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INEQUALITY OF OPPORTUNITY, ECONOMIC INEQUALITY AND POVERTY IN GHANA

.

BY

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ABSTRACT

This thesis examines the trend and patterns of inequality of opportunity for consumption expenditure and its association with poverty in Ghana. Using the 1998/99, 2005/06 and 2012/13 rounds of the nationally representative Ghana Living Standard Survey, the study first provides the parametric and non-parametric lower-bound estimates of inequality of opportunity for consumption expenditure over time, across sex and area of residence. The study uses five circumstance variables, namely, mother's education, father's education, parents' occupation, region of birth and ethnicity. The findings show that the parametric (non-parametric) estimate of inequality of opportunity decreased from about 34 to 30 percent (23 to 19 percent) between 1998/99 and 2012/13 despite the increase in consumption inequality over the same period. The study then decomposes inequality of opportunity into the relative contribution of each circumstance and finds that the fall in disparities of opportunity over time is driven by the decrease in the relative contribution of ethnicity and north-south place of birth, especially in urban areas. Furthermore, the study reveals a higher opportunity gap in rural areas than urban, and among male-headed households than female.

Secondly, the thesis investigates the nature of the north-south opportunity divide in Ghana. By estimating the level of inequality of opportunity in the northern and southern Ghana, the results unveil greater inequality of opportunity in the north compared to the south. This finding is attributed to the higher level of development as well as the availability of better economic opportunities in the latter compared to the former. The study also finds that the effect of circumstances on outcome is mainly direct rather than indirect through effort variables such as education, number of hours worked, migration and household composition. Using the opportunity profile, the *least-advantaged* group with respect to opportunities in Ghana are identified to be

people whose father has no more than primary education and whose parents have been into farming activities most of their lives. The study further shows through the analysis of poverty profiles that the opportunity-deprived group is characterised by greater level of poverty, especially in the northern part of Ghana. This finding suggests that opportunity-deprivation may be related to poverty in Ghana. Furthermore, by examining the determinants of poverty in the opportunity-deprived group, the study shows that education as well as occupation of household members play an important role in moving a household out of poverty, especially when the household head is from the *least-advantaged* category. In addition, residing in a district with high employment prospects and low fertility may save households from poverty, particularly in northern Ghana.

Finally, the study unveils the existence of considerable heterogeneities across districts in the levels and the progress on poverty, consumption inequality and inequality of opportunity. The result also showed that there is a positive and significant correlation between inequality of opportunity and poverty, and between inequality of opportunity and inequality of outcome. Surprisingly, the analysis reveals no association between the changes in inequality of opportunity and poverty reduction. Meanwhile, changes in consumption inequality are found to be positively correlated with changes in inequality of opportunity, suggesting that providing equal opportunities may help reduce outcome inequality in Ghana.

DECLARATION

I, Dede Woade Adzovi Gafa, hereby declare that, except for references to other people's work, which have been duly acknowledged, this thesis is entirely my own work and that neither the whole nor part of this work has been presented for another degree elsewhere.

Signature..... Date……20th August 2020…….

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DEDICATION

I dedicate this thesis to all women who are rising above their circumstances to achieve their dreams.

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ABBREVIATIONS/ ACRONYMS

CAADP	Comprehensive Africa Agriculture Development Programme
C & M	Cooke et al. (2016) and McKay et al. (2016)
FCUBE	Free and Compulsory Universal Basic Education
GDP	Gross Domestic Product
CEPA	Centre for Policy Analysis
GE	Generalized Entropy
GLSS	Ghana Living Standard Survey
GNI	Gross National Income
GoG	Government of Ghana
GSS	Ghana Statistical Service
ILO	International Labour Organization
IO	Inequality of Opportunity
LEAP	Livelihood Empowerment against Poverty
MDG	Millenium Development Goal
MLD	Mean Logarithmic Deviation
MoFA	Ministry of Food and Agriculture

NGO	Non-Governmental Organization
ODI	Overseas Development Institute
OLS	Ordinary Least Squares
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
UNDP	United Nations Development Programme

CHAPTER ONE

INTRODUCTION

1.0 Motivation

The recently observed increase in within-country inequality[1], and the new evidence of the dampening effect of inequality on poverty reduction has spurred much interest among main actors at the national and international levels on the twin issues of poverty and inequality. It has been emphasized in the global agenda, the Sustainable Development Goals (SDGs), that reducing inequalities within as well as between countries would require the provision of a more equal access to opportunities (UNDP, 2015)[2]. Thus, ensuring equality of opportunity is part of the targets of the tenth SDG, which focuses on inequality reduction.

In sub-Saharan Africa (SSA), Ghana has been among the best performing countries in terms of economic growth over the last decades. Since the 1990s, the country's per capita GDP[3] has been constantly above the SSA median (World Bank, 2016). The growth performance of Ghana has engendered considerable poverty reduction, making the country one of the early achievers of the Millennium Development Goal 1 (MDG1). Indeed, poverty fell from 51.1 percent in 1991/92 to 24.2 percent in 2012/13, a reduction of about 26.9 percentage points over 20 years. Nevertheless, this average national progress hides large differences in poverty incidence between administrative

[1] Milanovic (2010).

[2] According to UNDP (2015, p.13), achieving the SDG 10 would require the implementation of "policies that create opportunity for everyone, regardless of who they are or where they come from."

[3] GDP per capita (PPP constant 2011 international US$)

regions and ecological zones (Annim et al., 2012; Coulombe and Wodon, 2007; Ghana Statistical Service (GSS), 2014a). More importantly, inequality has increased over the same period. For instance, Cooke et al. (2016) recently examined the trend in poverty and inequality in consumption expenditure in Ghana and revealed that the Gini coefficient has increased from 0.37 in 1992 to 0.41 in 2013. Furthermore, there seems to be a persistence of spatial disparities, especially between the northern and the southern parts of the country, not only in monetary indicators of welfare, but also in other dimensions, such as education, health, etc. (Annim et al., 2012; Senadza, 2012; Rolleston, 2011; Coulombe and Wodon, 2007; Teal, 2001). Again, recent studies showed that compared to the south, the northern part of the country has poorer socio-economic outcomes (McKay et al., 2016). These studies also revealed that the northern regions in Ghana have the highest levels of poverty incidence, poverty depth, and inequality (Cooke et al., 2016; McKay et al., 2016).

The rising income inequality and its spatial persistence in Ghana have raised concerns about the future development of the country, given the potentially detrimental effect of rising inequality on poverty reduction in particular. The Government of Ghana (GoG) with the support of international donors has taken a number of actions, both social and political, aimed at bridging the income gap and further reducing poverty. In terms of social actions, a policy of Free and Compulsory Universal Basic Education (FCUBE) for all children has been implemented, backed by the Education Act of 1961. The aim was to give equal chances to both males and females from all regions and social origin through equal access to primary education. Various policies have also been implemented to improve access to both basic and higher education, health care and other services. These policies include the Capitation Grant, which was introduced in the 2005/06 academic year. It is primarily aimed at improving the enrolment opportunities at the primary and junior secondary levels for

children from deprived socio-economic backgrounds. Additionally, the Livelihood Empowerment against Poverty (LEAP) cash transfer programme started in 2008, and aims at promoting poor households' investment in human capital development, and reducing short-term vulnerability and poverty.

A number of scholars attribute the existing regional disparities to the country's economic structure, the bias of both colonial and post-colonial investment policies towards regions that are rich in natural resources, and climatic conditions (Tsikata and Seini, 2004; Aryeetey et al., 2009). Several studies also suggest that the increasing income inequality results from differences in returns to education (Teal, 2001; Coulombe and Wodon, 2007). However, only few discuss the importance of inequality of opportunity, which is increasingly seen as a more relevant concept to investigate in order to better understand inequality in a given society and its impact on growth and development (World Bank, 2005; Ferreira et al., 2011).

While the existing empirical studies on the subject have focused on measuring inequality of opportunity for consumption expenditure at a given point in time (Cogneau et al., 2006; Brunori et al., 2015a), to the best of my knowledge, none of these studies have examined its dynamics, in the light of public actions and institutional changes. Additionally, even though there is much evidence on the relationship between income inequality, growth and poverty (Fosu, 2010a; Fosu, 2010b; Ravallion, 2009; World Bank, 2005), there has been little attempt to investigate the relationship between inequality of opportunity and poverty (Narayan et al., 2013; Marrero and Rodriguez, 2013). On this basis, the present study seeks to answer the following questions: (1) What have been the trend and patterns of inequality of opportunity since the late-1990s[4] in Ghana?

[4] The study focuses on this period because of data limitations. Relevant information for the analysis is only

(2) Is there a spatial dimension to inequality of opportunity in Ghana? (3) What factors determine the likelihood that an individual will be above or below the poverty line, conditional on his or her social background? (4) What is the relationship between inequality of opportunity, consumption inequality and poverty reduction in Ghana?

1.1 Research objectives

The overall objective of the present study is to analyse the trend and patterns of inequality of opportunity for consumption expenditure[5] and its association with poverty in Ghana. Specifically, the study seeks to:

1. Analyse the trend and patterns of inequality of opportunity for consumption expenditure since the late-1990s in Ghana
2. Examine the north-south opportunity divide in Ghana
3. Analyse the determinants of poverty among the opportunity-deprived households in Ghana
4. Examine the levels of consumption inequality, inequality of opportunity and poverty

available in the Ghana living standard surveys from the fourth round (1998/99) to the sixth round (2012/13). For more details, see the data description in Chapter 3.

[5] While income could also be used as an outcome variable in the analysis of inequality of opportunity, this study employs consumption expenditure for two main reasons. Firstly, consumption expenditure tends to reflect permanent rather than transitory income (Deaton, 1997). Thus, when using consumption expenditure as an outcome variable, the findings are more likely to reveal the lifetime inequality of opportunity (Ferreira and Gignoux, 2008). Secondly, as indicated by a number of researchers, income or earnings data, especially in developing countries, tend to suffer from measurement errors compared to consumption data (Attanasio and Pistaferri, 2016). The problem of underreporting of income, in particular, among the upper income groups may introduce some bias in the findings (McKay, 2000; Coulombe and McKay, 1995).

across districts, and the relationship between changes in consumption inequality, inequality of opportunity and poverty reduction in Ghana.

1.2 Justification of the study

The debate about the importance of 'equality of opportunity' as opposed to 'equality of outcome' started with the idea of fairness and justice. A person's achievement or outcome (income, wealth, etc.) can be explained by his or her own endeavour (hard work, perseverance, creativity, etc.), and other exogenous factors, that are beyond his or her control (market failures, country or region of birth, parental background, age, sex, race, etc.). Roemer (1998) called the former 'effort' and the latter 'circumstances'. Thus, in situations where circumstances account for differences in outcomes between two individuals there is a position of unfairness where chances to succeed are unequal.

In the literature on inequality, many scholars support the proposition that the kind of equality that is desirable is 'equality of opportunity,' as opposed to 'equality of outcome' (Dworkin, 1981b; Arneson, 1989; Roemer, 1998). In a society where 'equality of opportunity' is provided, any observed disparities in outcomes can be attributed to differences in effort; thus, emanating from the individual's own choices. And any public action to level these outcomes is considered as unfair.

According to the World Bank (2005), equality of opportunity matters for sustainable growth and development. The report highlights the effect of disparities in opportunities on resources allocation, especially when markets are imperfect. It further emphasizes on how inequity negatively influences institutions and leads to higher risk of social conflicts. Furthermore, they argue that providing equal access to development opportunities to all is the underlying factor of inclusive growth and development. According to Ostry et al. (2011), growth can be sustainable and effectively reduce poverty only if it is inclusive. Such inclusiveness then implies an

improvement in income distribution, but more importantly an improvement in opportunity distributions (access to education, access to quality health care, access to electricity, access to drinking water, fair access to the job market, etc.) to enable individuals to benefit from the growth that is being achieved. Ali and Son (2007, p. 1-2) states that "Growth is inclusive when it allows all members of a society to participate in, and contribute to, the growth process on an equal basis regardless of their individual circumstances."

To increase the awareness of government and policy-makers, the recently adopted SDGs have incorporated inequality reduction as part of the global objectives to be achieved by 2030. According to the third target of goal 10, countries are supposed to implement policies that provide equal opportunity and promote the reduction in inequality of outcome.

Consequently, for countries in the developing world, particularly in SSA, measuring inequality of opportunity is important since it gives a better picture of the mechanisms through which long-term patterns of inequality that can lead to inequality traps and hamper future development, are generated (Bourguignon et al., 2007b; Checchi and Peragine, 2010; Fleurbaey and Peragine, 2013). Additionally, it informs public policy on the type of redistributive policies to implement in order to address the opportunity distribution challenges, promote inclusiveness, and enable individuals to benefit from the growth that is being achieved at the regional or national level. As stated by Sen (1992, p. 28), "an important and frequently encountered problem arises from concentrating on inequality of incomes as the primary focus of attention in the analysis of inequality. The extent of real inequality of opportunities that people face cannot be readily deduced from the magnitude of inequality of incomes, since what we can or cannot do, can or cannot achieve, do not depend just on our incomes but also on the variety of physical and social characteristics that affect our lives and make us what we are."

In answering the first objective, the present study measures the level of inequality of opportunity for consumption expenditure in 1998/99, 2005/06 and 2012/13, at the national level, across sex and area of residence. By so doing, the study adds to the literature by unveiling the trend and patterns of the disparities in opportunities in Ghana, a sub-Saharan African country with a persistent level of inequality. The second objective provides evidence on the spatial nature of inequality of opportunity in Ghana, with an emphasis on the north-south dichotomy, while the third objective provides an understanding of the linkages between *opportunity-deprivation* and poverty as well as the processes through which individuals are able to escape poverty given their *opportunity-deprivation* status. Lastly, the fourth objective, which entails a preliminary analysis of the relationship between inequality of opportunity, inequality of outcome and poverty reduction in Ghana, further makes the study different from other existing works.

By providing a strong country-specific diagnosis and by taking into account country context and history in investigating the nature of opportunity distribution, the study will help in prioritizing and shaping policies to fit Ghana's needs. Specifically, unveiling the levels and trend in inequality of opportunity would not only help understand the factors behind the existing and growing inequality in the country, but it could also direct government attention to some policy options that might effectively curb inequality. Also, by examining the spatial dimension of opportunity distribution, the study would provide a better understanding of the existing north-south differences in the levels of outcome inequality. Since opportunity deprivation may lead to persistence of inequality and poverty, this analysis would be crucial in fighting spatial inequality and poverty in the country. The present study further identifies the most deprived group and examines the correlates of poverty within the group. The results of this investigation would help in targeting the worse-off group and provide adequate support in the fight for equal access to opportunites and

inclusive development. Furthermore, the analysis contributes to the literature by providing evidence on a possible effect of inequality of opportunity on poverty reduction, which could form a basis for more indepth future research on the relationship between inequality of opportunity and poverty.

1.3 Organization of the study

The rest of the thesis is organized as follows. The next chapter, Chapter two, provides a review of the theoretical and empirical literature underpinning the concept and the measurement of inequality of opportunity, and the inequality-poverty nexus. This chapter is followed by three empirical chapters, Chapter three, four and five. Chapters three and five address the objectives 1 and 4, respectively, while Chapter four focuses on the objectives 2 and 3. Specifically, in Chapter three, I examine the trend and patterns of inequality of opportunity for consumption expenditure in Ghana since the late-1990s. Chapter four investigates the north-south opportunity divide, examines the link between opportunity and poverty, and identifies the determinants of poverty among the *opportunity-deprived* group in Ghana. The last empirical chapter, Chapter five, examines the relationship between consumption inequality, inequality of opportunity and poverty reduction in Ghana. I summarize and conclude the thesis in Chapter six, with some policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The present chapter provides a review of the literature for the study. It is structured as follows. The next section (Section 2.1) reviews the literature on inequality of opportunity, with a focus on the theory and concept of inequality of opportunity, as well as on the methodological and empirical literature. Then, a review of the literature on inequality-growth-poverty nexus is provided (Section 2.2). The first part of this literature focuses on the relationship between inequality and growth, while the second part examines the effect of inequality on poverty. Section 2.3 summarizes and concludes the chapter.

2.1 Inequality of opportunity

2.1.1 Theory and concept

Inequality – or *equality* – is a broad concept, which has been the focus of many discourses in the theories of social justice (Dworkin, 1981a; Dworkin, 1981b; Sen, 1979; Sen, 1992; Neckerman, 2004; Ferreira and Ravallion, 2008; Atkinson, 2015). *Inequality* generally refers to the disparity in the distribution of status, wealth, power, rights, etc. It is often considered unfair, while *equality* is equated to fairness and justice. However, the existing philosophical and economic literature on the subject has highlighted the importance of defining the kind of equality that is being advocated for. Sen (1979, 1992) argues that the questions: 'why equality?' and 'equality of what?' are both essential to studies of inequality, although he maintains that the latter is much more crucial than

the former[6]. According to him, once an answer and a justification are found for the question 'equality of what?', then the question 'why equality?' has already been answered. And, to know whether or not inequality is desirable or acceptable, one must identify the kind or type of equality that is being discussed, since equality in a particular 'space' might imply inequality in another 'space'.

In the inequality of opportunity literature, many have advocated for equality of opportunity as opposed to equality of outcome. John Rawls' work, 'A Theory of Justice', published in 1971, is one of the foundation stones of the theory of equality, fairness and justice. In his essays, Rawls paid a particular attention to inequalities in the basic structures of society – i.e. social positions, political system, and economic and social circumstances – which are prevalent and affect the progress as well as the achievements of individuals. He further puts emphasis on 'fair distribution of primary goods', defined under his 'difference principle' as 'rights and liberties, power and opportunities, income and wealth' (Rawls, 1971, p. 62) and 'self-respect' (Rawls, 1971, p. 440). According to Rawls (1971), after the 'primary goods' have been fairly distributed, each individual is responsible for his or her end, since any outcome would be the result of his or her own choices.

In the same line of thought, Dworkin in his 1981 essays, 'What is equality?' made a distinction between 'equality of welfare' and 'equality of resources'. According to him, the former can result from a distribution that takes initial conditions into account, so as to even out differences in individuals' state of well-being. And the latter, which he defines as equality in "whatever resources are owned privately by an individual" (Dworkin, 1981b, p. 283), can be achieved through an equitable distribution of the resource pie based on individuals' choices in a well constrained and

[6] See Sen (1992).

appropriately defined market. For Dworkin (1981a), even though equality of welfare may seem more desirable, trying to attain it is pointless since most conceptions of welfare are subjective and, thus, are valued differently by individuals. Instead, he supports a notion of equality or fairness based on equality of resources.

Cohen, in contrast to Rawls and Dworkin, does not cast aside equality of welfare, but agrees with a 'revised welfare equality principle', which stipulates that one cannot ignore welfare inequality if it results from factors that the individual cannot be held accountable for. Thus, Cohen (1989) adopts the concept of 'equal access to advantage', which is similar to Arneson (1989)'s 'equal opportunity for welfare'. But, unlike Arneson (1989), Cohen (1989) emphasizes access, rather than mere availability of the opportunities. The concept is based on the idea that an individual's outcome is influenced by choices and luck. Consequently, in situations where it is clear that the outcome is due to the former, no redistribution should take place; but in cases where bad luck (what he referred to as "brut luck[7]") is the source of inequality of outcome, a compensation with additional resources would be egalitarian. He further postulates that in most of the cases the distribution of achievement is a mixture of both choice and luck. As a result, there could be uncertainties regarding the egalitarian nature of the redistribution of resources. Thus, there is a need to identify and compensate the individual for the welfare loss that is caused by factors beyond his control. In defining what his view of equality within the framework of fairness and justice is, Cohen (1989, p. 920) maintains that: "People's advantages are unjustly unequal (or unjustly equal) when the inequality (or equality) reflects unequal access to advantage, as opposed to patterns of choice against a background of equality of access."

[7] See Dworkin (1981b) or Cohen (1989) for more details.

One major and recent contribution to the existing literature is the work of John Roemer, who added to the theory of 'equality of opportunity' as proposed by Dworkin (1981a), Dworkin, (1981b), Arneson (1989) and Cohen (1989). Roemer (1998, p. 2) defines equality of opportunity in relation to what he calls "level-the-playing-field" principle. It stipulates that chances to achieve an outcome should be equalized among individuals. According to him, "levelling playing field might be thought to require compensating those with inferior bundles of internal resources with an extra dose of external resources." If all individuals are divided into types based on their circumstances, – a type is a group of people with the same set of circumstances – an equal opportunity policy is a distribution of resources that equalizes achievements across types, given that these individuals exert the same 'degree' of effort[8]. More interestingly, Roemer (1998) argues that effort can be influenced by beliefs and preferences. Beliefs and preferences are in turn shaped by circumstances. Thus, it is somehow not realistic to expect individuals to have the same level of effort when they have different circumstances. Instead, one should expect them to have the same "degree" of effort (i.e. how hard a person tries, conditional on his circumstances). In simple terms, Roemer stipulates that under an equal-opportunity policy, resources should be distributed in such a way that people who tried equally hard achieve the same outcome. In his essay, he further highlighted the idea that equality of opportunity is more about the 'compensation principle' rather than the 'reward principle'. The former stipulates that resources should be provided to compensate people for the deficit that is caused by factors beyond their control, and the latter establishes that individuals should be rewarded for their efforts.

Surveys on people's perceptions of equity and fairness suggest that in a number of countries, most individuals consider inequalities arising from differences in circumstances as unfair, and consent

[8] See Roemer (1998, p. 10).

to government interventions that aim at providing adequate support to individuals from deprived groups (Lefranc et al., 2008; Fleurbaey and Peragine, 2013). However, if the person's outcome status is explained by lack of effort, then, any government intervention to reallocate resources would be unfair. In the theoretical literature, the concept of 'responsibility' advances that people are partly liable for whatever outcome they get. Therefore, the role of government is not to compensate the individual for consequences of his or her own choices, but rather to level the playing field by compensating for losses that are due to exogenous circumstances. Based on these arguments, many believe that tackling inequality of opportunity should be the main concern of policy makers, rather than inequality of outcome (Dworkin, 1981b; Roemer, 1998, among others).

Inequality of opportunity, in simple terms, can be defined as inequality of chances. Let's take the example of two children, A and B, who are born on the same day. We expect A and B to be different as a result of genetic diversity (differences in characteristics such as sex, race, etc.; and differences in inherited attributes or predispositions). But, in addition to these genetic disparities, there are social differences over which they have no control (wealth status of parents, region of birth, parents' occupation, etc.). Let's now assume that child A is born in a wealthy family, while child B's parents are deprived farmers with no education. Because of the differences in social origin, child A and child B have unequal prospects for life. When growing up, they are likely to receive different quality of health care and nutritional intakes that would affect their development as well as their future productivity. Moreover, there is a high probability that A receives better quality formal education from the primary up to the tertiary level, while child B faces a higher probability of dropping out of school due to lack of financial means. Consequently as adults, A is more likely to get a well-paid job, while B struggles to make ends meet. Or, even if B is able to get the same qualification as A, the two are probably not going to have equal chances in the job

market, as a result of differences in social connections. Thus, A gets a decent and well-paid job and B, because of his background, ends up accomplishing less[9].

In this particular scenario, one can easily identify the disparities in opportunities or chances for success that exist between A and B. Aside social elements such as parents' wealth and power, factors like sex, race, and ethnicity can influence the achievement of individuals.

As highlighted in the literature, the existence and the persistence of opportunity gaps can result from market failures in the allocation of resources as well as imperfections of markets for production factors, such as capital, labour, and land (World Bank, 2005). Similarly, bad institutions can reinforce inequality of opportunities. For instance, in a country where rule of law and the enforcement of property rights are very weak, and where corruption is prevalent, access to resources and markets is a luxury that only the elite and relatively wealthy individuals are able to afford (World Bank, 2005).

In a nutshell, equal chances are provided when, for an individual from a deprived or marginalized group, the effect of factors such as family background, labour market discrimination, ethnicity, race, sex, etc., that are independent from his or her choices, are compensated for. The role of government in that regard would be to equalize chances, through increasing access to quality education, health care, and other key important services for deprived and marginalized groups; and also to improve institutional quality and put in place anti-discrimination laws in order to minimize inequality of opportunity. Thus, in a society where observed outcome inequality is not explained by inequality of opportunity, an individual from a deprived background has similar chances of being educated, getting a decent job, and thus, achieving a good outcome, as the person with a

[9] For a more elaborate scenario that considers cross-country differences, see World Bank (2005).

wealthier social origin, conditional on effort.

2.1.2 Measurement

The measurement of inequality of opportunity is based on two distinct interpretations of equality of opportunity. These interpretations are related to two underlining principles, namely: the 'reward principle,' also known as the 'responsibility principle'[10], and the 'compensation principle.' Based on these principles, two approaches have been used to evaluate the level of equal opportunities in the empirical literature: the ex-ante approach and the ex-post approach. On the one hand, under the ex-post approach, equal opportunity exists if by exerting the same degree of effort, two individuals with different circumstances obtain the same level of outcome. Hence, this approach measures the distribution of opportunities based on people's effort and outcome. In other words, inequality of opportunity corresponds to the inequality in the distribution of outcome within a group of individuals that apply the same degree of effort (Checchi and Peragine, 2010).

On the other hand, the ex-ante approach rests on the idea that there is equality of opportunity if different groups of people with different circumstances face similar opportunity sets (Ferreira and Gignoux, 2011). Thus, this approach considers circumstances and outcome in estimating inequality of opportunity. Specifically, the population is divided into groups based on their circumstances, and inequality of opportunity is evaluated as the between-group inequality (Bourguignon et al., 2007a; Checchi and Peragine, 2010; Brunori et al., 2015a).

One of the first empirical studies in the inequality of opportunity literature is the work of Roemer (1998). Roemer (1998) tried to identify the optimal policy that would equalize opportunities in a

[10] See Fleurbaey and Peragine (2013).

given society based on the ex-post perspective of equality of opportunity. The study divides the population into types, where a 'type' is defined as a group of people with the same circumstances. And according to the author, equal opportunity exists if individuals of different types, who belong to the same centile of their type distributions of effort (meaning that they exert the same degree of effort), have the same outcome. Thus, his opportunity equalizing policy is defined as one that maximizes the minimum outcome, across all types, of individuals who exert the same degree of effort for their type.

Following Roemer (1998), various approaches have been employed to empirically evaluate inequality of opportunity. However, for the purpose of this study, three main studies are discussed, namely, Bourguignon et al. (2007a), Checchi and Peragine (2010) and Ferreira and Gignoux (2011).

Using the ex-ante approach, Bourguignon et al. (2007a) proposed a method of measuring inequality of opportunity based on a counterfactual analysis. Specifically, the study, first, simulated a counterfactual distribution of earnings – their outcome variable – which reflects what the distribution of earnings would have been if individuals had the same circumstances. Then, an inequality measure is applied over both the observed and the counterfactual distributions to determine the total earnings inequality, and the inequality that is explained by factors other than circumstances, respectively. The ratio of the difference between these two inequality indexes to total earnings inequality is interpreted as the share of inequality of opportunity in observed earnings inequality. More specifically, the paper estimated the following equation:

$$lnW = f(C, E, u) \quad (1)$$

$$lnW = f(C, E(C, v), u) \quad (2)$$

$$lnW = f(C, n) = CB + n \quad (3)$$

Where W represents earnings, C and E are vectors of circumstance and effort variables, respectively, and effort is a function of circumstances (Equation 2). u, v and n are error terms and B is a matrix of coefficients. The estimates of Equation 3 are used in the simulation of the counterfactual distribution (i.e. a distribution of earnings which assumes a fixed set of circumstances across individuals), which is expressed as $\widetilde{W} = exp(\bar{C}\hat{B} + \hat{n})$. After computing the Theil inequality indexes, using the actual earnings distribution, W, and the counterfactual distribution, $\widetilde{W}$, the overall opportunity share of earnings inequality is given as:

$$\frac{I(W) - I(\widetilde{W})}{I(W)} \quad (4)$$

where $I(W)$ and $I(\widetilde{W})$ are Theil indexes over the distribution of W and $\widetilde{W}$, respectively.

Bourguignon et al. (2007a) also decomposed the overall effect of circumstances into direct and indirect effects. To obtain the direct effect, the paper estimated the following specification:

$$lnW = C\delta + E\alpha + \varepsilon \quad (5)$$

Using the estimated coefficients, the authors computed a counterfactual distribution by assuming that circumstances are the same across individuals, while maintaining the variations due to the residuals and effort, through which the indirect effects of circumstances are channelled, $W^d = exp(\bar{C}\hat{\delta} + E\hat{\alpha} + \hat{\varepsilon})$.The direct effect of circumstances on earnings is then given by $\frac{I(W) - I(W^d)}{I(W)}$. Bourguignon et al. (2007a) obtained the indirect effect by taking the difference between the overall and the direct effect.

In order to correct for possible bias in the estimates of Equations 1 and 5 due to omitted circumstances variables (unobservable circumstances) that are captured in the residual, the paper used Monte-Carlo methods to estimate the potential biases and to obtained bounds around the coefficients.

Checchi and Peragine (2010)'s methodology is based on the following income function: $g: \Omega * \Theta \rightarrow R_+$ such that: $x = g(c, e)$, where c is a vector of circumstances that belong to a finite set $\Omega = (c_1, c_2, \dots, c_n)$, and $e \in \Theta$ is a scalar variable, which represents effort (e is assumed to be one dimensional). For the ex-post approach, the sample is partitioned into tranches, where a 'tranche' is a set of individuals who have exerted the same effort. Effort in this case is measured by the quantile of income distribution of the type. Thus, individuals across type have exerted the same degree of effort if they are at the same p^{th} quantile of their type income distribution. By assuming that $\chi_{i,p}$ is the vector of incomes in quantile p of *t*ype i, the vector of income of individuals who have exerted responsibility p can be written as: $\chi_p = \{\chi_{1,p}, \chi_{2,p}, \dots, \chi_{n,p}\} \in R_+^{\frac{N}{m}}$, where m is the number of quantiles. The income profile is thus given as: $X = \{\chi_1, \chi_2, \dots, \chi_m\} \in R_+^N$. Using the above partition, the authors derived the share of the observed inequality that is explained by circumstances and effort.

First, the existing residual inequality in $\chi_{i,p}$ (the set of incomes within quantile p of a *t*ype i) are eliminated by substituting the income of type i individuals who have exerted responsibility $p(x \in \chi_{i,p})$ with the arithmetic mean of the vector $\chi_{i,p}$ – denoted by $\mu_{i,p}^X$. With the transformation, the new vector $\chi_{i,p}^S = \{\mu_{i,p}^X 1_{i,m}\} \in R_+^N$, is obtained where $1_{i,m}$ is the unit vector of length $\frac{N_i^X}{m}$. The smoothed income profile $X^S = (\chi_1^S, \chi_2^S, \dots, \chi_m^S) \in R_+^N$ (where $\chi_p^S = \{\chi_{1,p}^S, \dots, \chi_{n,p}^S\} \in R_+^{\frac{N}{m}}$) is the

overall income vector. If the same procedure is used to eliminate the within tranche inequality (by replacing the income of all individuals in a tranche by the mean income of the tranche $\mu^S_{\chi_p}$) it gives a distribution in which inequality of opportunity has been eliminated: $X^S_B = \{\mu^S_{\chi_1} 1_{\frac{N}{m}}, \dots, \mu^S_{\chi_p} 1_{\frac{N}{m}}, \dots, \mu^S_{\chi_m} 1_{\frac{N}{m}}\} \in R^N_+$.

