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ESSAYS ON FISCAL POLICIES AND INCOME REDISTRIBUTION

BY

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DECLARATION

I, Ekua Senuah Appiah, hereby declare that this thesis, with the exception of references to other literature, which have been duly acknowledged, is the result of my own effort and that it has neither in whole nor in part been presented elsewhere for the award of a degree.

2nd November, 2021

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ABSTRACT

The increasing rate of income inequality across the globe has generated a growing public support for income redistribution. Most governments usually employ fiscal policies as the main instruments to redistribute income. Despite the recognition that fiscal policies play a central role in addressing income inequality, empirical studies on this subject is very limited.

The thesis addressed three main issues: the first study conducts an ex-ante evaluation analysis on the redistributive impact of a hypothetical child support grant financed with domestic tax revenues; the second study examines the determinants of income redistribution and the third study investigates the impact of cash transfers on the intra-household labour market decisions of beneficiaries.

The first objective of the thesis seeks to examine the redistributive impact of a hypothetical child support grant financed with direct tax revenues. The Ghana tax-benefit microsimulation model (GHAMOD) was used to perform all the simulations. The magnitude of redistribution was derived by measuring the change in the inequality measure before and after taxes or transfers. In assessing the progressivity of the transfer, the study employed both concentration curves and concentration indices. Since the pursuit of equality in income distribution also involves poverty reduction, the study also examined the impact of this policy on poverty rate. Three policy scenarios were examined: a targeted child support grant; a universal child support grant with flat benefits and lastly, a universal child support grant with differentiated benefits. The following conclusions were drawn based on the simulations: a universal child support grant with differentiated benefits was the most effective child benefit

scheme to reduce inequality and poverty even though it the costliest scheme. Generally, the results showed a trade-off between the fiscal cost and the extent of inequality reduction. The results also confirmed that the extent of redistribution does not only depend on the extent of progressivity of the cash transfer but also depends on the size or the magnitude of the transfer. Again, the simulations for the income tax reform indicated that increasing the tax rate for the top income bracket provides an avenue of raising revenue to fund the proposed programme and also ensures that the ultimate goal of income redistribution is achieved.

The second research objective seeks to examine the factors that influence the extent of redistribution that can be achieved with a given set of taxes and benefits policies. It first tested the validity of the median voter theorem since many empirical studies have produced inconsistent results. Secondly, the study accounted for other factors that have the potential of affecting the impact of redistributive policies. The econometric technique used for the analysis was the system GMM. The outcome of the study confirmed the validity of Meltzer-Richard median voter hypothesis. Furthermore, the extended baseline regression models shown that, a country's income level, fertility rate and trade openness positively affect the extent of redistribution. The degree of democratisation, on the other hand, negatively affect redistribution.

Lastly, the third research objective evaluates the impact of cash transfers on intra-household labour market decisions of beneficiaries using the Livelihood Empowerment Against Poverty (LEAP) programme as a case study. The study assessed how household bargaining affect the labour supply decisions of couples who received the LEAP grant. For the impact evaluation analysis, the study employed

difference-in-difference with inverse probability weighting (DD-IPW). All the regression models showed that cash transfers did not significantly affect the labour supply of couples. Women's bargaining power turned out to be significant and positively affected the labour market decisions of couples.

DEDICATION

To my beloved mother, the late Madam Agnes Aggrey who died just a day after I gained the offer to pursue this PhD programme and my cherished father, the late Mr. Fred Appiah who also died during the third year of this PhD programme.

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I take full responsibility for any inadvertent errors, omissions or misrepresentations that may be found in this thesis.

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LIST OF ABBREVIATIONS

AFAM-PE	Asignaciones Familiares-Plan de Equidad
ATEs	Average Treatment Effects
BDH	Bono de Desarrollo Humano
CEPS	Customs, Excise and Preventive Service
CIT	Corporate Income Tax
CST	Communication Service Tax
DD	Difference-in-Difference
DLICs	District LEAP Implementation Committees
ECS	Electronic Communication Services
EU	European Union
EU-SILC	European Union Statistics on Income and Living Conditions
GETFL	Ghana Education Trust Fund Levy
GHAMOD	Ghana Tax-Benefit Microsimulation Model
GLSS	Ghana Living Standards Survey
GRA	Ghana Revenue Authority
GSFP	Ghana School Feeding Programme
GSS	Ghana Statistical Service
IRS	Internal Revenue Service
ISER	Institute for Social and Economic Research
ISSER	Institute for Statistical, Social and Economic Research
LEAP	Livelihood Empowerment Against Poverty
LIS	Luxembourg Income Study

MESW	Ministry of Employment and Social Welfare
NFSL	National Fiscal Stabilization Levy
NHIL	National Health Insurance Levy
NHIS	National Health Insurance Scheme
NSPS	National Social Protection Strategy
OPM	Oxford Policy Management
OVC	Orphan and Vulnerable Children
PAYE	Pay-As-You-Earn
PETI	Programmea de Erradicacao de Trabalho Infantil
PIT	Personal Income Taxes
PNAD	Pesquisa Nacional por Amostra de Domicílios
PRAF	Programmea de Asignación Familiar
PROGRESA	Programmea de Educación, Salud y Alimentación
SPT	Special Petroleum Tax
SSC	Social Security Contributions
SWIID	Standardised World Income Inequality Database
UNGA	United Nations General Assembly
UNU-WIDER	United Nations University-World Institute for Development Economics Research
VAT	Value Added Tax
WIID	World Income Inequality Data

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the Study

As far back as 1651, Thomas Hobbs described life without the government as, "nasty, brutish and short", this underscores the significance of the government in every economy. To Stiglitz (1997), the government has the ability of improving the standard of living of the citizenry when there is imperfect information, competition or incomplete market. According to Musgrave (1959), the government plays three fundamental roles: allocation, distribution and stabilization. Government intervention is deemed necessary if Pareto inefficient outcomes arise due to market failure (allocation); if competition in the private market makes a group of individuals worse off (distribution); or when some resources are not efficiently utilized (stabilization).

With regard to resource distribution, achieving a 'just' distribution of income is a vital issue in economic policy debates. Empirical studies however do not provide a definite conclusion about the impact of unequal distribution of income on the economy. According to Alesina & Perotti (1996), inequality generates both political and economic instability that impact negatively on investment. Instability in the economy consequently results in policy uncertainty, which negatively affects some economic decisions including physical or human capital investment or the level of savings. In similar vein, foreign as well as local investors are not encouraged to invest resources in a state where economic and political conditions are not stable.

But other empirical studies have found that inequality has a positive effect on the economy. For instance, Chaudhuri and Ravallion (2006) argued that, inequality influences the growth of the economy positively. This is because, inequality provides incentives for entrepreneurship and innovation. This is essential to ensure that the private market functions effectively since this encourages more investment and consequently, economic growth. Furthermore, Barro (2000), argued that in the context the poor economies, allowing only a handful of individuals to accumulate the amount of capital required to start a business generates positive externalities for the entire country.

Although the literature does not provide a clear conclusion on the relationship between inequality and economic growth, there is the need to be concerned with issues of inequality since income distribution largely affects the welfare of the people (Lee, 2009). As noted by (Ostry *et al.*, 2014), it will be wrong to conclude that solving the problem of inequality may negatively affect economic performance than the problem itself since reductions in income inequality generate higher and a more sustainable growth.

Even though economic growth results in an increase in national income, it is more effective in reducing the rate of poverty if there is equity in income distribution or if the result in economic growth is accompanied by a reduction in the rate of inequality (White & Anderson, 2001; Dagdeviren *et al.*, 2002). Again, Fosu (2011) noted that, although several countries have recorded reductions in poverty rate as a result of economic growth, “further progress could have occurred under a relatively (more) favourable income distribution”. This explains why the increasing rate of inequality in

many countries across the globe has become a major economic and social concern and has therefore generated a lot of discussions on how government policies could be employed to address the problem.

Inequality is not inevitable, it is a policy choice and it is certain that if the government does not tackle inequality deliberately, it will worsen. Indeed, equality in the distribution of resources cannot certainly be promoted by the private market hence the need for government intervention. Hence in the year 2015, several countries endorsed "Agenda 2030" which incorporated the Sustainable Development Goals (SDGs) as well as the concept of "leave no one behind"[1] (UNGA, 2015). This implies "ending extreme poverty in all its forms as well as reducing inequalities among both individuals (vertical) and groups (horizontal)" (Stuart & Samman, 2017). The aim to "leave no one behind" is to address two related issues: ending absolute poverty and also ensuring that individuals who are behind (either in absolute or relative terms) 'catch up' with those who are ahead. This brings to fore, the role of income redistribution.

Even though redistribution can be achieved by using regulatory instruments such as price controls, interest rate controls or wage controls, the primary instruments that most governments employ to influence income distribution directly are fiscal policy

[1] This relates to the tenth goal of the SDGs which is to decrease the inequality rate within and among countries. To achieve this objective, governments are mandated to implement policies, particularly fiscal, social protection and wage policies, in order to progressively reduce inequality.

instruments. If well formulated, fiscal policies are important for driving national development, economic growth and social stability. Redistributive fiscal policies comprise of government spending such as monetary payments, that is, cash transfers or in-kind benefits as well as tax policies including income and corporate taxes.

