased enrollment. And as enrollment increased, the student-teacher ratio (STR) increased from 26 to 32 in 2018, from 32 to 43 in 2019. The GES can use some variables like student-teacher ratio and textbook-student ratio to measure education quality. The GES benchmark for the student-teacher

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ratio for high school is 25:1, which implies that a teacher should manage every one of 25 students. A study by Mohammed and Kuyini (2020) shows that the STR increased to 32:1 in 2018 and 43:1 in 2019, meaning the number of students assigned to one teacher rose to 32 students in 2018 and 43 students in 2019, contrary to the GES benchmark. The student-classroom ratio (SCR) increased to 52:1 in 2019, meaning that 52 students were assigned to one classroom in 2019. This proves that there is pressure on resources and inadequate teachers (Mohammed & Kuyini, 2020).

2.7 Who gains from education more?

Targeting the poor and the vulnerable is as equally important as implementing the policies that reduce burdens on education. Yuki (2003) compiled research investigating the incidence of public expenditure on education in a cross-section of less developed countries. With regard to Africa, the total education subsidies that accrue to the poor households were 16.4% in Ghana in 1992 (21.8% primary, 14.9% secondary, and 6% tertiary), 19.9% in South Africa in 1993 (25.8% primary, 18.8% secondary and 6.1% higher), 17% in Kenya in 1992 (21.8% primary, 6.4% secondary and 2% higher). In all these countries, the poor gain a disproportionate proportion of primary school subsidies while higher education subsidies accrue mainly to the wealthy (Yuki, 2003).

Gaddah, Munro, and Quartey (2015) suggested that total public spending can be made more progressive by increasing subsidies on services used relatively more by the poor while decreasing subsidies on services used by the rich. This means that, since the top income group dominates secondary and especially tertiary schooling, welfare can be improved or strengthened by reallocating public spending to basic education. The highest return rate in Ghana (social and private) is at the senior secondary level (followed closely by the primary). At the same time, the poor tend to terminate education at the basic level. Therefore, it is necessary to make post-basic

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education more accessible to the poor to provide them with higher earnings potential, thereby raising them out of poverty (Gaddah, Munro & Quartey, 2015).

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CHAPTER 3: METHODOLOGY

3.1 Introduction

The objective of the study is to assess the relationship between poverty and education. This chapter explains the research scope and design, and the data analysis models that the study adopted to achieve the objective.

3.2 Estimation Framework

3.2.1 Data Source

This research seeks to address the research question from a microeconomic scope, focusing on the individuals in the economy. The study used secondary data from the Ghana Living Standard Survey. The GLSS provides accurate, credible, and internationally comparable welfare and living conditions statistics in Ghana. The GLSS-7, conducted in 2016/17, gathers detailed information on demographic characteristics of the population, education, health, employment and time use, migration, housing conditions, and household agriculture. It is a representative survey that interviewed 14,009 households and collected data on 58,844 members of the households sampled (GSS, 2017).

3.2.2 Econometric approach

The study used a quantitative design because it used secondary data from GLSS, allowing the research to carry out measurements and statistical analysis. The study also used multiple linear regression estimators like Awan *et al.* (2011) to observe the variables' trends. The variables the study used are education, rural/urban, household size, household expenditure less education expenses is used as a proxy for income, gender, age, welfare, poor and employment status, sector of employment as dummy variables. Awan *et al.* (2011) employed the ordinary least squares estimator to understand the impact of education on poverty in Pakistan. This study used some of

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the variables they employed. Ordinary least squares were used because this is a quantitative study that wants to determine the relationship between education and poverty. OLS regression is performed using the log of welfare as the dependent variable because OLS works well with continuous variables. As a robustness check, an additional regression estimate is performed using a binary variable indicating whether a person is poor as the dependent variable. OLS is not appropriate for the additional regression because the binary nature of the dependent variable makes OLS estimates biased. Therefore, the logit model is employed to perform the additional regression. The logit model is appropriate because it does not assume multivariate normality and equal covariance matrixes (Wooldridge, 2010).

Hypothesis

The study presents the following hypotheses as a basis for the research, and the study used the education variable's coefficients t-test to test the hypotheses.

Ho = Education has no effect on poverty in Ghana ($b=0$).

H1 = Education has an effect on poverty in Ghana ($b\neq 0$).

Regression 1

Regression one (1) and two (2) are performed using the log of welfare as the dependent variable.