If an inequality measure is applied to the two distributions, the share of the overall inequality explained by inequality of opportunity can be written as:

$$OI = 1 - \frac{I(X^S_B)}{I(X^S)} \qquad (9)$$

Where $I(X^S_B)$ and $I(X^S)$ are the estimates of inequality based on X^S_B and X^S, respectively. In the ex-ante approach, a partition into types is implemented. For $c_i \in \Omega$, where type i is a set of individuals with vector of circumstances c_i; $X \in R^N_+$ is the vector that represents the income distribution of the population, and N^X_i is the number of people of type i in distribution X; type i income distribution is denoted by $x_i = \{x^1_i, \dots, x^{N^X_i}_i\}$, which represents the set of outcome levels achieved by exerting different degrees of effort under the same circumstances c_i. Using this partition, three (3) distributions of outcome are obtained: $X = (x_1, \dots, x_i, \dots, x_n) \in R^N_+$; $X_B = (\mu_x 11_N 1, \dots, \mu_x i 1_N i, \dots, \mu_x n 1_N n) \in R^N_+$ and $X_w = (\tilde{x}_1, \dots, \tilde{x}_i, \dots, \tilde{x}_n) \in R^N_+$. Where X is the overall income vector; X_B is the distribution in which within-types inequality has been eliminated through the replacement of the income of each individual of a type i by the mean of the type's income vector $\mu_x i$. And X_w is the distribution for which the between-type inequality has been eliminated and it corresponds to the distribution due to individual responsibility. The share of inequality of opportunity is therefore expressed as:

$$OP = \frac{I(X_B)}{I(X)} = 1 - \frac{I(X_w)}{I(X)} \quad (10)$$

Where $I(X_B)$, $I(X)$, $I(X_w)$ are the inequality estimates based on X_B, X and X_w, respectively.

Ferreira and Gignoux (2011) reconciled the methodology of Bourguignon et al. (2007a) and the ex-ante approach of Checchi and Peragine (2010). They showed that these two methodological approaches are two different ways of obtaining similar results. According to them, both studies used the ex-ante approach to measure inequality of opportunity as the between-type share of overall outcome inequality (Ferreira and Gignoux, 2011, p. 33). However, Bourguignon et al. (2007a) developed a parametric approach, while Checchi and Peragine (2010)'s approach is non-parametric. The authors also proposed another version of the parametric approach propounded by Bourguignon et al. (2007a), which generates the same estimates of inequality of opportunity. They argued that using the estimates of the reduced-form equation, Equation 3, the predicted values of the outcome, given by $\widehat{W} = exp(C\hat{B} + \hat{n})$, can be used to compute an absolute measure of inequality of opportunity, $AbsoluteIOp = I(\widehat{W})$, and a relative inequality of opportunity, expressed as:

$$RelativeIOp = \frac{I(\widehat{W})}{I(W)} \quad (11)$$

Furthermore, Ferreira and Gignoux (2011) argued that the measures that were derived from the approaches of Checchi and Peragine (2010) and Bourguignon et al. (2007a) should be interpreted as the lower-bounds estimates of the actual inequality of opportunity, mainly because of the bias introduced by unobserved circumstances. Also, the authors emphasized that the absolute index, which measures the level of inequality of opportunity can also be used in addition to the relative index, which is the share of inequality of opportunity in total outcome inequality.

2.1.3 Empirical literature

In the growing literature on inequality of opportunity, a number of studies have empirically examined the extent of opportunity gaps in various parts of the world. Indeed, the level of inequaliy of opportunity has been estimated in developed as well as developing countries using various approaches and different sets of circumstance variables, depending on the richness of the data that is being utilised.

For instance, Pistolesi (2009) estimated inequality of opportunity in the United States over the period 1968 to 2001. The paper used earnings as an outcome variable, and parental education and occupation, ethnicity, place of birth and age as circumstance variables. Furthermore, to measure effort, the study considered years of schooling and working hours. The results of a semi-parametric estimation unveiled that the contribution of inequality of opportunity to earnings inequality in 1968 ranges between 20 to 43 percent, but declined to at least 18 percent in 2001. Also, Lefranc et al. (2009) distinguished between three determinants of outcomes, namely: effort, circumstance, and luck. The study provided and examined the testable conditions under which equality of opportunity could be violated. Using the first and second order stochastic dominance approaches, they conducted an empirical investigation of equality of opportunity in France over the period 1979-2000. The study used per adult equivalent household income and father's occupation as the outcome and circumstance variable, respectively. The estimation focused on a sample of household heads and spouses. The results suggested that even though inequality of opportunity exists in the country, it is decreasing over time.

Similarly, Checchi and Peragine (2005, 2010) analysed inequality of opportunity in Italy, using four waves of household survey from 1993 to 2000. They used the tranches and types-based non-

parametric approaches in estimating the existing opportunity gaps for earnings and cognitive skills. Parental education (highest educational attainment in the couple of parents) is used as a circumstance variable. The estimation revealed that inequality of opportunity explains about 20 percent of the overall earnings inequality, with major differences between the north and the south and across gender. The study also highlighted that disparities in opportunities tend to be higher in less developed regions of the country. Again, Almas et al. (2011) found an increasing inequality of opportunity in Norway over the period 1986 and 2005. The authors focused on individuals aged 30 to 60 years and used a parametric approach based on a generalized version of the classical proportionality principle, with pre-tax income and disposable income as outcome variables.

With respect to the developing world, Bourguignon et al. (2007a) used the 1996 household data to investigate the level of inequality of opportunity for earnings in Brazil. Their sample comprised male adults residing in urban areas, and the circumstance variables used are parental education, father's occupation, race and region of birth. The findings of the paper suggest that the share of inequality of opportunity in total inequality lies between 10 and 37 percent. Thus, the study concludes that circumstances, especially family background, play a major role in explaining earnings inequality in Brazil. Moreover, the study conducted a cohort analysis in order to shed light on the pattern of inequality of opportunity across different age groups and decomposed the opportunity share into the direct and indirect effects of circumstances. The study found that the effect of circumstances on the distribution of earnings in Brazil is largely direct.

Similarly, Ferreira and Gignoux (2011) employed nationally representative household surveys to estimate inequality of opportunity in six Latin American countries, namely, Brazil, Colombia, Ecuador, Guatemala, Panama and Peru. The study used their proposed parametric approach and that of Bourguignon et al. (2007a), as well as the non-parametric approach of Checchi and Peragine

(2010). The sample is restricted to household heads or spouses aged 30 to 49 years. Parents' education, father's occupation, gender, ethnicity, and region of birth are considered as circumstance variables. Two outcome variables are used, namely: household well-being which is measured by household per capita income or consumption expenditure, and labour earnings. The results suggested that there is no statistically significant difference between the non-parametric and the parametric estimates of inequality of opportunity. With respect to consumption expenditure, the study found that the share of opportunity gap in total inequality is at least 25 percent in Colombia, 33 percent in Ecuador, 51 percent in Guatemala, 38 percent in Panama and 34 percent in Peru. The findings also revealed that earnings (transitory income) based inequality of opportunity may underestimate the inequality of opportunity for permanent income, measured by the consumption expenditure of the household.

Singh (2012) compared the extent of disparities in opportunity for earnings and consumption expenditure in rural and urban India, using a sample of male adults and five circumstance variables, namely, father's education and occupation, religion, caste and place of birth. The study revealed a higher inequality of opportunity in urban areas than rural.

In northern Africa, Hassine (2012) and Assaad et al. (2017) employed the parametric approach developed by Bourguignon et al. (2007a) and Checchi and Peragine (2010)'s non-parametric method to estimate inequality of opportunity, focusing on the case of Egypt. The latter covered the period 1988 to 2006, while the former considered the period from 1988 to 2012. Both works found evidence of a decreasing opportunity share. Specifically, on the one hand, Hassine (2012) observed that inequality of opportunity fell by 7 percentage points between 1988 and 2006 in Egypt. On the other hand, Assaad et al. (2017) found that when consumption expenditure is considered as an outcome variable, the estimates of the relative inequality of opportunity decrease from 18 percent

in 1998 to 13 percent in 2012. Furthermore, Hassine (2012) examined inequality of opportunity across various sub-groups, including, gender, age and geographical locations and unveiled that there is a lower contribution of opportunity inequality to overall inequality in rural areas compared to the urban areas, and a higher opportunity share for women and among the youth in Egypt.

Furthermore, in a cross-country analysis, Brunori et al. (2013) used secondary data on inequality of opportunity for 41 countries, to investigate the correlation between inequality of opportunity and other variables such as per capita GNI, income inequality, intergenerational elasticity of income and intergenerational correlation of education. The analysis established that there is a quadratic association between inequality of opportunity and income, suggesting the possibility of a Kuznets relationship between the two variables. Additionally, a positive correlation is found between inequality of opportunity, total inequality and intergenerational mobility.

In SSA, Piraino (2015) measured inequality of opportunity in South Africa. The author examined the relation between intergenerational elasticity and the index of inequality of opportunity, constructed based on a parametric and non-parametric ex-ante approach proposed by Ferreira et al. (2011). Using father's education and occupation, and race as circumstance variables, the results show that inequality of opportunity explains about 20 percent of total earnings inequality among active males. Furthermore, Hassine and Zeufack (2015) using the ex-ante parametric approach investigated the trend in inequality of opportunity for income and consumption expenditure in Tanzania using three waves of the National Panel Surveys. The study focused on household heads and considered parents' education, gender, region of birth and the age at which one or both parents died as circumstance variables. The results suggest that inequality of opportunity declined from 24 percent in 2008 to 21 percent in 2010, but increased to 25 percent in 2012.

Again, Cogneau et al. (2006) conducted an empirical analysis of opportunity gap for per capita income as part of a study on inequality in Africa. The authors compared the estimates for five countries, namely, Cote d'Ivoire, Ghana, Guinea, Madagascar, and Uganda, obtained using data from the mid-1980s to the mid-1990s. The analysis was conducted using household survey data restricted to male adults with information on father's education, father's occupation and region of birth. For each country, the paper decomposed income inequality into position-based inequality (disparities that result from the person's education and occupation) and origin-based inequality (inequality that is explained by parent's education and occupation) using a parametric approach. The results showed that the share of inequality that is explained by circumstances is 12 percent in Cote d'Ivoire, 5 percent in Ghana, 13 percent in Guinea, 19 percent in Madagascar and 8 percent in Uganda. Similarly, Brunori et al. (2015a) assessed the extent of inequality of opportunity for consumption expenditure in 11 SSA countries, namely, Comoros, Congo D.R.C., Ghana, Guinea, Madagascar, Malawi, Niger, Nigeria, Rwanda, Tanzania and Uganda. The estimation results suggest that circumstances explain over 10 percent of consumption inequality in these countries. The findings also unveil that factors such as ethnicity, birthplace, and family background interact in affecting opportunity in Africa. With respect to Ghana, the study used the 6th round of the Ghana Living Standard Survey and considered a sample of individuals aged 15 years and above with information on parental education, ethnicity and place of birth. The authors observed that the share of the overall inequality in household per capita consumption expenditure that is explained by unequal opportunities ranges between 14 percent (based on the non-parametric approach) and 29 percent (based on the parametric approach). Furthermore, the study revealed that ethnicity is the main contributor to opportunity disparity in Ghana.

2.2 Inequality, growth and poverty reduction: A literature review

2.2.1 Inequality and growth: theoretical and empirical review

The importance of income distribution in the growth process was first highlighted by Kaldor (1957). In Kaldor's growth model, the distribution of income between wages and profits determines the level of savings and investment, which in turn is important for economic growth. The model suggests that unequal distribution of income spurs growth since the capitalists have a higher marginal propensity to save, and savings translate into investments that support growth. His conclusion was simply that inequality is good for growth. After his work, the role of inequality in growth and development has been extensively studied with a focus on the channels through which the effect operates. And the main question was whether or not *inequality is harmful for growth*.

In the literature, many authors such as Alesina and Rodrik (1994) and Persson and Tabellini (1994) have put forward hypotheses relating income distribution to the political process through which growth-enhancing policies are implemented. These authors argue that with an initially unequal distribution of income and of other resources, there is pressure for distortionary redistributive policies through the political process that negatively affect growth in the long-run (Perotti, 1996; Knowles, 2005). According to Alesina and Rodrik (1994), inequality affects growth through the choice of policies that are implemented and the more unequal a country is the more growth-unfriendly the policies implemented are. The authors conducted a cross-country empirical analyses which support the theoretical postulations and suggest that wealth inequality, measured by income and land inequality, inhibits growth. The results also reveal that this effect holds irrespective of the level of democratization of the country.

These findings are also confirmed by Clarke (1995) who conducts a cross-country analysis using

various indicators of inequality and finds that inequality (initial inequality) is negatively associated with growth independently of the political institutions in place. However, unlike Alesina and Rodrik (1994) and Clarke (1995), Persson and Tabellini (1994) show that these results hold only for democracies. His model suggests that as a result of high initial inequality the median voter in a democracy opts for more re-distributive policies. The findings of the empirical investigation which is based on a panel and cross-country data analysis were in support of these arguments.

Conversely, Li and Zou (1998) tell a different story. They found a positive effect of inequality on growth when government's resources are solely allocated to consumption expenditures. In this case, as income distribution becomes more equal, there would be more political pressure for tax increase since the majority of people benefit from the public consumption services that are provided. Li and Zou (1998) demonstrate that the relationship between income inequality and growth becomes negative when all government resources are allocated to production, but is ambiguous when it is spent on both production and consumption services. Using panel data and fixed and random effects estimation techniques, the authors in their empirical analysis found that the effect of initial income inequality and growth is mostly ambiguous, but sometimes positive. These findings are also consistent with the results of Forbes (2000) and Deininger and Olinto (1999), who also found that inequality is good for growth. Nevertheless, Knowles (2005) indicates that the positive effect found in these papers might be explained by the short-run nature of their analysis since the relationship between inequality and economic growth as argued by the literature is mainly a long-run phenomenon.

Furthermore, the literature tests the hypothesis that when capital or credit market imperfections exist, in a highly unequal economy investment is quite low, leading to weak economic growth. Galor and Zeira (1993) develop a model of overlapping generation and inter-generational altruism

in which output depends on investment in human capital, and individuals either invest or not in human capital given their inherited wealth and the easiness of borrowing in the credit market. They found that income and wealth inequality have a negative effect on investment and hence on growth, when credit markets are imperfect. Their model suggests that in countries where access to credit is limited, the initial distribution of income determines investment in human capital such that individuals at the bottom of the income distribution have no or insufficient level of investment in human capital. And since human capital determines productivity and hence output, inequality has a negative effect on output and growth.

This argument has been further supported by Aghion et al. (1999) who argue that even in the absence of market imperfections, inequality adversely affects growth. But this effect is worsened when *capital markets are imperfect*. By considering a situation of capital markets imperfection, they look at the effect of inequality on growth in a simple endogenous growth model in which individuals are producers with different level of capital. It is argued that with imperfect capital markets, access to loan or credit is limited for the relatively less endowed individuals. Hence, an initially unequal distribution would prevent individuals at the bottom of the distribution from investing even though the return to their investment is higher than that of the rich, and this inhibits growth. In this sense, redistribution is good for growth.

Other studies put forward the negative effect of inequality on political stability, which has been identified to be important for growth. They argue that the discontent and the feeling of unfairness of the lower class of the population can generate violence, increasing the risk of conflicts and political instability. And as a result of the political uncertainties, the rate of investment falls, affecting growth and development (Alesina et al., 1996). Alesina and Perotti (1996), for instance, tested the following hypotheses: (1) income inequality leads to an increase in political instability,

(2) political instability negatively affects investment. Using a cross-country data on 71 countries, their analysis provided empirical support for the two hypotheses: inequality increases the risk of political unrest which in turn dampens investment, leading to lower growth.

Reconciling the diverging views, Perotti (1993) and Shin (2012) suggest that the effect of income inequality on growth depends on the country's stage of development. Specifically, Perotti (1993) argues that in low income countries, inequality is needed to generate growth, since in a situation of unequal income distribution only the upper income group would have enough resources to invest in human capital. However, as the economy grows to attain a high level of income, growth is spurred only through redistribution. Perotti (1993) further indicates that the initial increase in growth due to high inequality and the fall in inequality during the later stage of development would depend on the position of the median voter. He presented a two-period model in which individuals invest in human capital or not in the first period depending on their income group; and in the following period there are positive externalities from the initial investment in period one that accrue to all. In addition to these externalities, there is also a possibility of redistribution through taxation which is tied to the position of the median voter on the income ladder. Interestingly, in the model, the individual's ability to invest in human capital is determined by the level of redistribution and also by the per capita income of the country such that in a poor country, a redistribution from the rich to the poor might not be insufficient to enable the latter to invest in human capital but would reduce the ability of the relatively rich to do so, thus leading to an overall negative effect for all individuals. The main conclusions of his analysis are summarized as follows:

> ... a very egalitarian poor economy will not be able to start the growth process. By contrast, an economy with a very unequal income distribution is in the best position to achieve a high initial rate of growth. However, once this economy reaches a higher level of per capita

> income, the very same income distribution pattern that fueled the initial spurt of growth will hamper further growth. Thus, a very unequal society will get stuck at an intermediate level of income, because the extreme concentration of resources in the hands of the upper class prevents the lower class and possibly even the middle class from reaching a post-tax income that allows investment in education. In a more egalitarian society all classes will eventually invest in education, so that inequality will decrease as per capita income reaches its highest level. (Perotti, 1993, p. 756)

2.2.2 Inequality and poverty reduction

The importance of equity has been emphasized by many scholars over the recent years and the literature clearly suggests that inequality matters for development (Pickett, 2013; Dabla-Norris et al., 2015; World Bank, 2006). Some studies have found that inequality can positively affect welfare – mainly via competition, innovation, and entrepreneurship by creating an incentive for greater productive effort, leading to higher incomes (Hassler and Mora, 2000; Dabla-Norris et al., 2015). Furthermore, with respect to poverty reduction in very low-income countries, decreasing inequality might actually serve to increase poverty by rendering more of the non-poor around the poverty line poor (see, e.g., Fosu, 2010a, 2010b). Overall, however, the existing literature tends to support the view that there is a negative relationship between income inequality and poverty reduction.

The first part of the literature can be summarized as follows: '*inequality is harmful for growth'*, and '*growth is good for the poor'*. Thus, '*inequality is bad for poverty reduction'*. This argument is based on the inequality-growth literature which stipulates that income disparities have a negative effect on economic growth (either through the political economy or human capital accumulation).

For instance, Birdsall et al. (1997) conducted an empirical investigation of the relationship between asset inequality, income growth and poverty using a panel data on 43 countries. They observed that asset inequality is critical in determining both the aggregate growth and the income growth of the poor. Furthermore, the findings suggest that the negative effect of the initial income inequality on growth found in many studies reflects the disparities in access to education and other assets such as land. The study further underlined the importance of capital accumulation for the poor's income. Similarly, Deininger and Squire (1998) maintain that asset inequalities are major constraints to income growth and thus, poverty reduction, because, the lack of assets does not enable the poor segment of the population to access capital for productive investments.

The literature on the inequality-poverty nexus also emphasizes that income inequality affects the rate at which economic growth is translated into poverty reduction. In other words, in countries with low level of inequality, the poor are more likely to benefit from the growth that is being generated. Conversely, in highly unequal countries, growth may not trickle down to the poor segment of the society, thereby leaving the situation of the poor unaltered. Thus, in addition to growth which has been identified as the main determinant of poverty reduction, there seems to be a consensus that income distribution affects the pace of poverty reduction as the economy grows.

Under the assumption of log-normality, Bourguignon et al. (2003) examined the link between income growth, income distribution, and poverty reduction and found that the sensitivity of poverty to growth depends on country-specific factors, such as the level of development, initial inequality, and changes in the distribution of relative income over time. Likewise, Bourguignon, (2004) shows that the effect of growth on poverty is higher the smaller the initial level of inequality. These findings are further confirmed by Ferreira and Ravallion (2008) and Fosu (2008, 2009, 2017). Ferreira and Ravallion (2008), additionally, showed that growth elasticity of poverty

falls when income inequality increases, meaning that persistent inequality dampens the impact of growth on poverty. This result is explained by the fact that as income inequality increases, the poor segment of the society benefits less and less from the growth that is being generated.

Ravallion (1997) provides additional evidence on the importance of initial inequality for poverty reduction by testing what he called the 'growth-elasticity' argument and the 'inclusive-growth' argument. The former hypothesis states that, at a given distribution of income, an increase in growth leads to a fall in poverty, while the latter stipulates that an initially high level of inequality dampens growth, and indirectly affects poverty. The results obtained were in support of these two hypotheses. Specifically, the study reveals that countries with high inequality would experience a lower poverty reduction conditional on a positive growth rate. It also shows that an increase in inequality would lead to a reduction in the growth elasticity of poverty. Furthermore, the author found evidence in favour of the inclusive growth argument, implying that high inequality negatively affects countries' growth performance, and therefore has negative implications for poverty reduction.

Fosu (2008, 2010a, 2010b) emphasize the importance of income in the poverty-reduction effect of inequality. These studies show that the inequality elasticity of poverty, which is found to be generally positive, increases with the level of income. Indeed, the relatively low incomes of African countries are found to be a major culprit behind their relatively low income and inequality elasticities of poverty (Fosu, 2009, 2017). The results further support the view that the inequality elasticity of poverty can be negative at very low levels of income, implying that a reduction in inequality could actually lead to an increase in poverty in very low-income countries.

2.3 Summary and conclusion

Throughout the literature, the importance of inequality in relation to growth, on the one hand, and to poverty reduction, on the other hand, as well as its role in the relationship between growth and poverty reduction, have been widely emphasized. The main conclusion of both the theoretical and empirical literature is that inequality matters. Although various studies have highlighted that growth plays a major role in reducing poverty, it has also been argued that an increase in inequality hampers countries' performance on poverty reduction. Summarizing the role of inequality in the progress on poverty, (Fosu, 2015, p. 56) writes: "(1) declining inequality tended to decrease poverty (though not necessarily in very low-income countries), and (2) lower initial inequality raised the rate at which growth was transformed into poverty reduction."

Rising inequality may also affect poverty through its effect on growth or/and on the poverty response to economic growth. While the literature on the effect of inequality on the growth elasticity of poverty seems conclusive, findings are far from unanimous with regards to the effect of inequality on growth (Bourguignon, 2004). Those who believe that inequality is good for growth highlight savings and investment as the main channels of transmission while many others show that inequality is harmful for growth using hypotheses that follow the *political economy approach* and the *credit market imperfection approach* (Galor, 2009).

Some economists have argued that the lack of clear consensus on the effect of inequality on economic growth suggests that the two components of income inequality, namely, inequality of opportunity and inequality that explained by effort may have opposite effects on growth. While the inequality that is explained by effort may affect growth positively, inequality of opportunity may have a clear adverse effect on growth (Bourguignon et al., 2007a, Ferreira et al., 2011, World

Bank, 2005). This can be explained by the fact that inequality of opportunity reflects a mechanism of exclusion of some groups from accessing productive resources. Hence, the resulting sub-optimal allocation of resources has a detrimental effect on growth, with implications for poverty reduction. On this basis, many scholars argue for equal distribution of opportunity in the fight against poverty in the developing world.

CHAPTER THREE

INEQUALITY OF OPPORTUNITY FOR CONSUMPTION EXPENDITURE IN GHANA

3.0 Introduction

This chapter addresses the first objective of the study, which is to analyse the trend and patterns of inequality of opportunity (henceforth IO) for consumption expenditure since the late-1990s in Ghana. Specifically, IO in Ghana is examined using the three most recent rounds of the Ghana Living Standards Surveys (GLSS): GLSS IV (1998/99), GLSS V (2005/06), and GLSS VI (2012/13). In addition to the national level estimates of IO, the study provides insights on the levels and trends of IO across sex and area of residence (urban and rural).

The rest of the chapter is structured as follows. The next section describes the methodological approaches that are employed in estimating IO for consumption expenditure. In Section 3.2 and 3.3, I examine the data and the variables that are used in the estimation, respectively. Section 3.4 discusses the results, and Section 3.5 summarizes the findings and concludes.

3.1 Methodology

The study measures IO using the ex-ante approach. It follows the methodological approach of Brunori et al. (2015a) by using the parametric ex-ante approach proposed by Bourguignon et al. (2007a) and Ferreira and Gignoux (2011), and the non-parametric ex-ante approach of Checchi and Peragine (2010).

Under the equality of opportunity framework, the determinants of any outcome, y, can be divided

into two categories of variables, namely, circumstance variables, c, and effort variables, e. Hence, the initial equation can be expressed as follows:

$$y = f(c, e) \qquad (12)$$

With the function, f, given as $f: \Omega * \Theta \rightarrow R_+$, linking individuals' set of circumstances and effort to a positive outcome y, where c and e are vectors of circumstance and effort variables, respectively, such that $c \in \Omega$, and $e \in \Theta$.

Since circumstances are likely to affect effort, $E(e|c) \neq 0$[11], Equation 12 is rewritten as:

$$y = f(c, e(c)) \qquad (13)$$

$$y = f(c) \qquad (14)$$

3.1.1 Conception of circumstances

Both the theoretical and methodological approaches in defining and estimating IO are based on the assumption of a one directional relationship between effort and circumstances, which runs from circumstances to effort. In other words, circumstances can affect effort, but effort does not influence circumstances since the latter is supposed to be strictly exogenous. According to Roemer (1998), circumstances are factors that influence a person's outcome, but are beyond his or her

[11] The possibility of there being a situation in which effort affects circumstances has been extensively debated in the literature but was ruled out by Roemer (1998). Thus, we assume that $E(c|e) = 0$. See Roemer (1998, p.14).

control[12]. Thus, a first step in an empirical investigation of IO is to identify the circumstance variables in the datasets. For instance, a person's wage is likely to be determined by variables that can fit under the category of effort. These variables include: years of education, number of hours worked, migration and networking abilities. Others may unambiguously be categorized as circumstance variables: family background, sex, race, ethnicity, place of birth, etc. Nevertheless, some important variables such as the characteristics of the labour market in the area of residence – employment prospect, social capital, etc. – that are likely to affect a person's outcome, cannot be assigned a given category without ambiguity (Almas et al., 2011). This ambiguity has also been highlighted in Roemer (1998, p. 14):

> ...I am defining the ability of a child to transform resources into educational achievement as the propensity she has to effect that transformation, by virtue of the influence of circumstances beyond her control, which – let us say, for the moment – include her genes, her family background, her culture, and more generally, her social milieu, to the extent that that milieu is unchosen.

The sentence cited above implies that 'social milieu' can only be considered a circumstance variable if it is 'unchosen'. However, in a situation where the 'social milieu' is chosen, it becomes endogenous and therefore would not qualify as a circumstance variable. For example, Brunori et al. (2015b) included area of residence in the set of circumstance variables in their empirical estimation while most studies did not (Hassine, 2012, Almas et al., 2011). In a robustness check,

[12] Per the definition of IO of Roemer (1998), the individual should be compensated for what he/she cannot be held responsible for. In other words, the individual is compensated for factors that he or she does not have any control over. Thus, if the individual is capable of altering some of the factors that determine his/her outcome through effort, then these factors do not qualify as circumstances.

Checchi and Peragine (2005) examine whether there is a significant change in the estimates of IO when migrants, meaning those who chose their area of residence, are excluded from the sample. Their findings show a significant fall in the estimate of IO for earnings in areas with high proportion of migrants, suggesting that considering area of residence as a circumstance variable may lead to a bias in the IO estimates when the share of migrants in the sample is high. Brunori et al. (2015b) argue that the bias results from the fact that the estimate of IO includes a part of inequality that is explained by effort, which in this case is migration.

I elaborate more on this bias by considering the case of a person who migrates from one district to another in quest of better social and economic prospects. It can be argued that, with migration, this individual now faces new circumstances that are different from his initial circumstances. I call these initial circumstances *pre-existing* circumstances, and the new circumstances *post-effort* circumstances. The former is exogenous while the latter is endogenous since it is determined by effort. Thus, in the example of IO, Equation 12 would be re-written as:

$$y = f(c^I, c^E, e) \qquad (15)$$

Where the vector of circumstances, c, is disaggregated into *pre-existing* and the *post-effort* circumstances (c^I and c^E, respectively), $c = c^I, c^E$. Since the *post-effort* circumstances are determined by effort, $c^E = g(e)$, Equation 15 becomes:

$$y = f(c^I, c^E(e), e) \qquad (16)$$

Hence, from Equation 16, one can observe how the estimation of the reduced-form equation, $y = f(c)$ would lead to an upward bias in IO estimates due to the inclusion of a *post-effort* circumstances as an explanatory variable. The IO estimate would therefore include the share of

inequality that is due to effort. Nevertheless, since effort is a function of *pre-existing circumstances*, Equation 16 can be re-written as: $y = f\left(c^I, c^E[e(c^I)], e(c^I)\right)$. The reduced-form equation therefore becomes:

$$y = f(c^I) \tag{17}$$

I keep this specification for the rest of the discussion.

3.1.2 Ex-ante parametric approach

The parametric approach assumes that the relationship between outcome and circumstances is linear[13], and consequently, Equation 17 can also be expressed as:

$$y = f(c^I) = c^I{}_i B + n_i \tag{18}$$

where B is a matrix of coefficients and n_i represents the error term. Equation 18 is estimated using Ordinary Least Squares (OLS).

In the approach proposed by Bourguignon et al. (2007a), a counterfactual distribution (i.e. a distribution in which individuals are assigned a fixed set of circumstances), $\tilde{\tilde{y}} = exp(\bar{c}^I \hat{B} + \hat{n})$, is created by simulating the distribution of outcomes that would be obtained if the individuals' circumstances were the same. By defining an inequality measure over the counterfactual distribution, one will obtain the inequality that is due to factors other than circumstances, $I(\tilde{\tilde{y}})$. Thus, according to Bourguignon et al. (2007a), IO can be measured in relative terms and expressed as follows:

[13] The function is assumed to be linear in circumstances.

$$RelativeIO = \frac{I(y) - I(\tilde{\tilde{y}})}{I(y)} \quad (19)$$

$RelativeIO$ is the total or overall effect of circumstances on outcome. In other words, it represents the share of inequality that is explained by *pre-existing* circumstances.

Ferreira and Gignoux (2011) proposed an alternative approach to computing the relative IO which generates almost identical estimates as those obtained when using the methodology proposed by Bourguignon et al. (2007a). According to Ferreira and Gignoux (2011), by computing an inequality estimate using the predicted outcomes that are generated from the OLS estimation of Equation 18, $\tilde{y} = exp(c^I \hat{B} + \hat{n})$, an estimate of absolute IO , $I(\tilde{y})$, can be obtained. This absolute IO is divided by the observed outcome inequality, $I(y)$, to obtain the relative IO which is given as:

$$RelativeIO = \frac{I(\tilde{y})}{I(y)} \quad (20)$$

Given that an individual's outcome is explained by effort and circumstances, under the methodology of Ferreira and Gignoux (2011), the residual proportion, that is $1 - \frac{I(\tilde{y})}{I(y)}$, can be interpreted as inequality that is explained by effort only if all possible circumstances that influence a person's outcome are included in Equation 18. In empirical investigations, this is often not the case, since all circumstance variables are not available in survey data, or are simply unobservable. Hence, the residual proportion would rather be interpreted as the share of inequality that is explained by effort and other unobserved circumstances, including luck.

The parametric approaches proposed by Bourguignon et al. (2007a) and Ferreira and Gignoux (2011), and described above, allow for a decomposition of the IO estimates into the partial effects

of each circumstance variable. On the one hand, the Ferreira and Gignoux (2011) approach allows for the use of standard regression-based decomposition methods proposed in the literature (Shapley decomposition, Fields method, etc.)[14].

On the other hand, using the approach proposed by Bourguignon et al. (2007a), it is possible to decompose IO by creating a counterfactual distribution, $\tilde{y}^j = exp(\bar{c}^{Ij}\hat{\delta}^j + c^{I\varphi\neq j}\hat{\delta}^{\varphi\neq j} + \hat{\varepsilon})$, where c^{Ij} is the circumstance of interest, $\tilde{y}^j$ is the distribution that is explained by variations in the residuals ε and circumstances c^{Ij}, with $\varphi \neq j$. In other words, the counterfactual distribution is obtained by equalizing the circumstance of interest ($\bar{c}^{Ij}$) across individuals, while controlling for the other circumstances. The next step is to compute an inequality index using the simulated distribution, $\tilde{y}^j$, and then take the difference between the observed inequality and the counterfactual, and divide it by the observed outcome inequality to obtain the share of inequality that is due to the circumstance c^{Ij}. The estimates of the partial effects give an idea of the contribution of each circumstance variable and are interpreted as the marginal contribution of circumstances to IO.