Fritz & Lavinas, (2016) highlighted two ways in which a country's tax system may influence the income distribution structure. To begin with, taxes are used to generate revenues to finance public spending on human capital development. In this regard, the tax policy can be described as one of the factors that contributes to human capital formation which helps improve market incomes and therefore "primary distribution", that is, income distribution before transfers and/or taxes. Furthermore, the tax policy affects the income distribution structure through progressive taxes which is aimed at modifying the "secondary distribution", that is, income distribution after taxes. It must be noted that, the redistributive impact of tax policies is dependent on the progressivity of the tax system. Since indirect taxes are generally regressive in nature, they are less appropriate instruments for redistributive purposes.

Cash transfers are defined as direct, regular and predictable financial support which is expected to raise the real income of poor and vulnerable households. The transfer enables beneficiary households to sustain expenditure on food, healthcare or education. Generally, cash transfer policies are implemented to decrease poverty rate within the shortest timeframe; reduce poverty in the longer term since it encourages beneficiaries to improve on their human capital; and also decrease food insecurity (Owusu-Addo *et al.*, 2018).

Transfers are categorised as either conditional or unconditional. Transfers that require recipients to comply with some specific behavioural requirements are described as conditional cash transfers. On the other hand, transfers without any conditionalities attached are described as unconditional cash transfer (Fiszbein & Schady, 2009; Baird *et al.,* 2013). Conditions are often attached to the transfers in order to enable recipients demand for more social services such as healthcare and education which will enable them to invest in their human capital since this is expected to break the transmission of intergenerational poverty (Hanlon *et al.,* 2010).

In 1997, the first nationwide conditional cash transfers programme known as the *Progresa* (which was later renamed *Oportunidades* and currently called *Prospera)* was implemented in Mexico. This programme became a huge success story since it brought about a significant reduction in poverty, increased in school enrolments, improved health and reduced malnutrition, increased investment and improved the use of labour time. Haven observed these overwhelming positive impacts, many countries in Latin America implemented similar policies and became 'the magic bullet' for reducing poverty. The positive impact of the "first generation" cash transfers which began in Latin America encouraged international organisations to replicate similar experiments in other emerging and developing countries which spurred the "second generation" cash transfers.

Cash transfers significantly reduce poverty and income disparities if policies are well-formulated and implemented. A review of experiences across the globe suggests that spending on public provision of social protection is one of the most important tools employed by many governments to reduce income inequality. In social policy

perspective, such programmes are intended "to catch those falling downward economically before they land into destitution and to provide assistance or a minimum income to those more permanently poor" (Grosh et *al.*, 2008).

The agenda to "leave no one behind" in the growth process requires governments to prioritise and fast-track actions to reach individuals or groups who are deprived in order to prioritise their needs. Corak (2016) attributed inequality to one's family background since a person's starting point greatly preconditions his adult labour market outcomes. Several empirical studies have established that economic status is persistent across generations. This means that children who grow in rich households earn more income compared to children who grow in poor households. If the resources of parents affect the development of the skills of their children, then cash transfers to poor households is justified on both efficiency and equity grounds (Benabou, 1996; Galor & Zeira, 1993).

Figure 1.1 shows how cash transfers may improve the child and family welfare of beneficiary households and consequently, reduce the rate of inequality. First and foremost, cash transfers whether conditional or unconditional in the form of either social pensions, child grants or public work leads to a much higher income for beneficiaries. This is because recipients are able to build their human capital which enables them break the intergenerational transmission of poverty which is caused by poor health and low skills as a result of not being able to access better social services. This enables beneficiaries to be highly productive and also earn much higher income so as to save or invest more. By implication, cash transfers allow beneficiaries to build capacities for market participation and income generation. This improves the

welfare of beneficiaries thereby reducing the extent of income inequality.

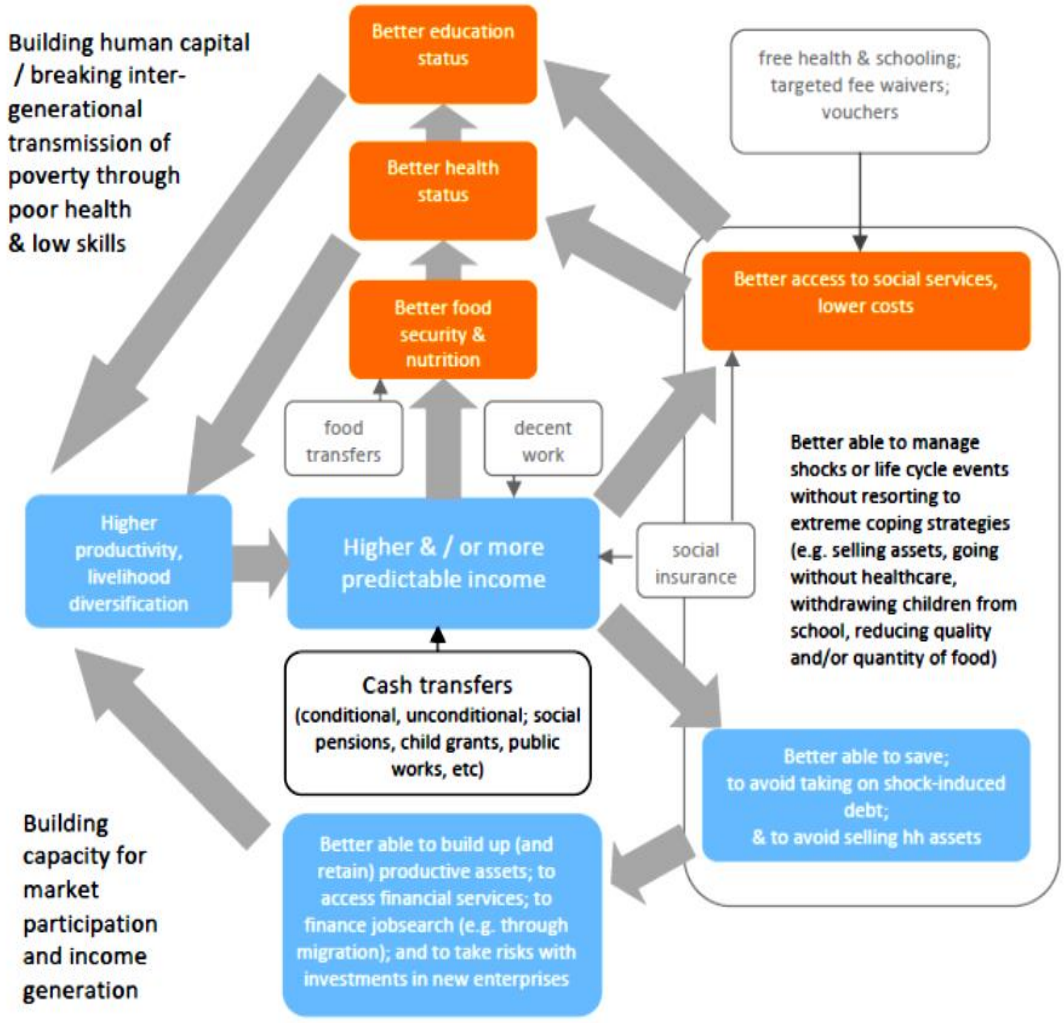

Figure 1.1: Channels through which Cash Transfers Affect Income Inequality
Source: Arnold *et al.*, (2011)

There is empirical evidence that, government policies such as cash transfers or subsidies increase family incomes and this enhances the child's development, health status as well as educational achievement (Barrientos & DeJong, 2004). The impact of family or household income on the welfare of children in the household justifies the need for government intervention programmes that transfer cash to low-income households or programmes that directly affect the human capital development of

children.

The government of Ghana in 2015 launched the National Social Protection Policy (NSPP). This policy aims to achieve "an all-inclusive society through the provision of sustainable mechanisms for the protection of persons living in situations of extreme poverty, vulnerability and exclusion". However, one policy area of the NSPP which has not been fully explored in the literature as an instrument effective for inequality reduction is the Child and Family Welfare Policy. Cooke *et al.,* (2016) estimated that, about 28.3 percent of children in Ghana live in poverty as compared to 20.3 percent adults. This implies that, out of 12.9 million children, about 3.65 million live in poverty. Furthermore, for every ten children, at least one child lives in extreme poverty. This represents approximately 1.2 million children. Due to the intergenerational transmission of inequality and poverty, policies aimed at alleviating child poverty should be a prime concern of the government. By using the Ghana microsimulation model (GHAMOD), this study seeks to conduct an ex-ante evaluation of the redistributive impact of a hypothetical child support grant policy. It provides a first attempt to empirically quantify the redistributive impact and cost of implementing a child support grant policy which is mainly financed by domestic tax revenues.

The problem of limited financial resources has become one of the major impediments facing the government with respect to the implementation of redistributive programmes. Hence, it is important to mobilize additional revenues in order to finance this proposed policy. It is important to note that, the composition and sources of revenue in turn influence the distributional outcomes and sustainability of the

policy (Bastagli *et al.*, 2012; Barrientos, 2013). This implies that a policy that aims to reduce poverty and inequality must strive to create fiscal space adequate enough to finance the programme without adversely affecting the ultimate goal of reducing poverty and inequality or jeopardising the stability of the economy (Handley, 2009; Heller, 2005). The thesis therefore simulates different child support grant as well as tax scenarios in order to determine the most efficient and effective policy to address the problem of inequality as well as poverty.