Model 1

$$\text{Log (welfare)} = \beta_0 + \beta_1 (\text{education}_1)$$

Regression 2

Model 2

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$$\begin{aligned} \text{Log}(\text{welfare}) = & \beta_0 + \beta_1(\text{education}_1) + \beta_2(\text{urban}_2) + \beta_3(\text{household size}_3) + \\ & \beta_4(\text{income}_4) + \beta_5(\text{sex}_5) + \beta_6(\text{age}_6) + \beta_7(\text{employment status}_7) + \\ & \beta_8(\text{sector of employment}_8) + \mu \end{aligned}$$

Regression 3

To test robustness, a logit model regression was performed using binary dependent variable, indicating whether a person is poor.

Model 3

$$\text{Pr}(\text{poor}_j = 1) = \log(P_j / 1 - P_j) = (X_j b)$$

$$\begin{aligned} \text{Pr}(\text{poor}_j = 1) = \log(P_j / 1 - P_j) = & (\beta_0 + \beta_1(\text{education}_1) + \beta_2(\text{urban}_2) + \\ & \beta_3(\text{household size}_3) + \beta_4(\text{income}_4) + \beta_5(\text{sex}_5) + \beta_6(\text{age}_6) + \\ & \beta_7(\text{employment status}_7) + \beta_8(\text{sector of employment}_8) + \mu) \end{aligned}$$

The importance of the variables in the regression is explained in the following paragraphs.

Welfare and poor variables: The variable ‘welfare’ is relevant to this study because the research examines if education can reduce an individual’s poverty level in Ghana. Therefore, to understand the essence of poverty in Ghana on individual analysis, data on ‘welfare’ and ‘poor’ were used to perform two regressions. Where ‘welfare’ is used as a dependent variable to perform the first regression, and ‘poor’ is used as a binary dependent variable indicating 1=poor; 0= non-poor to perform logit regression to check robustness. In poverty analysis, the GLSS uses total adult equivalent expenditure or measure of household consumption adjusted for household size and scale of consumption.

Completed level of education: This research investigates whether schooling can reduce the poverty level in Ghana. Therefore, exploring education as a variable is key to this thesis. The

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education variable focuses on the level of education an individual has attained, whether 'none' indicating 1, primary representing 2, secondary (3), post-secondary (4), university/professional (5). Completed level of education is an independent variable.

Urban/rural: The rural or urban variable is used to determine if a person's residence or location, either in the rural or urban, affects their access to education and poverty. The GLSS collect data by making 1 (urban=1) represent a person in the urban area and 2 (rural=2) representing someone in the rural community.

Household size: The study used household size as a control variable to adjust for the other household factors that might make it poor or wealthy. To identify the effect of education on welfare or being poor, it is essential to control other factors.

Sex: sex is used because the study wants to discover what education level can reduce an individual's poverty regarding gender, whether female or male. Gender (male =1; female =2) is an explanatory or independent variable in this study.

Age: age is an independent variable that helps the study determine if a person's age is statistically significant to their poverty level.

Income: 'household expenditure less education expenses' is used as a proxy for income because income variable is poorly measured and expenditure is used in place of income in developing country datasets. It is used as an independent variable to determine if a person's income affects their poverty level.

Employment status: the employment status is used as a dummy variable in the model. Regarding the employment status of individuals in the GLSS survey, 1 represents a paid employee, 2 denotes a casual worker/apprentice. Figure 3 indicates self-employed non-Agric, 4 illustrates

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self-employed Agric, 5 indicates a family worker Agric, 6 signifies a family worker non-Agric, and 7 represents other.

Sector of employment: the industry or sector of employment is used as a dummy variable in the model. The values are divided into four categories. Also, the missing values (NA) are converted to other category. NGOs and international organizations are combined to represent 1, government sector and parastatals organizations are added to represent 2. The private sector is represented by 3, and cooperatives are added to other/not-working to represent 4.

3.2.3 Limitations of the ordinary least squares

The performance of ordinary least squares may cause problems like multicollinearity, overfitting, and omitted variable bias. Multicollinearity happens when some or all the independent variables are correlated with each other. And this multicollinearity is a problem because ordinary least squares assume no linear correlation among the independent variable. So, if some of the independent variables have a high correlation, there is a possibility that a standard error will occur, which affects the statistical significance of the results. To address this issue of multicollinearity, variance inflation factor (VIF) would be performed among the independent variables to identify the correlation, and one of the paired independent variables that has a high correlation between them will be dropped.