[14] Regression-based decomposition methods are used to quantify the contribution (partial effects) of various factors to inequality. On the one hand, Fields's method decomposes the log variance of the explained variable into the relative contribution of each explanatory variable – i.e. relative factor inequality weight (Fields, 2003). On the other hand, the Shapley decomposition combines regression with the Shapley value approach to produce an exact additive decomposition of inequality (Shorrocks, 2013). Generally, the marginal contribution of a particular factor is obtained by taking the difference between the observed inequality and an estimated inequality, from which the effect of that factor has been excluded.

3.1.3 Ex-ante non-parametric approach

The non-parametric counterpart of the parametric approach discussed above is proposed by Checchi and Peragine (2010). The initial model in the non-parametric approach is given as Equation 12 with $f: \Omega * \Theta \rightarrow R_+$, where $c \in \Omega$ and $e \in \Theta$. Then let $\omega \subseteq \Omega$, such that $c^I \in \omega$. We now define the finite set ω as $\{(c_1^I, c_2^I, \dots, c_n^I)\}$, where $c^I{}_i$ denotes a vector of *pre-existing* circumstances.

First, the total sample is partitioned into n types based on circumstances, where type i is a set of individuals with vector of circumstances c_i^I. If $X \in R_+^N$ is the vector that represents the outcome distribution of the population, and N_i^Y is the number of people of type i in distribution Y, then $Y = \{(y_1, y_2, \dots, y_n)\} \in R_+^N$ is the profile of the population, and $y_i = \{y_i^1, \dots, y_i^{N_i^X}\}$, is the outcome distribution of type i. Thus, the within-type disparities can be attributed to effort and the between-type inequality represents the effect of differences in circumstances.

To evaluate the between-type inequality, that is inequality of opportunity, the within-type inequality is eliminated by creating a counterfactual distribution. This counterfactual distribution entails a smoothing procedure in which the outcomes of each type i individuals are replaced by the mean outcome of type i, μ_i, such that $\mu_i = \frac{\sum_{j=1}^{N_i^Y} y_i^j}{N_i^Y}$. A new distribution of outcome is therefore obtained and defined as: $y_s = (\mu_1(1), \dots, \mu_k(i), \dots, \mu_N(n))$, where N is the total size of the population. If y_s represents the distribution for which the within-types inequality has been eliminated, then for a given measure of inequality $I: R_N^+ \rightarrow R_+$, the share of inequality that is due to initial circumstances can be written as:

$$RelativeIO = \frac{I(y_s)}{I(y)} \quad (21)$$

where $I(y_s)$ is the absolute measure of IO and $I(y)$ is the observed outcome inequality.

3.1.4 Parametric vs. non-parametric ex-ante approaches

The parametric and the non-parametric approaches have often been used in the literature in a complementary way since they both have advantages and limitations. On the one hand, the non-parametric approach is simple and flexible. However, it does not allow for a decomposition of IO into partial effects of circumstances. Additionally, the non-parametric approach requires a large dataset for a detailed partition of the population into types. A small sample size may lead to lower precision of IO estimates, since with the partition, fewer number of observations by type are more likely to be obtained. Empirical studies often attempt to solve the problem of small sample by aggregating the information contained in the circumstance variables. Hence, fewer types are generated with a reasonabe degree of freedom. However, whilst this aggregation helps to reduce the number of types and improve the accuracy of the IO estimates, it may lead to a downward bias of IO under the non-parametric approach (Brunori et al., 2015a).

On the other hand, the parametric approach allows for decomposition and is less data demanding. However, this approach imposes a functional form on the relationship between outcome and circumstances with its linearity assumption[15]. This assumption may lead to the underestimation of

[15] In the empirical literature, researchers attempt to relax this assumption by including interaction terms in the estimation of Equation 17 (Assaad et al., 2017). The same procedure is also employed in the present analysis and the estimates of IO based on the assumption of linearity between outcome and circumstances

IO since it does not account for non-additive simultaneous effects of some circumstance variables on outcome (Brunori et al., 2015a).

Under both approaches, there is an omitted variable bias due to unobservable circumstances (see Ferreira and Gignoux (2011) for further details). Hence, as a result of missing circumstances in the non-parametric approach, any within-type inequality is attributed to effort, leading to lower IO estimates. A similar problem arises in the parametric estimation where the IO measure only takes into account the observed circumstances. Consequently, the measured IO under both approaches increases with the number of circumstance variables that are used in the estimation (Ferreira and Gignoux, 2011)[16]. A potential solution, therefore, is to interpret the parametric and the non-parametric estimates of IO as lower-bound estimates of the true IO (Ferreira and Gignoux, 2011).

3.1.5 Inequality measures

The inequality measures that have been extensively employed in the literature for the estimation of IO are the Theil's second measure (Theil's L) and the Gini coefficient. Theil's L – henceforth Theil-L – measure of inequality, also known as Mean Logarithmic Deviation, is a generalized entropy (GE) index for which $\alpha = 0$[17]. It is given by:

$$GE(0) = MLD(X) = \frac{1}{N}\sum_{i=1}^{N} ln(\frac{\mu}{x_i}) \qquad (22)$$

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are compared those that are obtained when interactions are taken into account in order to evaluate the extent of the bias.

[16] See Ferreira and Gignoux (2011) for proof.

[17] The generalized entropy indexes are obtained with the general formula: $GE(\alpha) = \frac{1}{N\alpha(\alpha-1)}\sum_{i=1}^{N} [(\frac{y_i}{\bar{y}})^{\alpha} - 1]$, where $\alpha = 0,1,2$. α is an indicator of inequality aversion. Thus, the higher the value of α, the greater the weight that is placed on the upper tail of the distribution.

where N is the population size, μ is the arithmetic mean of the outcome per person and x_i is the outcome of person i. The measure ranges from 0 to $+\infty$, with 0 representing perfect equality, and higher values denoting higher levels of inequality.

In addition to the desirable axiomatic properties for relative inequality measures (anonymity, mean independence, population independence and Pigou-Dalton transfer principle), Theil-L is additively decomposable (the same applies to Theil's T($GE(1)$). In other words, the overall inequality can be obtained by adding the values of the between-group inequality and within-group estimate. Hence,

$$MLD(X) = \sum_{k=1}^{K} s_k MLD_k + \sum_{k=1}^{K} s_k ln(\frac{\mu}{\mu_k}) \qquad (23)$$

where k is the number of groups, such that $k = 1,2,\ldots,K$. $\sum_{k=1}^{K} s_k MLD_k$ is the within-group estimate and $\sum_{k=1}^{K} s_k ln(\frac{\mu}{\mu_k})$ is the between group inequality.

More importantly, this measure of inequality is widely used in the computation of IO because it is the sole inequality measure based on the arithmetic mean, which satisfies the *path independent decomposability* property of Foster and Shneyerov (2000) (cited in Ferreira and Gignoux (2011))[18]. As argued by Ferreira and Gignoux (2011), the use of Theil's second measure of inequality makes the estimation of IO consistent with the methodological approach described above, and gives an estimated IO that satisfies a number of desirable properties, such as *normalization, within-type symmetry, within-type transfer insensitivity, and between-type transfer principle* (see, e.g. Ferreira

[18] According to Foster and Shneyerov (2000), a measure of inequality satisfies the *path independent decomposability* property if the overall inequality equals the between-group inequality, obtained from a *smoothed distribution* in which each outcome in a group is replaced by the group's *representative* outcome, and a within-group inequality, taken over a *standardised distribution*.

and Gignoux (2011)).

The Gini coefficient, compared to the Theil-L index, is very intuitive and less sensitive to extreme values. It is based on the Lorenz curve which depicts the cumulative proportion of income that goes to a cumulative share of the population. The formula of the Gini coefficient is given by:

$$Gini(X) = \frac{1}{2N^2\mu}\sum_{i=1}^{N}\sum_{j=1}^{N}|x_i - x_j| \qquad (24)$$

where N is the total number of individuals in the population, μ is the arithmetic mean of the outcome per person, x_i and x_j are the outcome of persons i and j, respectively.

However, unlike the Theil-L index, the Gini coefficient is not perfectly decomposable. Its decomposition gives:

$$Gini(X) = Gini_{Between} + Gini_{Within} + R \qquad (25)$$

where R is the residual term which is positive when there is an overlap in the subgroup outcome distribution. Consequently, similar to most previous works, the Theil-L measure of inequality is employed in this study for the estimation of IO.

3.2 Data

The empirical investigation of IO in Ghana is conducted using nationally and regionally representative household living standards surveys from the GSS. Six (6) rounds of the GLSS are available: Round 1 (GLSS I), Round 2 (GLSS II), Round 3 (GLSS III), Round 4 (GLSS IV), Round 5 (GLSS V) and Round 6 (GLSS VI). The surveys were conducted in 1988/87, 1988/89, 1991/92, 1998/1999, 2004/05 and 2012/13, respectively. However, there have been important changes in the questionnaires between rounds 2 and 3. Hence, it is difficult to compare the two first surveys

to the four more recent ones (Coulombe and Wodon, 2007). Additionally, even though the GLSS III is comparable to the IV, V and VI to some extent, employing this survey in the present study could be problematic because data on ethnicity, which is used as a circumstance variable in this study, is not available in the GLSS III dataset. Consequently, the study focuses GLSS IV, V and VI.

As presented in Table 3.1, a nationally representative sample size of 5,998 households were covered in 300 Enumeration Areas (EAs) for round 4; 8,687 households in 580 EAs for round 5 and 18,000 households in 12,000 EAs for round 6. Hence, there is a total of 22,211 respondents in the fourth round; 37,128 in the fifth round and 72,372 in the sixth round.

Table 3. 1: Ghana Living Standard Surveys (GLSS): Overview – 1998/99 to 2012/13

Round	Number of Households	Enumeration Areas (EAs)	Number of Respondents
Round 4 (1998/99)	5,998	300	22,211
Round 5 (2005/06)	8,687	580	37,128
Round 6 (2012/13)	18,000	12,000	72,372

Source: GSS, 1999, 2006, 2013b.

The individual sections of each survey comprise data on the individual's characteristics (age, ethnicity, place of birth, educational attainment, area of residence, employment status, migration status, etc.) as well as information on parents, such as parents' (father and mother) educational attainment, and parents' occupation.

3.3 Definition of variables

This study uses consumption expenditure (Brunori et al., 2015a; Ferreira et al., 2011; Assaad et al., 2017) as an outcome variable. The circumstance variables are: the household head's mother and father's educational attainment, parent's occupation, ethnicity and place of birth. These variables are chosen based on the empirical literature and the richness of the GLSS datasets.

The gender (sex) of the household head is not included in the set of circumstance variables in estimating IO for consumption expenditure. Ferreira and Gignoux (2011) argued that the gender of the household head, because of its endogenous nature, does not qualify as a circumstance variable in the estimation of IO when consumption expenditure is used as the outcome variable. In other words, selecting a male or a female household member as a head is not entirely exogenous. In the GLSS data, a member of a household is considered as a household head if the person is acknowledged as such by the other members of the household, and is usually responsible for the

upkeep and maintenance of the household. Thus, a person can be identified by other household members as household head on the basis of ownership of the housing unit, earnings, age, gender, bargaining power or decision-making (Posel, 2001; Budlender, 2003), among others. Meanwhile, most of these factors can be explained by the individual's choices and effort. For instance, in some settings where men are chosen as household head because of the ownership of the housing unit or earnings, the headship of a female would, to some extent, depend on her own choices and effort.

In computing the IO estimates, the focus is on household heads who belong to the working-age population for each of the GLSS surveys. The minimum legal age of entering the labour market in Ghana according to the Ghana Children Act 1998 is 15 years and the official or legal retirement age is 60 years[19]. However, I consider the working-age population to be between 15 and 64 years, since many individuals who are above 60 years of age remain economically active. Thus, for the estimation of IO , the sample is restricted to household heads aged 15 to 64 years old. It is important to note that the age limit is applied to ensure that most of the individuals in the sample are in the labour market, in which case they are more likely to contribute to the household income with their wage earnings[20].

[19] Per the definition of ILO, the labour force is the proportion of the population aged 15 and older that is economically active: all people who supply labour for the production of goods and services during a specified period. Some countries have an upper age limit. This is the case of Ghana. (visit the ILO website for more details)

[20] In a situation where the household head is not active in the labour market, household income may be coming solely from other members of the household, and may not sufficiently reflect the opportunities of the household head.

3.3.1 Outcome variable

3.3.1.a Per adult equivalent consumption expenditure

For all the rounds, the study uses real annual consumption expenditure per adult equivalent as an outcome variable. The variable is computed using information on household consumption expenditure provided in the GLSS datasets. In order to make the values comparable across surveys, the spatial and time differences in the cost of living are controlled for.

In analyzing inequality of opportunity, one is interested in investigating the share of the distribution of people's outcome that is due to circumstances, and to factors other than circumstances. Consequently, as shown in the methodology section, the outcome of the individual is mapped to his or her circumstances. Unlike earnings which are reported at the individual level in household surveys, consumption expenditure is computed at the household level. Hence, it includes incomes from household members, remittances, government transfers etc. A difficulty that arises when using consumption expenditure as an outcome variable in computing IO is disaggregating the household consumption expenditure into the contribution of household members. An approach that is often used in empirical studies is to assign the per capita or per adult equivalent consumption expenditure to each household member[21]. Although this approach seems reasonable, the results obtained would meaningfully reflect the opportunities, including labour market opportunities, that are faced by individuals – their "capabilities[22]" – only if households

[21] While using per capita consumption expenditure is equal to the assumption that resources are shared equally within the household, employing the per adult equivalent consumption expenditure takes into account not only the household size, but also its composition and the economies of scale within the household.

[22] Sen (2005, p. 153) defined capability as "the opportunity to achieve valuable combinations of human

members included in the sample belong to the active population and contribute significantly to the household's resources (a household may comprise infants, children, working or non-working adults and the elderly).

In the present study, similar to Assaad et al. (2017), the sample comprises all household heads with background information. This restriction allows us to trace disparities in opportunities in the labor market, since household heads who are 15 to 64 years old are more likely to be in the job market, and hence, contribute reasonably to household resources. Nevertheless, estimates of IO based on a sample of all household members aged 15 and above, following the approach of Brunori et al. (2015a) are also reported in the appendices.

3.3.2 Circumstance variables

An important aspect of the estimation of IO is the definition of circumstance variables under the parametric and the non-parametric approach. It is important to note that under each approach, a similar definition and categorisation of the circumstance variables is used in order to ensure the comparability of the IO estimates over time and across sub-groups.

3.3.2.a Parental characteristics

To control for parents' characteristics, the study uses three variables: (1) *mother's education*, (2) *father's education*, and (3) *parents' occupation*. Under the parametric approach, the parental education variables are measured by years of education, while for the non-parametric approach, the variables are defined as the highest educational level completed by each parent and are coded

functionings — i.e., what a person is able to do or be."

as dummy variables. Each of the variables takes on the value 0 if the parent has no more than primary education, and the value 1 if the parent has attained secondary level or more[23]. The different treatment of the education variable under the non-parametric approach aims at reducing the total number of types in the non-parametric approach, and thereby improving the precision of the IO estimates (see Section 3.1.4 for further details).

Since the surveys do not provide information on parents' wealth, the third parental variable – parents' occupation – is constructed in a way that reflects to some extent parents' (father and mother) combined wealth. In the case of Ghana, highest levels of poverty are historically found among individuals that are involved in the agricultural sector, followed by those that are self-employed in non-farm activities, while workers who are employed in the private or public sectors are more likely to be non-poor (Mckay et al., 2016). Thus, the parental occupation variable is coded 1 if both parents have been into agricultural activities most of their life. It is coded 2 if the individual belongs to either of the following categories: (a) father is in sales or elementary occupations and mother is in agriculture; (b) father is in agriculture and mother is into sales or elementary occupations; and (c) both parents are into elementary occupations. It takes the value 3 if at least one of the parents is in occupations other than agriculture, sales or elementary occupations, namely, services, production, professional, technical, clerical and administrative.

[23] In all the rounds of the GLSS data, information about parental characteristics in each household was reported only for people who did not have their parents living in the household. Hence, parents' information for individuals whose parent(s) lives (live) in the same household was obtained by using the available information on educational attainment provided in the education section of the data. The same thing was done to obtain information on parent's occupation.

3.3.2.b Ethnicity

The potential role of ethinicity on socioeconomic development has been recognised in many parts of the world, particularly in countries with significant ethnic diversity. In the case of Ghana, Addai and Pokimica (2010), for instance, found that ethnicity influences individuals' actual and percieved well-being. Generally, the influence of ethnicity can operate in various forms, including: ethnic bias and favoritism, which negatively affects welfare and equity (Ilorah, 2009); ethnic identity, which may influence a person's values, attitudes, behaviour and self-esteem (Kennedy and Cummins, 2007); ethnic occupational niches engendered by social networks (Hofmeyr, 2010); and ethnic discrimination and stereotyping with consequenses on individuals' outcome (Contrada et al., 2000).

Like many African countries, Ghana is ethnically diverse. However, three are dominant ethnic groups. These are: *Akan*, *Ga-Adangbe* and *Ewe*. For the purpose of this study, the *ethnicity* variable is categorised based on the system of inheritance[24]. The three types of system are considered: the patrilineal system, where kinship and inheritance are obtained through fathers (this is the case of the *Ewe*, *Gurma*, *Mole-Dagbani*, and other ethnic groups such as *Grusi*, *Mande*, *etc.*); the matrilineal system, where kinship and inheritance is from mother to children (*Akan* and *Guan* belong to this category) and the mixed or double unilineal system of inheritance, where kinship and inheritance are transmitted from both parents to children (This is the case of the *Ga-Adangbe* ethnic group). Thus, *ethnicity* is a categorical variable, which takes on the value 1 for *Akan/ Guan*, 2 for *Ga-Adangbe*, 3 for *Ewe/ Gurma/ Mole-Dagbani/ others*. Since the focus of the study is on Ghanaians, individuals who are foreign nationals as well as those born outside Ghana are excluded

[24] A disaggregated ethnicity variable is also used in computing different estimates of IO (see Section 3.4.4).

from the sample. Besides, the observations that fall within those categories are few[25]. Furthermore, *ethnicity* is not used as a circumstance variable in the regional level estimation. Given that for some of the regional samples there is no sufficient ethnic diversity in the data, particularly in the three northern regions and the Volta region, using the variable would be a bit problematic. Consequently, *ethnicity* is excluded from the set of circumstance variables that are used in the regional level estimations.

3.3.2.c Place of birth

To capture the individual's place of birth, a dummy variable is used. It takes the value 0 if the individual is born in *Northern Ghana* and 1 for *Southern Ghana*[26]. Following the categorization of GSS, northern Ghana is composed of three regions: Northern region, Upper East and Upper West regions, while the other 7 regions are considered as Southern Ghana.

3.3.3 Types under the non-parametric approach

In the non-parametric approach, the sample is divided into types. Each type represents a group of people with the same set of circumstances, for instance, a group of *Akan/ Guan* born in the southern part of Ghana whose mother and father have no more than primary education and work in the

[25] When categorising the ethnicity region of birth variable, we realised that there are few observations for this category of persons; 122 observations in the GLSS VI and 66 observations in the GLSS V datasets.

[26] Given the historical dichotomy in the level of development between the northern and southern Ghana, as defined (see Tsikata and Seini, 2004; Aryeetey et al., 2009; McKay et al., 2016), this particular treatment of the place of birth variable would help capture the disparity in the economic and social capital between these locations. This socio-economic capital is likely to influence the person's progress and ultimately his/her outcome. Furthermore, this categorization helps to preserve adequate degrees of freedom for the non-parametric estimation.

agriculture sector. With the 5 circumstance variables, the maximum number of types that could be obtained is 144. Since the between-types inequality estimates are obtained through a smoothing approach that uses the type mean-outcome, having a small number of observations by type could lead to an overestimation of the non-parametric IO estimates. It has been argued that having few number of types that have less than five observations is likely to generate more accurate estimates than otherwise. Thus, in the summary statistics, I report the percentage of types with a number of observations greater or equal to 5 (Brunori et al., 2015a). Furthermore, in order to minimize the difference between the parametric and the non-parametric estimates of IO, similar categorizations of the circumstance variables are used in both approaches, except for the parental education variables. The latter variable (parental education) is recoded under the non-parametric approach in order to limit the number of types, and consequently reduce the risk of having a small number of observations by type for better precision of the estimates.

3.4 Results

3.4.1 Descriptive statistics

Table 3.2 reports the descriptive statistics across rounds, based on the *restricted sample*, which is obtained by restricting the GLSS data to household heads with background information, who are 15 to 64 years old. It is observed that, consistent with prior evidence in the case of Ghana (Cooke et al., 2016), mean consumption expenditure per adult equivalent has increased over time (between 1998/99 and 2012/13).

The table also shows that most mothers have no more than primary education although the proportion of mothers who belong to that category declined across surveys, implying a rise in the proportion of mothers who have attained at least secondary education between 1998/99 and

2012/13 (from 8.0 percent in 1998/99 to 20.1 percent in 2012/13). A similar trend is identified for fathers' education. This change in the pattern of educational attainment partly reflects the increase in enrolment at the secondary and tertiary levels in Ghana over the years (Table 3.2). Nevertheless, there is a difference in the proportion of mothers and fathers who have attained the same level of education. The finding is the same when focusing on years of education. On average, mothers have lower years of education than fathers. In 2012/13, the average years of education for fathers is 4.2 compared to 2.3 for mothers. This difference in the years of schooling or educational attainment mainly reflects the gender gap in educational attainment that still exists in the country.

Table 3. 2: Descriptive statistics across rounds (1998/99 – 2012/13) – The outcome variable is consumption expenditure per adult equivalent

	1998/99	2005/06	2012/13
Annual Per Adult Equivalent Consumption Expenditure (GHC)			
Mean	1483.3	1936.5	3822.3
Std. Err.	27.4	24.0	45.7
Urban (%)			
Rural	65.0	56.4	43.8
Urban	35.0	43.6	56.2
Female (%)			
Male	71.5	73.7	72.3
Female	28.5	26.4	27.7
Mother's years of education			
Mean	1.0	1.8	2.3
Std. Err.	0.1	0.1	0.0
Father's years of education			
Mean	2.9	3.6	4.2
Std. Err.	0.1	0.1	0.1
Mother's educational attainment (%)			
Not more than primary	92.0	85.2	79.9
Secondary and above	8.0	14.9	20.1
Father's educational attainment (%)			
Not more than primary	74.3	67.5	60.9
Secondary and above	25.7	32.5	39.1
Parent's occupation (%)			
Both are in agriculture	54.2	51.8	46.5
At least one is in sales/elementary occup	27.3	18.6	20.6
At least one is in serv/prod. or in prof/admi/cl	18.4	29.6	32.9
Region of birth (%)			
Northern Ghana	16.8	18.2	18.5
Southern Ghana	83.2	81.9	81.5
Ethnicity (%)			
Akan and Guan	54.5	55.1	52.8
Ga-Adangbe	10.0	10.5	9.1
Ewe and Gurma/Mole/others	35.6	34.5	38.1
Number of types	51	61	63
Number of types with obs.>=5	32	43	50
Percentage of types with obs. > = 5	0.6	0.7	0.8
Average Number of obs. by type	108	107	196
Sample size	4,212	6,510	12,262

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: The descriptive statistics are based on the *restricted sample* (all household heads who are

15 to 64 years old and have available background information) and take into account sampling weights and clustering. The mean consumption expenditure is in January 2013 prices.

As observed in Table 3.2 most household heads in the sample have parents who have worked in agriculture most of their life. Additionally, the proportion of household heads who have at least a parent in *service, production, professional or administrative* activities is rising over time. In 1998/99, the dominant category is *both parents are into agriculture*. It is followed by the categories, '*at least one parent is in sales or elementary occupation'* and '*at least one parent is in service, production, professional or administrative*,' respectively. However, in 2005/06 and 2012/13 (for the two latest surveys), it is rather the category '*at least one parent is into services, production related, professional/ administrative/ clerical* jobs,' which became second dominant[27]. This change in the patterns of parents' occupation partly reflects the change in the structure of the Ghanaian economy, where the service sector has become an important contributor to GDP and employment since 2006 (World Bank, 2017).

Furthermore, the majority of household heads present in the *restricted sample* are born in southern Ghana, and this is consistent across rounds. Also, the proportion of people who have reported northern Ghana (or southern Ghana) as their place of birth has been quite stable over time (Table 3.2). The dominant ethnic group is *Akan /Guan,* which represents more than 50 percent of

[27] A further disaggregation of this category (*at least one parent is into services, production related, professional/ administrative/ clerical*) shows that it became dominant in 2005/06 and 2012/13 mainly as a result of an increase in the proportion of parent in services and production related activities, since the proportion of household heads whose parents are into professional/ administrative/ clerical occupations declined between 1998/99 and 2012/13.

household heads in 1998/99, 2005/06 and 2012/13. However, the proportion of persons who belong to this ethnic category increased slightly between 1998/99 and 2005/06, before decreasing over the period 2005/06 – 2012/13 (Table 3.2).

Appendix Tables A.1 and A.2 present the descriptive statistics across gender and area of residence (rural or urban). Overall, the trend in the mean consumption expenditure per adult equivalent in the sub-samples between 1998/99 and 2012/13 is similar to what is observed in the entire sample. Specifically, the increase in consumption expenditure is observed for both male and female as well as in rural and urban areas (Appendix Tables A.1 and A.2).

As observed in Appendix Table A.1, on average, female-headed households are better off in terms of per adult equivalent consumption expenditure than male-headed households, and household expenditure increased faster for female-headed households than those headed by male over the period 1998/99 – 2012/13. This finding is in line with that of Cooke et al. (2016), who found lower poverty levels among female-headed households compared to their male-headed counterparts. The study argued that female heads often have a migrant husband; and therefore tend to receive more remittances than male-headed households. The average years of education of parents seem to have stagnated over time in the male and female sub-samples. On the one hand, fathers in the male sample have about 3 years of education on average across the two first surveys and about 4 years in 2012/13, while in the female sample, it has slightly improved from 3 years in 1998/99 to 4 and 5 years in 2005/06 and 2012/13, respectively. On the other hand, mothers' average years of education is 1 for both the male and the female samples in 1998/99, and about 2 in the subsequent surveys.

On average, the proportion of female household heads that have both parents in agricultural

activities seems to be lower than the proportion of male heads with the same background characteristic. In other words, a higher proportion of female heads have at least a parent involved in non-agriculture activities compared to their male counterparts (Appendix Table A.1). Furthermore, *Akan /Guan* is the dominant ethnic group in both sub-samples. The only exception is the male sub-sample in 2012/13, where it is the second dominant ethnic group (Appendix Table A.1). Again, the proportion of individuals in the sample who are *Akan/ Guan* seems to be quite stable over time.

With respect to the rural-urban disaggregation (Appendix Table A.2), it is observed that on average consumption expenditure is lower in rural areas compared to the urban areas. Additionally, compared to urban areas, rural dwellings have the highest proportion of household heads whose parent (mother or father) has at most primary education, with the average years of education being around one for mothers and two for fathers in 1998/99 and 2005/06 and 2012/13 (Appendix Table A.2). Moreover, even though there has been an increase in the percentage of heads whose parent has attained secondary level or more, this increase is higher in urban than rural areas (Appendix Table A.2). It is also observed that the percentage of heads whose parents are in the agriculture sector is more than two times higher in the rural areas than urban dwellings (Appendix Table A.2). The *Akan /Guan* ethnic remains dominant in rural and urban areas across all the three surveys. Also, similar to the observation from the entire sample, across sex and area of residence, a higher proportion of household heads are born in the southern part of Ghana compared to the north. However, this proportion has been stable over time.

In addition to the descriptive statistics, Table 3.2 and the Appendix Tables A.1 and A.2 present information on the number of types used in the non-parametric estimation of inequality of opportunity. It is important to note that the percentage of types with not less than five observations

is between 60 and 80 percent in all samples, except for the female sub-group in 1998/99 where 50 percent of the total number of types used in the non-parametric approach had less than five observations. Hence, the 1998/99 non-parametric IO estimate based on the female sample may be less precise compared to its parametric counterpart, and should be taken with caution.

3.4.2 OLS estimation results

Following the methodology proposed by Ferreira and Gignoux (2011), the OLS method is employed in estimating the reduced-form, Equation 17[28]. The regression estimates are reported in Tables 3.3, 3.4 and 3.5. Table 3.3 shows that for all rounds an additional year of parental education (both father and mother) is significantly associated with higher consumption expenditure. The results are similar across gender and area of residence (Tables 3.4 and 3.5). However, the effect of father and mother's education has decreased over time, especially among female heads and in urban areas. Thus, parental education seems to be less and less important in determining children's outcome, measured by consumption expenditure.

[28] It is important to note that OLS is appropriate in estimating the effect of circumstances on outcome only if Equation 17 is truly a 'reduced form' equation. Meanwhile, one could argue that the circumstance variables that are included in c^I may be correlated with the unobserved circumstance variables, – in which case c^I is not orthogonal to n – thus leading to a problem of endogeneity and rendering the OLS estimates biased and inconsistent $(E(c^I|n) \neq 0)$. In other words, the OLS estimates would take into account the effect of the correlated unobserved circumstances. However, OLS is still commonly used in the empirical literature because the main interest when estimating IO is not so much to obtain the 'true value' of the parameters but to capture the overall effect of circumstances on the outcome (see Bourguignon et al., 2003, p.8 for more details).

Table 3. 3: OLS regression results of the reduced-form equation across rounds (1998/99–2012/13) – The dependent variable is log of consumption expenditure per adult equivalent

VARIABLES	(1) **1998/99**	(2) **2005/06**	(3) **2012/13**
Mother's Years of Education	0.03***	0.02***	0.02***
	(5.76)	(7.01)	(8.00)
Father's Years of Education	0.03***	0.02***	0.02***
	(5.58)	(7.96)	(9.36)
Parents' occupation			
Both are in agriculture	Ref	Ref	Ref
At least one is in sales/elementary occup	0.25***	0.25***	0.28***
	(6.99)	(7.48)	(10.27)
At least one is in serv/prod. or in prof/admi/cl	0.22***	0.23***	0.31***
	(4.56)	(7.01)	(11.47)
Ethnicity			
Akan/Guan	Ref	Ref	Ref
Ga-Adangbe	0.06	-0.03	0.04
	(1.01)	(-0.54)	(0.63)
Ewe/Gurma/Mole/others	-0.10**	-0.10***	-0.08***
	(-2.05)	(-2.92)	(-3.09)
Place of Birth			
Northern Ghana	Ref	Ref	Ref
Southern Ghana	0.44***	0.43***	0.26***
	(5.55)	(8.55)	(7.27)
Constant	6.47***	6.73***	7.45***
	(76.23)	(123.70)	(203.40)
Observations	4,212	6,510	12,262
R-squared	0.24	0.22	0.21

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: t-statistics in parentheses ( ). *** p<0.01, ** p<0.05, * p<0.1.

The results are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering.