Haven examined the impacts of redistributive fiscal policies, there is also the need to understand the factors that drive the extent or magnitude of redistribution that is observed in many countries. In their seminal paper, Meltzer & Richard (1981) concluded that, if voters' utility is single peaked and the policy space is unidimensional, then the median voter[2] becomes key in majority decision-making. Since self-centered politicians are concerned about maximizing the probability of gaining or retaining power, the preferences of the median voter are translated into policy action. This implies that, in democratic policymaking, higher initial inequality is expected to positively affect redistribution. Empirical studies on the relationship between the rate of inequality and redistribution have produced varied results. As a result of these consistencies, this thesis intends to retest the median voter theory and

[2] The median voter can be described as that individual with the median income when all voters are arranged based on market or factor incomes.

account for other factors that may influence the extent of income redistribution by using the recent World Income Inequality Data (WIID).

Although the impact of redistributive transfers and taxes seem to be direct, the anticipated impact is theoretically complicated when considering behavioural changes of economic agents that is, the second-round effect. In fact, social protection programmes are perceived to result in undesirable behaviours or create a 'dependency syndrome'. This is when beneficiaries of cash transfers are discouraged from engaging in productive economic activities thus reducing their labour supply. Majority of studies that have evaluated the behavioural adjustments of beneficiaries of cash transfers are usually based on Becker's unitary household model (Becker, 1981) hence less is known about the impact of cash transfers on intra-household labour market decisions.

The thesis is therefore built on the premise that, besides the regular mechanisms through which cash transfers may influence labour supply decisions of beneficiary households as suggested by the unitary household model, the collective household model (Chiaporri, 1988; 1992) provides an additional channel through which cash transfers may affect adults' labour supply decisions. The model allows researchers to examine the intra-household responses to cash transfers by considering power relations within the household. This provides a different approach of evaluating households labour market responses to cash transfers.

1.2 Research Problem

The rising rate of inequality across the globe over the past decades (IMF, 2014) together with the growing realization that this can obstruct economic development (Halter *et al.*, 2014; Ostry *et al.*, 2014) underscores the need to implement policies that can address the problem. In Ghana, various governments have launched diverse programmes aimed at alleviating poverty and ensuring equitable distribution of resources. These include: the capitation grant, the Livelihood Empowerment Against Poverty (that is, the LEAP programme), the school feeding programme, the programme to eliminate schools under trees, free distribution of school uniforms, exercise books and textbooks and the free senior high school programme. Furthermore, projects to improve health care delivery have also been implemented: Community-based Health Planning Services (CHPS), indoor residual spraying against malaria-carrying mosquitoes, national immunization against polio, and universal health care programme.

Indeed, there has been progress in reducing the rate of poverty. Poverty rate, as measured by poverty headcount has been declining over the years as shown in Figure 1.2. From 51.7 percent in 1991 to 39.5 percent in 1998 and further reduced to 28.5 percent in 2006. With reference to the new poverty line for 2012/2013, the overall incidence of poverty reduced from 31.9 percent in 2005/2006 to 24.2 percent in 2012/2013 (GLSS III, IV, V and VI).

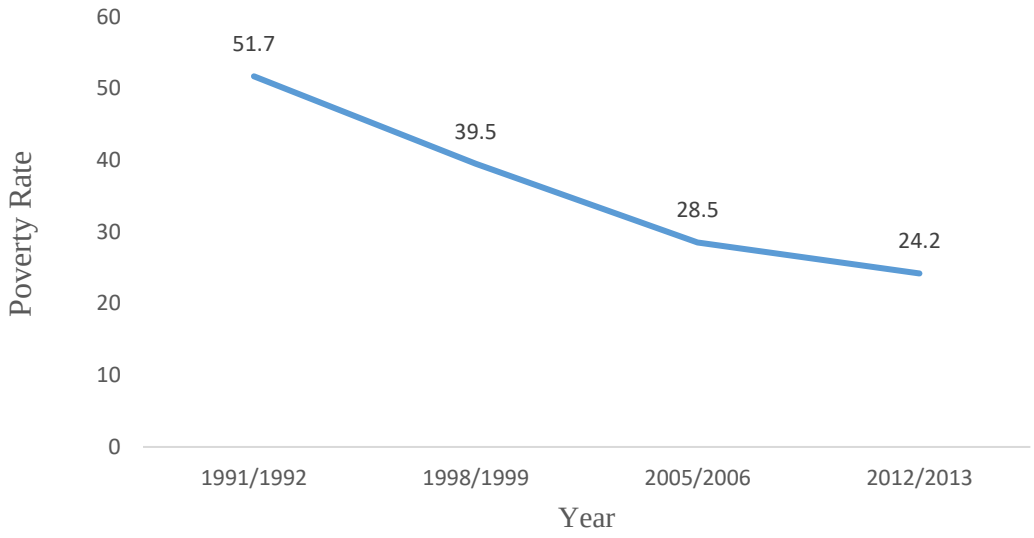

Figure 1.2: Trend of Poverty Headcount in Ghana
Source: Author's Construct using GLSS III, IV, V and VI, (2019)

Despite the fact that there has been progress in reducing the rate of poverty, inequality rate as measured by household consumption expenditure has been increasing over the years. Figure 1.3 shows the trend of inequality from the year 1991/1992 to 2012/2013. In 1991/1992, the country recorded an inequality rate of 37 percent. Inequality has widened significantly between the poorest and the richest quintiles. For instance, in the 1990s whereas the poorest fifth of the country's population earned just 6.9 percent of the total national income, the richest 20 percent earned 44 percent. The inequality rate increased by 2 percentage points in 1998/1999 and further increased to 41.9 percent in 2005/2006. The gap between the poorest and richest quintile expanded more during this period. Whereas the poorest population earned just 5.2 percent of the total national income, the richest earned close to 48.3 percent. The Gini coefficient increased marginally from 41.9 percent to 42.3 percent in 2012/13 (GSS, 2014).

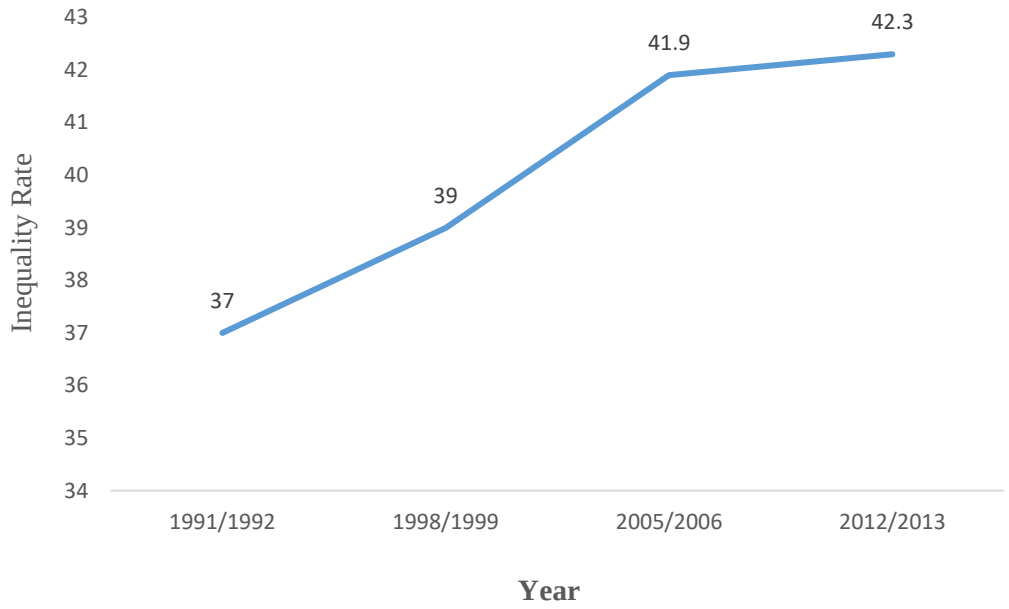

Figure 1.3: Trend of Inequality Rate in Ghana
Source: Author's Construct using GLSS III, IV, V and VI, (2019)

Since the "leave no one behind" agenda embraces an all-inclusive growth, governments are mandated to implement innovative policies to address the inequality problem. This calls for more ex-ante policy evaluation studies to examine how new policies may affect income distribution. By doing this, policymakers become well informed about the effectiveness of alternative policy scenarios. Even though ex-ante policy evaluation studies are common in many developed countries, they are not frequently conducted in developing countries as most countries do not have the tools for ex-ante evaluation studies.

With regard to social policy modelling, researchers are required to capture the interactions between the policy and the complexities of both economic and social life, as well as the interactions between different policies. The thesis therefore employs the recently developed tax-benefit microsimulation model (Adu-Ababio *et al.,* 2017) to examine the redistributive impacts of a non-contributory child support grant financed

with domestic taxes. Even though microsimulation models are frequently employed in modelling economic policies in many advanced countries, developing countries rarely apply these models for fiscal incidence analysis since only a handful of countries have access to such tools.