Secondly, omitted variable bias happens when an important variable is excluded. To fix this omitted variable bias, the study will add more independent variables to make sure that the variables that will help understand poverty and education are better included.

Overfitting is caused by adding too many independent variables. Some variables may account for more variance but add nothing to the model. To avoid adding many independent

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variables that add nothing to the model, a relevant check will be performed using scatterplots. If the independent variable is found to have no strong linear relationship with the dependent variable, then that independent variable will not be added to the model.

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CHAPTER 4: RESULTS

4.1 Introduction

Chapter four seeks to examine whether there is a correlation between education and poverty using an ordinary least square estimator in R studio. This chapter will also present the findings obtained from the research and descriptive statistics of the variables.

4.2 Descriptive statistics: exploring the correlation between education and poverty.

The measures used for the descriptive statistics for the various variables are mean, standard deviation, and others. The mean welfare in Ghana during 2016/2017 is 3,327.19, and the standard deviation is 3,573.17. The standard deviation for poverty is high, indicating that the values are spread over a wider range.

Table 2: Descriptive statistics for the variables

Variables	Number of Observations	Mean	Std. Dev.	Min	Max
Welfare	58,844	3,327.19	3,573.17	39.03	199,643.02
Poor	58,844	0.37	0.48	0.00	1.00
Education	58,844	1.81	1.12	1.00	5.00
Household size	58,844	6.16	3.53	1.00	28.00
Sex	58,844	1.52	0.49	1.00	2.00
Age	58,844	25.06	20.36	0.00	99.00
Urban/rural	58,844	1.64	0.48	1.00	2.00
Employment status	58,844	4.81	1.71	1.00	7.00
Sector	58,844	3.49	NA	1.00	4.00
Income	58,844	10,239.7	9358.6	81.1	208,868.1

Source: Author's computation based on GLSS 7 data

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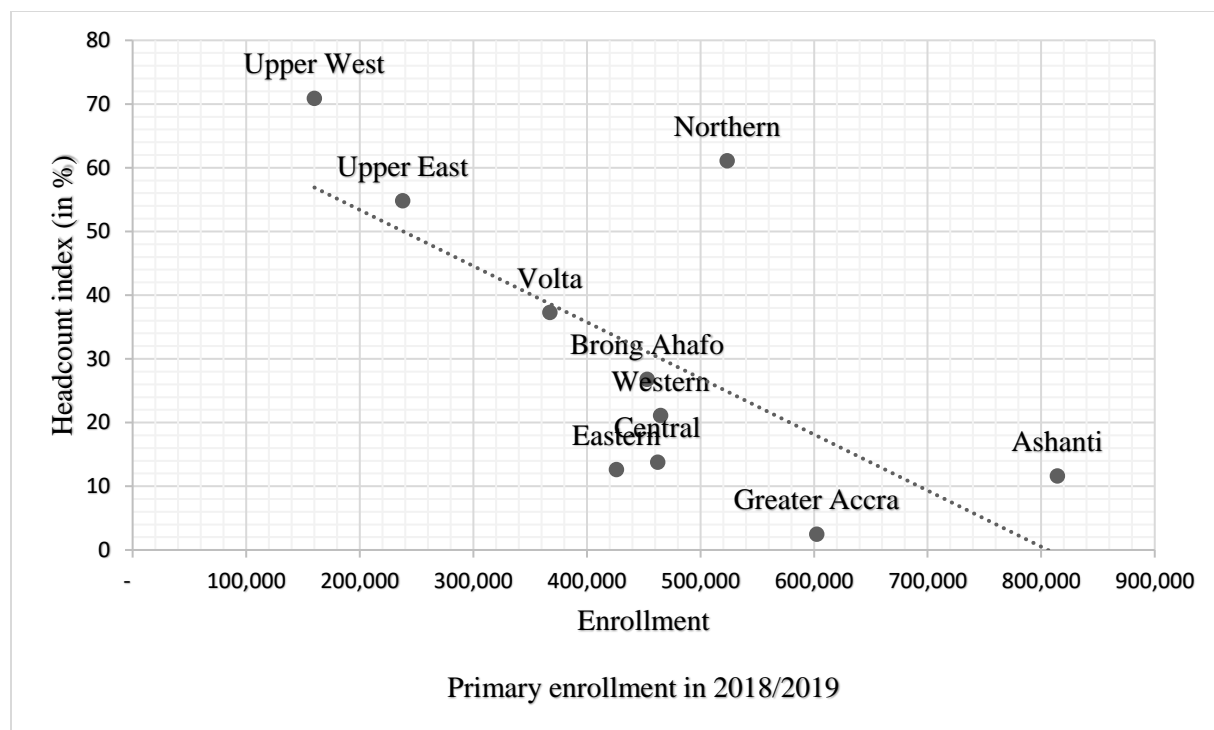