Table 3. 4: OLS estimates across sex (1998/99–2012/13) – The dependent variable is log of consumption expenditure per adult equivalent

	1998/99		2005/06		2012/13	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
Mother's Years of Education	0.04***	0.03***	0.02***	0.02***	0.02***	0.03***
	(3.60)	(3.80)	(3.94)	(6.03)	(3.54)	(7.33)
Father's Years of Education	0.03***	0.02***	0.03***	0.02***	0.02***	0.02***
	(4.67)	(4.39)	(5.16)	(6.47)	(5.62)	(7.99)
Parents' occupation						
Both are in agriculture	Ref	Ref	Ref	Ref	Ref	Ref
At least one is in sales/elementary occup	0.21***	0.25***	0.15***	0.28***	0.27***	0.29***
	(2.94)	(5.67)	(2.93)	(7.24)	(6.36)	(9.16)
At least one is in serv/prod. or in prof/admi/cl	0.13*	0.25***	0.14***	0.25***	0.29***	0.32***
	(1.66)	(4.29)	(2.67)	(6.84)	(6.33)	(10.31)
Ethnicity						
Akan/Guan	Ref	Ref	Ref	Ref	Ref	Ref
Ga-Adangbe	0.21**	-0.00	0.01	-0.04	0.06	0.03
	(2.23)	(-0.02)	(0.14)	(-0.64)	(0.63)	(0.50)
Ewe/Gurma/Mole/others	-0.06	-0.12**	-0.06	-0.10***	-0.02	-0.10***
	(-0.74)	(-2.32)	(-1.13)	(-2.87)	(-0.43)	(-3.58)
Place of Birth						
Northern Ghana	Ref	Ref	Ref	Ref	Ref	Ref
Southern Ghana	0.35***	0.46***	0.35***	0.43***	0.32***	0.23***
	(2.70)	(5.59)	(4.40)	(7.98)	(5.40)	(5.94)
Constant	6.53***	6.46***	6.87***	6.70***	7.40***	7.47***
	(48.46)	(74.93)	(84.10)	(113.28)	(115.98)	(182.54)
Observations	1,282	2,930	1,652	4,858	3,154	9,108
R- squared	0.19	0.25	0.16	0.23	0.19	0.21

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: t-statistics in parentheses ( ). *** p<0.01, ** p<0.05, * p<0.1.

The results are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering.

Table 3. 5: OLS estimates across area of residence (1998/99–2012/13) – The dependent variable is log of consumption expenditure per adult equivalent

	1998/99		2005/06		2012/13	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*	*Rural*
Mother's Years of Education	0.03***	0.02**	0.02***	0.01**	0.02***	0.02***
	(4.57)	(2.21)	(6.16)	(2.15)	(7.08)	(3.22)
Father's Year Education	0.03***	0.02***	0.02***	0.02***	0.02***	0.02***
	(4.26)	(4.06)	(4.92)	(5.11)	(7.82)	(4.06)
Parents' occupation						
Both are in agriculture	Ref	Ref	Ref	Ref	Ref	Ref
At least one is in sales/elementary occup	0.13**	0.15***	0.03	0.19***	0.18***	0.11***
	(2.36)	(3.21)	(0.53)	(3.72)	(5.29)	(2.62)
At least one is in serv/prod. or in prof/admi/cl	0.10	0.12*	0.07	0.13***	0.17***	0.19***
	(1.48)	(1.93)	(1.52)	(3.28)	(4.80)	(5.09)
Ethnicity						
Akan/Guan	Ref	Ref	Ref	Ref	Ref	Ref
Ga-Adangbe	0.03	0.05	-0.12*	0.06	0.13***	-0.14
	(0.33)	(0.65)	(-1.69)	(0.97)	(2.64)	(-1.27)
Ewe/Gurma/Mole/others	-0.08	-0.12*	-0.11**	-0.05	-0.05	-0.11***
	(-0.94)	(-1.90)	(-2.43)	(-1.11)	(-1.30)	(-3.07)
Place of Birth						
Northern Ghana	Ref	Ref	Ref	Ref	Ref	Ref
Southern Ghana	0.36***	0.42***	0.15**	0.49***	0.09*	0.31***
	(3.24)	(4.58)	(2.04)	(7.51)	(1.89)	(6.36)
Constant	6.83***	6.41***	7.33***	6.55***	7.82***	7.32***
	(50.87)	(65.93)	(83.18)	(96.28)	(145.83)	(152.66)
Observations	1,471	2,741	2,757	3,753	5,554	6,708
R- squared	0.19	0.18	0.11	0.18	0.15	0.12

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: t-statistics in parentheses ( ). *** p<0.01, ** p<0.05, * p<0.1.

The results are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering.

The results also reveal that the occupation of the household head's parents (father and mother) is important for household consumption expenditure. Households headed by persons who have at

least one parent in *sales or elementary occupations*, as well as those who have at least a parent in *service, production, professional, administrative or clerical* occupations tend to have higher consumption expenditure than those that are headed by persons whose parents (father and mother) have been into agriculture related activities all their lives. Since the variable has been constructed to reflect the combined wealth of parents, these results suggest that, on average, the occupation or wealth of parent matters for the well-being of their children. In other words, there exists some level of intergenerational transmission of welfare in Ghana. These findings are consistent across rounds, sex of the household head and area of residence (Tables 3.3, 3.4 and 3.5). Additionally, households headed by persons who are born in the southern part of Ghana tend to have higher consumption expenditure than their counterparts whose head is born in northern Ghana. These findings suggest the existence of some disparities in opportunities based on place of birth, which reflects the physical as well as social infrastructure in the part of the country where the individual was born. The findings are similar for all sub-samples (Tables 3.3, 3.4 and 3.5). Also, the southern premium is higher in rural areas than urban. Furthermore, the north-south differential effect seems to be decreasing over time. This result suggests that there is a convergence in consumption expenditure between households headed by persons who were born in the north and those that are headed by people born in the south. The finding is attributable to various factors, such as migration, the growing urbanisation and various government interventions in northern Ghana aiming at bridging the north-south divide. The decreasing disparities are even more pronounced in the male sample than female, and in urban areas than rural (Tables 3.4 and 3.5).

With respect to ethnic differences, it is shown based on the estimation results that households headed by persons who belong to the *Ewe/ Gurma/ Mole-Dagbani/ Other* ethnic group have a significantly (about 10 percent in 1998/99 and 8 percent in 2012/13) lower per adult equivalent

expenditure than their counterparts headed by persons in the *Akan/ Guan* ethnic group (Table 3.3). These results mainly hold among male-headed households across surveys, but not for female-headed households (Table 3.4). The finding also applies to rural households (in 1998/99 and 2012/13), as well as urban households in 2012/13 (Table 3.5). Furthermore, urban households headed by someone who belong to the *Ga-Adangbe* ethnic group had on average lower consumption expenditure compared to those that have an *Akan/ Guan* as head in 2005/06, and a relatively higher consumption expenditure in 2012/13 (Table 3.6).

3.4.3 Inequality trends

To analyse Ghana's performance in terms of inequality, the Gini and the Theil-L indices of inequality in consumption expenditure per adult equivalent (henceforth I_c) are computed and reported in Table 3.6. First, the estimates obtained by Cooke et al. (2016) and McKay et al. (2016) – henceforth C & M – are reproduced in order to compare with the authors' observation regarding the trend of consumption inequality in Ghana. The inequality estimates reported by C & M reflect the level of inequality among individuals within the country. They are computed using the usual procedure of attributing the consumption expenditure per adult equivalent, calculated at the household level, to each member of the household.

Secondly, inequality estimates are also computed using the *restricted sample* which is obtained after limiting the GLSS data to household heads with information on parents' characteristics, ethnicity and place of birth. These estimates represent the level of inequality among household heads or among households, since the sample consists of only household heads and each household appears once in the dataset[29]. The results based on the *restricted sample* are compared to those

[29] C & M also employed consumption expenditure per adult equivalent as measure of welfare.

obtained by C & M in order to check the robustness of the trend in consumption inequality after sample restriction.

As shown in Table 3.6, the results of C & M are confirmed. Indeed, I_c has slightly increased in Ghana between 1998/99 and 2012/13. This trend is consistent for the two measures of inequality (Table 3.6). The replicated inequality estimates are very similar to that of C & M, and reveal that the Gini coefficient increased marginally from 0.387 in 1998/99 to 0.406 in 2005/06, and then remained stable between 2005/06 and 2012/13, with an estimate of 0.406 and 0.409, respectively. Similarly, the Theil-L index increase slightly from 0.254 to 0.287 between 1998/99 and 2005/06, but remained unchanged between 2005/06 and 2012/14. Moreover, the findings show that while there has been about 5 percent increase in I_c during the period 1998/99 – 2005/06, the pace has considerably slowed between 2005/06 and 2012/13.

Additionally, when the *restricted sample* is used, the conclusion remains about the same, although the Gini coefficients seem to have remained unchanged over the period. As shown in Table 3.6, the Gini coefficient computed based on the *restricted sample* is 0.406 in 1998/99, 0.410 in 2005/06, and 0.417 in 2012/13, while the Theil-L indices of I_c are 0.283, 0.292 and 0.303 in 1998/99, 2005/06 and 2012/13, respectively. Furthermore, the Gini and Theil-L indices obtained for the *restricted sample* are greater than those reported by C & M. This discrepancy, however, may be explained by the difference in the units of analysis (C & M estimated the level of inequality among individuals while the estimates based on the restricted sample represent the level of inequality among households).

Table 3. 6: Inequality in consumption expenditure in Ghana: C&M, replicated C&M and the restricted sample (1998/99 – 2012/13) – The inequality measures are the Theil-L index and the Gini index

	Theil-L – C&M			Gini – C&M		
Year	**1998/99**	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Overall est.	0.255	0.286	0.288	0.388	0.406	0.409
Std. Errors	n/a	n/a	n/a	n/a	n/a	n/a
Sample Size	n/a	n/a	n/a	n/a	n/a	n/a
	Theil-L – C&M (Replicated)			**Gini – C&M (Replicated)**		
Year	**1998/99**	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Overall est.	0.254	0.287	0.289	0.387	0.406	0.409
Std. Errors	0.012	0.010	0.007	0.008	0.007	0.005
Sample Size	26,411	37,126	72,368	26,411	37,126	72,368
	Theil-L – Restricted Sample			**Gini – Restricted Sample**		
Year	**1998/99**	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Overall est.	0.283	0.292	0.303	0.406	0.410	0.417
Std. Errors	0.013	0.010	0.008	0.009	0.007	0.005
Sample Size	4,212	6,510	12,262	4,212	6,510	12,262

Source: Cooke et al. (2016), McKay et al. (2016) and author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The table presents the estimates reported by Cooke et al. (2016), McKay et al. (2016), a replication of these estimates using the GLSS data, and estimates based on the *restricted sample.* The *restricted sample* comprises household heads with background information, who are 15 to 64 years old. The age restriction is done to ensure that most individuals in the sample are part of the labour force. The results take into account sampling weights and clustering. C & M= Cooke et al. (2016) and McKay et al. (2016).

Hence, in the computation of C & M more weight is given to households with many members (that might not necessarily be the poorer households) than those with fewer members in the distribution, mainly because the number of times a household's consumption expenditure per adult equivalent

is represented in the data is equal to the number of members in that household. For instance, if there are many more poor households with larger size than rich households, then – by applying an inequality measure that considers equal weight across the distribution – we expect the estimate of inequality computed among household heads to be smaller than that of C & M. But, the opposite may hold if there are more large size households among the upper or/and the middle class. Thus, the inequality estimates presented in Table 3.6 for the *restricted sample* are likely to be lower or higher than those reported in C & M depending on the distribution of the size of households present in the data.

Table 3.7 presents the estimates of I_c using the *restricted sample* disaggregated by sex and area of residence (rural-urban). The inequality estimates reveal that there is a greater disparity in consumption expenditure among male-headed households compared to those headed by females. This finding is similar to that of Cooke et al. (2016). It is also observed, based on the Theil-L (Gini) estimates reported in Table 3.7, that I_c increased marginally among male-headed households from 0.283 (0.404) in 1998/99 to 0.311 (0.423) in 2012/13, while among female-headed households, I_c has stagnated over the period 1998/99 – 2012/13 (Table 3.7). Indeed, the Theil-L (Gini) index among female-headed households is 0.283 (0.409) in 1998/99, 0.274(0.400) in 2005/06 and 0.278 (0.399) in 2012/13.

Table 3. 7: Inequality in consumption expenditure across sex and area of residence – restricted sample (1998/99 -- 2012/13) – The inequality measures are the Theil-L index and the Gini index

	Theil-L – Restricted Sample			Gini – Restricted Sample		
	1998/99	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Male	0.282	0.294	0.311	0.404	0.411	0.423
Female	0.283	0.274	0.278	0.409	0.400	0.399
Rural	0.262	0.248	0.292	0.393	0.380	0.412
Urban	0.228	0.244	0.243	0.364	0.377	0.379

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The results reported in the table are based on the *restricted sample*, which comprises all household heads aged 15 to 64 years, with available background information. The results take into account sampling weights and clustering. For further details, see notes of Table 3.6

Furthermore, I_c is higher among rural households than urban households. This finding is consistent across surveys and inequality measures (Table 3.7). Nevertheless, between 1998/99 and 2005-06, the slight increase of I_c at the national level is an urban rather than a rural story. While consumption inequality declined marginally in rural areas between 1998/99 to 2005/06 (from 0.262 to 0.248 according to the Theil-L estimates), it rose slightly in urban areas over the same period. However, from 2005/06 to 2012/13, I_c rose in rural dwellings and stagnated in urban areas.

3.4.4 Inequality of opportunity

The parametric and the non-parametric estimates of IO for consumption expenditure based on the *restricted sample* are presented in Table 3.8. The absolute and the relative estimates are reported. Also presented in Table 3.8 are IO estimates by sex and area of residence. Overall, the estimates of IO provided using the two approaches are similar and show almost the same trends. However,

in many instances (particularly in the overall and the male samples), the parametric estimates are slightly greater than the non-parametric ones.

It is important to recall that, in addition to the problem of omitted circumstance variables under the parametric and the non-parametric approaches[30], the IO estimates may further be biased by the linearity assumption in the former and the aggregation of circumstances in the latter (see Section 3.1.4). As argued by Brunori et al (2015a), although both approaches give the lower bound estimates of IO, the difference between the parametric and the non-parametric estimates depends on the relative severity of the downward-bias introduced by the linearity assumption in the parametric approach and the aggregation in the non-parametric approach. Thus, the present results suggest that aggregating the parental education variable under the non-parametric approach imposes a greater bias on the estimates than the linearity assumption under the parametric approach.

[30] Recall that according to Ferreira and Gignoux (2011), the parametric and the non-parametric estimates of IO are lower-bound estimates of the true IO because not all circumstances that influence a person's outcome are included in the analysis due to data limitations and partial observability of circumstances (as a result, the IO estimates under both approaches are biased downward. See Section 3.1.4).

Table 3. 8: Inequality of opportunity estimates using the parametric and the non-parametric approaches (1998/99 – 2012/13) – The inequality measure is Theil-L index

	Parametric Approach					
	Theil-L – Absolute IO			Theil-L – Relative IO		
	1998/99	2005/06	2012/13	1998/99	2005/06	2012/13
Ghana	0.066	0.063	0.061	23.41%	21.48%	20.26%
Male	0.071	0.067	0.063	25.11%	22.62%	20.43%
Female	0.053	0.043	0.051	18.72%	15.57%	18.42%
Rural	0.047	0.044	0.036	17.76%	17.96%	12.35%
Urban	0.043	0.027	0.036	18.90%	11.20%	14.96%

	Non-Parametric Approach					
	Theil-L – Absolute IO			Theil-L – Relative IO		
	1998/99	2005/06	2012/13	1998/99	2005/06	2012/13
Ghana	0.065	0.057	0.057	22.78%	19.40%	18.75%
Male	0.068	0.062	0.058	24.26%	21.16%	18.52%
Female	0.060	0.041	0.057	21.24%	15.01%	20.40%
Rural	0.050	0.038	0.038	18.89%	15.23%	12.92%
Urban	0.044	0.029	0.034	19.39%	11.94%	13.97%

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The results reported in the table are based on the *restricted sample*, which comprises all household heads aged 15 to 64 years, with available background information. The circumstance variables employed are mother and father's education, parents' occupation, region of birth and ethnicity. The results take into account sampling weights and clustering. The absolute (absolute IO) and the relative (relative IO) estimates are obtained using the parametric approach proposed by Ferreira and Gignoux (2011) and the non-parametric approach proposed by Checchi and Peragine (2010), discussed in Sections 3.1.2 and 3.1.3, respectively.

The results presented in Table 3.8 mainly show that despite the slight increase in I_c among households in Ghana between 1998/99 and 2012/13, the share of the overall inequality that is explained by IO has declined between 1998/99 and 2012/13. Specifically, the findings suggest that

the relative IO based on the parametric (non-parametric) approach decreased from 23.41 (22.78) percent in 1998/99 to 21.48 (19.40) percent in 2005/06, and then to 20.26 (18.75) percent in 2012/13. At first glance, the decreasing trend in the relative IO at least suggests that the denominator, I_c, has increased at a faster rate than the numerator, IO.

Meanwhile, on the one hand, the absolute IO estimates based on the parametric approach reveal that IO in absolute terms has been stable over the period, with a value of 0.066 in 1998/99, 0.063 in 2005/06, and 0.061 in 2012/13. On the other hand, the non-parametric estimates show a slight decrease from 0.065 to 0.057 between 1998/199 and 2005/06, then a stagnation over the period 2005/06 – 2012/13. The results remain about the same when interactions among the circumstance variables are included in the OLS regression (Appendix Table A.3). Indeed, as reported in Appendix Table A.3, the absolute parametric estimates are 0.068, 0.066 and 0.065, which correspond in relative terms to 24.41%, 22.76% and 21.62% for the years 1998/99, 2005/06 and 2012/13, respectively. Therefore, the linearity assumption seems to impose a relatively small constraint on the IO estimates in Ghana.

A similar trend is revealed when a much more disaggregated set of circumstance variables are used for the overall sample (Appendix Table A.4)[31], although the estimates of IO are larger than those reported in Table 3.8 as a result of the inclusion of additional categories for the circumstance

[31] Circumstance variables as well as the interactions between these variables are introduced in the OLS equation. The circumstance variables are: mother and father's educational attainment (each measured in years of education), mother and father's occupation (divided in four categories, namely, production/administration/clerical, sales/elementary occupations, services, agriculture, and production and other related activities), ethnicity (coded into seven categories: Akan, Ga-Adangbe, Ewe, Guan, Gurma, mole-dagbani, and others), and place of birth (categorised into 10 regions, namely, Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, and Upper West).

variables[32]. As reported in Appendix Table A.4, the absolute IO estimates based on the parametric approach fell slightly from 0.097 in 1998/99 to 0.095 in 2005/06, and then to 0.091 in 2012/13. And with respect to the relative IO, there is a decline from 34.41 percent in 1998/99 to 32.63 percent is 2005/06, and then to 29.98 percent in 2012/13.

The results, therefore, suggest that the rise in I_c that is observed among households in Ghana may not be as a result of an increase in IO, but may rather be attributed to effort or other unobserved circumstances, including luck. This finding may be explained by the increase in the returns to education in Ghana over the years, whereby as the economy grew, people who strived to attain higher educational levels obtained higher wages with positive implications for their household consumption expenditure, hence leading to an increase in inequality in the country (Teal, 2001; Coulombe and Wodon, 2007; Baffour and Turkson, 2015).

Using the 2012/13 GLSS dataset, Brunori et al. (2015a)[33] found an estimate of relative IO (absolute IO) in Ghana of about 29 percent (0.0858) using the parametric approach and 14 percent (0.0392) based on the non-parametric approach. Hence, despite few methodological differences between the current study and that of Brunori et al. (2015a), the 2012/13 estimates of IO obtained

[32] As argued in the literature, the estimate of IO increases as more variables explaining the variation in the outcome are included the analysis (Ferreira and Gignoux, 2011; Brunori et al., 2015a). Disaggregating the information in each circumstance variable (coding each of the variables into a higher number of categories) is equivalent to adding regressors (dummy variables) to the OLS equation in the parametric approach.

[33] As discussed in Section 2.1.3, Brunori et al. (2015a) measured IO in 11 SSA countries, including Ghana (see Section 2.1.3). The estimates for Ghana are obtained using the GLSSVI dataset and four circumstance variables, namely, mother and father's education, ethnicity and place of birth. Unlike Brunori et al. (2015a), the present study focuses on analyzing the trend and pattern of IO in Ghana. Three rounds of the GLSS survey (IV, V, and VI) are used and five circumstance variables are considered (mother and father's education, parents' occupation, ethnicity and place of birth).

in the present analysis are overall similar to those reported in the latter[34].

Nevertheless, two key methodological differences explain the marginal variations between the estimates (the results presented in Table 3.8 and Appendix Table A.4 for the year 2012/13 are slightly higher than those obtained by Brunori et al. (2015a)). First, the present study considered a higher number of circumstance variables. Brunori et al. (2015a) considered four circumstance variables (mother and father's education, ethnicity and place of birth) as opposed to five circumstance variables in the present study (mother and father's education, parent's occupation, ethnicity and place of birth). Thus, with the inclusion of an additional circumstance variable, the estimates of IO in the present analysis are – as expected – higher than to those reported by Brunori et al. (2015a).

Secondly, Brunori et al. (2015a) considered all individuals in the household aged 15 years and above. Meanwhile, in the present study, the focus is on household heads who have 15 to 64 years old. In Appendix Table A.5, the sample used in computing the IO estimates reported in Table 3.8 is extended to include all household members who are 15 years and above, with available background information (similar to the sample used by Brunori et al. (2015a)). The results of the parametric and non-parametric estimation of IO, based on the sample of all household members who are 15 years and above, are lower than those that are computed using the household heads sample (see Table 3.8 and Appendix Table A.5). This finding suggests that including all household members in the sample may reduce the effect due to circumstances on outcome disparities. A

[34] The parametric estimates of IO at the national level, using a more detailed information on the circumstance variables are reported in Appendix Table A.4 for the overall household head sample. The results show a relative (absolute) estimate of about 30 percent (0.091) in 2012/13.

possible explanation of this result is that an extended sample may include dependants, for instance, the older persons, who do not contribute or contribute little to household resources. Hence, the effect of circumstances on the average consumption expenditure is dampened and IO would tend to be underestimated.

Furthermore, Cogneau et al. (2006), using the 1988/89 round of the GLSS dataset (GLSS II) and three circumstance variables, namely, father's education, father's occupation and region of birth, found an absolute IO estimate of 0.02 and a relative estimate of about 5 percent. The estimates reported in the present study are therefore updated versions of the IO estimates of Cogneau et al. (2006), since it uses the GLSS IV, V and VI (1998/99, 2005/06 and 2012/13, respectively), with a richer set of circumstances variables (five instead of three). Although the larger IO estimate obtained for 1998/99 could imply that IO increased between 1988/89 and 1998/99, such conclusion clearly goes beyond the scope of this study, which considers only recent rounds of the GLSS survey.

The disaggregation by sex reveals that there is a high IO among male household heads than female, suggesting that compared to female-headed households, a higher proportion of the gap between the rich and the poor male-headed households is explained by *pre-existing* circumstances such as parents' characteristics, ethnicity and place of birth. In other words, the chances for achieving a high level of consumption expenditure are less equal among male than female heads. This finding may be explained by the difference in the sources of household income between female and male-headed households. Indeed, as detailed in Appendix Table A.6, a higher share of income in female-headed households comes from non-wage sources, especially remittances, compared to their male-headed counterparts. Hence, one may expect lower IO estimates among female-headed households since non-wage income – that is income coming from external sources, such as remittances or gifts

– is less likely to be related to the observed *pre-existing* circumstances of the household head than wage income. The latter component, unlike the former, may reflect disparities in labour market opportunities (Baah-Boateng, 2013).

Also, Table 3.8 provides evidence of a decreasing trend of IO for male-headed households over the period, while female-headed households experienced a decline in IO between 1998/99-2005/06 and an increase from 2005/06 to 2012/13. On the one hand, the parametric estimates of the share of the distribution of consumption expenditure among households that is explained by IO declined from 25.11 percent in 1998/99 to 20.43 percent in 2012/13 for male heads. On the other hand, female-headed households experienced a fall in relative IO from 18.72 percent to 15.57 percent between 1998/99 and 2005/06, and an increase from about 15 percent in 2005/06 to 18.42 percent in 2012/13. Similar trends are observed for the non-parametric estimates. This rise in IO among female-headed households over the latter period may be due to the increasing importance of labour earnings in household income, accompanied by a significant drop in the share of income obtained from remittances in female-headed households in Ghana over 2005/06 (see Appendix Table A.6).

Furthermore, rural-urban disaggregation shows that overall, absolute IO is higher in rural areas than in urban dwellings, reflecting the difference in labour demand as well as the availability of high income-generating opportunities between these locations. Even though existing studies show that unemployment rates are higher in urban than rural Ghana (Baah-Boateng, 2013; GSS, 2013a), employment in rural dwellings is concentrated in agriculture, which employs more than 70 percent of the rural population (GSS, 2014b). Hence, access to decent employment opportunities in rural areas highly depends on *pre-existing* circumstances, whereby individuals with favourable backgrounds have higher chances to access the well-remunerated non-agricultural jobs. This finding is similar to that of Singh (2012) who found higher IO in rural areas than urban in India.

Moreover, IO decreased in rural areas between 1998/99 and 2012/13. In urban areas, however, it decreased over the period 1998/99 and 2005/06, while rising from 2005/06 to 2012/13 according to the parametric (non-parametric) estimates (Table 3.8).

3.4.4a Contribution of circumstance variables to inequality of opportunity for consumption expenditure

To better understand the importance of each circumstance variable in explaining the observed values and trends in IO, the study conducts a Shapley-Shorrocks decomposition[35] of IO across rounds and all sub-groups (Shorrocks, 2013; Brunori et al., 2015a). The results are reported in Figures 3.1, 3.2 and 3.3.

Conducting a decomposition allows us not only to identify the relative contribution of each circumstance variable to the observed IO at every point in time, but also to compare the relative importance of each circumstance variable over time. It is however important to note that rather than depicting a causal relationship, the results of the decomposition represent correlation between the circumstance and the outcome variables (Ferreira and Gignoux, 2011; Brunori et al., 2015a). Thus, the interpretation of the relative marginal contribution must be done with caution.

Additionally, given that the observed *pre-existing* circumstances may be correlated with other unobserved ones, it is not entirely correct to interpret the relative contribution of each circumstance variable as the contribution of the variable alone, but as the relative contribution of the circumstance variable and other circumstances that might be correlated with the variable

[35] The Shapley decomposition is a regression-based decomposition, based on the Shapley value approach. It was proposed by Shorrocks (2013) and allows the decomposition of any inequality measure into the expected marginal effect of each of the components by using all possible permutations.

considered (Brunori et al., 2015a; Assaad et al., 2017). Thus, the relative importance of place of birth, for example, includes the effect of the available social and perhaps cultural infrastructure that are likely to influence a person's human and social capital when he (she) is growing up, and ultimately affect his (her) outcome. Similarly, the contribution of parents' occupation reflects the importance of parental wealth and social network in labour market that might influence outcome.

Furthermore, in decomposing IO into the relative contribution of each circumstance variable, categorical variables are transformed into dummy variables, and the number of dummy variables corresponds to the number of categories in these circumstance variables. Thus, for a given year, the present analysis includes mother and father's education as continuous variables (i.e. years of schooling), parental occupation as two dummy variables, ethnicity as two dummy variables and one dummy variable for place of birth[36]. As argued by Sastre and Trannoy (2002), one of the drawbacks of the Shapley decomposition of inequality is its sensitivity to the level of disaggregration of the components [37]. Nonetheless, given that the categorization of the circumstance variables in the present study remains unchanged across surveys, the relative effects of circumstance variables are reasonably comparable over time.

As shown in Figure 3.1, while the relative importance of parent's education has increased over time, that of place of birth and ethnicity declined over the period. Indeed, between 1998/99 and 2012/13, the contribution of place of birth decreased from about 35.37 percent to 16.92 percent and that of ethnicity declined from 16.60 percent to 7.84 percent. Ethnicity, hence, became the least contributor to inequality of opportunity in 2012/13. The relative importance of parent's

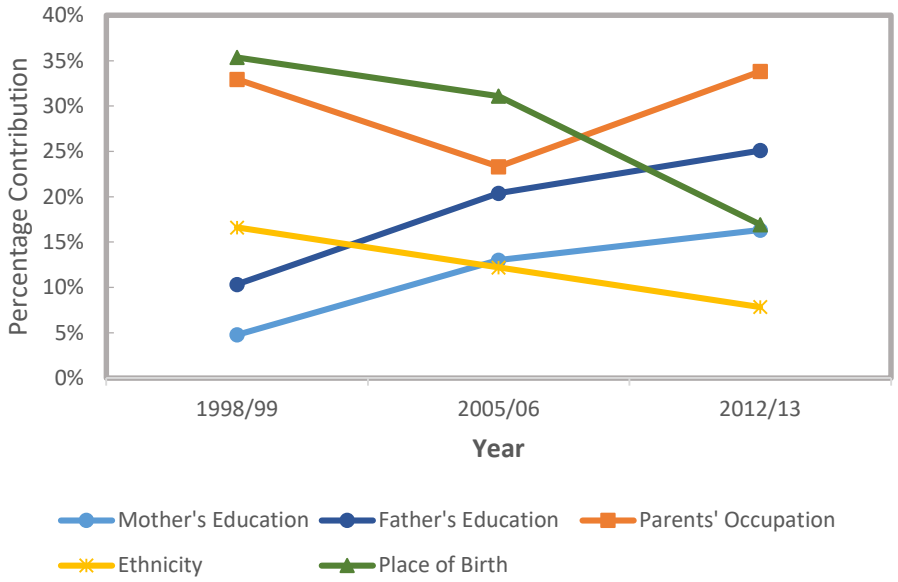
[36] Recall that parent's occupation and ethnicity are defined as categorical variables, and each of them is coded into three groups.

[37] For further details on this issue are provided in Sastre and Trannoy (2002).

occupation fell from 1998/99 to 2005/06, and then increased between 2005/06 and 2012/13 to become the highest contributor to IO. The variable is followed by father and mother's education, which increased in relative importance over the three rounds.

These findings suggest that parental characteristics (father and mother's education and parents' occupation), which reflect parental wealth, have gained in importance over time in explaining the disparities in opportunities in Ghana while a person's place of birth and ethnicity are less and less important. While the increasing contribution of parental characteristics to IO could be explained by several possible reasons, the downward trending contribution of place of birth may be attributed to increasing urbanization and internal migration between 1998/99 and 2012/13. Both factors result from infrastructural development and the high level of connectivity between regions, especially between the north and the south. Moreover, the improvement of institutional settings and decentralization in Ghana over the years may have reduced the influence of ethnic diversity in the distribution of resources in the country (Osei-Assibey, 2014; Asante and Gyimah-Boadi, 2004).

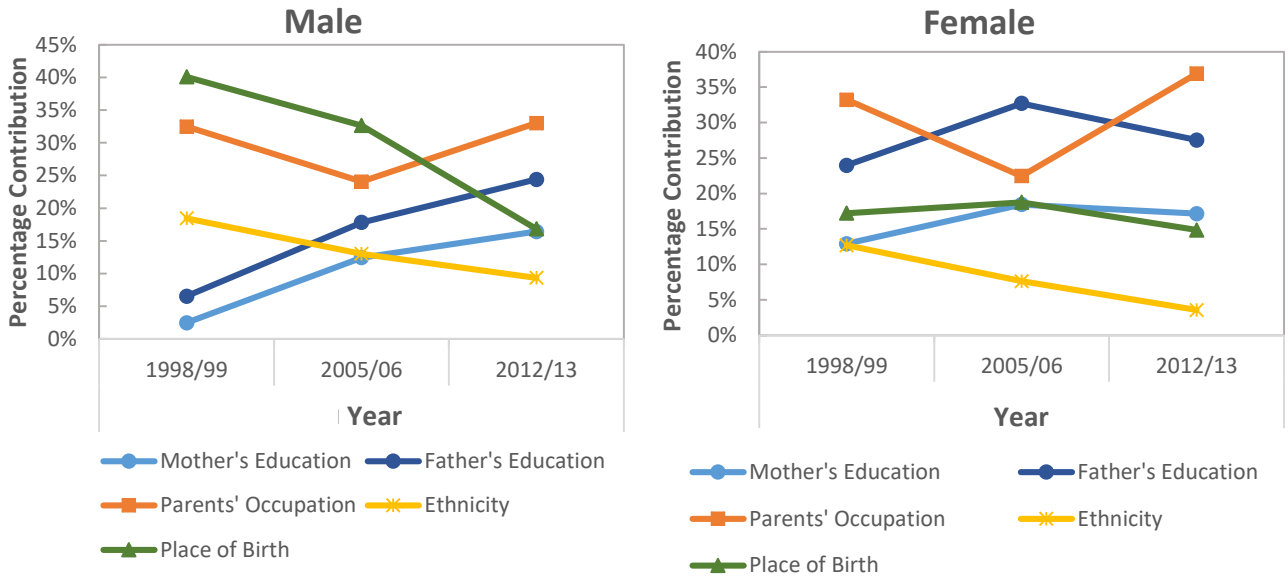
Figure 3. 1: Shapley decomposition of inequality of opportunity estimates across rounds (1998/99 – 2012/13)



Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Note: The results take into account sampling weights and clustering.