It is important to also know the factors influencing the extent of redistribution that is observed in many countries. Majority of empirical studies on the factors influencing redistribution have centered on examining the validity of the median-voter theorem. Several empirical studies on the relationship between redistribution and inequality have produced varied findings or inconsistent results. Whilst some studies support the theoretical predictions of Meltzer and Richard (Milanovic 2000; Scervini 2012), others found an inverse relationship (Georgiadis & Manning, 2007). This means that the relationship between inequality and redistribution is ambiguous. This thesis therefore intends to re-examine the major determinants of redistribution by retesting the Meltzer-Richard hypothesis while taking into account a plethora of other factors that may influence the extent of redistribution.

The call on government to address the rising inequality rate implicitly assumes that the government is capable of solving the problem. However, concerns have been raised regarding the effectiveness of government intervention programmes in addressing the problem of the increasing rate of inequality as a result of the countervailing behavioural adjustments of economic agents. Cash transfers have often been critiqued as a policy instrument for addressing inequality since recipients often become permanently dependent on the transfers and may therefore not be motivated to improve their circumstances by their own efforts. In other words, it is assumed that

social protection programmes breed laziness which leads to permanent dependency on the transfers. Hence in order to fully assess the impact of cash transfer programmes, it is necessary to also analyse the second-round effects especially regarding the labour market responses of beneficiaries.

Majority of studies that have attempted to empirically examine the second-round effect of cash transfers usually employ the unitary household model (Becker, 1981) which considers the household a single unit. This assumption indirectly implies that household members have similar tastes and preferences, pool resources together which means that the source of household income does not affect household decisions and also, household members' preferences are influenced by a benevolent or an altruistic head. These assumptions have been seriously criticised in several empirical studies. Another disadvantage of the unitary household model is the failure to account for the distribution of power in the household. The difference in power is a key factor in the decision-making process within the household. Collective household bargaining models on the other hand, provide predictions about how members of the household might respond to cash transfers by taking into consideration the differences in the preferences of household members. This enables the decision-making process of the household to be modelled as a bargaining process so that the outcomes of household decisions may be influenced by the differences in power in the household (Chiappori, 1988; 1992).

In summary, this thesis addresses three main issues: the first study seeks to conduct an ex-ante evaluation analysis on the redistributive impact of a hypothetical cash support grant financed with domestic taxes; the second study seeks to examine the

determinants of income redistribution and the third has to do with examining household behavioural responses to cash transfers especially regarding labour supply decisions based on the cooperative household bargaining model.

1.3 Research Objectives

In general, this thesis seeks to investigate the role of cash transfers and taxes as policy instruments for income redistribution. In particular, the thesis aims to accomplish these research objectives:

1. to analyse the redistributive impact of a hypothetical child support grant financed with domestic tax revenues;
2. to examine the determinants of redistribution; and
3. to evaluate the impact of cash transfers on intra-household labour market decisions.

1.4 Justification for the Study

The idea of a child support grant as a policy instrument to reduce the increasing rate of income inequality is based on the conclusions drawn by Becker & Tomes (1979) and Loury (1981). The authors highlighted in their study that, family income (earnings of parents) has the potential of affecting the future income of children through human capital investment which may be constrained by the level of parental income. It must be emphasized that, one of the main causes of earning differentials is due to the level of human capital development and this results in income inequalities. According to Corak (2013), households with higher income levels have the ability of investing in the human capital development of their children compared to low-income

households. Therefore, cash transfers to households with children increases household income which provides the opportunity of developing the human capital of children especially poor and deprived ones. All things being equal, earning disparities are expected to decline which eventually leads to a reduction in income inequality.

Again, since the vision of the Ghana National Social Protection policy is to achieve an all-inclusive as well as socially empowered society by the providing sustainable mechanisms that protect the vulnerable or persons living poverty, the study serves as an avenue to quantitatively assess the impact of a child support grant on income distribution. The findings from the study will therefore help policymakers to gain a better and practical understanding of how social grants specifically child support grant may help reduce the incidence of poverty and also improve the distribution of income.

The second objective investigates the factors that influence the magnitude of redistribution that can be achieved using fiscal policies. It starts by first testing for the validity of the median voter hypothesis. This is important because empirical literature does not provide a clear conclusion on this hypothesis which is key in explaining redistribution. In addition to this, empirical literature on the determinants of income redistribution is very limited as such, the study contributes to the scarce literature on the determinants of income redistribution.

The third objective of the thesis seeks to investigate the impact of cash transfers on labour supply decisions of beneficiaries. First of all, in order to minimize the bias in the estimation of the impact of public policy, it is important to account for the behavioural responses of recipients. This ensures that, the perceived benefits of the

programme do not outweigh the costs. This prevents erroneous conclusions and policy recommendations.

Furthermore, the collective household bargaining model makes it possible to examine the intra-household labour market decisions by taking into consideration the power distribution in the households. A woman's bargaining power within the household is expected to affect household decisions. This has strong implications for policy design, particularly because it has been widely recognized in the literature that women manage household resources efficiently (relative to men) and that they are more likely to spend the transfers in ways that will improve the welfare of the household (Duflo, 2003; Thomas, 1990).

1.5 Outline of the Thesis

The rest of the thesis is organised as follows: chapter two presents an overview of Ghana's tax-benefit system; chapter three reviews the relevant literature for the study; chapters four, five and six present the methodological frameworks and techniques employed in conducting the analysis as well as the empirical results for each of the objectives respectively and the final chapter presents a summary of the main findings, conclusions and policy implications based on the results.

CHAPTER TWO

OVERVIEW OF GHANA'S TAX-BENEFIT SYSTEM

This chapter presents an overview of Ghana's tax-benefit system. It is structured into two main sections: the first section presents an overview of the tax system whilst the second section presents an overview of the various benefits policies.

2.1 The Tax System

The overview presented in this section relies heavily on the information provided on the website of the Ghana Revenue Authority (GRA). Taxes include the following: income tax which is administered by the Internal Revenue Service (IRS), sales and service taxes which is also administered by the Value-Added Tax Service (VATS) and lastly, customs and excise duties administered by the Customs, Excise and Preventive Service (CEPS),

2.1.1 Domestic Taxes

The Value Added Tax (VAT), the Ghana Education Trust Fund Levy (GETFL) and the National Health Insurance Levy (NHIL) are all indirect taxes levied on the supply of goods and services. With the exception of supplies that are zero-rated or subject to a flat rate of 3% (for wholesalers and retailers of goods), the standard rate of VAT is 12.5%, the NHIL is 2.5% and the GETFL is 2.5%.

Income tax is imposed on the chargeable income of both resident and non-resident persons annually. The Internal Revenue Act 2000 specifically Act 592 defines chargeable income as: "the total of a person's assessable income, from each business,

employment, and investment, less the total amount of deductions allowed to that person for the year under sections 13 to 22 (relating to general and specific deductions), section 39 (relating to reliefs), section 57 (relating to life insurance), and section 60 (relating to contributions to retirement funds)".

National Fiscal Stabilization Levy (NFSL): It is a quarterly levy chargeable on the accounting profit before tax on some specified companies and institutions. The rate is 5 percent on the profit before tax.

Personal Income Tax (PIT): Individuals who are self-employed are supposed to pay income tax on profit from employment, investment, or business. A resident person is required to pay tax on income accruing in, derived from, brought into, or received in Ghana. On the other hand, a non-resident person is required to pay tax on income accruing in, and derived from Ghana irrespective of whether the income is received in Ghana. The tax rates are graduated with rates ranging from 0% to 25%. Annual income up to GHS 1,200 is taxed at 0%. Any income above GHS 25,920 is taxed at a rate of 25%.

Pay-As-You-Earn (PAYE): PAYE is defined as a system of withholding income tax from the payments made by employers and employees. Under the PAYE system, the employer deducts tax from an employee's taxable income at source and then remits the tax to the GRA by the 15th day of the month following the month in which the deduction was or should have been made. The PAYE is computed with the PIT rates. Table 2.1 shows the tax rate schedule for PAYE (effective 23 May, 2013). A flat rate of 25 percent is imposed on the chargeable income of non-resident persons

Table 2.1: Tax Rate Schedule for PAYE (Annual Tax Rate: Effective 1st January, 2020)

Annual Tax Rate

Chargeable Income (in GH.¢)	Chargeable Income (in GH¢)	Tax Rate
First	3,828.00	Free
Next	1,200.00	5
Next	1,400.00	10
Next	36,000.00	17.5
Next	197,532.00	25
Exceeding	240,000.00	30

Source: PWC (2020)

Stamp Duty: Stamp duties are levies paid (at various rates) for undertaking certain transactions. Such transactions include:

- conveyance or transfer on the sale of any property;
- appointment of a new trustee;
- natural resource lease or license (for example, mining and timber);
- agreement or memorandum of agreement;
- award of cost in a matter of dispute;
- bill of exchange (for example, issue of cheques);
- bill of lading; and
- insurance policy.