Figure 2. enrolment level and poverty by region (2018 – 2019).

Source: author's computation based on GLSS 7.

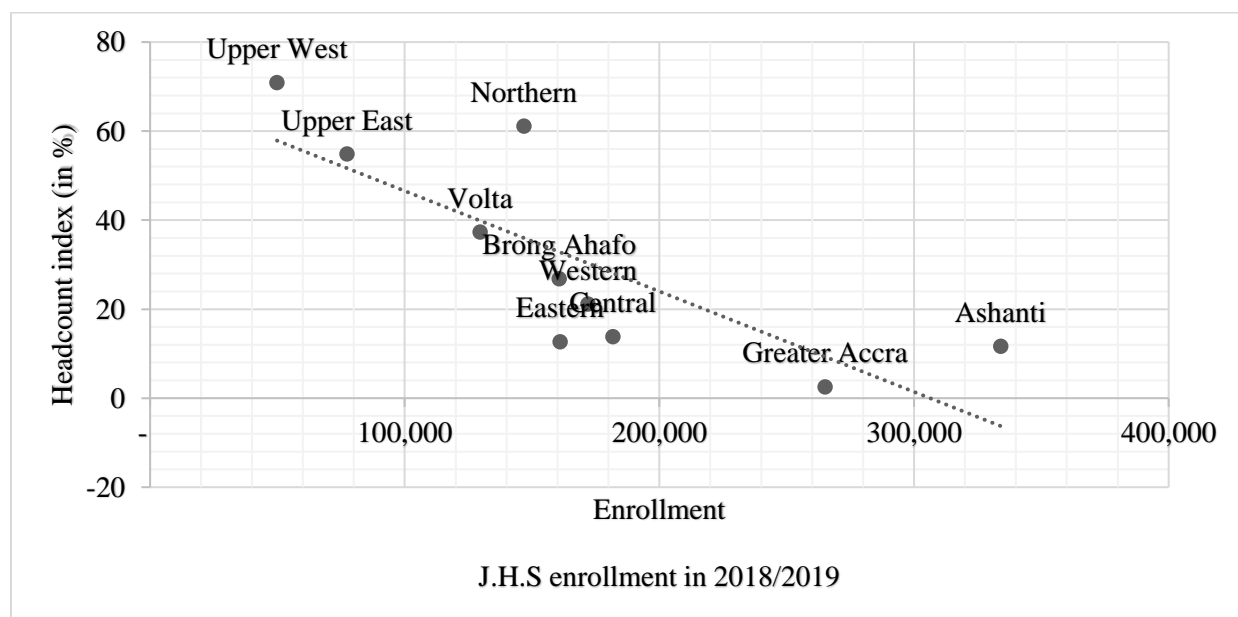


Figure 3. enrolment level and poverty by region (2018 – 2019).

Source: author's computation based on GLSS 7.