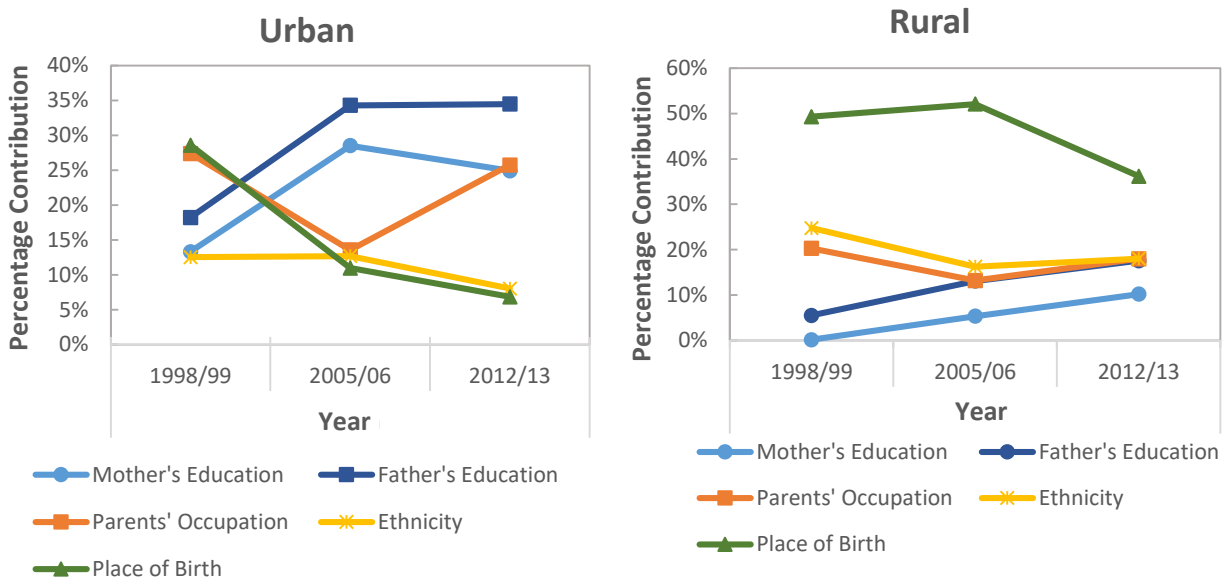
Figure 3. 2: Shapley decomposition of inequality of opportunity across sex (1998/99 – 2012/13)



Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Note: The results take into account sampling weights and clustering.

Figure 3. 3: Shapley decomposition of inequality of opportunity in area of residence (1998/99 – 2012/13)



Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Note: The results take into account sampling weights and clustering.

The relatively low contribution of ethnicity to IO in 2012/13 observed in the present study is contrary to the results of Brunori et al. (2015a), who found that ethnicity is relatively more important in explaining IO in Ghana. The difference in the findings results from the relatively higher number of dummy variables used by Brunori et al. (2015a) to capture the contribution of ethnicity to IO. Indeed, the estimates of the marginal effect obtained through the Shapley decomposition method tend to be sensitive to the relative number of dummy variables used to capture the effect of a circumstance (Sastre and Trannoy, 2002; Brunori et al., 2015a). More specifically, the relative contribution of a circumstance variable is an increasing function of the number of dummy variables used to proxy it, all things being equal (see Brunori et al., 2015a).

Hence, by using 63 dummy variables for ethnicity, and 42 dummy variables for parental education, as it is the case in Brunori et al. (2015a), ethnicity is more likely to explain larger variability than parental education, therefore leading to the dominant role of ethnicity reported by the study. This problem is however minimized in the present study with the use of similar number of dummy variables to capture ethnicity, place of birth and parental occupation.

The results of the decomposition for the male sub-sample are similar to those of the entire sample (Figure 3.2). With regard to female-headed households, the relative contribution of ethnicity declined across rounds, while that of place of birth and parents' education increased between 1998/99 and 2005/06, and then fell over the period 2005/06 – 2012/13. Moreover, the trend in the relative importance of parents' occupation is consistent with what is observed for the aggregate sample (Figure 3.2). Overall, the relative importance of parental occupation and education for IO is higher in the female sample compared to male. Indeed, the contribution of father's education for females was about 4 times that of males in 1998/99. This finding confirms the earlier findings of greater importance of parental education for female's outcome than male (Tansel, 1997). Furthermore, the importance of place of birth and ethnicity has been lower in the female sample than in the male, though their importance has decreased faster for the latter than the former (Figure 3.2).

As shown in Figure 3.3, the Shapley decomposition by location indicates that place of birth is a major relative contributor to opportunity gaps in rural areas while parental wealth variables (father and mother's education and parents' occupation) are relatively important for IO in urban areas (Figure 3.3). Given that a large proportion of individuals live in their region of birth (see Appendix Table A.7), the notable relative contribution of place of birth to IO in rural dwellings may be attributable to differences in the availability of employment opportunities in rural south and the

rural north in Ghana. Furthermore, the results support the finding that over time, the relative importance of place of birth and ethnicity is falling while that of parents' education and occupation is rising. The faster decrease of the contribution of place of birth in the urban areas compared to rural suggests that there is a greater decline of the southern-born premium in urban areas.

3.5 Summary of findings and conclusion

In sum, the analysis of the trends in IO for consumption expenditure since the late-1990s, suggests that the share of the observed inequality that is explained by IO has decreased in Ghana. The fall in IO for consumption expenditure despite the increase in observed inequality, suggests that much of the observed upward trend in inequality in consumption expenditure in Ghana may be attributed to disparities in effort or other unobserved circumstances, including luck. The results are similar to the findings of Assaad et al. (2017), who found a downward trending IO for consumption expenditure in the case of Egypt.

Despite the fact that the estimates of IO are lower-bound estimates of the true IO, the findings show that Ghana has a moderate level of IO. The share of the observed inequality that is explained by IO in the country is lower than that of Malawi, which is about 33 percent in 2010, but it is higher than that of Tanzania, which is about 25 percent in 2012, and that of Egypt, which is about 13 percent in the same year (Brunori et al., 2015a; Hassine and Zeufack, 2015; Assaad et al, 2017)[38].

The study also finds that IO is higher for male-headed households compared to female-headed

[38] In the computation of IO for consumption expenditure in Malawi, Tanzania and Egypt, two, seven and four circumstance variables were used, respectively.

households. The findings further reveal that IO for consumption expenditure decreased among male-headed households over the entire period considered, while for female-headed households, it increased between the two most recent surveys. This result is attributed to the increase in the relative contribution of wage income to resources in female-headed households over the period, which presumably tends to reflect the disparities in opportunities in the labour market in Ghana.

With respect to the rural-urban disaggregation, the study shows that unlike the case of Tanzania, IO is higher in rural than in urban areas. The finding may be explained by the presence of high-paying employment and income-generating activities in the cities compared to rural dwellings where the major activities are in the agriculture sector, which is mostly at the subsistence level (Ministry of Food and Agriculture (MoFA), 2016).

Furthermore, the contribution of circumstance variables to IO has changed over the one and half decades considered in this study. While in the late-1990s, ethnicity and place of birth were the major contributors to IO in Ghana, about 15 years later, it is parental wealth (the contribution of parental wealth is reflected by parents' education and occupation) which is important. Indeed, it is shown that parents' education, especially the education of the father, and parents' occupation contribute largely to IO in 2012/13.

The substantial decline in the relative contribution of place of birth and ethnicity are the main drivers of the downward trend in IO of consumption expenditure in Ghana. This finding is quite similar to that of Assaad et al. (2017) who found that the fall in IO in Egypt is largely explained by the decline in the contribution of region of birth. The results may be explained by a growing urbanization in northern Ghana (Fuseni and Kemp, 2016) and an increase in migration between the north and the south (Van der Geest, 2011), propably facilitated by infrastructural development

and increasing connectivity between the two parts of the country. Another explanation may be the implementation of a number of development programmes as well as social interventions, aimed at reducing the north-south divide. These programmes that have been put in place – the universal basic education, capitation grant, LEAP programme, National Health Insurance sheme (NHIS), youth employment programmes and school feeding programmes (Osei-Assibey, 2014) – may have given better opportunities to individuals from disadvantaged backgrounds to achieve higher outcomes. Moreover, the decreasing and relatively low contribution of ethnicity to the overall IO may be due to decentralization programmes and improvement of the countries' institutions, that may have limited the influence of ethnic diversity on the distribution of resources (Osei-Assibey, 2014; Asante and Gyimah-Boadi, 2004; Andràand MesplàSomps, 2010).

CHAPTER FOUR

OPPORTUNITY AND POVERTY IN GHANA: THE NORTH-SOUTH DIVIDE

4.0 Introduction

Focusing on the GLSS VI survey, the present chapter, first, investigates the existence of a north-south divide with respect to inequality of opportunity in Ghana. Secondly, the study examines whether the lack of opportunities, as a result of *pre-existing* circumstances, is related to poverty in the country. Specifically, I use the opportunity profile, proposed by Ferreira and Gignoux (2011), as well as poverty profiles to identify the *least advantaged* or the *worst-off* type and the probability of being poor according to social background, respectively. Lastly, the study conducts an empirical analysis of the correlates of poverty within the opportunity-deprived group in Ghana.

The rest of the chapter is structured as follows. The next section discusses the spatial dimension of inequality of opportunity in Ghana. Then, in Section 4.2, the association between opportunity and poverty is examined using opportunity and poverty profiles. This analysis is followed by the empirical investigation of the determinants of poverty among the *least advantaged* in Ghana (Section 4.3). Section 4.4 summarizes the main findings and concludes.

4.1 Inequality of opportunity: The north-south divide

Various studies, including Annim et al. (2012), McKay et al. (2016) and Cooke et al. (2016) have highlighted the spatial dimension of inequality in Ghana, especially the existence of a north-south divide. Specifically, these studies have found evidence of high consumption inequality as well as

poverty in the northern part of the country, compared to the south. To confirm these findings, with respect to inequality, and also shed some light on the north-south opportunity divide in the country, Table 4.1 reports the Theil-L indices of I_c and IO based on the *restricted* sample. Furthermore, a regional disaggregation is conducted in order to give a better understanding of the spatial dimension of inequality and IO in Ghana. The analysis focuses on the 2012/13 survey and uses three circumstance variables, namely, mother's education, father's education and parents' occupation (see Chapter 3, Section 3.4.2 for more details).

First, similar to the findings of McKay et al. (2016) and Cooke et al. (2016), the estimates of I_c show that inequality is higher in northern Ghana than in the southern part. The Theil-L indices are 0.337 for the former and 0.278 for the latter. The regional disaggregation of I_c reveals that inequality is higher in the three northern regions, namely, Northern, Upper East and Upper West regions, than in other regions of Ghana. The regional sub-samples also show that Upper West region, which has been identified as the poorest region in Ghana (Cooke et al.,2016), has the highest I_c level. The region is followed by Northern and Upper East regions, respectively. In southern Ghana, the least unequal region is Greater Accra, with an estimated inequality of 0.214, while the most unequal is the Volta region.

Table 4. 1: Inequality in consumption expenditure and inequality of opportunity (2012/13) – Northern vs. southern Ghana and regional estimates

Region	Inequality in Consumption Expenditure (Theil-L)	Absolute IO		Relative IO	
		Parametric	Non-Parametric	Parametric	Non-Parametric
North	0.337	0.057	0.062	16.78%	18.44%
South	0.278	0.041	0.037	14.75%	13.16%
Western	0.279	0.042	0.044	14.91%	15.75%
Central	0.288	0.028	0.022	9.59%	7.78%
Greater Accra	0.214	0.026	0.021	12.19%	9.83%
Eastern	0.244	0.026	0.032	10.80%	13.22%
Volta	0.291	0.029	0.034	9.83%	11.61%
Ashanti	0.253	0.034	0.038	13.48%	15.15%
Brong Ahafo	0.259	0.017	0.015	6.55%	5.98%
Northern	0.313	0.049	0.064	15.73%	20.44%
Upper East	0.309	0.045	0.047	14.44%	15.26%
Upper West	0.472	0.120	0.121	25.35%	25.59%

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The results reported in the table are based on the *restricted sample*, which comprises all household heads aged 15 to 64 years, with available background information. The circumstance variables employed are mother and father's education and parents' occupation. The results take into account sampling weights and clustering. The absolute (absolute IO) and the relative (relative IO) estimates are obtained using the parametric approach proposed by Ferreira and Gignoux (2011) and the non-parametric approach proposed by Checchi and Peragine (2010), discussed in Sections 3.1.2 and 3.1.3, respectively.

Secondly, the estimates of IO for the north-south disaggregation and across regions suggest that, similar to I_c, IO is lower in southern Ghana than in the north. The gap between the estimates is wider under the non-parametric approach compared to the parametric approach. The absolute estimate under the parametric approach is 0.062, representing about 18.4 percent of the observed inequality in the north, while in the south the estimate is 0.037, equivalent to 14.8 percent of I_c. With respect to the non-parametric approach, the absolute estimates obtained are 0.057 for the

north and 0.041 for the south, which correspond to 16.8 percent and 13.2 percent, respectively, in relative terms.

The disaggregated analysis reveals that IO also followed a similar pattern as I_c in the three northern regions, but not in the south. The highest opportunity gap is found in the Upper West region, where IO accounts for at least 25 percent the observed consumption inequality. The region's level of absolute IO is about twice that of the country as a whole[39] (see Tables 4.1 and 3.6). In the southern part of Ghana, Western region has the highest level and share of IO. In terms of relative IO, Western region is followed by Ashanti, Greater Accra, Eastern, Volta, Central and Brong Ahafo regions. The Brong Ahafo region has the lowest opportunity gap, although the region's level of inequality is higher than that of Ashanti, Eastern and Greater Accra regions.

The relatively high level of IO in northern Ghana may be explained by the economic structure and the existing job opportunities in that part of the country. Indeed, the economy of the northern part of Ghana is essentially agricultural-based and employment is largely concentrated in that sector (Jedwab and Osei, 2012). Moreover, the agricultural sector in the north, which is essentially based on food crop production, has not benefited much from trade openness and export growth in Ghana over the recent years, and hence, remains largely at the subsistence level (ODI and CEPA, 2005). Although there has been a substantial shift of employment from farming to non-farming activities, much of this activity is in the informal sector, characterised by low productivity and earnings (Baah-Boateng and Ewusi, 2013). Consequently, the limited availability of the high-paying non-agriculture employment might have created a situation of high opportunity gap, whereby those

[39] The estimate of IO at the national level includes two more additional circumstances variables. If all these variables were considered in the regional level analysis, the estimates would have been greater than the current level.

from the upper class have higher chances to access less vulnerable employment while those from a disadvantaged background are more likely to end up in vulnerable jobs or be unemployed.

In order to understand the channels through which circumstances influence opportunity distribution, the IO estimate is decomposed into the direct effect of circumstances, and their indirect effect through effort variables such as education, number of hours worked, migration and household composition. First, education is included as an effort variable in the decomposition, in order to identify the indirect effect of circumstances through education. And secondly, we consider a group of effort or choice variables, which includes in addition to education, number of hours worked, migration status of the household head, and the composition of the household, in order to further isolate the direct effect of circumstances.

This basic analysis is crucial for policy purposes since it sheds light on whether the observed regional IO arises from the effect of circumstances on education (and other effort variables) or whether it is direct, in which case it may be attributed to social connections and networks linked to parental social class. A decomposition is conducted for the north and south, as well as for each region in order to highlight the spatial dimension of the effects. Given that various policies have been implemented to reduce the gap in school enrolment and provide access to education for all (at least basic education), independently of socio-economic background, it is expected that the estimated indirect effect, via education in particular, would be low, which may suggest that chances for educational attainment have somehow been equalized[40].

In order to decompose IO into the direct and indirect effects of circumstances, the study employs

[40] It should however be noted that this analysis does not provide full evidence on inequality of opportunity for educational achievement, which of course would require further investigation.

the methodology proposed by Bourguignon et al. (2007a). To evaluate the direct effect, the following equation is estimated:

$$w = c_i\delta + e_i\alpha + \varepsilon_i \qquad (26)$$

Equation 26, which is the linear form of Equation 12 is estimated, where δ and α are matrices of coefficients on circumstance and effort variables, respectively, and ε_i represents the error term.

A counterfactual, $w^d = exp(\bar{c}\hat{\delta} + e\hat{\alpha} + \hat{\varepsilon})$, is then created by setting individuals' circumstances to be the same, while controlling for effort. Since effort has been controlled for, the direct effect (the effect of circumstances that is not channelled through the effort variables) can be written as:

$$DE = RelativeIO^d = \frac{I(w) - I(w^d)}{I(w)} \qquad (27)$$

Finally, the indirect effect is obtained by taking the difference between the overall or total effect, $RelativeIO$, and the direct effect, $RelativeIO^d$.

$$RelativeIO^{ind} = RelativeIO - RelativeIO^d \qquad (28)$$

$$IE = TE - DE \qquad (29)$$

$RelativeIO^{ind}$ or IE is interpreted as the share of observed inequality that is explained by the effect of circumstances, c, through effort, e.

Effort, e, is measured by education, number of hours worked, migration and household composition. The education variable is defined as the individual's years of schooling, while migration status is a dummy variable, which takes the value '0' if the individual resides in the town or village of his birth (i.e. not a migrant), and '1' if otherwise. To control for household

composition, the study uses the number of infants, children, adults and seniors in the household as well as their squared values.

It is important to note that there could be some issues with using the migration status of a person, as defined, as an effort variable. The reason is that the variable may reflect the migration of the parents and not the decision or the choice of the individual (in which case it would rather be considered as a circumstance). Also, even though the presence of infants, children and adults may result from the choice of the household head, one can argue that it is the consequence of a joint decision of the household head and the spouse or other members of the household. Furthermore, the presence of seniors in the household may not be entirely due to the household head's own choices but rather be a circumstance, since old or disabled parents or relatives may join the household because of some situations that are out of the head's control. Keeping in mind all these drawbacks, the results of the second decomposition, which take into account migration and household composition need to be taken with caution.

Using the methodology described above, the relative IO is decomposed into direct effect (DE) and indirect effect (IE) of circumstances, first through education, measured by years of schooling; and secondly through education, number of hours worked, migration and household composition. This exercise is conducted for each of the regions, using GLSS VI and the *restricted sample* (household heads sample). Parents' characteristics (father and mother's educational attainment and parents' occupation) are considered as circumstance variables. The results are presented in Table 4.2[41].

[41] The difference between the estimates of relative IO reported in Table 4.2 and the estimates presented in Tables 4.1 results from the reduction in the sample size due to missing data for the individual's education variable (years of schooling). The estimates, however, are close to the earlier ones obtained from the

Table 4. 2: Decomposition of inequality of opportunity into direct and indirect effect of circumstances using the parametric approach (2012/13) – The inequality measure is the Theil-L index

Region	Inequality in Consumption Expenditure per Adult Equivalent (*Ic*)	Relative IO	Effort Variables: Household Composition, Migration, Number of hours worked and Education		Effort Variable: Education	
		Total effect (TE) of Circumstances	Direct Effect (DE) of Circumstances	Indirect Effect (IE) of Circumstances	Direct Effect (DE) of Circumstances	Indirect Effect (IE) of Circumstances
Ghana	0.276	14.55%	11.18%	3.37%	13.70%	0.85%
South	0.268	13.19%	9.96%	3.23%	12.37%	0.82%
North	0.328	20.88%	17.93%	2.95%	19.90%	0.98%
Western	0.273	14.17%	11.13%	3.04%	13.49%	0.68%
Central	0.297	8.81%	5.86%	2.95%	8.35%	0.46%
Greater Accra	0.218	12.86%	9.11%	3.75%	11.99%	0.87%
Eastern	0.234	10.59%	8.34%	2.25%	9.86%	0.73%
Volta	0.285	6.80%	4.29%	2.51%	6.40%	0.39%
Ashanti	0.247	12.19%	9.95%	2.24%	11.62%	0.57%
Brong Ahafo	0.236	4.97%	3.44%	1.54%	4.67%	0.30%
Northern	0.322	18.03%	16.41%	1.62%	17.60%	0.44%
Upper East	0.281	20.38%	16.65%	3.74%	19.47%	0.91%
Upper West	0.430	30.65%	21.49%	9.16%	27.15%	3.50%

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The results reported in the table are based on the *restricted sample*, which comprises all household heads aged 15 to 64 years, with available background information. The circumstance variables employed are mother and father's education and parents' occupation. The results take into account sampling weights and clustering. The decomposition into direct and indirect effects is conducted using the approach proposed by Bourguignon et al. (2007a) and are based on the parametric approach – the direct effect (DE) is calculated based on Equation 27, and the indirect effect (IE) is derived by substracting DE from the total effect (TE) (see Equation 28).

The results show that the indirect effect through education is very low for Ghana and for all the

parametric estimation.

regions with the exception of Upper West. According to the estimates, while in all other regions, including Northern region and Upper East region, the IE through education is less than 1 percent, in the Upper West, about 3 percent of the observed consumption inequality among households is explained by the indirect effect of the household head's parental characteristics on his or her education. This finding suggests that Upper West still lags behind all other regions in terms of equal distribution of opportunities for educational attainment within the region, and this may be partly explaining the high levels of inequality and IO for consumption expenditure in the region. The gap between the Upper West region and all other regions is also observed when migration status and household composition are taken into account.

Perhaps, one of the most important findings of this analysis is that, as expected, much of the observed IO is due to the direct effect of circumstances. Even when other effort variables are controlled for the extent of the direct effect is still large, suggesting that the effects of parental social connections and networking, especially in the labour market, may be at play. Nevertheless, it can also be argued that the effect of parental characteristcs is affecting outcome through the quality of education and other effort variables that were not captured in the estimation.

4.2 Linking opportunity to poverty: Opportunity and poverty profiles

4.2.1 Opportunity profile

In order to identify the *opportunity-deprived* or the *least advantaged* group, Ferreira and Gignoux (2011) proposed the use of *opportunity profiles*. An *opportunity profile* is obtained by first partitioning the population into types – a type being a group of individuals with the same set of circumstances – and then ranking the type-mean (or other moments) of the distribution of outcome in ascending order. Given that the measure of IO is the between-type inequality, obtained after

smoothing the distribution of outcome within groups by replacing the individuals' outcome with the type-mean, a ranking of these type-means provides valuable information on the groups that have relatively low or high chances of achieving an outcome. The types with the lowest rank in the opportunity profile can, therefore, be considered as the least advantaged groups (since they have the lowest mean outcome)[42].

The opportunity profile presented in Table 4.3 is based on parents' occupation and father's educational attainment (with a total of six types), since these two circumstance variables are found in the previous sections to be relatively important in explaining the disparities in opportunity for consumption expenditure in Ghana. The opportunity profiles are reported for the overall sample (the *restricted* sample) and sub-samples based on the north-south disaggregation, since in earlier analysis, the study found evidence for a north-south opportunity divide. A more detailed partition with all circumstance variables based on the *restricted* sample is reported in the Appendix Table B.3.

[42] The outcome in this case is assumed to be positive, i.e. the higher the outcome, the greater the individual's welfare.

Table 4. 3: Opportunity profile (2012/13)

Restricted Sample				
Type	**Father's Education**	**Parent's Occupation**	**Mean Cons. Exp.**	**N**
1	Not more than primary	Both are in Agriculture	2313	**5831**
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	3218	**1543**
4	Secondary or more	Both are in Agriculture	3525	**723**
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	3731	**983**
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	4869	**749**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	5259	**2430**
Northern Ghana				
Type	**Father's Education**	**Parent's Occupation**	**Mean Cons. Exp.**	**N**
1	Not more than primary	Both are in Agriculture	1735	**2398**
4	Secondary or more	Both are in Agriculture	2250	**33**
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	2739	**503**
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	3360	**235**
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	3422	**32**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	5578	**148**
Southern Ghana				
Type	**Father's Education**	**Parent's Occupation**	**Mean Cons. Exp.**	**N**
1	Not more than primary	Both are in Agriculture	2953	**3433**
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	3676	**1040**
4	Secondary or more	Both are in Agriculture	3866	**690**
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	4027	**748**
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	5122	**717**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	5404	2282

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The profile is based on the *restricted sample*, which comprises all household heads aged

15 to 64 years, with available background information. Two circumstance variables are used, namely, father's educational attainment and parents' occupation. The mean consumption expenditure per adult equivalent is computed for each type (i.e. a group of household heads with the same set of circumstances). The results take into account sampling weights and clustering. N = number of observations by type.

Based on the rank of each type, I categorize the types into classes: lower, middle and upper class. Given that six types are obtained, each class comprises two types. Thus, the two types with the lowest ranking would be referred to as lower class, the two types with the highest ranking as upper class, and the two with middle ranking as the middle class. In other words, I allow the composition of each class to differ from one sample to the other.

Overall, the findings suggest that the *least-advantaged* type (group) comprises people who have both parents in the agriculture sector and whose father has at most primary education, while the *most-advantaged* group contains household heads who have at least one parent into service, production, professional or administration related activities and a father who has attained secondary level education or more. Moreover, the north-south disaggregation shows that the mean consumption expenditure of the most *opportunity deprived* group is just slightly above the national poverty line (GHC 1314) in northern Ghana, even though at the national level, its value is about twice the poverty line.

Furthermore, at the national level, the lower class consists of those whose father has no more than primary education and whose parents have both been in agriculture activities, or at least one of them is into sales or elementary occupations. The middle class consists of household heads whose father has at most primary education and whose parent (at least one) is into service, production, professional or administration related activities. It also includes those whose father has at least

secondary education, with at least one parent involved in sales or elementary occupations. Finally, the upper class is made up of heads whose father has at least secondary education, with at least one parent in sales and elementary occupations or working in service, production, professional or administration related activities.

While the composition of the classes are maintained in the southern part of Ghana, a different ranking is observed in the north. Indeed, in the northern part of Ghana, the lower class consists of households heads whose parents are in agriculture, no matter what the education level of the father is; and the middle class comprises those whose father has at most primary education, with at least one parent into sales, service, production, professional or administration related activities and elementary occupations. The upper class remains similar to that of the south. This difference in the ranking between the north and the south, especially with regard to the composition of the lower class, may be explained by the subsistence nature of farming activities in the north compared to the south where the production of cash crops, such as cocoa, is likely to raise the incomes of those in the agriculture sector (ODI and CEPA, 2005; Al-Hassan and Diao, 2007).

4.2.2 Poverty profile

To provide a better understanding of the relation between opportunity deprivation and poverty, I provide a poverty profile that shows the proportion of the population in poverty across types. While the opportunity profile proposed by Ferreira and Gignoux (2011) identifies the *least advantaged* type, the poverty profile shows the patterns of poverty based on types, and therefore brings out the association between opportunity and poverty. Hence, this exercise may be considered as the descriptive analysis of the link between *opportunity deprivation* and poverty.

Table 4.4 presents a poverty profile based on the Foster-Greer-Thorbecke (FGT) indices (also

known as the P_α measures of poverty). These indices are the headcount ratio (α=0), the poverty gap (α=1) and the squared poverty gap (α=2)[43]. I computed these indices using the consumption expenditure of adult equivalent of individuals within a given type and the national poverty line of GHC 1314 per annum. The headcount ratio measures the share of the population in poverty. The poverty gap gives information on the depth of poverty, that is, how far the poor is from the poverty line, while the squared poverty gap reflects the severity of poverty, which accounts for the level of inequality among the poor. The information provided in Table 4.4 is based on the 2012/13 dataset using the *restricted sample*. Additionally, a north-south disaggregation is conducted with the aim of unveiling the differences in these two parts of the country.

[43] Foster et al. (1984).

Table 4. 4: Poverty profile, 2012/13 – Share of population in poverty (%)

Rank (Headcount)	Father's Education	Parent's Occupation	Headcount	Depth	Severity	N
		Restricted Sample				
1	Not more than primary	Both are in Agriculture	27.5	9.0	4.2	**5831**
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	14.8	3.9	1.6	**1543**
3	Secondary or more	Both are in Agriculture	11.1	2.6	1.0	**723**
4	Not more than primary	At least one is in Serv/Prod or Prof/Admi	9.4	2.7	1.1	**983**
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	7.3	1.7	0.6	**749**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	3.6	0.9	0.3	**2430**
All			15.8	4.8	2.1	**12259**
		Northern Ghana				
1	Not more than primary	Both are in Agriculture	50.1	20.3	10.6	**2398**
2	Secondary or more	Both are in Agriculture	45.0	15.1	6.6	**33**
3	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	36.8	8.0	3.0	**32**
4	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	20.4	5.9	2.7	**503**
5	Not more than primary	At least one is in Serv/Prod or Prof/Admi	18.2	5.4	2.1	**235**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	6.5	2.2	1.1	**148**
All			39.1	15.0	7.7	**3349**
		Southern Ghana				
1	Not more than primary	Both are in Agriculture	21.2	5.8	2.4	**3433**
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	13.2	3.4	1.3	**1040**
4	Secondary or more	Both are in Agriculture	10.5	2.4	0.9	**690**
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	8.0	2.3	0.9	**748**
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	6.7	1.6	0.6	**717**
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	3.5	0.8	0.3	**2282**
All			12.2	3.2	1.3	**8910**

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The profile is based on the *restricted sample,* which comprises all household heads aged 15 to 64 years, with available background information. Two circumstance variables are used, namely, father's educational attainment and parents' occupation. The indices are computed using the consumption expenditure of adult equivalent of individuals for each type and the national poverty line of GHC 1314 per annum.The results take into account sampling weights and clustering. N is the number of observations.

Since the analysis is conducted using the *restricted sample* – which comprises all household heads with background information – the poverty levels reported in Table 4.4 are smaller than those computed using the overall sample (see McKay et al. (2016)). For instance, the headcount ratio reported by McKay et al. (2016) is 24.2 percent for Ghana, 52.4 percent for the north and 18.5 percent for the south, whereas those presented in Table 4.4 are 15.8 percent, 39.1 percent and 12.2 percent, respectively[44].

The findings reveal that, overall, the incidence, depth and severity of poverty are highest among households headed by individuals who are from the lowest class or have the most deprived backgrounds (i.e. father with no more than primary education and both parents are in agricultural related activities). Thus, this category of households is the poorest in Ghana. Specially, the

[44] Given that poverty is measured using the per adult consumption expenditure, as a household is identified as poor, its members are automatically poor per the conventional measures of poverty (including the headcount ratio, poverty gap and squared poverty gap). Thus, the use of the *restricted sample* for the present analysis as well as the resulting differences in the poverty estimates compared to that of McKay et al. (2016) – does not alter the conclusion of the present section and does not matter for achieving the study's research objectives.

headcount ratio of the most deprived group is 27.5 percent, which is more than seven times the poverty incidence in the most advantaged group (i.e. father has at least secondary education and at least one parent has been into services, production, professional or administration related activities most of his/her life), and about twice the poverty level of the second least advantaged group (i.e. father has at most primary education and at least one parent is into sales and elementary occupations while the other parent is into agriculture activities).

With respect to the north-south disaggregation, the results show higher respective poverty levels in northern Ghana compared to the southern part. For instance, the headcount ratio in northern Ghana is mostly about 2 to 4 times that of the south. These findings are in line with the conclusion of McKay et al. (2016), who found higher poverty levels in northern Ghana compared to the south.

To provide further evidence on the link between opportunity deprivation and poverty in Ghana, Table 4.5 reports each type's contribution to poverty, that is, the percentage of poor people who belong to each type. This poverty profile is similar to that of Ferreira and Gignoux (2008). However, instead of considering the background characteristics separately, I consider the *types* that are obtained after grouping the various circumstances. This approach, in addition to providing evidence on the contribution of each characteristics to poverty, also offers a more detailed partition by considering a set of circumstances[45]. Moreover, the population is divided into three mutually exclusive poverty categories: extremely poor (extreme poverty line of GHC 720.5), poor (with expenditure below GHC 1314, but not less than the extreme poverty line) and non-poor (those with expenditure above the poverty line of GHC 1314).