Corporate Income Tax (CIT): This is the tax paid by all resident and non-resident companies on income relating to investment and business, derived from, accrued,

brought into and received in Ghana. Even though the standard corporate tax rate is 25 percent, the rate varies according to the status of the company, the location of the company's business activities as well as the sector in which the company operates. Hence mining companies or companies engaged in upstream petroleum business are required to pay a tax of 35 percent.

Mineral Royalties: Holders of mining concessions are supposed to pay 5 percent of the total revenue accrued from mining. This excludes petroleum and water.

Windfall Tax: Mining companies are required to pay a windfall tax of 10%.

Local Taxes: These taxes are collected by the District, Municipal and Metropolitan Assemblies (authorities) from individuals operating a business within their localities. The local authorities are also responsible for the collection of property taxes.

Gift Tax: An entity that receives a gift in respect of a business or investment is expected to account for that gift as part of the assessable income of that entity. The tax rate is 25 percent (for non-resident) or the highest marginal rate of 30 percent (for residents). There is an option to elect and apply a 15 percent tax on gifts received by an individual if the gift is not in respect of business or employment.

Tax Stamp: This tax is imposed on operators in the informal sector. The amount paid is based on turnover and nature of product but not on profit.

Vehicle Income Tax: This tax is imposed on commercial vehicles and is paid on quarterly basis.

Communication Service Tax (CST): This tax is payable by users of electronic communication services (ECS). The rate is 9 percent. This is imposed on ECS and also recharges that are made by ECS providers.

Special Petroleum Tax: Individuals authorised to operate as oil marketing companies are mandated to impose a Special Petroleum Tax at specific rates per litre on these petroleum products: petrol, liquefied petroleum gas, diesel natural petroleum gas and kerosene.

2.1.2 Customs and Excise Taxes

Import Duties: Generally, import duties range between 0% and 35% and the rate depends on the nature (description) of the imported item as specified in the Common External Tariff (CET). Duties on import are normally imposed on the cost, insurance and freight (CIF) value of the imported item. NHIL of 2.5% and GETFL of 2.5% are also applied to the CIF and import duty amounts, while VAT of 12.5% is applied on the CIF, import duty, NHIL and GETFL inclusive amount.

Special Import Levy: An import levy of 2% is charged on the importation of certain goods. This levy is applied in addition to the import duties as well as mandatory statutory or administrative charges.

African Union Import Levy: A levy is 0.2 percent is imposed on the importation of goods from a non-AU country.

Economic Community of West African States (ECOWAS) levy: This levy is charged on the goods imported from non-ECOWAS member countries.

Export and Import (EXIM) Levy: The rate of the EXIM levy is 0.75 percent and it applies on all goods imported into the country.

Advance Eco Levy: Exporters of used electrical and electronic equipment and tyres imported into Ghana. Specific rates of levy are applicable for each item in accordance with the Harmonised System (HS) code classification.

Excise Duties: Excise duties generally range between 0% and 175% of the ex-factory price and apply to products such as beer, spirits, tobacco products, etc.

Environmental Tax: A tax of 10 percent is imposed on some specified locally manufactured and imported plastic products.

Airport tax: This tax is imposed on foreign and local travel. The tax is GH¢5 for local travel and US$60–US$200 for foreign travel.

2.1.3 Tax Reliefs

A relief is an allowance granted to resident individuals to reduce their tax burden.

Marriage or responsibility relief: This relief is granted to a resident individual who takes care of his or her spouse or takes care of at least two children. The relief is GH¢1200.00 per annum.

Child Education Relief: This is granted to a resident individual who pays his or her child's school fees. The relief which can be granted to only one parent covers a maximum of three children who attend any recognized registered educational

institution in Ghana. An adopted child also qualifies for this relief. The relief is GH¢600.00 per child per annum.

Disability Relief: This relief is granted to disabled persons who receive income from employment or business only. The relief is 25 percent of the disabled person's income from employment or business.

Old Age Relief: This relief is granted to persons who are 60 years of age. The relief is GH¢1500.00 per annum

Aged Dependent Relative Relief: This relief is granted to person's who takes care of a relative who is of age 60 and above. It can be claimed by only one is granted up to a maximum of two relatives. The relief is GH¢1000.00 per annum

Educational Relief: A person is granted educational relief if he or she undergoes training to update his or her profession technical or vocational skills or knowledge. The relief is GH¢ 2000.00 per annum

Mortgage Relief: Mortgage interest relief is a tax relief which is based on the amount of qualifying mortgage interest that is, paid in a given tax year for the principal private residence. This relief can be enjoyed for only one building.

Relief from Double Taxation: A resident person (excluding a partnership) is allowed to claim foreign tax credit for any income tax they pay to a foreign country in respect of a foreign sourced income to the extent that the foreign-sourced income is included in the assessable income of that person.

2.2 The Benefit System

The Livelihood Empowerment Against Poverty (LEAP) Programme

Scope

This is a social intervention programme that provides cash transfers as well as free health insurance to households who are extremely poor [3]. The Department of Social Welfare under the Ministry of Gender, Children and Social Protection oversees the implementation of the programme. The programme has been described as the flagship of the National Social Protection Strategy (NSPS). It was first piloted in March, 2008 in 21 districts with 1,654 households. By 2010, the programme had extended to about 35,000 households. In March 2012, 100 districts made up of 68,000 households were already receiving the grant. As at December 2015, 146,074 households in 185 districts were also benefitting from the grant and in April 2017, the LEAP programme had reached over 213,000 households across the country. By April 2018, 213, 044 households in 254 districts were benefiting from the grant.

Objectives of the LEAP programme

Generally, the LEAP programme aims to reduce the incidence of poverty by increasing and sustaining consumption expenditure and also ensuring that extremely

[3] Based on the GLSS, extremely poor households are those whose expenditure falls below 50% of the national mean household consumption expenditure. Approximately 18.2% of the population was categorized as extremely poor (GSS, 2007).

poor and vulnerable people attain some opportunities and promote their access to services as well. The specific objectives of the programme include the following (MESW, 2012):

1. to ensure that children below 5 years, the aged (people who are 65 years and above and cannot engage in productive labour) as well as individuals with severe disability have improved basic consumption and nutrition;
2. to boost access to health care services among children who are below 5 years old, the aged (people who are 65 years and above and cannot engage in productive labour) and severely disabled individuals;
3. to increase in school enrolment, attendance and retention of beneficiaries at the basic school level; and
4. to ensure that beneficiaries get access to complementary services in relation to welfare, livelihood and improvement of productive capacity.

Although the transfer is unconditional for the elderly and disabled persons, caregivers of orphan and vulnerable children are required to comply to some conditionalities including:

1. enrolment and retention of school-age children;
2. birth registration of new born babies and their attendance at post-natal clinics;
3. full vaccination of children up to the age of five; and
4. non-trafficking and ensuring that children do not engage in 'worst forms' of child labour

Eligibility Criteria

Beneficiaries of the grant are households who constitute the bottom 20 percent of the

country's extremely poor households. In other words, recipients are households who are described as "the poorest of the poor" and households with at least a member with these demographic characteristics: an elderly person (an individual over 65 years with no productive capacity); a household living with an orphan or vulnerable child, or an individual with severe disability and is unable to work.

Selection of Beneficiaries

The process is aimed at identifying the poorest households according to the guidelines of the NSPS. District LEAP Implementation Committees (DLICs) were formed in all selected districts who further selected communities within these districts to benefit from the programme. The selection of the communities took into consideration the following: availability and access to quality basic social services, the prevalence of adverse health, the level of National Health Insurance Scheme (NHIS) registration, prevalence of child labour and child trafficking as well as the geographical isolation of the community. Community LEAP Implementation Committees (CLICs) were also formed in the selected communities to select potential beneficiary households after which information on their assets, household and demographic characteristics were collected. A proxy means test was then used to select the final recipients of the grant.

Benefit Amount

At the start of the programme, beneficiaries received transfers ranging from GH¢8.00 in households with only one recipient to GH¢15.00 in households with four or more recipients per month. The amount was tripled in 2012. In 2013 and 2015 it increased again to make room for inflation. Currently, the amount ranges from GH¢ 64.00 to

GH¢ 106.00 per each payment cycle depending on the number of eligible members in the household, the household receives between. The number of beneficiaries in the household who qualify for the grant determines the amount of the benefit that will be given to the household. The amount has been increasing since the programme was implemented (see Table 2.2).

Table 2.2: LEAP Benefit amount as at 2010 to the end of 2018

Beneficiaries	2010-11(GH¢)	2012 (GH¢)	2013-14(GH¢)	2015-16 (GH¢)	2017-18 (GH¢)
1	8	24	32	48	64
2	10	30	38	60	76
3	12	36	44	72	88
4 or more	15	45	53	90	106

Source: Author's Compilation, (2019)

Pension Benefits

Pension benefits are received by retired persons. Pension contributions are categorised into three:

First tier: This is a compulsory basic social security scheme which is managed by SSNIT. Workers are expected to contribute 13.5 percent of their gross salary.

Second tier: This is also a mandatory fully funded and privately managed occupational scheme. Individuals are expected to contribute 5% of their gross salary.

Third tier: This is a voluntary fully funded provident fund and personal pension scheme managed by private fund managers. An optional scheme for everyone to either top-up their pensions or to use as a sole pension provision.