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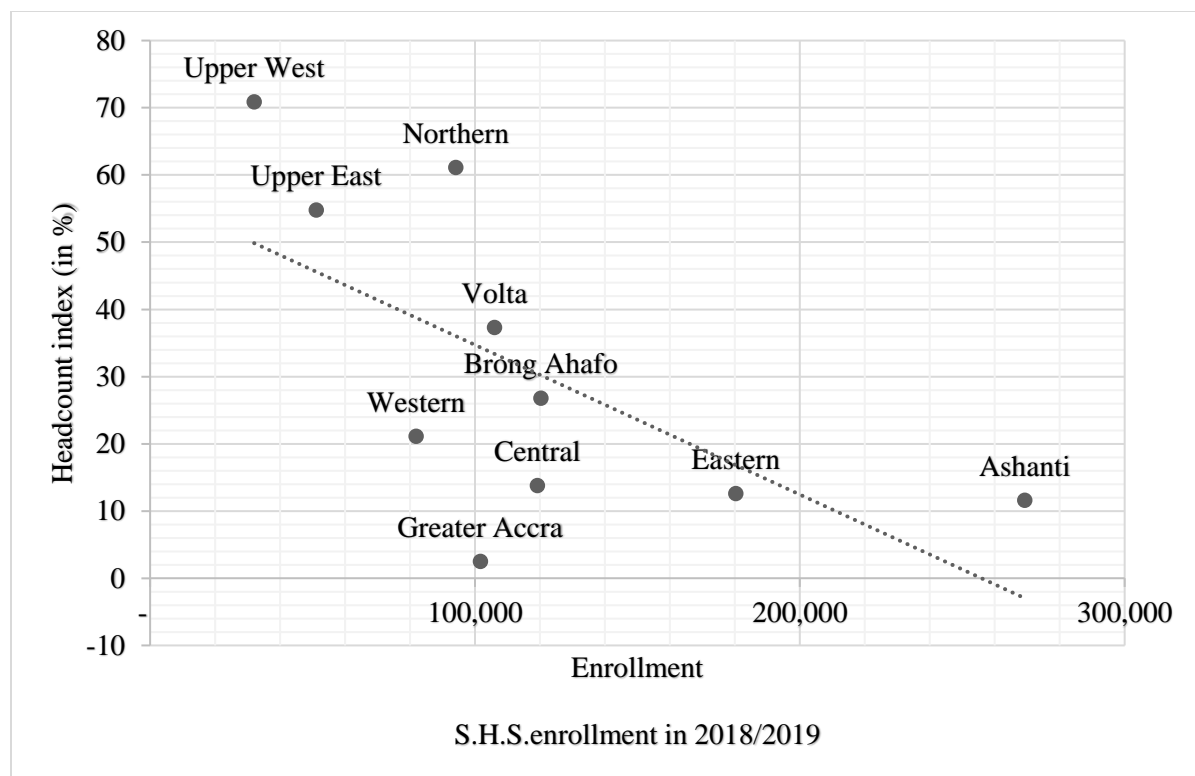


Figure 4. enrolment level and poverty by region (2018 – 2019).

Source: author's computation based on GLSS 7.

From the figures above, the Upper West region has the lowest enrolment in primary, junior high, and senior high education of 160,106; 49,860 and 32,035 respectively, because the region has the highest poverty headcount ratio of 70.9%. The Ashanti region has a poverty headcount ratio of 11.6% and recorded the highest enrolment of 814,141 in primary, 334,025 in junior high, and 269,234 in senior high. Greater Accra also recorded the lowest poverty headcount ratio of 2.5% and enrolment of 602,282 in primary, 265,061 in junior high, and 101,658 in senior high school. The 2018/2019 data collected by Ghana statistical service about enrolment and poverty by region shows that enrolment is high in regions where the poverty headcount ratio is low (Ghana Statistical service, 2019).

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4.3 Multicollinearity test/correlation between the variables

One assumption underlying ordinary least square is that the independent variables should not have a correlation or a linear relationship. If the independent variables correlate, then the problem of multicollinearity arises. A variance inflation factor (VIF) was performed to detect multicollinearity among the independent variables. From table 1, the variance inflation factor is less than 5, meaning that the independent variables are not highly correlated. From the correlation matrix graph below, it is evident that the independent variables are not strongly correlated. Therefore, there is no risk of potentially biased results in the regression.

Table 3: Correlation matrix for the independent variables

	Household size	urban	Income	Sex	Age	Education
Household size	1.00	0.22	0.15	0.00	-0.18	-0.19
Urban/rural	0.22	1.00	-0.31	-0.12	-0.03	-0.33
Income	0.15	-0.31	1.00	0.00	-0.03	0.32
Sex	0.00	-0.02	0.00	1.00	0.06	-0.02
Age	-0.18	-0.03	-0.03	0.06	1.00	0.04
Education	-0.19	-0.33	0.32	-0.02	0.04	1.00

Source: Author's computation based on GLSS 7 data

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Table 4: Variance inflation factor (VIF) for the model.