[45] For instance, based on Table 4.5, the proportion of the extremely poor people who have both parents in the agriculture sector is 81.6 percent (78.1 percent + 3.5 percent) for the overall sample.

As presented in Table 4.5, a relatively large proportion of poor people are born in deprived homes. Specifically, about 78.1 percent of the extremely poor, 64.4 percent of the poor, and 34.0 percent of the non-poor individuals, belong to the *least-advantaged* group in Ghana compared to 3.5 percent, 6.5 percent and 28.1 percent, respectively, for the *most-advantaged* group. These figures change considerably when the north and south sub-samples are considered. In the northern part of Ghana, 89.6 percent of the extremely poor and 76.3 percent of the poor are from the *least advantaged* type compared to 67.6 percent and 60.2 percent, respectively, in the southern part of the country. In other words, nine out of ten extremely poor households in northern Ghana are headed by persons with an opportunity deprived background, and three out of four poor households are headed by people who belong to that category. These findings therefore suggest that poverty in Ghana is an 'opportunity deprivation' phenomenon, especially in northern Ghana. Nevertheless, even among the non-poor, the proportion of households that are headed by the *least-advantaged* is relatively higher than those headed by other types, suggesting that many individuals who also belong to the *opportunity deprived* group in the country have been able to escape poverty. Thus, 'opportunity deprivation' does not necessarily lead poverty.

Table 4. 5: Poverty profile, 2012/13 – Share of the total number of extremely poor, poor and non-poor (%)

Type	Father's educ.	Parent's Occupation	Extremely Poor	Poor	Non-Poor	Total
		Restricted Sample				
1	Not more than primary	Both are in Agriculture	78.1	64.4	34	39.5
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	8.0	14.3	13.3	13.1
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	4.4	5.2	9.0	8.3
4	Secondary or more	Both are in Agriculture	3.5	5.6	7.4	7.0
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	2.5	4.0	8.2	7.5
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	3.5	6.5	28.1	24.6
Total			100	100	100	100
Sample Size			**1,125**	**1,682**	**9,452**	**12,259**
		Northern Ghana				
1	Not more than primary	Both are in Agriculture	89.6	76.3	52.7	64.3
2	Not more than primary	At least one is in Sales/ele& none in Serv/Prod	5.9	15.2	27.3	20.9
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	2.6	5.1	11.3	8.4
4	Secondary or more	Both are in Agriculture	0.7	1.1	0.7	0.8
5	Secondary or more	At least one is in Sales/ele& none in Serv/Prod	0.6	1.5	1.2	1.1
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	0.6	0.8	6.8	4.5
Total			100	100	100	100
Sample Size			**800**	**732**	**1,817**	**3,349**
		Southern Ghana				
1	Not more than primary	Both are in Agriculture	67.6	60.2	31.9	35.6
2	Not more than primary	At least one is in Sales/Elementary occup & none in Serv/Prod	9.9	14.0	11.8	11.9
3	Not more than primary	At least one is in Serv/Prod or Prof/Admi	6.1	5.3	8.7	8.3
4	Secondary or more	Both are in Agriculture	6.1	7.2	8.2	8.0
5	Secondary or more	At least one is in Sales/Elementary occup & none in Serv/Prod	4.2	4.9	9.0	8.5
6	Secondary or more	At least one is in Serv/Prod or Prof/Admi	6.2	8.5	30.4	27.7
Total			100	100	100	100
Sample Size			**325**	**950**	**7,635**	**8,910**

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The profile is based on the *restricted sample,* which comprises all household heads aged 15 to 64 years, with available background information. Two circumstance variables are used, namely, father's educational attainment and parents' occupation. The three categories, extremely poor, poor and non-poor are obtained using the extreme poverty line of GHC 720.5 and the poverty line or GHC 1314. The results take into account sampling weights and clustering.

In sum, the statistics presented above, not only confirm the north-south divide in Ghana, but also show that opportunity deprivation may be associated with high poverty incidence, depth and severity – given that poverty tends to be more prevalent amongst the *least-advantaged* groups. Furthermore, the findings suggest a possible north-south divide in the relation between opportunity and poverty, which further implies that, on average, persons with opportunity-deprived background living in northern Ghana are more likely to be poor compared to their southern counterparts.

4.3 Poverty correlates among opportunity deprived individuals in Ghana

In this section, I empirically investigate the determinants or the correlates of poverty conditional on the household head's social background. This part of the study mainly focuses on the *opportunity-deprived* type.

Using father's educational attainment and parents' occupation as circumstance variables, the *least-advantaged* type has been identified as people whose father has attained at most primary education level and whose parents (father and mother) have been involved in agricultural activities most of their lives. According to the poverty profiles presented in Tables 4.4 and 4.5, this group includes mostly the poor, but also the non-poor individuals who managed to escape poverty perhaps as a result of other *pre-existing circumstances*, their effort and choices, or simply good luck.

The aim of this analysis is to shed some light on the correlates of poverty within the group. More specifically, this section unveils the factors that influence the likelihood of being above or below the poverty line (i.e. non-poor or poor) conditional on a deprived social background. The analysis focuses on effort variables such as education and employment, and geographical location. The findings would, implicitly, depict the processes behind intergenerational poverty trap in Ghana.

4.3.1 Methodology

The model below is estimated:

$$y_i = a + b_j X_{ji} + \varepsilon_i \qquad (30)$$

Where y_i is the dependent variable, measuring the poverty status of the ith individual and X_{ji} includes all the explanatory variables that are mainly effort variables in the IO literature such as migration, level of education, employment sector, and employment status. j is an index that identifies each explanatory variable ($j = 1,2, \dots, m$; m is a total number of explanatory variables). ε_i is the error term.

The study estimates a logistic regression where y_i is a dummy variable defined as:

$$y_i = \begin{cases} 0 & if \quad Cons_i < Z \\ 1 & if \quad Cons_i \geq Z \end{cases}$$

Where $Cons_i$ is the per adult equivalent consumption expenditure and Z is the poverty line that allows the categorization of consumption expenditure into two mutually exclusive groups: 'non-poor' and 'poor.'

Given the dichotomous nature of the dependent variable, which takes the value 1 if the individual

is non-poor and 0 if he or she is not, a logistic regression approach is employed.

The following equation is specified:

$$P_i = \mathrm{E}(y_i = 1|X_{ji}) = F(a + b_j X_{ji}) \qquad (31)$$

$$P_i = \mathrm{E}(y_i = 1|X_{ji}) = \frac{exp(a+b_j X_{ji})}{1+exp(a+b_j X_{ji})} \qquad (32)$$

The logistic regression function is given as:

$$logit(P_i) = ln(\frac{P_i}{1-P_i}) = a + b_j X_{ji} \qquad (33)$$

with $i = 1,2, \ldots, \mathrm{n}$

Where P_i is the probability of being poor, $P_i/(1 - P_i)$ is the odds ratio and b_j is the coefficient attached to the explanatory variable X_j.

4.3.2 Data and variables

The study focuses on the GLSS VI dataset. The analysis is conducted using two different samples: (a) the *entire* sample, which includes all household heads and spouses and (b) the *opportunity deprived* sample, which comprises only households headed by persons who belong to the *least advantaged* type – that is, persons whose parents have been involved in agricultural activities most of their lives and whose father has no more than primary education. Hence, although the main focus is on the *least advantaged* type, throughout the forthcoming discussion a comparison is made between the results obtained from the entire sample – which includes all types – and the *opportunity deprived* sample. This comparison allows us to investigate whether groups with different opportunities can be treated as homogeneous in poverty analysis. Moreover, it enables us

to underline the relevance of each covariate in both cases. Furthermore, the study conducts a the north-south disaggregation with the aim of unveiling the differences in the effect of the covariates across these locations.

In line with the existing poverty literature (Annim et al. 2012; Coulombe and Wodon, 2007), the following regressors are included in the estimation: (a) demographic variables: age of the household head, sex of the household head, household composition (number of infants, children, adults and seniors, as well as their squared values to account for the non-linearity of the effect), the marital status and the migration status of the household head; (b) geographic variables: area of residence (rural or urban), region of residence, employment prospect in area of residence; and (c) effort variables: education, employment sector, industry of employment. The employment prospect variable is measured by the ratio of active age population in regular employment to the total labour force[46]. The variable is constructed at the district level and is coded into two categories (i.e. a dummy variable), namely: high and low employment prospects, with a threshold of 50 percent[47].

[46] To construct the employment opportunity variable, I did not consider those who are contributing family workers in calculating the number of individuals in regular employment. This category of workers is omitted because contributing family work is globally considered as vulnerable employment per the classification of ILO. Thus, computing a measure of employment prospect with this category of workers may not be appropriate.

[47] The 50 percent threshold corresponds to the 30th percentile of the labour force participation rate across districts. This value is calculated using the labour force participation rate of population between 15 and 64 years of 170 districts in the GLSS VI survey (2012/13). Thus, districts with low employment prospects correspond to the 30 percent of the total districts with the lowest labour force participation rate.

4.3.3 Results

As expected, the statistics presented in Appendix Table B.4 show a lower level of consumption expenditure as well as higher poverty rates for the *opportunity deprived* sample compared to the *entire* sample. Focusing on the north and south sub-samples, it is observed that households in the south have a lower number of infants and children on average, compared to the north. Moreover, there is a greater proportion of youth-headed households in the north than the south. With respect to education, overall, the majority of the individuals in the sample have primary and secondary education. However, on average, the level of education tends to be lower in the *opportunity deprived* sample and in northern Ghana. The statistics also show that employment prospects are higher in southern Ghana than in the northern part of the country. Specifically, on average, about 90 percent of those from *opportunity deprived* homes in northern Ghana live in districts with low employment prospect while in the south, about 82 percent of people who belong to the same category live in districts with relatively higher prospects. The finding reflects the disparities in employment opportunities across these locations.

Agriculture is the main sector of employment in all the samples, on average, with a larger proportion of individuals from the *opportunity deprived* type employed in the sector. On the one hand, in northern Ghana, the statistics reveal that the *opportunity deprived* are mainly engaged in farming activities and vulnerable employment. Indeed, about 43 percent of the opportunity deprived in the north are agriculture self-employed, while 25 percent are family, casual and domestic workers, apprentices and others, about 17 percent are non-agriculture self-employed, 11 percent are government workers and 4 percent are in the private sector. On the other hand, in southern Ghana, non-agriculture self-employment is the second dominant type of employment, after agriculture self-employment, while public employment is the least.

Table 4.6 presents the odds ratios obtained from the logistic regression for the *entire sample* as well as the *opportunity-deprived* sample. Overall, the estimates obtained using the Ghana sub-sample seem to reflect the story of southern Ghana. Indeed, most of the coefficients for Ghana and southern Ghana are about the same for almost all the covariates with similar significance levels, especially when the *entire* sample is considered. Meanwhile, the estimates for northern Ghana tell a slightly different story.

Focusing on the *opportunity deprived* sample, the results reported in Table 4.6 reveal that households headed by older persons are more likely to be non-poor compared to youth-headed households, especially in the south. Meanwhile, in the north, the older a household head is the smaller the probability that the household would escape poverty. This finding may be attributed to the decrease in IO in Ghana over time, implying that the younger generation is able to access better opportunities in the northern part of the country. It can also be argued that the availability of diverse employment opportunities in the southern part of Ghana makes it possible for individuals to remain in the labour market and earn higher income as they get older and acquire more professional experience, compared to the north where physical strength is needed to remain economically active in the agricultural sector.

Also, having an additional child or infant in the household decreases the odds of escaping poverty. This result is in line with the existing literature underlining the negative impact of fertility on poverty reduction (Birdsall and Griffin, 1988). Meanwhile, an additional adult may contribute to the household human capital and income, and hence enable the household to move out of poverty (Rodgers, 1990). The coefficient on the number of adults is however insignificant for the northern Ghana sub-sample and the squared term shows a negative effect on poverty status. In other words, while having an additional adult dependant does not affect poverty status in a significant way, it

may rather reduce the odds of escaping poverty after a certain threshold. The finding may again be attributed to the limited availability of well-remunerated employment in the north compared to the south, thereby restraining the contribution of the additional adult dependant to household resources.

Furthermore, education, which reflects a person's effort, seems to be crucial for poverty in general. The results show that the odds of escaping poverty increase monotonically with an increase in educational attainment in the *entire* sample, when focusing on the Ghana sample and the south (the coefficients on primary, secondary and tertiary education are significant for these two sub-samples). However, when the household head comes from a deprived home, only the secondary and tertiary levels of education seem to bring a significant change to poverty status compared to no education. In other words, primary education does not make any significant difference in poverty status, on average, when the head of the household is from the least advantaged group, but households in which the head or the spouse has secondary (tertiary) education are about 2 (4) times more likely to be non-poor. This finding suggests that overall, more effort is required to escape poverty when a person has a disadvantaged background.

Table 4. 6: Determinants of poverty (2012/13) – Logit regression estimates

	Entire Sample			Opp. Deprived		
VARIABLES	Ghana	North	South	Ghana	North	South
Age of Head						
15-24	Ref	Ref	Ref	Ref	Ref	Ref
25-34	1.96***	1.04	2.29***	1.91**	0.88	2.68***
	(0.39)	(0.40)	(0.51)	(0.49)	(0.34)	(0.85)
35-44	1.88***	1.12	2.18***	1.50	0.86	2.00*
	(0.42)	(0.43)	(0.56)	(0.45)	(0.38)	(0.73)
45-54	1.52*	0.79	1.79**	1.47	0.43*	2.12*
	(0.38)	(0.34)	(0.51)	(0.48)	(0.21)	(0.82)
55-64	1.65**	0.52	2.04**	1.45	0.39*	2.13*
	(0.41)	(0.24)	(0.57)	(0.48)	(0.20)	(0.83)
Sex of Head						
Male	Ref	Ref	Ref	Ref	Ref	Ref
Female	0.88	0.77	0.90	1.14	0.74	1.24
	(0.15)	(0.24)	(0.17)	(0.30)	(0.27)	(0.37)
Household Composition						
Nb. of infants	0.66***	0.71*	0.65***	0.71*	0.59**	0.70*
	(0.08)	(0.14)	(0.09)	(0.13)	(0.14)	(0.15)
Nb. of Children	0.51***	0.45***	0.52***	0.50***	0.52***	0.47***
	(0.04)	(0.07)	(0.05)	(0.06)	(0.10)	(0.07)
Nb. of Adults	0.59***	1.27	0.54***	0.63***	1.61	0.57***
	(0.06)	(0.28)	(0.06)	(0.08)	(0.47)	(0.08)
Nb. of Seniors	0.40***	0.15***	0.44**	0.38*	0.31	0.36*
	(0.12)	(0.08)	(0.14)	(0.20)	(0.28)	(0.22)
Nb. of Infants Squared	1.07	1.06	1.07	1.05	1.03	1.07
	(0.05)	(0.06)	(0.06)	(0.07)	(0.08)	(0.08)
Nb. of Children Squared	1.07***	1.11***	1.07***	1.08***	1.09**	1.09***
	(0.02)	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)
Nb. of Adults Squared	1.04***	0.95**	1.05***	1.03*	0.93**	1.04**
	(0.01)	(0.02)	(0.01)	(0.01)	(0.03)	(0.02)
Nb. of Seniors Squared	1.33	3.00***	1.21	1.44	1.81	1.45
	(0.28)	(1.04)	(0.26)	(0.53)	(1.30)	(0.60)
Education						
No Education	Ref	Ref	Ref	Ref	Ref	Ref
Basic/Primary	1.27**	1.28	1.27**	1.21	1.38	1.18
	(0.13)	(0.28)	(0.14)	(0.17)	(0.35)	(0.18)
Secondary	2.08***	1.89**	2.12***	1.98***	1.53	2.05***
	(0.21)	(0.47)	(0.23)	(0.26)	(0.41)	(0.30)
Tertiary	4.53***	6.00***	4.40***	4.88***	5.11***	5.26***
	(0.98)	(2.13)	(1.16)	(1.62)	(2.39)	(2.35)
Employment Prospect in Area of Residence						
Low employment prospect	Ref	Ref	Ref	Ref	Ref	Ref
High employment prospect	1.20	2.77***	1.06	1.06	2.94**	0.91
	(0.19)	(0.90)	(0.19)	(0.22)	(1.23)	(0.20)

Table 4.6 (Continued)

	Entire Sample			Opp. Deprived		
VARIABLES	**Ghana**	**North**	**South**	**Ghana**	**North**	**South**
Employment Sector						
Agric. Self Employed	Ref	Ref	Ref	Ref	Ref	Ref
Paid employee						
Publ./Govt./NGO/Army/StOwn.	1.16	2.44**	0.99	0.93	2.26*	0.77
	(0.24)	(0.87)	(0.23)	(0.30)	(1.02)	(0.30)
Paid employee Private	0.62***	0.82	0.59***	0.54**	0.32**	0.60*
	(0.10)	(0.33)	(0.11)	(0.14)	(0.17)	(0.18)
Non-Agric Self-Employed	1.05	1.76**	0.95	1.17	1.18	1.23
	(0.17)	(0.50)	(0.17)	(0.23)	(0.40)	(0.29)
Contributing/Casual/Apprentices/						
Domestic/Other	0.96	0.85	0.99	0.93	0.78	0.98
	(0.10)	(0.18)	(0.12)	(0.11)	(0.19)	(0.13)
Industry						
Agriculture	Ref	Ref	Ref	Ref	Ref	Ref
Mining/Quarrying	3.58***	18.39***	3.64***	4.05***		3.87***
	(1.22)	(20.64)	(1.30)	(1.85)		(1.80)
Manufacturing	1.94***	1.60	2.10***	1.43	1.53	1.46
	(0.36)	(0.51)	(0.46)	(0.34)	(0.71)	(0.42)
Services	2.17***	1.47	2.39***	1.92***	1.58	2.01***
	(0.35)	(0.40)	(0.44)	(0.40)	(0.46)	(0.52)
Migration of Head						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	1.09	0.76	1.12	1.16	1.12	1.15
	(0.10)	(0.16)	(0.11)	(0.15)	(0.32)	(0.16)
Marital Status of Head						
Married/Informal	Ref	Ref	Ref	Ref	Ref	Ref
Never Married	0.62**	0.50*	0.69	0.52**	0.49*	0.56
	(0.14)	(0.18)	(0.19)	(0.16)	(0.20)	(0.23)
Separated/Divorced/Widowed	0.71*	0.74	0.71*	0.61*	1.09	0.57*
	(0.12)	(0.30)	(0.13)	(0.18)	(0.43)	(0.19)
Area of Residence						
Rural	Ref	Ref	Ref	Ref	Ref	Ref
Urban	2.59***	3.23***	2.53***	1.64***	2.65***	1.50**
	(0.44)	(0.73)	(0.48)	(0.30)	(0.82)	(0.31)
Region						
Greater Accra	Ref		Ref	Ref		Ref
Western	0.52		0.50*	0.40*		0.39*
	(0.21)		(0.20)	(0.21)		(0.20)
Central	0.55		0.55	0.74		0.75
	(0.22)		(0.22)	(0.31)		(0.32)
Eastern	0.38***		0.38**	0.34***		0.35***
	(0.14)		(0.14)	(0.13)		(0.14)
Volta	0.32***		0.31***	0.29***		0.27***
	(0.12)		(0.12)	(0.13)		(0.12)

Table 4.6 (Continued)

	Entire Sample			Opp. Deprived		
VARIABLES	**Ghana**	**North**	**South**	**Ghana**	**North**	**South**
Ashanti	0.73		0.71	0.63		0.63
	(0.27)		(0.27)	(0.25)		(0.25)
Brong Ahafo	0.45**		0.42**	0.42**		0.40**
	(0.16)		(0.15)	(0.17)		(0.16)
Northern	0.24***	1.12		0.20***	1.15	
	(0.09)	(0.32)		(0.08)	(0.37)	
Upper East	0.29***	2.34***		0.21***	1.90*	
	(0.13)	(0.71)		(0.11)	(0.65)	
Upper West	0.14***	Ref		0.11***	Ref	
	(0.05)			(0.05)		
Constant	18.25***	1.32	20.25***	21.35***	1.14	22.49***
	(8.14)	(0.79)	(9.46)	(11.12)	(0.73)	(12.65)
Observations	13,803	2,131	11,672	4,780	1,133	3,638

Notes: Standard errors in parentheses ( ). *** p<0.01, ** p<0.05, * p<0.1.

The table reports the odds ratios (see Section 4.3.1), with the standard errors for the odds ratios in parentheses. The p-values used to determine the level of significance are for the coefficients, $\hat{b}_i$ ($t = \hat{b}_i / SE_{\hat{b}_i}$.). The results take into account sampling weights and clustering. The *entire* sample comprises all household heads and spouses, irrespective of the 'opportunity deprivation status' of the household head. And the *opportunity deprived* sample includes only households headed by persons who belong to the *least-advantaged* type (i.e., persons whose parents have been involved in agricultural activities most of their lives and whose father has no more than primary education).

Focusing on northern Ghana, it is first of all observed that the coefficients on secondary and tertiary education are significant in the entire sample, whereas, contrary to the result based on the 'south' sample, the effect of primary education is insignificant. This finding suggests that higher educational attainment may be needed to escape poverty in northern Ghana compared to the south. Secondly, compared to those who have no education, only tertiary education seems to make a significant difference in the *opportunity deprived* sample in the north (Table 4.6). Thus, while

more effort is required to escape poverty in north than the south, an even greater effort is needed when the household head has an *opportunity deprived* background. This difference in the findings between the north and the south with respect to education may again be explained by lower economic opportunities and urbanisation in the former, making it harder to find a relatively better remunerated job with primary, and even secondary education.

Compared to the agriculture sector, being in the mining and the service industry seems to increase the odds that the household would escape poverty in all samples.The finding reflects the lower remuneration of agriculture activities, on average, as a result of low productivity in the sector (Baah-Boateng and Ewusi, 2013; MoFA, 2016). The sex as well as the migration status of the household head have no significant effect on the odds of escaping poverty. Meanwhile, residing in urban areas may improve poverty status, probably as a result of the greater availability of higher-paying jobs in cities compared to rural dwellings. Employment availability in area of residence does not have any significant effect on poverty in the *entire* sample and in southern Ghana. However, it matters for poverty in northern Ghana. Indeed, households living in areas with high employment prospects in the north are more likely to escape poverty compared to their counterparts in areas with low employment opportunities. The results suggest that the availability of jobs is consequential for poverty reduction in the region.

Furthermore, in the south, the employment sector of the household head or the spouse seems to have no effect on poverty in the *opportunity deprived* sample. However, it is observed that, compared to self-employment in agriculture, being a paid employee in public institutions or Non-Governmental Organisations (NGOs) saves the household from poverty in northern Ghana. Also, consistent with the earlier evidence on poverty in Ghana, the results at the national level show that apart from Western, Central and Ashanti regions, individuals in all other regions are more likely

to be poorer than those in the Greater Accra region.

4.3.4 Summary of findings and conclusion

The main findings of the analysis conducted in this chapter are in three folds. First, the study identified the existence of a north-south divide with respect to IO in Ghana. More specifically, the results show that the chances to attain higher consumption expenditure are less equal in the northern part of Ghana compared to the south. This finding is similar to that of Checchi and Peragine (2005), who argued in the context of Italy that IO tends to be higher in less developed locations. Also, Upper West region is the most *opportunity deprived* region in Ghana, with about 25 percent of its existing consumption inequality resulting from *pre-existing* circumstances over which the individual has no control.

Secondly, the study shows that individuals whose parents have been involved in agriculture activities most of their lives and whose father has no more than primary education are the *least-advantaged* in the country. Hence, they are characterised by higher incidence of poverty compared to the others. Furthermore, the findings reveal that poverty is highly associated with opportunity deprivation, especially in northern Ghana, where about 90 percent of the extremely poor belong to the *least-advantaged* group.

Lastly, the analysis of poverty correlates in the *opportunity deprived* group generally reveals that household composition, age of the household head, sector of employment and education of household members are factors that influence poverty in Ghana. With respect to education, the chapter shows that while on average, having at least primary education increases the odds of escaping poverty compared to no education, higher educational attainment may be required if the household head has a disadvantaged background, and an even greater educational achievement

may be required when the household is in the northern part of the country. These findings are attributed to the lack of decent employment opportunities in the north, which makes it harder for individuals to get well-paid jobs with a lower level of education. Furthermore, the results suggest that availability of high employment prospects plays an important role in poverty reduction in northern Ghana, which further supports the above conclusion.

CHAPTER FIVE

INEQUALITY OF OPPORTUNITY, CONSUMPTION INEQUALITY AND POVERTY REDUCTION IN GHANA

5.0 Introduction

Using a sample of 51 districts[48], this chapter presents the current levels as well as the districts' performance on poverty, consumption inequality and IO between 2005/06 – 2012/13 in Ghana. Furthermore, it examines the correlation between consumption inequality, IO and poverty reduction in the country.

The chapter is structured as follows. I briefly discuss the data and the estimation procedure used in the present analysis. Then, in Section 5.2, the study discusses the state of poverty, consumption inequality and IO at the district level and examines the performance of each district on the reduction of poverty, consumption inequality and IO. Section 5.3 analyses the relationship between consumption inequality, IO and poverty reduction, while Section 5.4 summarizes the main findings and concludes.

5.1 Data and estimation procedure

This analysis focuses on the rounds V and VI of the GLSS (2005/06 and 2012/13, respectively). Under these surveys, different number of districts were captured, mainly due to the creation of

[48] The number of districts in Ghana has changed over the years. In the late-1980s, there were 110 districts. The number rose to 138 by 2006, to 170 in 2008, to 216 in 2012 and then to 254 in 2018. The present study uses the district categorization available in the GLSS V dataset (2005/06) – i.e. 110 districts. Out of these 110 districts, however, the analysis considers 51 districts because of data limitations.

new districts by the government of Ghana over the period. While the GLSS V covers 110 districts, the GLSS VI has 170 districts. Thus, for consistency, the study uses the district categorization reported in GLSS V.

For each district, the study employs the headcount ratio, one of the FGT measures of poverty (P_α with α equals 0) as a measure of poverty incidence. The variable is equal to the share of the population living below the new national absolute poverty line of GHC 1,314 per year[49]. Furthermore, the Theil-L index, also known as Mean Log Deviation, is used in measuring consumption inequality and IO. The circumstance variables are father's education and parents' occupation.

Given the smallness of the districts' sample sizes, the parametric approach is used in estimating IO for consumption expenditure. As discussed earlier in this study, this approach is superior to the non-parametric approach when the sample size is relatively small. Nevertheless, in order to obtain reasonable estimates for the OLS regression, the study considers only districts with 40 observations or more (Harrell, 2001). Hence, as detailed in the Appendix Table C.1, out of 110 districts, 51 are retained for the present analysis.

5.2 Spatial inequality, inequality of opportunity and poverty in Ghana

Table 5.1 reports the levels of poverty incidence, inequality in consumption expenditure and IO for consumption expenditure for the 51 districts (see Appendix Table C.2 for the estimates for GLSS V).

[49] For comparability of the estimates of poverty across surveys, the study controls for changes in prices between surveys using the price indexes for food and non-food expenditures.

Accra has the lowest poverty incidence, with a headcount ratio of 1.6 percent in 2012/13. The district is followed by Cape Coast, Kumasi, Shama-Ahanta East, Tema, Yilo Krobo and Ga. In each of these districts, the headcount poverty rate is less than 7 percent. Other districts with lower poverty incidence relative to the national estimate of 24.2 percent (see GSS, 2014a) are: Adansi West, Agona, Juabeso-Bia, East Akim, Sunyani, Gomoa, Bibiani/Anhwiaso/Wekwai, Kpandu, Techiman, Tamale, Ketu, Kwaebibirem, Amansie East, Asunafo, Sekyere East, Jasikan, Jomoro, West Akim and Atebubu/Sene. Almost all these districts are in Southern Ghana, except Tamale district which is one of the major cities in the north. The highest poverty levels are found in the north. Bole and East Gonja, in the Northern region have a poverty incidence of 84.9 percent and 81.7 percent, respectively. Poverty is also high in Wa (63.1 percent), and in districts such as, Builsa, Chereponi-Saboba, Nkwanta, Krachi North Tongu, Nzema and Bawku East.

A number of districts with low poverty rates also exhibit low levels of disparities in consumption expenditure and opportunities for consumption expenditure. It is the case of Accra and Tema in Greater Accra region, Gomoa in the Central region, and Kwaebibirem and Yilo Krobo in the Eastern region. In contrast, even though Cape Coast, Ga and Shama-Ahanta East are among districts with the lowest poverty headcount, their levels of consumption inequality and IO are relatively high.

Table 5. 1:Levels of poverty incidence, inequality in consumption expenditure and inequality of opportunity by district (2012/13)

District	Region	Poverty Incidence	Inequality (Theil-L)	Inequality of Opportunity
Accra	Greater Accra	1.590	0.167	0.010
Adansi West	Ashanti	10.378	0.235	0.038
Agona	Central	11.562	0.219	0.026
Amansie East	Ashanti	19.501	0.262	0.044
Asante Akim North	Ashanti	30.263	0.247	0.009
Assin	Central	27.551	0.187	0.001
Asunafo	Brong Ahafo	20.149	0.329	0.022
Atebubu/Sene	Brong Ahafo	23.540	0.224	0.017
Bawku East	Upper East	43.566	0.303	0.009
Bibiani/Anhwiaso/Wekwai	Western	14.719	0.199	0.025
Birim South	Eastern	34.274	0.230	0.048
Bole	Northern	84.884	0.491	0.046
Bolgatanga	Upper East	25.618	0.252	0.027
Builsa	Upper East	59.401	0.267	0.044
Cape Coast	Central	1.832	0.283	0.037
Chereponi-Saboba	Northern	54.392	0.262	0.019
Dormaa	Brong Ahafo	24.523	0.262	0.048
East Akim	Eastern	12.876	0.200	0.014
East Gonja	Northern	81.674	0.182	0.020
Ejisu Juaben	Ashanti	32.697	0.224	0.012
Ga	Greater Accra	6.566	0.225	0.022
Gomoa	Central	13.488	0.166	0.019
Ho	Volta	29.310	0.336	0.069
Hohoe	Volta	30.033	0.285	0.021
Jasikan	Volta	21.568	0.330	0.049
Jomoro	Western	22.723	0.314	0.023
Juabeso-Bia	Western	12.179	0.218	0.022
Ketu	Volta	18.722	0.199	0.010
Kpandu	Volta	17.566	0.305	0.010
Krachi	Volta	47.348	0.270	0.017
Kumasi	Ashanti	2.596	0.224	0.026
Kwaebibirem	Eastern	18.911	0.186	0.005
Kwahu South	Eastern	26.009	0.209	0.027
Manya Krobo	Eastern	44.755	0.239	0.024
Mfantsiman	Central	30.075	0.185	0.020
Nkroranza	Brong Ahafo	27.590	0.282	0.001
Nkwanta	Volta	47.723	0.181	0.005
North Tongu	Volta	45.109	0.318	0.004

Table 5.1 (Continued)

District	Region	Poverty Incidence	Inequality (Theil-L)	Inequality of Opportunity
Nzema	Western	42.819	0.337	0.039
Offinso	Ashanti	37.778	0.206	0.032
Sefwi-Wiawso	Western	24.959	0.222	0.021
Sekyere East	Ashanti	20.640	0.208	0.035
Sekyere West	Ashanti	25.502	0.193	0.013
Shama-Ahanta East	Western	3.436	0.228	0.019
Sunyani	Brong Ahafo	13.306	0.180	0.023
Tamale	Northern	18.460	0.209	0.038
Techiman	Brong Ahafo	17.831	0.202	0.010
Tema	Greater Accra	3.913	0.178	0.016
Wa	Upper West	63.092	0.544	0.203
West Akim	Eastern	23.488	0.193	0.017
Yilo Krobo	Eastern	4.286	0.086	0.009
Mean		26.995	0.245	0.027
Std. Dev.		18.790	0.077	0.029
Min		1.590	0.086	0.001
		(Accra)	**(Yilo Krobo)**	**(Nkroranza)**
Max		84.884	0.544	0.203
		(Bole)	**(Wa)**	**(Wa)**

Source: Author's computation using the GLSS VI survey (GSS, 2013b).