The Capitation Grant

In order to fulfil the Millennium Development Goals on education, the government in 2004/2005 introduced the capitation grant. The grant covers the additional costs and levies that parents normally pay as school fees.

The National School Feeding Programme

This programme was implemented in the 2005/2006 academic year. It is within the framework of the Comprehensive African Agricultural Development Programme (CAADP) Pillar III. The aim of this programme is to provide food security and mitigate the rate of hunger within the UN's Millennium Development Goals (MDGs) on hunger, malnutrition and poverty. School children in the public schools are provided with one nutritious hot meal during school hours.

The programme's immediate aim is to mitigate the rate of hunger and malnutrition, encourage school enrolment, attendance and retention. It also seeks to increase domestic food production in communities that are deprived. The overall objective of the programme is to reduce poverty and boost food security.

The Free Senior High School Programme

In the year 2017, the Ghanaian government initiated a new policy where every child who gains admission to any public senior high school attends school at no cost. This is popularly known as the free senior high school programme. This covers tuition fees, admission fees, examination fees, library usage fees, textbooks, ICT usage fees, science resource centre fees, utility fees, boarding and meal.

CHAPTER THREE

LITERATURE REVIEW

This chapter presents a review of literature relevant for the study. It consists of three main sections. Each section discusses both the theoretical and empirical literature for each of the research objectives. Hence the first section presents literature on the redistributive impact of fiscal policies; section two presents the literature on the determinants of redistribution and section three presents literature on intra-household labour responses to cash transfers.

3.1 Fiscal Policy and Income Redistribution

3.1.1 Definition of Terminologies

Income Redistribution

Income redistribution basiaclly refers to the difference between market income inequality and disposable or net income inequality. Fiscal redistribution thus refers to the change in the inequality rate which is due to changes in taxes and benefits policies. Redistribution can either be horizontal or vertical. The thesis is concerned with vertical redistribution where redistribution follows the Robin Hood principle that is, shifting of resources from high-income to low-income groups. Fiscal policies affect income distribution through taxes, transfers and public expenditures. The Robin Hood type of redistribution puts the burden of the tax on the rich through corporate and personal income taxes and then reallocate government expenditures to favour the poor and marginalised groups. The transmission mechanism between fiscal policies

and inequality reduction include: well-designed cash transfer programmes as well as progressive taxes.

Progressive versus Regressive Fiscal Policies

A transfer programme is said to be regressive (progressive) if it confers an absolutely smaller (larger) benefits to individuals/households with higher (lower) incomes. In other words, a policy is considered as regressive (progressive) if persons in the bottom quintile get a smaller (larger) total share of the programme's transfers than their population share. With a progressive tax system, the tax rate rises as the taxable amount rises.

Fiscal Space

Heller (2005) defined fiscal space as making: "room in a government's budget that allows it to provide resources for a desired purpose without jeopardising the sustainability of its financial position or the stability of the economy". In other words, fiscal space implies generating additional resources in order to fund government's spending on a particular project or sector.

Universalism versus Targeting

Discussions on how policies should to designed to address the problem of poverty and income inequality usually focus on these important issues: should government intervention programmes be made universal or targeted to only poor households? and should government transfers be equal for all individuals (households) or must be related to certain conditions, for instance, economic status? Whereas the universal

approach to social protection maintains that all citizens should receive the same state-provided benefits, advocates of targeted programmes argue that government intervention programmes must be directed only to poor individuals (households).

According to Tawney (1952), "the strategy of equality" must involve: “the pooling of its surplus resources by means of taxation, and the use of the funds thus obtained to make accessible to all, irrespective of their income, occupation, or social position, the conditions of civilization which, in the absence of such measures, can be enjoyed only by the rich”. Again, in their influential paper, Korpi and Palme (1998) concluded that, “the more we target benefits at the poor and the more concerned we are creating equality via equal public transfers to all, the less likely we are to reduce poverty and inequality”. According to the authors, when policies are targeted only to the poor, they yield a lesser redistributive effect even though the policy was originally designed to redistribute incomes. This implies that government intervention programmes should not be directed only to the poor only but must be universal. Similar conclusions have been put forward by (Ferrarini *et al.*, 2016; Marx *et al*., 2016)

The inclusion of high-income earners in social protection programmes has however been criticised by some scholars. Goodin & Le Grand (1987) argued that the failure of government intervention programmes to reduce the rate of inequality is as a result of the inclusion of non-poor individuals (households). If the programme aims to reduce poverty rate, then a universal programme that also benefits the rich is a waste of resources. Furthermore, if the aim of the policy is to reduce inequality rate, then the authors concluded that: “In egalitarian terms . . . the beneficial involvement of the non-poor in the welfare state is not merely wasteful-it is actually counterproductive.

The more the non-poor benefit, the less redistributive (or, hence, egalitarian) the impact of the welfare state will be".

Targeting within universalism

The idea of targeting within universalism is defined as, "making provisions within universal policy frameworks for extra benefits and services that disproportionately help less privileged people without stigmatizing them", Skocpol (1991).

3.1.2 The Theoretical Foundations of Fiscal Policy

3.1.2.1 The Keynesian Stabilization Policy

During the Great Depression which occurred in the 1930s, economic theories which existed at that time could not explain the causes of the worldwide collapse of the economy or even provide solutions to kick-start production and employment. As a result, John Maynard Keynes led a revolution in economic thinking and this changed the laissez-faire (free market) recommendations of the classical economists which prevailed at that time. The classicals believed that the free markets would eventually lead to full employment.

The main tenet of the Keynesian school of thought is that, aggregate demand is the backbone of the economy. Since the total output of an economy is the sum of consumption, investment, government spending and net exports, an increase in demand must come from any of these components. But during a recession, strong forces often dampen demand hence spending reduces. The reduction in the spending of consumers leads to a reduction in investment spending by businesses due to the

reduction in demand. This puts the burden of increasing aggregate demand on the government. To Keynes, the economy must not remain stuck in recession after the downward spiral in aggregate demand. By this, he justifies the need for government intervention through public policies as this would lead to full employment and price stability.

Expansionary government policies increase aggregate demand, re-employ people who would re-spend their incomes and induce new production that would re-employ others, and so on —the multiplier effect. The Keynesian revolution brought about a change the meaning of fiscal policy. It moved away from the revenue or tax side of the budget to include both spending and revenues. Thus, fiscal policy is defined as the manipulation of public spending and taxes in order to influence aggregate demand.

3.1.2.2 The Role of the Government (Musgrave, 1959)

Within a perfect competitive market framework, it is assumed that pareto-efficiency exits if for a given the set of factor prices, a reallocation of factor inputs will not increase overall production or output. However, given the initial income distribution, it is not possible to reallocate the produced output between individuals to make one better off without making the other worse-off (Atkinson & Stiglitz, 2015). The intervention of the government within the free-market system is necessary in order to correct these defects. The function of the government is justified because the competitive market is not able to attain the pareto-efficiency conditions. Again, even though the competitive market system can generate pareto-optimal solution, it might not be an equitable one. Musgrave (1959) therefore summarized the function of public policy (fiscal policy) to include allocation, distribution and stabilization. Based on the

research objective, the discussion shall be limited to the distribution role of the government

The Distributive Function of Fiscal Policies

Since the competitive market cannot guarantee a just distribution of welfare, government intervention is necessary to ensure that the distribution of income is fair or just. A distribution is considered as fair based on value judgement as well as social philosophy. Philosophers have developed a variety of answers to the question of fairness. Hence a distribution is said to be fair if: it conforms to some standards of equity; it is done in order to maximize overall or total satisfaction; or if individuals have the right to the fruits of their own endowment. Without government intervention, the distribution of income might depend on the ownership of factors of production as well as the market prices.

Fiscal Instruments for Redistribution

Redistribution can be accomplished by:

i. a tax-benefit scheme which combines progressive taxation with subsidies to poor-households.
ii. Progressive taxation with revenues used to finance public services.
iii. Taxation of goods mostly consumed by the high-income group (luxury goods) and subsiding goods which are mostly purchased by low-income groups.

It must be mentioned that each of these policy options might lead to efficiency cost or deadweight loss[4]. Even though redistribution involves efficiency cost, this does not establish a conclusive case against redistributive fiscal policies (Musgrave & Musgrave, 1989).

3.1.3 Empirical Literature Review

The empirical literature presented here consists of three components: the first part reviews literature on cash transfers and redistribution; the second, reviews literature on the taxation and redistribution and the third component reviews literature on the joint redistributive impact of transfers and taxes.

3.1.3.1 Cash Transfers and Income Redistribution

Since the empirical literature on the redistributive impact of cash transfers is very extensive, the review presented in this section shall concentrate on studies related to child support grant.

Bäckman and Ferrarini (2010) examined the relationship between family policy institutions and household poverty using the families of 21 new and old welfare democracies using data from Luxembourg Income Study (LIS). The analysis was however restricted to pre-school children. By using a multilevel modelling framework, individual level data as well as country-level data were combined to

[4] This cost arises when there is an interference in the choices of consumers and producers.

simultaneously analyse their relationship to the risk of child poverty. The results of the study indicated that family support policies were linked to lower risk of child poverty at the micro level.