Independent variables	Variance inflation factor
Education	1.239138
Household size	1.189135
Sex	1.005682
Age	1.039243
Income	1.269301
Urban/rural	1.255545

Source: Author's computation based on GLSS 7 data

4.4 Econometric Results

In determining the relationship between poverty and education, the ordinary least squares method was used in R studio to estimate the equation's parameters. The regression output for the model is indicated below:

Table 5: Relationship between education and poverty

	Welfare (1)	Welfare (2)	Poor (3)
Constant	7.096*** (0.006)	7.945*** (0.054)	1.355** (0.688)
Education	0.355*** (0.003)		
Household size		-0.106*** (0.001)	1.539*** (0.019)
Income		0.0001*** (0.00000)	-0.001*** (0.00002)
factor(sex)2		0.023*** (0.004)	-0.258*** (0.041)
Age		0.0003** (0.0001)	-0.004*** (0.001)
factor(education)2		0.228*** (0.007)	-0.593*** (0.069)
factor(education)3		0.231*** (0.005)	-0.569*** (0.055)
factor(education)4		0.288*** (0.010)	-1.167*** (0.136)

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factor(education)5		0.171*** (0.013)	-4.010*** (0.350)
factor(urban/rural)2		-0.262*** (0.005)	0.589*** (0.049)
factor(employment status)2		-0.098*** (0.014)	0.413*** (0.157)
factor(employment status)3		-0.005 (0.011)	-0.110 (0.140)
factor(employment status)4		-0.168*** (0.011)	0.291** (0.128)
factor(employment status)5		-0.235*** (0.011)	0.371*** (0.131)
factor(employment status)6		-0.057*** (0.017)	-0.008 (0.199)
factor(employment status)7		-0.282*** (0.012)	0.696*** (0.141)
factor(sector of employment)2		0.106* (0.055)	-1.431** (0.712)
factor(sector of employment)3		0.049 (0.054)	-0.973 (0.688)
factor(sector of employment)4		0.171*** (0.054)	-1.685** (0.691)
Observations	58,844	58,844	58,844
R2	0.203	0.699	
Adjusted R2	0.203	0.699	
Log-Likelihood			-8,303.941
Akaike Inf. Crit.			16,645,880
Residual Std. Error	0.791 (df = 58842)	0.486 (df = 58825)	
F Statistic	14,988.200*** (df = 1; 58842)	7, 587.632*** (df = 15; 58825)	

Note: *p<0.1; **p<0.05; ***p<0.01

Note: The values in parentheses below the estimates are the standard errors.

Note: Results are not weighted and therefore relate only to the GLSS7 sample.

The p-value from the regression model is $< 2e^{-16}$, which shows that the coefficients of the variables are statistically significant. That is, the p-values of the coefficients are lesser than the significance value, which is 0.1. The p-value from the regression model shows that the coefficient of education is statistically significant. The coefficient of household, rural/urban, income, and sex are also statistically significant.

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Hypothesis testing

We present the following results from testing the following hypotheses of the model.

H_0 =Education has no effect on poverty in Ghana.

H_1 =Education has an effect on poverty in Ghana.

From table 5, at 99% confidence level, the t -value is 146.611, and the p-value is $< 2e-16$, which is less than the alpha value of 0.05 or 5%. Therefore, the null hypothesis can be rejected: education has no effect on poverty in Ghana. This shows that welfare is statistically significant to the model.

4.4.3 Discussion of the regression results

Discussion of regression 1 results

$$\text{Log}(welfare) = 7.096 + 0.355 \text{ education}$$

The coefficient of education is 0.355 or 35.5%. Holding all other variables constant, the 35% demonstrates that as an individual's level of education increases, welfare rises by 35.5%. It indicates a positive relationship between welfare and the level of education a person receives. And the p-value for education is 0.002, which is lesser than the significance level of 0.1. Therefore, the relationship between welfare and the level of education is statistically significant.

The result from the regression shows that those who have not attended school have lower welfare than individuals with education. And this confirms the human capital theory that states that individuals with a higher level of education tend to get a higher income, thereby increasing their welfare.

Discussion of regression 2 results

$$\text{Log}(welfare) = 7.945 - 0.262 \text{ rural/urban} - 0.106 \text{ household size} + 0.0001 \text{ income} + 0.023 \text{ sex} - 0.0003 \text{ age}$$

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The household expenditure less education expenses used as a proxy for income coefficient is 0.0001 or 0.01%, which shows that welfare is expected to increase by 0.01% as income increases. There is a positive relationship between welfare and income. And the p-value for income is 0.000, which is lesser than the significance level of 0.1. It means the relationship between income and welfare is statistically significant.