Notes: In computing IO estimates, the outcome variable is the per adult equivalent consumption expenditure and the circumstance variables are father's education and parent's occupation. The measure of inequality used in the computation of consumption inequality and IO levels is the Theil-L index, that is the generalized entropy index (GE(α)) with α=0, also known as Mean Log Deviation. The estimates take into account sampling weights and clustering.

Similarly, Assin and Nkwanta are relatively poor districts, but in terms of distribution of outcome and opportunity these districts are among the most equal, suggesting that the income of most households in these districts may be close to the poverty line. Furthermore, although poverty and inequality in consumption expenditure are relatively high in Asante Akim North, Bawku East and North Tongu, chances to achieve higher level of consumption expenditure are relatively equal.

However, in districts such as Bole, Builsa, Ho, Manya Krobo, Nzema, and Wa, not only is poverty high, but also consumption inequality and IO seem to be a challenge. Appropriate policy interventions may therefore be required in these locations to reduce both poverty and consumption inequality.

To provide some insight into the association between poverty, consumption inequality and IO, Table 5.2 presents the zero-order correlation coefficients between poverty, inequality of outcome and IO. First, the results show that districts with higher poverty levels also tend to be less equal with respect to outcome and opportunity. Although this significant cross-sectional association between poverty and IO may be explained by a number of possible factors, it could be argued that in locations where opportunity sets are equally distributed, individuals have more equal chances to achieve higher outcome (quality education, equal labour market opportunities, etc.); consequently, many are able to escape poverty.

Secondly, similar to the results of Brunori et al. (2013), consumption inequality is found to be positively and highly correlated with IO. As argued by Brunori et al. (2013), the relation between IO and inequality of outcome could be traced in both ways. Firstly, the unequal distribution of opportunities among individuals shapes the distribution of their outcomes, such that those with superior opportunity sets get higher outcomes while those with inferior opportunity sets obtain lower outcomes. Secondly, the existence of inequality in outcome among parents are likely to influence the distribution of opportunity sets among children, such that, children born in a richer home, for instance, access better opportunities than those from poor homes.

Table 5. 2: Pairwise zero-order correlation between poverty incidence, inequality in consumption expenditure and inequality of opportunity (2005/06 - 2012/13)

	Consumption Inequality	Inequality of Opportunity
Poverty Incidence (Headcount ratio)	**0.5126***** (4.180) [0.000]	**0.2948**** (2.160) [0.036]
Inequality of Opportunity	**0.6628***** (6.200) [0.000]	

Source: Author's computation using the estimates presented in Table 5.1.

Notes: P-values are in brackets [ ] and t-statistics are in parentheses ( ). *** p<0.01, ** p<0.05.

5.3 Progress on consumption inequality, inequality of opportunity and poverty reduction and its implications

To provide evidence on the performance of each district in terms of poverty reduction and better distribution of outcome and opportunity, Table 5.3 presents the growth rates of the headcount ratio, inequality in consumption expenditure as well as changes in opportunity distribution over the period 2005/06 to 2012/13.

Also, to ensure that the changes in poverty and inequality levels between 2005/06 and 2012/13 are significantly different from zero, the Appendix Table C.3 reports the results of the two-sample t-test. The findings show that, indeed, there is a significant difference in the average levels of poverty, consumption inequality and IO between the two years. The findings further support the evidence that the average poverty rate and IO level are lower in 2012/13, and the average consumption inequality level is higher in 2012/13 compared to 2005/06 (Appendix Table C.3) .

As shown in Table 5.3, the districts with the least poverty levels seem to have achieved the greatest

progress on poverty reduction. This is the case of districts such as Accra, Cape Coast, Kumasi, Shama-Ahanta East and Yilo Krobo, with the exception of Tema, where poverty increased by 55.8 percent. The other best performers on poverty include: Agona, Jasikan, East Akim, Bolgatanga, Juabeso-Bia, Amansie East, Ga, Ketu, Sekyere East, Tamale, West Akim, Kpandu, Builsa, Dormaa, Gomoa; while the least performers are: Birim South, Chereponi-Sabola, East Gonja, Ejisu Juaben, Krachi, Manya Krobo, North Tongu, Nzema, Offinso, Sekyere West, Techiman and Tema. In the latter group, poverty considerably increased.

Yilo Krobo experienced the highest decline in inequality in consumption expenditure between 2005/06 and 2012/13. The district is followed by Gomoa, Adansi West, West Akim, Accra, Amansie East, Tema, Sunyani, Atebubu/Sene, Ejisu Juaben, Tamale, Bolgatanga, Ga, Ketu, Agona, and Wa, respectively. Inequality of outcome increased in all the other districts.

Table 5.3 also shows that IO declined in more than half of the districts considered. The districts that experienced an increase in opportunity gap, in descending order are: Kumasi, Jasikan, Nzema, Builsa, Ejisu Juaben, Bolgatanga, East Gonja, Kwahu South, Sefwi-Wiawso, Offinso, Bole, Juabeso-Bia, Ho, Birim South, Hohoe, Shama-Ahanta, Gomoa, Sekyere east, Dormaa, Amansie East, Ga and Tema.

Table 5. 3: Growth rates of poverty incidence, inequality in consumption expenditure and inequality of opportunity by district (%), 2005/06 – 2012/13

District	Region	Poverty Growth	Inequality Growth	Inequality of Opportunity Growth
Accra	Greater Accra	-90.15	-30.55	-69.19
Adansi West	Ashanti	-11.02	-39.33	-66.39
Agona	Central	-63.18	-8.95	-57.91
Amansie East	Ashanti	-57.60	-29.31	14.06
Asante Akim North	Ashanti	-14.33	7.78	-68.70
Assin	Central	-16.51	23.50	-93.29
Asunafo	Brong Ahafo	-16.85	77.37	-14.43
Atebubu/Sene	Brong Ahafo	-18.99	-17.40	-73.53
Bawku East	Upper East	-19.00	58.89	-64.89
Bibiani/Anhwiaso/Wekwai	Western	-12.65	33.76	-6.33
Birim South	Eastern	54.35	44.68	49.43
Bole	Northern	23.64	140.84	71.36
Bolgatanga	Upper East	-57.83	-15.36	123.37
Builsa	Upper East	-34.40	36.06	134.81
Cape Coast	Central	-74.11	19.14	-19.18
Chereponi-Saboba	Northern	71.26	0.53	-10.71
Dormaa	Brong Ahafo	-53.40	21.45	18.85
East Akim	Eastern	-59.15	34.60	-27.41
East Gonja	Northern	204.61	25.92	122.98
Ejisu Juaben	Ashanti	62.76	-16.59	132.81
Ga	Greater Accra	-56.94	-13.92	10.23
Gomoa	Central	-47.20	-49.95	33.12
Ho	Volta	-24.64	15.54	61.21
Hohoe	Volta	-21.81	44.36	42.71
Jasikan	Volta	-61.01	133.27	171.80
Jomoro	Western	-3.35	38.23	-46.04
Juabeso-Bia	Western	-57.83	2.85	63.05
Ketu	Volta	-55.34	-13.14	-82.24
Kpandu	Volta	-34.47	51.69	-74.82
Krachi	Volta	80.15	75.13	-47.53
Kumasi	Ashanti	-77.93	32.93	191.24
Kwaebibirem	Eastern	-11.88	-14.28	-65.99
Kwahu South	Eastern	-19.86	52.49	122.88
Manya Krobo	Eastern	106.78	29.88	-40.06
Mfantsiman	Central	-17.54	-17.13	-40.70
Nkroranza	Brong Ahafo	-6.71	55.91	-94.97
Nkwanta	Volta	8.15	73.33	-67.60

Table 5.3 (Continued)

District	Region	Poverty Growth	Inequality Growth	Inequality of Opportunity Growth
North Tongu	Volta	48.20	87.21	-59.84
Nzema	Western	50.21	100.30	144.97
Offinso	Ashanti	49.11	38.10	77.03
Sefwi-Wiawso	Western	-3.69	15.37	100.94
Sekyere East	Ashanti	-50.84	17.06	25.12
Sekyere West	Ashanti	135.39	52.96	-45.47
Shama-Ahanta East	Western	-72.06	25.35	36.16
Sunyani	Brong Ahafo	-18.93	-17.62	-46.86
Tamale	Northern	-41.80	-16.29	-62.61
Techiman	Brong Ahafo	71.66	29.06	-16.00
Tema	Greater Accra	55.79	-26.96	4.95
Wa	Upper West	12.58	-4.33	-12.17
West Akim	Eastern	-37.17	-32.82	-38.07
Yilo Krobo	Eastern	-86.55	-61.27	-82.29
Mean		-7.30	20.99	5.06
Std. Dev.		60.12	43.64	77.38
Min		-90.15 **(Accra)**	-61.27 **(Yilo krobo)**	-94.97 **(Nkroranza)**
Max		204.61 **(East Gonja)**	140.84 **(Bole)**	191.24 **(Kumasi)**

Source: Author's computation using the GLSS VI survey (GSS, 2013b).

Notes: For each variable, the values reported in the table are the percentage changes between 2005/06 and 2012/13. The estimates for 2005/06 and 2012/13 are presented in Appendix Table C.2. All the estimates take into account sampling weights and clustering.

To shed light on the relationship between changes in consumption inequality and IO, and poverty reduction, Table 5.4 reports the zero-order correlation coefficients between these variables. Although these coefficients do not imply causality, they provide relevant information on the association between the variables. The results show a positive and significant correlation between

poverty growth and changes in consumption inequality, suggesting that districts that experienced a fall in inequality had greater reduction in poverty. This finding is in line with the conclusion of many other studies that found a negative relationship between consumption inequality growth and poverty reduction.

Interestingly, no association is found between the growth of IO and poverty reduction, suggesting that equality of outcome is more important for poverty reduction in Ghana than equality of opportunity. These results may however be peculiar to the sample used, and thus may require further investigation. Nevertheless, as observed in Table 5.4, changes in IO are positively and significantly correlated with growth in consumption inequality. Thus, although the findings show no association between the reduction in IO and poverty reduction, ensuring an equal access to opportunities by all citizens could help in bridging the consumption gap in the country.

Table 5. 4: Pairwise zero-order correlation between the growth rates of poverty incidence, inequality in consumption expenditure and inequality of opportunity (2005/06 - 2012/13)

	Poverty Growth	**Inequality Growth**
Inequality of Opportunity Growth	**0.078**	**0.281****
	(0.550)	(2.050)
	[0.588]	[0.046]
Inequality Growth	**0.286****	
	(2.090)	
	[0.042]	

Source: Author's computation using the estimates presented in Table 5.3.

Notes: P-values are in brackets [ ] and t-statistics are in parentheses ( ). ** p<0.05.

5.4 Summary and conclusion

This chapter first examines the patterns of consumption inequality, IO and poverty in Ghana by reporting and discussing district-level estimates based on the GLSS VI survey. It then analyses the progress of each district on these variables over the period 2005/06 and 2012/13. The study finds considerable heterogeneity across districts, confirming the existence of a spatial dimension to the levels and performance on poverty, consumption inequality and IO in the country. While, on average, overall consumption inequality increased, and poverty and IO have fallen over the period, some districts have experienced a decline in poverty incidence, inequality of outcome and opportunity and in other districts, poverty increased and consumption inequality fell.

Furthermore, the study finds that overall consumption inequality and IO tend to move together. Moreover, the greater the level of poverty, the higher the level of IO is. Also, the study reveals no association between the equalization of opportunities and poverty reduction in Ghana. Instead, the reduction in opportunity disparities is positively and significantly correlated with the decline in inequality of outcome. These preliminary findings suggest that reducing IO may help reduce the existing disparities in consumption expenditure in Ghana, with possible indirect effect on future poverty reduction.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

6.0 Introduction

This chapter summarises and concludes the thesis by highlighting the main findings, especially the results from the three empirical chapters. Then, I discuss some policy implications and provide the key limitations of the study. The rest of the chapter is structured as follows. Section 6.1 provides the summary of findings, Section 6.2 concludes with policy recommendations, and Section 6.3 discusses the limitations as well as possible research areas for future studies.

6.1 Summary of findings

In recent years, the growing literature on equality of opportunity has increasingly emphasized on its importance for inequality reduction and development. Indeed, this literature has brought the world's attention to the benefits of ensuring that people are given equal chances to achieve a decent outcome, independently of their social background and other characteristics such as race, sex, religion, place of birth, etc. Hence, the recently adopted Sustainable Development Goal ten (SDG 10) stresses the need to bridge opportunity gaps by 2030, especially in countries with persistent levels of inequality. Focusing on the case of Ghana, the present study empirically investigates the extent of IO and its effect on poverty reduction.

6.1.1 Inequality of opportunity for consumption expenditure in Ghana

In the first empirical chapter, the thesis examines the patterns and trends of IO for consumption expenditure since the late-1990s in Ghana, using the parametric and the non-parametric ex-ante

approach. The estimates of IO for consumption expenditure are computed at the national level using the 1998/99, 2005/06 and 2012/13 household surveys (GLSS IV, V and VI, respectively), and five circumstance variables, namely, mother's education, father's education, parents' occupation, ethnicity and place of birth. The choice of these circumstance variables is informed by the existing empirical literature as well as the richness of the GLSS surveys.

Under both the parametric and the non-parametric approaches, parents' occupation is a categorical variable, with the following categories: persons whose parents have been involved in agriculture activities most of their lives, persons who have at least one parent is into sales or elementary activities and none is into professional and admistrative occupations, and persons who have at least one parent involved in professional or administrative occupations. Ethnicity is defined into three categories based on the system of inheritance (the first is Akan and Guan, the second is Ga Adangbe, and the third is Ewe, Gurma, Mole-Dagbani and others ethnic groups). With respect to place of birth, the sample is divided into individuals who are born in northern Ghana and those born in the south. The parental education variables, however, receive different treatments under the parametric and the non-parametric estimations. In the parametric approach, the variables are measured as years of schooling. Meanwhile, in the non-parametric estimation, these variables are coded into three categories (persons whose parent has no education, persons whose parent has no more than primary education, and persons whose parent has secondary education or more) in order to improve the precision of the estimates.

The study finds that about 19–30 percent of the observed consumption inequality is explained by existing opportunity gap in the country. These estimates are slighty higher than those presented by Brunori et al. (2015a), who obtained lower bound estimates of 14-29 percent. This marginal difference in the estimates is attributed to few methodological differences, particularly the use of

a richer set of circumstance variables in the present study compared to Brunori et al (2015a) – five circumstance variables are used compared to four in the case of Brunori et al (2015a).

Although the level of IO in Ghana remains high (recall that these are lower-bound estimates), it remains moderate compared to that of other countries. For example, the estimate of IO in Ghana is lower than that of Malawi (33 percent), but higher than the IO estimate for Egypt, which is 13 percent. Furthermore, a disaggregation analysis by sex (male and female) and area of residence (urban and rural) reveals a higher opportunity gap in rural areas than urban, and among male-headed households than female.

On the one hand, the former may be attributed to differences in the labour market (i.e. the difference in labour demand and the availability of well-remunerated jobs) between rural and urban locations. Since the unemployment rate is higher in rural than in urban areas, and high-income generating activities tend to be concentrated more in urban dwellings compared to rural, the outcome of a person residing in a rural community is more likely to depend on his or her circumstances. Hence, access to high-income generating labour market opportunities, and other advantages, for instance, would highly depend on parental characteristics, such as, wealth, social network, education, etc. On the other hand, the higher IO among male-heads may result from disparities in the sources of household income between male and female-headed households. Indeed, existing evidence[50] based on the GLSS data suggests that a higher proportion of resources in female-headed households is obtained from non-wage sources, which tend to be less related to circumstances compared to wage income.

The study futher shows that IO has decreased between 1998/99 and 2012/13, although marginally.

[50] See Appendix Table A.6.

This result suggests that the observed upward trend in inequality of outcome in Ghana – in this case consumption expenditure – may be resulting from effort and other unobserved circumstances. This finding may be attributed to the increase in the returns to education, that is effort, leading to rising disparities of outcome in the country (Teal, 2001; Coulombe and Wodon, 2007; Baffour and Turkson, 2015), such that individuals who gained higher educational attainment through effort earned higher wages and, therefore, achieved greater consumption expenditure.

Furthermore, the decline in opportunity gap seems to be driven by the notable fall in the relative contribution of ethnicity and place of birth over time. The fall in the relative contribution of place of birth suggests that northerners and southern-born are more and more given an equal chance to achieve a high outcome, particularly in urban areas where there is a faster decline in the relative importance of place of birth. A possible explanation for the decrease in the relative importance of ethnicity is the improvement in institutional quality, democracy and decentralization that promote fair allocation of public resources (Osei-Assibey, 2014), while the decline in the contribution of place of birth is attributable to the growing urbanisation, the increasing – though slow – public investment in human development, infrastructure development in the northern part of the country as well as migration (ODI and CEPA, 2005; Van der Geest, 2011; Fuseni and Kemp, 2016). Meanwhile, the importance of parental wealth variables (mother and father's education and parents' occupation) seems to be increasing over time, suggesting that the chances for achieving high consumption expenditure are increasingly influenced by parental education and occupation.

6.1.2 Opportunity and poverty in Ghana: The north-south divide

A number of studies on inequality in Ghana have emphasized the spatial nature of the distribution of welfare in the country, especially the north-south divide (Annim et al., 2012; Senadza, 2012;

Rolleston, 2011). The literature also underlines the higher levels of consumption inequality in the north compared to the south, and its persistence over time (Mckay et al. 2016). In the second empirical chapter, the study first investigates the existence and the nature of a north-south differential in IO in Ghana, which may be explaining the dichotomy between the two parts of the country. The estimates of IO for the southern and northern Ghana, using the 2012/13 GLSS survey, unveil that indeed there exist greater disparities in opportunities in the north compared to the south. This result is attributed to the higher level of development as well as the availability of better economic opportunities in the latter compared to the former, where a large proportion of the population is employed in low productivity agricultural sector. Moreover, to provide a deeper understanding of the channels through which *pre-existing* circumstances affect the distribution of opportunities at the regional level, the study conducts a decomposition of the IO estimates into the direct and indirect effect of opportunities on outcome. The results suggest that much of the influence of circumstances on the distribution of outcome in Ghana operates through the direct channels. In other words, IO in the country may largely result from parental social networks and connections, especially in the labour market – or the quality of education which is likely to be affected by the parental wealth variables. Hence, the individual's social background, in terms of parental education and occupation, is likely to have a direct influence on his or her labour market outcome, with implications for consumption expenditure.

Next, using the opportunity profile proposed by Ferreira and Gignoux (2011), the study finds that people whose father has no more than primary education and whose parents have been into farming activities most of their lives are the *least-advantaged* with respect to opportunities in Ghana. Also, the study reveals a greater poverty incidence in this category compared to the other types, especially in the northern part of the country where almost all the poor or extremely poor

households are headed by persons with a *least-advantaged* background. This finding suggests that, indeed, opportunity-deprivation may be related to poverty in Ghana, especially in the northern part of the country. This result draws attention to the possible existence of poverty traps in the north, which may be explaining the slower progress on poverty reduction found by McKay et al. (2016).

Lastly, the chapter investigates the correlates of poverty among the *opportunity deprived* type in Ghana. The results show that to escape poverty, education as well as occupation are important, especially when the household head is from the *least-advantaged* type. With respect to education, the results reveal that, on average, at least secondary educational attainment may be needed to increase the odds of escaping poverty when the household head is from the *least-advantaged* type. This is particularly the case in northern Ghana, where only tertiary education appears to significantly increase the likelihood of being non-poor conditional on an *opportunity deprived* background. The finding suggests that greater effort may be required to escape poverty if the individual belongs to the *least-advantaged* type, and even more so when the individual resides in the northern part of the country. Again, the results, especially for northern Ghana, may be explained by the limited availability of high-income generating employment prospects, especially in the agriculture sector, which is the dominant sector in that part of the country. Thus, only those with higher (or better) qualification are able to access the available well-paying economic opportunities outside the sector. Furthermore, the results suggest that residing in a district with high employment prospects may save households from poverty in northern Ghana. Meanwhile, having a higher number of infants or children in the household decreases the odds of escaping poverty, confirming the negative relationship between fertility and poverty reduction that is found in the literature (Birdsall and Griffin, 1988).

6.1.3 Inequality of opportunity, consumption inequality and poverty reduction in Ghana

The third empirical chapter provides evidence on spatial poverty, consumption inequality and IO in Ghana using data on 51 districts, and compares the progress on poverty, consumption inequality and IO reduction between 2005/06 and 2012/13. Furthermore, the study presents some preliminary findings on the relationship between changes in consumption inequality, IO and poverty reduction in the country. The study finds considerable heterogeneity among districts in Ghana with respect to the levels and progress on poverty, consumption inequality and IO over the period 2005/06 – 2012/13. While some districts, like Accra, experienced a fall in inequality, IO and poverty, others did not.

Additionally, poverty and consumption inequality tend to move together, confirming the negative relationship between increasing inequality and poverty reduction that has been found in the literature. Also, IO is positively and significantly correlated with poverty and inequality in consumption expenditure. The positive association between IO and poverty suggests that districts with high level of IO tend to be poorer. The study explains this finding by arguing that in locations where opportunities are unequally distributed, many people are left behind (i.e. they have no access to quality education, decent jobs, etc.); hence they get low outcomes and fall into poverty. According to Brunori et al. (2013), the correlation between IO and inequality of outcome could reflect a bi-directional effect. First, unequal distribution of opportunities shapes the distribution of outcome among individuals, such that, individuals who have access to better opportunity attain a higher outcome level, while those at the bottom of the opportunity distribution end up at the bottom of the outcome ladder. Secondly, the existence of inequality in outcome among parents influences the distribution of opportunity sets among children (e.g., children born in a richer homes access better opportunities than those from poor homes).

Furthermore, the result of the correlation between changes in IO and poverty reduction reveals that

there is no association between the two variables. This finding, however, may only pertain to the sample used in the present analysis, and thus, necessitates further investigation. Meanwhile, changes in consumption inequality are found to be positively correlated with changes in IO, suggesting that providing equal opportunities may help reduce outcome inequality in Ghana.

6.2 Conclusion and policy implications

While progress has been made over the last decade, there is still a need for future policies to put emphasis on reducing the existing inequality of opportunities in Ghana. Achieving this goal would help give equal chances to citizens, as emphasized in the country's 1992 constitution (Republic of Ghana, 1992), and ensure a better distribution of outcome (SDG 10).

Although the study finds a falling trend in IO in Ghana, mainly as a result of the decreasing contribution of ethnicity and place of birth, there is a growing importance of parental wealth in opportunity distribution in the country. The influence of parental wealth, social network and connections implies that chidren who have relatively rich parents are more likely to access better opportunities compared to those from poor homes. There is therefore a need to limit the effects of these circumstances on the distribution of outcome and give better opportunities to individuals from relatively deprived homes through social interventions.

Evidence suggests that the influence of parental wealth and socio-economic status are indirectly linked to a number of factors, such as, early-childhood care, nutrition, education, access to health care and other basic services (Stuhler, 2018). Hence, future policies should prioritize development programmes that improve nutrition as well as the availability of community-based services (e.g., schools, health care, etc.) for children from deprived homes.

This type of intervention must target children from poor rural communities whose parents are involved in smallholder farming, especially those living in the three northern regions since these regions are identified as the poorest and the most unequal in terms of consumption expenditure and opportunities. Moreover, existing programmes that are in line with this goal shoud be encouraged and improved. An example of such programme in Ghana is the LEAP programme (started in 2008) which seeks to alleviate short-term poverty and promote human capital development among poor households by improving access to education and health care for vulnerable groups and children.

It is important to note that inequalities in the quality of education, health care or other social services may also reinforce the influence of circumstances, such as parental wealth, on opportunity distribution such that children whose parents cannot afford quality services would end up with lower outcomes. Thus, government of Ghana's provision of social services must not only focus on availability, but also on quality.

Additionally, strengthening institutions (i.e, control of corruption and rule of law) that encourage a merit system, where the influence of parental networks or personal connections is restrained, and anti-discrimination laws are enforced,[51] would promote greater equalization of opportunity, particularly in the labour market. Also, maintaining democracy would help preserve the gains in terms of low influence of ethnicity on outcome distribution, since existing evidence suggests that democratic institutions limit the incidence of ethnic bias and favoritism (Burges et al., 2015).

[51] According the Constitution of Ghana and the Labour Act, any discrimination on the basis of gender, race, colour, ethnic origin, religion, creed or social or economic status is prohibited (Republic of Ghana, 1996; ILO, 2018).

The study also underlines the spatial dimension of inequality of opportunity, especially the north-south divide, which, despite government effort and various policies that have been implemented, remains a matter of concern. The study reveals that bridging the north-south opportunity divide may be attained faster if the focus is on generating better employment opportunities through appropriate growth strategies, especially in rural areas and northern Ghana. In this regard, the agriculture sector has a major role to play. Appropriate actions should be taken to remove the existing bottlenecks and boost productivity and growth in the sector. A starting point may be striving to achieve the targets of 6 percent agricultural growth and the minimum allocation of 10 percent of public expenditure to the sector under the Comprehensive Africa Agriculture Development Programme (CAADP)[52]. Yet, the choice of agricultural policies as well as their implementation remain crucial to ensure an economy-wide impact and avoid unproductive investments and a waste of public resources. As governement of Ghana, through MoFA, in 2017, enrolled the 'Planting for Food and Jobs' programme, which aims at transforming the sector and promoting employment, food security and poverty alleviation (MoFA, 2017), it must ensure of the appropriate implementation, monitoring, and evaluation of the programme for positive outcomes. Moreover, such policies should be accompanied by other economic reforms, including trade enhancement measures and infrastructural development, in order to create a business-friendy environment for greater private investment in the sector.

Similar to many existing works, the study reveals that consumption inequality is negatively associated with poverty reduction. Ghana has been successful in reducing poverty over the years. Yet, consumption inequality increased. Sustaining the progress on poverty may therefore require

[52] The policy framework was adopted in 2003 at the African Union Summit in Maputo.

a reduction of inequality. The study shows that addressing the existing opportunity gaps is presumably a way to ensure a better distribution of outcomes in the country.

6.3 Limitations of the study

The main limitations of the study are as follows. Firstly, although the study accounts for changes in prices in the GLSS IV and V datasets (1998/99 and 2005/06, respectively) in order to make them comparable to the 6th round (2012/13) of the survey, comparing the consumption expenditure data across surveys remains questionable. For instance, the variation in recall periods across surveys for regularly purchased items may introduce differences in the measurement errors, which in turn may affect the comparability of the estimates[53].

Secondly, in estimating IO, the study considers consumption expenditure per adult equivalent, which is the average level of expenditure of all household members, as the outcome variable. Meanwhile, the most appropriate approach in estimating IO for consumption expenditure would have been to disaggregate household consumption expenditure into the contribution of each household member, such that, in the analysis, the circumstances of each individual in the household are mapped to his/her contribution to the total expenditure. However, the information to perform such disaggregation is unavailable in household surveys. Hence, although the approach

[53] The data on total household consumption expenditure reported in household surveys are computed based on the information provided by household members on their consumption purchases. When administering the questionnaire, there is a number of visits, which the interviewer is required to make, with a number of days' interval. Each time, the household members are asked to provide information on their purchases since the last visit. The frequency of the visits as well as the interval between two visits are likely to influence the accuracy of the response that is given. Meanwhile, the frequency of visits and between-visit interval lengths tend to differ across the GLSS surveys. For the GLSS IV, V and VI, the number of visits were 7, 11 and 6, with 5, 3 and 5-day intervals, respectively.

used in the present study has been widely used in the literature, it may lead to a bias in the IO estimates. Moreover, per adult equivalent consumption expenditure of the household is computed using household consumption expenditure and the equivalence scale, which reflects the size of the household and its composition. Therefore, the estimates of IO based on this outcome variable reflect not only the effect of circumstances on consumption expenditure, but also its influence on the size and the composition of the household (i.e. number of infants, children, adult, etc.), hence on fertility decisions, matching of spouses, etc. (Bourguignon et al., 2007a; Checchi et al., 2016).

Thirdly, though the study attempts to investigate the relationship between IO and poverty, no rigorous econometrics analysis is performed as a result of insufficient number of observations at the district level. Hence, the results presented in that part of the study may be considered as preliminary findings that future studies on Ghana might build upon.

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APPENDIX

Appendix A: Inequality of opportunity for consumption expenditure

A.1 Descriptive statistics – Outcome variable: consumption expenditure per adult equivalent

Table A. 1: Descriptive statistics across sex (1998/99 – 2012/13)

	1998/99		2005/06		2012/13	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
Annual Per Adult Equivalent Consumption Expenditure (GHC)						
Mean	1437.7	1597.3	1849.1	2180.7	3719.8	4089.6
Std. Err.	32.2	51.6	27.3	49.5	52.9	90.1
Mother's years of education						
Mean	1.0	1.2	1.7	2.0	2.1	2.6
Std. Err.	0.1	0.1	0.1	0.1	0.1	0.1
Father's years of education						
Mean	2.8	3.2	3.4	4.3	3.9	4.9
Std. Err.	0.1	0.2	0.1	0.1	0.1	0.1
Mother's educational attainment (%)						
Not more than primary	92.5	90.5	85.8	83.5	81.0	76.9
Secondary and above	7.5	9.5	14.3	16.5	19.0	23.2
Father's educational attainment (%)						
Not more than primary	75.4	71.6	69.9	61.0	63.6	53.9
Secondary and above	24.6	28.5	30.1	39.0	36.4	46.1
Parents' occupation (%)						
Both are in agriculture	56.2	49.3	53.9	45.7	49.0	39.9
At least one is in sales/elementary occup	25.8	31.2	18.6	18.7	20.4	21.1
At least one is in serv/prod. or in prof/admi/cl	18.0	19.5	27.5	35.6	30.6	39.0
Region of birth (%)						
Northern Ghana	19.9	9.0	21.3	9.3	21.8	10.1
Southern Ghana	80.1	91.0	78.7	90.8	78.2	89.9
Ethnicity (%)						
Akan and Guan	50.5	64.5	51.6	64.8	49.9	60.5
Ewe and Gurma/Mole/others	39.8	25.1	38.2	24.0	41.4	29.4
Ga-Adangbe	9.8	10.5	10.2	11.3	8.8	10.1
Number of types	35	32	60	48	63	55
Number of types with obs.>5	20	16	43	30	48	38
Percentage of types with obs. > 5	0.6	0.5	0.7	0.6	0.8	0.7
Average number of obs. by type	84	40	81	34	145	57
Sample size	2,930	1,282	4,858	1,652	9,108	3,154

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: The descriptive statistics are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering. The mean consumption expenditure is in January 2013 prices.