Matsaganis *et al.,* (2005) examined the impact of family transfers of child poverty in Southern Europe particularly in Portugal, Spain, Italy and Greece. The study employed the microsimulation approach for the analysis. Specifically, the European microsimulation model was used to assess the distributional impact current family transfers and also examined the scope for possible reforms. The study found that the under the existing policy, a number of poor families with children are not eligible for income support or get low amount of benefit. Surprisingly, the study also found that universal child support was ineffective although very costly. The conclusion drawn from the study was that, there is a trade-off between the cost of implementing fiscal policies and poverty reduction. Again, benefits that are more generous have greater impact on income distribution at a higher cost.

By using the European Union tax-benefit microsimulation model, Immervoll *et al.,* (2001) examined the impact of child benefits on child poverty. The sample for the study consisted of 15 countries within the European Union. The comparative analysis showed that family benefits differ with respect to their importance to the income of households as well as the prevention of child poverty. For some countries, the study found that the child support grant was generous and even without the grant, the household income was adequate to prevent child poverty. In some other countries, the grant was relatively small and as such, its impact on poverty is very small. For the third group of countries, the child benefits had a significant impact on poverty. The

study further analysed the effects of swapping child benefits policies between two countries. The outcome of the policy swapping exercise indicated that there is more room for improvement when we look beyond the borders of the country. The study concludes that the poverty reduction motive of universal child support grants could be improved without necessarily relying on means-testing or compromising the other functions of the benefit.

Salanauskaite & Verbist, (2013) conducted a similar study but this time, compared the family support system in Lithuania to some other selected countries (Estonia, Hungary, Slovenia and the Czech Republic). The study sought to examine the extent to which the size and design of family support policies affected child poverty alleviation. The study was conducted by using the European Union microsimulation model. The findings from the study showed that, the size and design of family benefit were important for child poverty reduction. Unlike Korpi & Palme (1998), this study found that a universal family support had the least impact on poverty.

In a similar study, Förster & Tóth, (2001) examined the impact of family transfers on child poverty for some selected countries including The Czech Republic, Poland and Hungary. The focus of the study was to evaluate the impact of family benefits reforms on child poverty alleviation just before and shortly after the reforms. The study employed household survey data for each of the countries. The data was however standardized to a common demographic and income concepts. The total household income as well as its components was used to assess the poverty situation. The study found that in general, social transfers and particularly, family benefits contributed to the significant reduction in child poverty in all the three countries.

Levy *et al.,* (2008) also examined how other tax-benefit policies could be used to support children in Poland. The study therefore examined the extent to which child poverty would change under different reform scenarios by using the European tax-benefit microsimulation model (EUROMOD). In the analysis, the authors showed the effects of other alternative methods of targeting family support policies on child poverty. This was done by "importing" and replacing the Polish child benefit system with that of the tax-benefit system from some selected European countries (Austria, France, and United Kingdom). The findings of the study showed that poverty in Poland would have reduced greatly if the child support policies were changed to reflect the system in the United Kingdom or France. The Austrian system, although would have resulted in similar outcomes, would have generated a greater reduction in the poverty gap.

The key findings from these studies is that, transfers and taxes are important policy instruments that can be used to mitigate inequality and poverty especially in households living with children, although significant cross-national difference exist with regard to the extent of this reduction. Some researchers have also concluded that the generosity of the transfer package is key if poverty and inequality issues need to be addressed. This implies that the size of the cash transfer is important if the policy is aimed at redistributing income.

Another strand of the literature points to the design of the policy as a key determinant of policy effectiveness (Levy *et al.,* 2009; Immervoll *et al.,* 2001; Salanauskaite & Verbist, 2013). An extensive body of the studies have been conducted to examine the effect of targeting on poverty reduction (Förster & Tóth, 2001; de Neubourg *et*

al., 2007). In other studies, Korpi & Palme, (1998) as well as Nelson, (2004) concluded that there is an inverse relationship between targeting and the cost of implementing transfer programmes.

3.1.3.2 Taxation and Redistribution

Martorano (2018) investigated the relationship between taxation and inequality in Latin America using least square dummy variable estimator. The results of the study indicated that direct taxes were more progressive in nature as compared to the indirect taxes. Direct taxes therefore contribute massively to inequality reduction. However, promoting equality through the tax system was hindered due to the following factors: the failure to tax top incomes, the low average tax revenue, as well as the low contribution of property taxes.

Cano (2016) explored the redistributive effect of Ecuador's PIT from 2007 to 2011 by using individual tax returns data. The study employed the widely used tax incidence analysis techniques. The redistributive impacts of income tax as well as various progressivity indices were computed. Again, microsimulation techniques were employed to simulate the impact of personal income taxes on income redistribution by using different tax scenarios. Lastly, the author calculated the income tax paid by top income groups and derived a range of optimal income taxes for the top 1% income group. The study found that although Ecuador's PIT was highly progressive, its redistributive capacity was low. The Reynolds-Smolensky redistributive index indicated that income inequality before and after the PIT was only lowered by one point. This was because individuals with high-incomes were more likely to reduce their taxable income through legal tax deductions than low-income individual. The

study also found that, the effective tax rate paid by high-income individuals were relatively low.

Duncan and Peter (2012) assessed the impact of changes in the progressivity of national income tax systems on actual and observed inequality for over one hundred countries worldwide for the period 1981 to 2005. By distinguishing between actual and observed income inequality, the study found that personal income taxes resulted in a decline in observed inequality in reported net and gross income. Furthermore, the results of the study revealed that this negative effect was more pronounced in countries where democratic institutions were more advanced. The study however found a smaller negative effect of personal income tax progressivity on true inequality. But in countries where democratic institutions were weak, an increase in personal income tax rates led to tax evasion by the rich, and consequently had a weaker effect on the inequality. Finally, the findings of the study indicated that changing the progressivity of the tax schedule at the top was more effective in reducing inequality compared to similar changes at the bottom of the income scale.

Duncan (2010) examined whether the structural progressivity of national income tax systems affected income inequality for a panel of countries between 1981 and 2005. The study developed and estimated time-varying measures of structural progressivity of national income tax systems. The outcome of the study indicated that progressivity had a negative effect on inequality in reported gross and net income. This negative effect was particularly stronger in countries whose institutional framework supports pro-poor redistribution. However, the effect of progressivity on true inequality, which was approximated by consumption-based measures of the Gini coefficient, was

significantly smaller. Finally, the results showed that tax progressivity had a much weaker effect on true inequality in countries with weak "law and order" and a large informal non-taxable sector.

3.1.3.3 Joint Impact of Taxes and Transfers on Redistribution

Enami *et al.,* (2019) used the Iranian Household Expenditure and Income Survey for 2011/12, to estimate the impact as well as effectiveness of various components of Iran's fiscal system on inequality and poverty. The authors conducted a marginal contribution analysis in order to determine the redistributive impact of each component on inequality and poverty. The results of the study showed that the fiscal system is able to reduce the poverty-head-count-ratio by 10.5 percent and inequality by 0.0854 as measured by the Gini coefficient. On the whole, the findings of the study indicated that transfers were more effective in reducing inequality compared to taxes. Even though transfers were not targeted toward the poor, they significantly reduced poverty. The authors also found that the impact of the Targeted Subsidy Programme (TSP) on poverty could be improved if resources were more targeted to the bottom deciles. Again, taxes were effective in raising revenue without causing poverty to rise.

Lustig *et al.,* (2013) examined the redistributive impact of social spending and taxes for Argentina, Brazil, Mexico, Bolivia and Peru using the standard tax and benefit incidence analysis. The study was conducted using the standard tax and benefit incidence analysis. The results of the study indicated that, the magnitude of the reduction in inequality as a result of direct transfers and taxes was pretty small, about 2 percentage points on the average. The results of the study highlighted the

importance of coverage and size of transfers as the key determinants of the extent of redistribution.

A similar study was conducted by Prasad (2008). Using secondary data, the study discussed the trends in the composition and levels of social transfers and taxes, and explored how these trends relate to income inequality. A key finding was that, taxes and social transfers had not been able to reverse the rising trend of income inequality. According to the author, taxation was less progressive and was therefore less likely to address the growing rate of income inequality found in many countries.

By using the system GMM estimator, Claus *et al.,* (2012) assessed the impact of government fiscal policies on income inequality for 150 countries in Asia between the period 1970 and 2009. The results indicated that although the tax system in Asia was progressive, government expenditures were more effective for redistributing income. Personal income tax (PIT) had a significant negative impact on income inequality in Asia compared to the rest of the world. This, the authors explained, was as a result of a greater number of people not paying income tax because their income fell below the tax-free threshold and also a majority of the working population were found in the informal sector. The general impact of progressive income tax was small. The results of the study also indicated that whereas corporate income taxation reduced income disparity in the rest of the world, it was regressive in Asia. The findings from the study supported the hypothesis that, imposing social security contributions and payroll taxes resulted in lower wages and higher unemployment. This was because even though these taxes were levied equally between employers and employees, the tax burden was usually shifted to employees in the form of lower wages. This was

expected to increase the rate of income inequality especially when capped at higher incomes. The study further estimated the marginal impact of the different types of government spending on income inequality. In the study, social protection expenditure was defined to encompass two components: expenditures on services and transfers as well as expenditures on services provided on a collective basis. Surprisingly, the results of the study showed that, government spending on social protection had a positive effect on income inequality. This unexpected positive effect suggests that government policies and legislative enforcement, that is, the second component of social protection expenditure, may have benefited higher-income households and individuals more than those with lower income. Furthermore, the unexpected positive effect may also be as a result of narrow benefit coverage and a lack of proper targeting for the few services and transfers that is provided by the government.