The coefficients of household size and urban/rural are -0.106 and -0.262, respectively. Holding all other variables constant, an increase in household size will cause welfare to decrease by 10.6%. It also has a p-value of 0.001, which shows that household size is statistically significant to welfare because the p-value is below 0.1. Regarding whether a person resides in urban or rural areas, holding all variables constant, individuals in the rural areas have 26.2% lesser welfare than individuals in urban areas.

The coefficient of gender is 0.023, holding all variables constant; females have 2.3% higher welfare than males. And the p-value is 0.004, which shows that gender is statistically significant to welfare because the p-value is below 0.1. Age is statistically significant to poverty because its p-value of 0.0001 is smaller than 0.1.

Discussions of regression 3 results

To test robustness, the logit model was performed using a binary dependent variable indicating whether a person is poor.

$$\Pr(\text{poor}_j = 1) = \log(P_j / 1 - P_j) = (1.355 + 0.589\text{rural/urban} + 1.539\text{ household size} - 0.001\text{ income} - 0.258\text{ sex} - 0.004\text{ age})$$

Regarding the logit model performed in R studio, holding all other variables constant, individuals from rural communities are 0.589 or 58.9% more likely to be poor than individuals in the urban areas. Secondly, females are 0.258 or 25.8% less likely to be poor than males. There is

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a negative relationship between poverty and income; if an individual's income increases, they are 0.001 or 0.1% less likely to be poor.

The coefficient of determination is a statistical measure of a good fit that determines how good the regression model is. The R-squared measures this, and it reveals how much the independent variables explain the variations in the dependent variable. This means, the R square shows how well the data fit the regression model. The R-squared for model 2 is 66.9%. This indicates that the variables used in the model explicitly explain half of the variations in poverty.

The standard error measures the accuracy of the estimate. It is also known as the standard deviation of the sample mean, and the higher the figure, the more spread the data are. The standard errors for all the variables in this study are small. It shows that the sample used is a good representative of the population of Ghana.

4.5 Conclusion of results

There is a positive relationship between welfare and education; as the level of education of an individual increases, that person's welfare keeps rising or getting better. From the regression results, the coefficient of education shows that if the level of education of an individual increase, welfare is expected to increase by 0.355 or 35.5%. And this confirms the human capital theory that states that, as an individual's education level increases, their income level rises, and therefore, they tend to have better welfare.

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CHAPTER 5: CONCLUSION

5.1 Introduction

This chapter summarizes the research findings and their implications, and it further suggests recommendations to the education community and policymakers. Finally, this chapter also provides the limitations of this research and the suggestions for further study.

5.2 Summary

This study aimed at investigating the effect of poverty on education in Ghana. This research's main objective was to determine the relationship between education and the poverty level of an individual in Ghana. The study used cross-sectional household secondary data collected by GLSS for 2016 and 2017. The key variables the research employed are welfare, poor, education, gender, age, income, urban/rural, household size. Employment status and sector of employment were used as dummy variables in this study. These variables were analyzed using an ordinary least square estimator and logit model in R studio. The key findings from the regression are summarized in the following paragraphs:

First, the null hypothesis was rejected, which states that education has no effect on poverty in Ghana; it was rejected because the p-value was less than 0.1 or 10%. According to the regression performed in R studio, a rise in the level of education of an individual can cause their welfare to increase by 35.5%. The regression output shows that the level of education completed has a positive relationship with welfare.

Secondly, holding all variables constant, females have 2.3% higher welfare than males, and an increase in household size will cause welfare to decrease by 10.6%. Household size is also found to have a negative relationship with welfare, meaning as household size increases, welfare also reduces.

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Lastly, the regression also showed a positive relationship between income and welfare, holding all variables constant; as income increases, welfare goes up by 0.01%. And individuals that live in rural communities have 26.2% lesser welfare than individuals in urban areas.

5.3 Recommendations

The findings show that education is statistically significant to poverty. Hence, I recommend that the government of Ghana make policies that will largely affect the poor in the rural communities. Policies like increased access to education should be targeted at the poor and vulnerable in societies to help reduce the country's poverty level. The trends in education enrolment and poverty show that regions in Ghana with the highest poverty headcount ratio have the lowest education enrolment; therefore, with this policy, regions like Upper West, Northern, and others can benefit from education.