Table A. 2: Descriptive statistics across area of residence (1998/99 – 2012/13)

	1998/99		2005/06		2012/13	
	Rural	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*
Annual Per Adult Equivalent Consumption Expenditure (GHC)						
Mean	1192.7	2023.7	1420.2	2603.2	2674.4	4715.5
Std. Err.	29.5	49.6	21.5	44.7	49.9	67.9
Mother's years of education						
Mean	0.6	1.8	1.0	2.7	1.3	3.0
Std. Err.	0.0	0.1	0.1	0.1	0.1	0.1
Father's years of education						
Mean	2.2	4.3	2.4	5.2	2.6	5.4
Std. Err.	0.1	0.2	0.1	0.1	0.1	0.1
Mother's educational attainment (%)						
Not more than primary	95.5	85.4	92.0	76.3	89.2	72.6
Secondary and above	4.5	14.6	8.0	23.7	10.8	27.4
Father's educational attainment (%)						
Not more than primary	80.8	62.2	78.5	53.3	75.3	40.8
Secondary and above	19.2	37.4	21.5	46.7	24.7	50.2
Parents' occupation (%)						
Both are in agriculture	66.7	31.1	68.5	30.2	67.9	29.9
At least one is in sales/elementary occup	20.8	39.5	12.7	26.3	14.3	25.5
At least one is in serv/prod. or in prof/admi/cl	12.5	29.4	18.8	43.5	17.8	44.6
Region of birth (%)						
Northern Ghana	20.4	10.2	24.3	10.3	26.3	12.5
Southern Ghana	79.6	89.8	75.7	89.8	73.7	87.5
Ethnicity (%)						
Akan and Guan	53.6	56.1	51.0	60.2	48.6	56.1
Ewe and Gurma/Mole/others	38.7	29.8	40.8	26.3	44.5	33.1
Ga-Adangbe	7.7	14.1	8.2	13.5	6.9	10.8
Number of types	29	35	55	54	58	56
Number of types with obs.>=5	17	20	37	51	46	42
Percentage of types with obs. > = 5	0.6	0.6	0.7	0.9	0.8	0.7
Average number of obs. by type	94	42	68	61	115	99
Sample size	2,741	1,471	3,753	2,757	6,738	5,554

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b)

Notes: The descriptive statistics are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling

weights and clustering. The mean consumption expenditure is in January 2013 prices.

A.2 Inequality of opportunity estimates

Table A. 3: Inequality of opportunity estimates using the parametric approach (estimates based on a modified reduced-form equation) – The inequality measure is the Theil-L index, 1998/99 – 2012/13

	Parametric Approach					
	Theil-L -- Absolute IO			Theil-L -- Relative IO		
	1998/99	2005/06	2012/13	1998/99	2005/06	2012/13
Ghana	0.069	0.066	0.065	24.41%	22.76%	21.62%
Male	0.074	0.071	0.068	26.28%	24.12%	21.74%
Female	0.058	0.045	0.057	20.60%	16.57%	20.58%
Rural	0.050	0.047	0.040	19.02%	19.01%	13.74%
Urban	0.047	0.029	0.038	20.61%	12.04%	15.74%

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: In computing the parametric IO estimates, the interactions between all the circumstance variables are included in the OLS equation (Equation 18). The results take into account sampling weights and clustering. The absolute (absolute IO) and relative (relative IO) estimates are obtained using the parametric approach proposed by Ferreira and Gignoux (2011) discussed in Section 3.1.2.

Table A. 4: Inequality of opportunity estimates using the parametric approach (Estimates based on a modified reduced-form equation and disaggregated circumstance variables) – The inequality measure is the Theil-L index, 1998/99 – 2012/13

	Parametric Approach					
	Theil-L -- Absolute IO			Theil-L -- Relative IO		
	1998/99	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Ghana	0.097	0.095	0.091	34.41%	32.63%	29.98%

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The circumstance variables included are the following: mother and father's years of education, mother and father's occupation (each of the variables are grouped four categories, namely, production/administration/clerical, sales/elementary occupations, services, agriculture, and production and other related activities), ethnicity (coded into seven categories: Akan, Ga-Adangbe, Ewe, Guan, Gurma, mole-dagbani, and others), and place of birth (categorised into 10 regions, namely, Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, and Upper West). In computing the parametric IO estimates, the interactions between all the circumstance variables are included in the OLS equation (Equation 18). The results take into account sampling weights and clustering. The absolute (absolute IO) and relative (relative IO) estimates are obtained using the parametric approach proposed by Ferreira and Gignoux (2011) discussed in Section 3.1.2.

Table A. 5: Parametric and non-parametric estimates of inequality of opportunity based on an extended sample – The inequality measure is the Theil-L index, 1998/99 – 2012/13

	Parametric Approach					
	Theil-L -- Absolute IO			Theil-L -- Relative IO		
	1998/99	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Ghana	0.062	0.062	0.051	22.51%	21.31%	17.71%
	Non-Parametric Approach					
	Theil-L -- Absolute IO			**Theil-L -- Relative IO**		
	1998/99	**2005/06**	**2012/13**	**1998/99**	**2005/06**	**2012/13**
Ghana	0.058	0.059	0.047	21.14%	20.25%	16.12%

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The results reported in the table are based on a sample comprised of all household members aged 15 years and above. The size of the sample is 32,743 observationsThe circumstance variables employed are mother and father's education, parents' occupation, region of birth and ethnicity. The results take into account sampling weights and clustering. The absolute (absolute IO) and relative (relative IO) estimates are obtained using the parametric approach proposed by Ferreira and Gignoux (2011) and the non-parametric approach proposed by Checchi and Peragine (2010), discussed in Sections 3.1.2 and 3.1.3, respectively.

A.3 Distribution of total households incomes by components

Table A. 6: Distribution of total households incomes by components (% share), 1998/99 – 2012/13

	Wage Income	Agricultural income	Non-farm self-employed income	Remittances	Rental income	Other Income	Total Income
			1998/99				
Female-headed households (FHHS)	11.7	31.3	30.5	22.3	2.3	2.0	100.0
Male-headed households (MHHs)	25.0	36.3	29.3	5.6	1.8	2.1	100.0
			2005/06				
Female-headed households (FHHs)	17.0	28.1	31.2	20.2	2.2	1.4	100.0
Male-headed households (MHHs)	31.9	36.7	23.2	5.3	1.9	1.0	100.0
			2012/13				
Female-headed households (FHHs)	33.0	6.4	53.6	4.1	2.1	0.6	100.0
Male-headed households (MHHs)	37.3	11.2	46.8	1.0	3.0	0.8	100.0

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The values reported in the table are based on the full GLSS sample. The results take into account sampling weights and clustering.

A.4: Cross-tabulation – Region of residence vs. region of birth

Table A. 7: Cross-tabulation – Region of residence vs. region of birth (1998/99 – 2012/13)

		Region of Birth		
		1998/99		
		Northern Ghana	Southern Ghana	Total
Region of Residence	Northern Ghana	80.8	0.8	12.3
	Southern Ghana	19.2	99.2	87.7
Total		100	100	100
Sample size		858	5,076	5,934
		2005/06		
		Northern Ghana	Southern Ghana	Total
Region of Residence	Northern Ghana	82.4	1.5	21.9
	Southern Ghana	17.6	98.5	78.1
Total		100	100	100
Sample size		2,152	6,392	8,544
		2012/13		
		Northern Ghana	Southern Ghana	Total
Region of Residence	Northern Ghana	84.6	2.3	27.2
	Southern Ghana	15.4	97.7	72.8
Total		100	100	100
Sample size		5,012	11,563	16,575

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: The values reported in the table are based on a sample which comprises all household heads, with the exception of household heads who are born outside of Ghana.

Appendix B: Opportunity and poverty: The north-south divide

B.1 Descriptive statistics – Outcome variable: Consumption expenditure per adult equivalent

Table B. 1: Descriptive statistics across regions (2012/13)

Variables	Western	Central	Greater Accra	Eastern	Volta	Ashanti	Brong Ahafo	Northern	Upper East	Upper West
Annual Per Adult Equivalent Consumption Expenditure (GHC)										
Mean	3720.4	3653.6	5654.4	3321.9	3059.5	4051.8	3143.1	2303.3	2342.7	2051.2
Std. Err.	110.7	195.6	143.8	104.6	95.2	93.6	90.5	83.3	92.5	80.5
Mother's years of education										
Mean	2.2	2.0	3.9	2.4	2.3	2.6	1.2	0.2	0.5	0.6
Std. Err.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
Father's years of education										
Mean	5.0	3.8	6.4	4.4	4.0	4.7	2.6	0.7	0.7	1.3
Std. Err.	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Mother's educational attainment (%)										
Not more than primary	81.6	83.0	65.7	78.2	80.9	76.2	89.8	98.2	95.5	94.6
Secondary and above	18.4	17.0	34.3	21.8	19.1	23.8	10.2	1.8	4.5	5.4
Father's educational attainment (%)										
Not more than primary	52.1	64.0	41.4	58.2	64.5	54.1	76.1	94.3	94.6	89.1
Secondary and above	47.9	36.0	58.6	41.8	35.5	45.9	23.9	5.7	5.4	10.9
Parent's occupation (%)										
Both are in agriculture	50.3	50.0	17.9	47.0	45.8	48.7	67.3	57.8	73.7	77.7
At least one is in sales/elementary occup	12.5	17.4	28.7	18.8	27.9	17.6	15.4	29.0	14.7	8.1
At least one is in serv/prod. or in prof/admi/cl	37.2	32.5	53.4	34.2	26.3	33.7	17.3	13.2	11.6	14.2
Number of types	12	12	12	12	12	12	12	9	11	12
Number of types with obs.>5	11	11	11	12	12	11	10	7	8	6
Percentage of types with obs. > 5	0.9	0.9	0.9	1.0	1.0	0.9	0.8	0.8	0.7	0.5
Average Number of obs. by type	104	90	122	110	90	124	102	146	96	82
Sample size	1,251	1,081	1,469	1,316	1,078	1,494	1,224	1,318	1,052	979

Source: Author's computation using GLSS VI (GSS, 2013b)

Notes: The descriptive statistics are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering. The mean consumption expenditure is in January 2013 prices.

B.2 Regression results of the reduced-form equation using OLS

Table B. 2: OLS estimates across regions (2012/13) – The dependent variable is log of consumption expenditure per adult equivalent

VARIABLES	(1) Western	(2) Central	(3) Greater Accra	(4) Eastern	(5) Volta	(6) Ashanti	(7) Brong Ahafo	(8) Northern	(9) Upper East	(10) Upper West
Mother's Years of Education	0.03***	0.03***	0.02***	0.02***	0.03***	0.02**	0.01	0.05***	0.06***	0.05***
	(6.96)	(3.83)	(3.81)	(3.29)	(4.32)	(2.09)	(1.60)	(2.79)	(4.05)	(4.00)
Father's Years of Education	0.01**	0.01	0.03***	0.02***	0.02**	0.03***	0.02***	0.02	0.03***	0.04***
	(2.12)	(1.19)	(6.13)	(2.78)	(2.58)	(5.43)	(2.62)	(1.48)	(3.38)	(4.05)
Parents' occupation										
Both are in agriculture	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
At least one is in sales/elementary occup	0.16**	0.26***	0.02	0.29***	0.03	0.25***	0.16**	0.43***	0.44***	0.92***
	(2.11)	(3.70)	(0.31)	(4.87)	(0.34)	(5.16)	(2.42)	(5.71)	(4.93)	(7.49)
At least one is in serv/prod. or in prof/admi/cl	0.34***	0.25***	0.04	0.20***	0.17**	0.21***	0.27***	0.64***	0.49***	0.67***
	(4.08)	(3.69)	(0.59)	(3.63)	(2.10)	(3.64)	(4.29)	(5.87)	(5.27)	(6.35)
Constant	7.65***	7.70***	8.12***	7.62***	7.54***	7.77***	7.66***	7.19***	7.28***	6.90***
	(123.35)	(118.33)	(108.87)	(147.93)	(108.59)	(199.00)	(171.08)	(126.46)	(92.23)	(108.21)
Observations	1,251	1,081	1,469	1,316	1,078	1,494	1,224	1,318	1,052	979
R-squared	0.15	0.10	0.12	0.11	0.10	0.14	0.07	0.16	0.16	0.27

Source: Author's computation using GLSS IV, V and VI (GSS 1999, 2006, 2013b).

Notes: t-statistics in parentheses ( ). *** p<0.01, ** p<0.05, * p<0.1.

The results are based on the *restricted sample* (all household heads who are 15 to 64 years old and have available background information) and take into account sampling weights and clustering.

B.3 Opportunity and Poverty

Table B. 3: Opportunity profile using all circumstance variables, 2012/13

Type	Mother's Education	Father's Education	Parents' Occupation	Ethnicity	Region of Birth	Mean Cons. Exp.	N
1	Not more than primary	Secondary or more	Both in Agric	Akan/ Guan	Northern Ghana	815.99	5.00
2	Not more than primary	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Northern Ghana	1139.14	4.00
3	Not more than primary	Not more than primary	Both in Agric	Ga-Adangbe	Northern Ghana	1382.34	4.00
4	Not more than primary	Not more than primary	Both in Agric	Akan/ Guan	Northern Ghana	1653.21	156.00
5	Secondary or more	Not more than primary	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	1659.25	6.00
6	Secondary or more	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Northern Ghana	1840.88	2.00
7	Not more than primary	Not more than primary	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	2030.25	2536.00
8	Secondary or more	Not more than primary	Both in Agric	Ga-Adangbe	Southern Ghana	2127.22	2.00
9	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Northern Ghana	2325.66	16.00
10	Not more than primary	Not more than primary	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	2710.24	1001.00
11	Secondary or more	Not more than primary	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	2735.94	12.00
12	Secondary or more	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	2748.25	5.00
13	Not more than primary	Not more than primary	Both in Agric	Ga-Adangbe	Southern Ghana	2918.93	238.00
14	Not more than primary	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Northern Ghana	3053.92	10.00
15	Not more than primary	Not more than primary	Both in Agric	Akan/ Guan	Southern Ghana	3094.46	1850.00
16	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	3116.60	547.00

Table B.3 (Continued)

Type	Mother's Education	Father's Education	Parents' Occupation	Ethnicity	Region of Birth	Mean Cons. Exp.	N
17	Not more than primary	Secondary or more	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3137.26	82.00
18	Not more than primary	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	3218.28	25.00
19	Secondary or more	Secondary or more	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3264.44	26.00
20	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3278.08	378.00
21	Not more than primary	Secondary or more	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	3288.13	28.00
22	Not more than primary	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	3437.68	222.00
23	Secondary or more	Secondary or more	Both in Agric	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	3481.41	2.00
24	Secondary or more	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3527.29	15.00
25	Secondary or more	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Southern Ghana	3545.18	38.00
26	Secondary or more	Secondary or more	Both in Agric	Ga-Adangbe	Southern Ghana	3634.58	8.00
27	Secondary or more	Not more than primary	Both in Agric	Akan/ Guan	Southern Ghana	3652.83	26.00
28	Secondary or more	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ga-Adangbe	Southern Ghana	3678.00	4.00
29	Not more than primary	Secondary or more	Both in Agric	Ga-Adangbe	Southern Ghana	3706.36	30.00
30	Not more than primary	Secondary or more	Both in Agric	Akan/ Guan	Southern Ghana	3735.88	352.00
31	Not more than primary	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Northern Ghana	3781.54	10.00
32	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Southern Ghana	3809.42	423.00
33	Not more than primary	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Southern Ghana	3816.39	340.00

Table B.3 (Continued)

Type	Mother's Education	Father's Education	Parents' Occupation	Ethnicity	Region of Birth	Mean Cons. Exp.	N
34	Not more than primary	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3820.26	114.00
35	Not more than primary	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	3863.65	267.00
36	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ga-Adangbe	Northern Ghana	3880.86	2.00
37	Not more than primary	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ga-Adangbe	Southern Ghana	3932.12	114.00
38	Not more than primary	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Southern Ghana	4286.73	728.00
39	Secondary or more	Secondary or more	Both in Agric	Akan/ Guan	Southern Ghana	4377.92	189.00
40	Not more than primary	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	4416.79	252.00
41	Not more than primary	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ga-Adangbe	Southern Ghana	4578.70	63.00
42	Secondary or more	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Southern Ghana	4645.82	41.00
43	Secondary or more	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	4732.99	74.00
44	Secondary or more	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	4831.99	23.00
45	Not more than primary	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Southern Ghana	4887.70	230.00
46	Secondary or more	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Northern Ghana	4964.33	10.00
47	Not more than primary	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ga-Adangbe	Southern Ghana	4970.30	40.00
48	Not more than primary	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	4984.30	95.00
49	Secondary or more	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	5003.58	7.00
50	Secondary or more	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	5451.58	11.00

Table B.3 (Continued)

Type	Mother's Education	Father's Education	Parents' Occupation	Ethnicity	Region of Birth	Mean Cons. Exp.	N
51	Not more than primary	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ga-Adangbe	Southern Ghana	5509.24	124.00
52	Secondary or more	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Southern Ghana	5962.00	778.00
53	Secondary or more	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Akan/ Guan	Southern Ghana	6035.05	223.00
54	Secondary or more	Not more than primary	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ga-Adangbe	Southern Ghana	6093.80	3.00
55	Secondary or more	Secondary or more	At least 1 in Sales/ Elementary occup & none in Sev/Prod	Ga-Adangbe	Southern Ghana	6217.12	30.00
56	Secondary or more	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Southern Ghana	6743.71	237.00
57	Secondary or more	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ga-Adangbe	Southern Ghana	6757.43	156.00
58	Secondary or more	Secondary or more	At least 1 in Serv/Prod or At least one in Prof/Admi	Ewe/ Gurma/ Mole-dagbani/ Others	Northern Ghana	7898.55	39.00
59	Secondary or more	Not more than primary	At least 1 in Serv/Prod or At least one in Prof/Admi	Akan/ Guan	Northern Ghana	14917.21	2.00

Source: Author's computation using GLSS VI (GSS, 2013b).

Notes: The profile is based on the *restricted sample,* which comprises all household heads aged 15 to 64 years, with available background information. Five circumstance variables are used, namely, mother and father's educational attainment, parents' occupation, ethnicity and place of birth. The mean consumption expenditure per adult equivalent is computed for each type (i.e. a group of household heads with the same set of circumstances). The results take into account sampling weights and clustering. N = number of observations by type.

Table B. 4: Correlates of poverty: Descriptive statistics, 2012/13

Variables	Entire Sample			Opp. Deprived		
	Ghana	North	South	Ghana	North	South
Mean Consumption Exp. Per Adult Equivalent (GHC)	3601.5	2619.3	3780.8	2598.5	1925.5	2803.4
Std. Dev.	3380.2	2757.0	3452.1	2383.6	2181.5	2403.4
Poverty status						
Poor	16.2	34.4	12.8	27.2	46.0	21.4
Non-Poor	83.8	65.6	87.2	72.8	54.0	78.6
Household Composition						
Nb. of infants						
Mean	0.7	0.8	0.6	0.7	0.9	0.7
Std. Dev.	0.8	0.8	0.8	0.8	0.9	0.8
Min	0.0	0.0	0.0	0.0	0.0	0.0
Max	6.0	6.0	4.0	6.0	6.0	4.0
Nb. of Children						
Mean	1.2	1.3	1.2	1.4	1.5	1.4
Std. Dev.	1.3	1.5	1.3	1.4	1.6	1.3
Min	0.0	0.0	0.0	0.0	0.0	0.0
Max	16.0	16.0	9.0	16.0	16.0	8.0
Nb. of Adults						
Mean	2.5	2.7	2.4	2.7	2.8	2.7
Std. Dev.	1.4	1.5	1.3	1.5	1.4	1.5
Min	0.0	0.0	0.0	0.0	0.0	0.0
Max	13.0	10.0	13.0	13.0	9.0	13.0
Nb. of Seniors						
Mean	0.1	0.1	0.1	0.1	0.1	0.1
Std. Dev.	0.3	0.4	0.3	0.3	0.4	0.3
Min	0.0	0.0	0.0	0.0	0.0	0.0
Max	2.0	2.0	4.0	2.0	2.0	2.0
Age of Head						
15-24	5.0	7.3	4.6	4.4	7.3	3.4
25-34	28.2	34.4	27.0	22.2	33.3	18.7
35-44	31.3	30.7	31.4	29.2	29.0	29.3
45-54	22.5	17.1	23.5	25.0	17.3	27.4
55-64	13.0	10.6	13.4	19.2	13.1	21.2
Sex of Head						
Male	82.7	90.8	81.3	87.5	93.0	85.8
Female	17.3	9.2	18.7	12.5	7.0	14.2
Education						
No Education	18.1	32.8	15.4	27.1	38.9	23.4
Basic/Primary	37.0	30.8	38.2	36.3	32.8	37.4
Secondary	35.5	23.4	37.7	31.4	19.2	35.2
Tertiary	9.3	13.0	8.7	5.2	9.1	4.0

Table B.4 (Continued)

Variables	Entire Sample			Opp. Deprived		
	Ghana	North	South	Ghana	North	South
Employment Prospect in Area of Residence						
Low employment prospect	21.9	82.7	10.8	35.3	89.6	18.2
High employment prospect	78.1	17.3	89.2	64.7	10.4	81.8
Employment Sector						
Agric Self Employed	28.2	32.3	27.5	46.8	43.5	47.9
Paid employee Publ/Govt/NGO/Army/St Own	10.4	15.1	9.5	6.8	10.6	5.7
Paid employee Private	16.3	6.7	18.1	8.1	4.1	9.2
Non-Agric Self-Employed	32.7	24.1	34.3	20.7	16.6	22.0
Contributing/Casual/Apprentices/Domestic/Other	12.4	21.8	10.6	17.6	25.2	15.3
Industry						
Agriculture	36.7	49.4	34.3	62.2	66.5	61.0
Mining/Quarrying	1.7	1.1	1.8	1.1	N/A	1.2
Manufacturing	9.7	7.4	10.1	6.4	4.6	6.9
Services	52.0	42.1	53.7	30.4	28.9	31.0
Migration of Head						
No	53.3	75.5	49.2	57.7	80.4	50.7
Yes	46.7	24.5	50.8	42.3	19.6	49.3
Marital Status of Head						
Married/Informal	79.1	85.6	77.9	84.9	88.0	83.9
Never Married	9.5	8.1	9.8	4.9	6.4	4.4
Separated/Divorced/Widowed	11.4	6.3	12.4	10.2	5.6	11.7
Area of Residence						
Rural	48.9	65.6	45.9	71.6	80.1	68.9
Urban	51.1	34.4	54.1	28.4	19.9	31.1
Region						
Greater Accra	13.2	N/A	15.6	12.3	N/A	16.2
Western	10.1	N/A	11.9	9.3	N/A	12.2
Central	14.2	N/A	16.8	5.1	N/A	6.7
Eastern	13.0	N/A	15.4	13.1	N/A	17.3
Volta	9.7	N/A	11.5	8.4	N/A	11.1
Ashanti	14.2	N/A	16.8	12.8	N/A	16.8
Brong Ahafo	10.2	N/A	12.1	15.0	N/A	19.8
Northern	5.1	33.0	N/A	6.7	28.0	N/A
Upper East	5.4	34.8	N/A	8.6	35.8	N/A
Upper West	5.0	32.2	N/A	8.6	36.2	N/A
Sample size	**13,803**	**2,131**	**11,672**	**4,780**	**1,133**	**3,638**

Notes: The *entire* sample comprises all household heads and spouses, irrespective of the 'opportunity deprivation status' of the household head. And the *opportunity deprived* sample

includes only households headed by persons who belong to the *least advantaged* type (i.e., persons whose parents have been involved in agricultural activities most of their lives and whose father has no more than primary education).

Appendix C: Inequality of opportunity, consumption inequality and poverty reduction in Ghana

Table C. 1: List of districts

No.	District	No.	District
	Western Region		**Central Region**
1	Bibiani/Anhwiaso/Wekwai	27	Agona
2	Jomoro	28	Assin
3	Juabeso-Bia	29	Cape Coast
4	Nzema	30	Gomoa
5	Sefwi-Wiawso	31	Mfantsiman
6	Shama-Ahanta East		**Volta Region**
	Greater Accra Region	32	Ho
7	Accra	33	Hohoe
8	Ga	34	Jasikan
9	Tema	35	Ketu
	Eastern Region	36	Kpandu
10	Birim South	37	Krachi
11	East Akim	38	Nkwanta
12	Kwaebibirem	39	North Tongu
13	Kwahu South		**Ashanti Region**
14	Manya Krobo	40	Adansi West
15	West Akim	41	Amansie East
16	Yilo Krobo	42	Asante Akim North
	Brong Ahafo Region	43	Ejisu Juaben
17	Asunafo	44	Kumasi
18	Atebubu/Sene	45	Offinso
19	Dormaa	46	Sekyere East
20	Nkroranza	47	Sekyere West
21	Sunyani		**Northern Region**
22	Techiman	48	Bole
	Upper East Region	49	Chereponi-Saboba
23	Bawku East	50	East Gonja
24	Bolgatanga	51	Tamale
25	Builsa		
	Upper West Region		
26	Wa		

Table C. 2: Poverty incidence, inequality in consumption expenditure and inequality of opportunity by district – Levels (2005/06 – 2012/13)

District	Region	Poverty Incidence	Consumption Inequality (Theil-L)	Inequality of Opportunity
2005/06				
Accra	Greater Accra	16.1512	0.240	0.032
Adansi West	Ashanti	11.6632	0.388	0.114
Agona	Central	31.4025	0.240	0.063
Amansie East	Ashanti	45.9867	0.371	0.039
Asante Akim North	Ashanti	35.3253	0.229	0.028
Assin	Central	32.9991	0.152	0.020
Asunafo	Brong Ahafo	24.233	0.185	0.026
Atebubu/Sene	Brong Ahafo	29.057	0.271	0.065
Bawku East	Upper East	53.7849	0.191	0.024
Bibiani/Anhwiaso/Wekwai	Western	16.8501	0.149	0.027
Birim South	Eastern	22.2052	0.159	0.032
Bole	Northern	68.6536	0.204	0.027
Bolgatanga	Upper East	60.7419	0.297	0.012
Builsa	Upper East	90.5486	0.196	0.019
Cape Coast	Central	7.0786	0.238	0.046
Chereponi-Saboba	Northern	31.7604	0.261	0.022
Dormaa	Brong Ahafo	52.6205	0.216	0.041
East Akim	Eastern	31.5168	0.149	0.019
East Gonja	Northern	26.8126	0.145	0.009
Ejisu Juaben	Ashanti	20.0893	0.268	0.005
Ga	Greater Accra	15.2494	0.261	0.020
Gomoa	Central	25.545	0.332	0.014
Ho	Volta	38.8949	0.291	0.043
Hohoe	Volta	38.4095	0.197	0.014
Jasikan	Volta	55.3157	0.142	0.018
Jomoro	Western	23.5119	0.227	0.042
Juabeso-Bia	Western	28.8802	0.212	0.014
Ketu	Volta	41.9222	0.229	0.056
Kpandu	Volta	26.8071	0.201	0.038
Krachi	Volta	26.2829	0.154	0.032
Kumasi	Ashanti	11.7653	0.168	0.009
Kwaebibirem	Eastern	21.4602	0.217	0.015
Kwahu South	Eastern	32.4527	0.137	0.012
Manya Krobo	Eastern	21.6437	0.184	0.039
Mfantsiman	Central	36.4732	0.223	0.034
Nkroranza	Brong Ahafo	29.5739	0.181	0.020
Nkwanta	Volta	44.1246	0.105	0.017
North Tongu	Volta	30.4387	0.170	0.009
Nzema	Western	28.5068	0.168	0.016
Offinso	Ashanti	25.3351	0.149	0.018
Sefwi-Wiawso	Western	25.9154	0.193	0.010
Sekyere East	Ashanti	41.9864	0.177	0.028
Sekyere West	Ashanti	10.8339	0.126	0.023

Table C.2 (Continued)

District	Region	Poverty Incidence	Consumption Inequality (Theil-L)	Inequality of Opportunity
2005/06				
Shama-Ahanta East	Western	12.2942	0.182	0.014
Sunyani	Brong Ahafo	16.4118	0.219	0.043
Tamale	Northern	31.7198	0.250	0.102
Techiman	Brong Ahafo	10.3871	0.157	0.012
Tema	Greater Accra	2.5118	0.243	0.015
Wa	Upper West	56.0425	0.569	0.231
West Akim	Eastern	37.3802	0.287	0.027
Yilo Krobo	Eastern	31.8755	0.221	0.050
2012/13				
Accra	Greater Accra	1.590	0.167	0.010
Adansi West	Ashanti	10.378	0.235	0.038
Agona	Central	11.562	0.219	0.026
Amansie East	Ashanti	19.501	0.262	0.044
Asante Akim North	Ashanti	30.263	0.247	0.009
Assin	Central	27.551	0.187	0.001
Asunafo	Brong Ahafo	20.149	0.329	0.022
Atebubu/Sene	Brong Ahafo	23.540	0.224	0.017
Bawku East	Upper East	43.566	0.303	0.009
Bibiani/Anhwiaso/Wekwai	Western	14.719	0.199	0.025
Birim South	Eastern	34.274	0.230	0.048
Bole	Northern	84.884	0.491	0.046
Bolgatanga	Upper East	25.618	0.252	0.027
Builsa	Upper East	59.401	0.267	0.044
Cape Coast	Central	1.832	0.283	0.037
Chereponi-Saboba	Northern	54.392	0.262	0.019
Dormaa	Brong Ahafo	24.523	0.262	0.048
East Akim	Eastern	12.876	0.200	0.014
East Gonja	Northern	81.674	0.182	0.020
Ejisu Juaben	Ashanti	32.697	0.224	0.012
Ga	Greater Accra	6.566	0.225	0.022
Gomoa	Central	13.488	0.166	0.019
Ho	Volta	29.310	0.336	0.069
Hohoe	Volta	30.033	0.285	0.021
Jasikan	Volta	21.568	0.330	0.049
Jomoro	Western	22.723	0.314	0.023
Juabeso-Bia	Western	12.179	0.218	0.022
Ketu	Volta	18.722	0.199	0.010
Kpandu	Volta	17.566	0.305	0.010
Krachi	Volta	47.348	0.270	0.017
Kumasi	Ashanti	2.596	0.224	0.026
Kwaebibirem	Eastern	18.911	0.186	0.005
Kwahu South	Eastern	26.009	0.209	0.027
Manya Krobo	Eastern	44.755	0.239	0.024
Mfantsiman	Central	30.075	0.185	0.020
Nkroranza	Brong Ahafo	27.590	0.282	0.001

Table C.2 (Continued)

District	Region	Poverty Incidence	Consumption Inequality (Theil-L)	Inequality of Opportunity
2012/13				
Nkwanta	Volta	47.723	0.181	0.005
North Tongu	Volta	45.109	0.318	0.004
Nzema	Western	42.819	0.337	0.039
Offinso	Ashanti	37.778	0.206	0.032
Sefwi-Wiawso	Western	24.959	0.222	0.021
Sekyere East	Ashanti	20.640	0.208	0.035
Sekyere West	Ashanti	25.502	0.193	0.013
Shama-Ahanta East	Western	3.436	0.228	0.019
Sunyani	Brong Ahafo	13.306	0.180	0.023
Tamale	Northern	18.460	0.209	0.038
Techiman	Brong Ahafo	17.831	0.202	0.010
Tema	Greater Accra	3.913	0.178	0.016
Wa	Upper West	63.092	0.544	0.203
West Akim	Eastern	23.488	0.193	0.017
Yilo Krobo	Eastern	4.286	0.086	0.009

Source: Author's computation using the GLSS V and VI surveys (GSS, 2006, 2013b).

Notes: In computing the inequality of opportunity estimates, the outcome variable is the per adult equivalent consumption expenditure and the circumstance variables are father's education and parent's occupation. The measure of inequality used in the computation of inequality and inequality of opportunity levels is the Theil-L index or the generalized entropy index (GE(α)) with α=0, also known as Mean Log Deviation. The estimates take into account sampling weights and clustering.

Table C. 3: Two-Sample t-test – Poverty incidence, consumption inequality and inequality of opportunity (2005/06 – 2012/13)

	Mean Difference	Std. Error Difference	t-statistic	Pr (|T|>|t|)	Pr (T > t)	Pr (T < t)	Degrees of Freedom
Poverty Incidence (Ho: Mean (diff.) = 0)	-4.170	2.364	-1.764	0.084	0.958	0.042	50
Consumption Inequality (Ho: Mean (diff.) = 0)	0.027	0.012	2.175	0.034	0.017	0.983	50
Inequality of Opportunity (Ho: Mean (diff.) = 0)	-0.007	0.003	-2.113	0.040	0.980	0.020	50

Notes: The values reported in this table are based on the levels of poverty incidence, inequality and inequality of opportunity reported in Appendix Table C.2. For each of the variables, the difference is taken between the 2012/13 (GLSS VI) and the 2005/06 (GLSS V) estimates.