5.4 Limitations of the study

The econometric approach employed in R studio to find the relationship between education and poverty does not explore the existence of causation between education and poverty.

5.5 Direction for further study

Future studies should pay attention to whether the quality of education affects an individual's poverty level in Ghana. Further studies should focus on determining if receiving education in urban areas, rural communities, and abroad studies affect poverty, which one of them lifts an individual from poverty faster or is statistically significant to poverty.

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APPENDIX

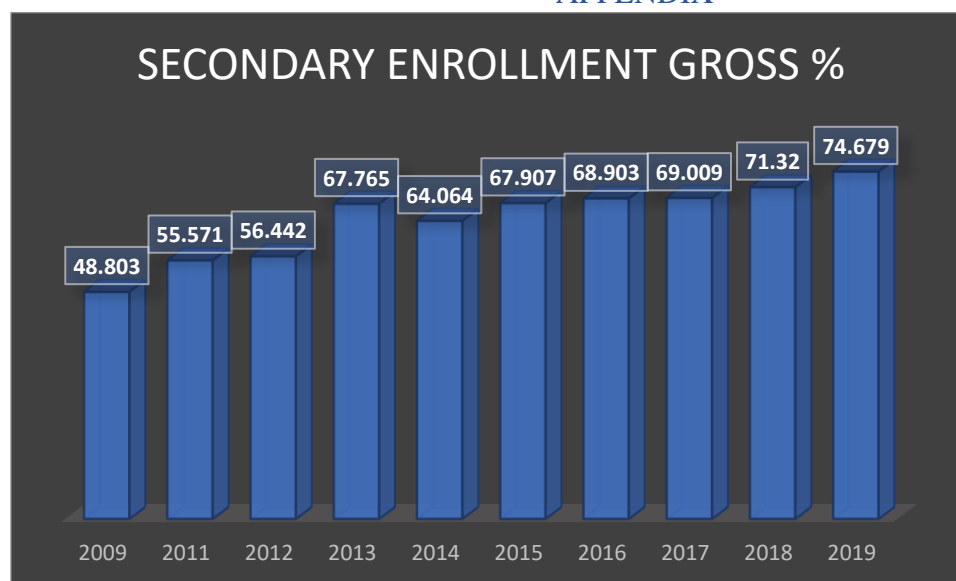


Figure 5. secondary enrolment gross %

Source: World Bank

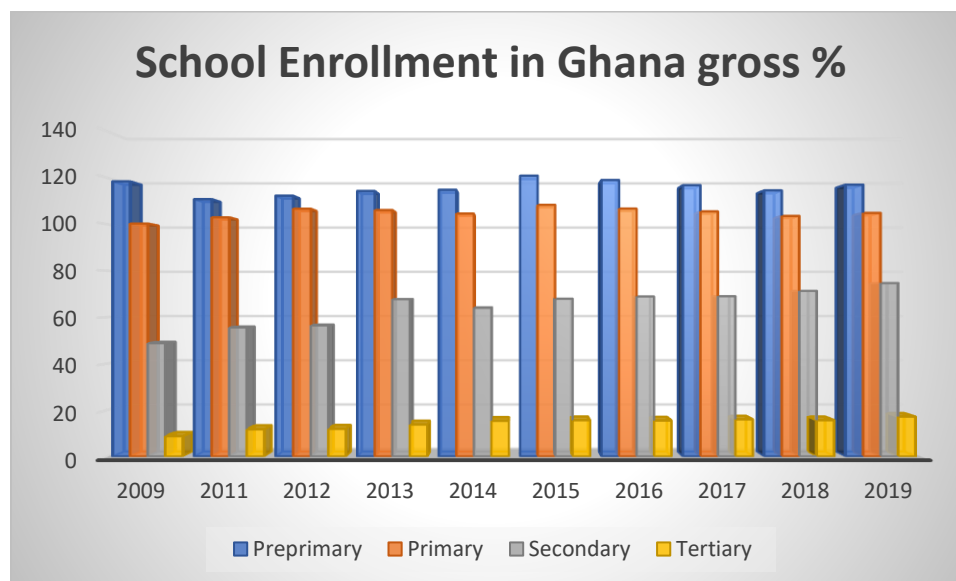


Figure 6. school enrollment in Ghana gross%

Source: World Bank