Martinez-Vazquez *et al.,* (2012) also examined the potential effect of taxation and public expenditure policies on income distribution using a panel dataset of 150 countries over the period between 1970 and 2006. The study employed a multivariate regression framework for the analysis. With regard to taxes, the results of the study indicated that progressive personal income taxes had a positive impact on income redistribution hence contributes to decreasing inequality. On the expenditure side, the findings showed that higher shares of GDP on social welfare, education, health and housing public expenditures had a positive impact on income distribution both individually and collectively.

Younger *et al.,* (2017) conducted a similar study for Ghana using the standard incidence analysis. The study employed the GLSS VI data as well as administrative tax and expenditure data for the 2013 fiscal year. The results of the study indicated that direct taxes, precisely PAYE and presumptive taxes had a small but statistically significant effect on the Gini coefficient. By comparing market income to disposable income, it could be seen that pensions, direct taxes (PAYE) and cash transfers (LEAP and school feeding) had virtually no effect on poverty. This is because neither pensions nor direct taxes affected the poor in Ghana: they were not in the formal economy or even the informal economy that paid presumptive tax. Both the LEAP and the school feeding programme benefited the poor but these were small programmes such that their overall effect was minute. Furthermore, indirect subsidies for electricity and fertilizer reduced poverty by a small amount, about 1 percentage point at the higher poverty lines, but only 0.2 percentage points at the lowest poverty line. Looking at the transition from disposable income to disposable income less indirect taxes, the results from the study indicated that indirect taxes increased poverty significantly. The last transition, from consumable to final income, was much more encouraging as there was substantial reduction in poverty. This was because education and health expenditures formed a large part of the budget and because they were relatively progressive, they were particularly helpful to poorer households in Ghana. Overall, fiscal policy reduced poverty by 2.9 percentage points at the lowest poverty line and 3.8 at the highest. At the national poverty line, fiscal policy reduced poverty by 5.4 percentage points.

3.1.3.4 Conclusion

A review of the empirical literature provides evidence to support the claim that public transfers directed to children play a vital role in reducing child poverty. Majority of these studies however often limit the analysis to only child poverty outcomes hence little is known of the impact of these child related policies on overall poverty and most especially inequality rate at the national level. This study intends to bridge this gap by examining the extent to which a child support programme can affect poverty and inequality rate at both the household level and the national level.

Again, the literature indicates that personal income tax (PIT) is a key instrument employed by governments to modify the post-tax income distribution (Poterba, 2007). However, the ability of PIT to redistribute incomes depends on the degree of progressivity as well as the tax base. This implies that the redistributive impact of cash transfers and taxes depends on both the size of cash transfers and taxes and their progressivity (Kakwani, 1977).

Overall, the literature provides evidence that suggest that fiscal policies are important instruments for redistribution. However, the extent of redistribution that fiscal policy could achieve is determined by its design. With regard to transfers, the literature highlighted on the degree of progressivity as well as the size of the transfer. Even though there is extensive research on the impact of fiscal policy, ex-ante analysis seems to be very limited. Furthermore, majority of these studies often focus on a large panel of countries whilst less attention has given to country level studies but the role of fiscal policy is likely to differ across various economies hence the need for country-specific studies. This thesis aims to fill these gaps in the literature.

3.1.4 Methodological Approaches for Fiscal Incidence Analysis

3.1.4.1 Models for Fiscal Incidence Analysis

Fiscal incidence analysis entails evaluating the changes in individual as well as social welfare resulting from implementing a fiscal policy. The analysis involves comparing the distribution of incomes before and after the introduction of a fiscal policy. For policy formulation purposes, fiscal incidence analysis is used to determine whether fiscal policies have achieved their expected objective. Evaluating the impact of a fiscal policy on income distribution requires models which allow for the quantitative measurement of the aggregate effects on the economy as a whole, as well as the impact on individual or household welfare. Three approaches are widely employed. These include:

i. Regression-Based Models
ii. General Equilibrium Models
iii. Microsimulation Models

Regression-Based Models

Quite a number of studies (Weller, 2007; Gwartney & Lawson, 2006; De Mello & Tiongson, 2006 and Martinez-Vazquez *et al.*, 2012) have employed multivariate econometric models to examine the impact of fiscal policies on income distribution. Multivariate regression models allow analysts to examine the impact of different fiscal policies on income distribution.

One drawback with regression-based models for fiscal incidence analysis is that, examining the impact of the various components of government expenditure and tax

policies on the distribution of income cannot be done in detail as compared to microsimulation and general equilibrium models. Hence regression-based models must be considered as a complement to the other two methods (Claus *et al.*, 2012).

General Equilibrium Models

A general equilibrium model represents a socioeconomic system in a logical manner so that the behaviour of all economic agents are compatible. An economic system is said to be in a general equilibrium if no feasible change in individual behaviour is worthwhile and no desirable change is feasible. The behaviour of the economic agents is assumed to follow the optimization principle. This assumption implies that agents implement the best feasible action in order to achieve the best outcome.

The general equilibrium model employs a social accounting matrix which is a comprehensive database containing information on all transactions and transfers between different factors of production, institutions (households, firms and government) and production activities within an economy and the rest of the world within a period of time. The matrix is a systematically integrated dataset that shows the interdependencies among the various sectors within the economy. Put differently, it shows the circular flow of economic activity in a given year which is also referred to as the base year.

Even though general equilibrium models allow for a comprehensive analysis of the effect of a policy, they are not suitable for distributional analysis since these models usually employ the representative agent approach (Spadaro, 2007). This approach leads to information loss regarding the heterogeneity of agents in terms of behaviour

as well as endowments due to modelling aggregate outcomes in a social accounting matrix as if they represented the behaviour of a group of homogenous agents. This has necessitated the use of microsimulation models for policy evaluation.

Microsimulation models instead rely on micro dataset hence it is possible to account fully for the heterogeneity of socioeconomic agents (Bourguignon & Spadaro, 2006). Even though microsimulation models are normally used by policy makers and researchers in many advanced countries for fiscal incidence analysis, these models are rarely applied in developing countries since only a handful of countries have access to such tools. It is important to emphasize here that, as a developing country now building its social protection systems, it is vital to know the system-wide or overall impacts of different policy options. Microsimulation models are suitable for this purpose. This is because the models are tailor-made to conduct counterfactual and ex-ante simulation analysis. This study therefore employs the recently developed Ghana tax-benefit microsimulation model (GHAMOD) to carry out the analysis (Adu-Ababio *et al.,* 2017).

Microsimulation Models

Microsimulation modelling are certainly one of the best approaches for fiscal incidence analysis. To provide an evidence-based impact evaluation of tax/benefit reforms, microsimulation modelling is regarded as one of the best approaches (Figari *et al.,* 2015). Orcutt (1957) pioneered the use of microsimulation models as a tool for evaluating the impact of economic and social policies in the social science discipline. However, models that simulate the impact of fiscal policies on the income of

households began in the early 1980s. This was when detailed and large data on the socioeconomic characteristics of households became increasingly available.

Essamah-Nssah (2008) defined microsimulation model as: "a logical representation of the behaviour of individual agents and their socioeconomic environment used to simulate the consequences of a policy reform on the level of activity or welfare for each individual in a representative sample of the whole population". These models are built on a representative sample from the real world which is then used to generate an artificial sample that typically mimics the original population upon which virtual experiments are conducted (Gilbert & Troitzsch, 2005). By mimicking the population through an experiment, it is possible to test the effectiveness of different policy options. This ensures that policies that are ineffective are not implemented (Mitton *et al.*, 2000). What microsimulation models do is to simulate the aggregate as well as the distributional effects of a policy. This is done by applying the rules governing that policy on the representative sample and then summing up the results across individual units using population weights (Martini & Trivellato, 1997).

Taxonomy of Microsimulation Models Applied to Redistributive Policies

A microsimulation model designed for redistribution analysis is made of up three important features (Bourguignon & Spadaro, 2006, Spadaro, 2007):

i. the micro-dataset which contains data on the socio-demographic and economic characteristics of the sample of individuals;
ii. the rules governing the policy; and
iii. a model that theoretically predicts the behavioural reaction of agents.

Microsimulation models can be categorized based on the inclusion of agents' behavioural reactions, the time dimension of the reaction as well as general or partial equilibrium dimension.

Models that do not include the behavioural reactions of agents are referred to as arithmetical models. Such models only simulate changes in individual (household) disposable income which is due to the modification of the rules used in calculating the tax (benefit) payments. These models are used to analyse the "morning after" effect of a policy reform. This implies that only the first-round effect of the policy reform is estimated. Even though the assumption of constant individual (household) behaviour has been criticised, arithmetical microsimulation models may provide an approximation of the final welfare effect if changes are small enough and individuals (households) are assumed to operate in perfect markets (Bourguignon & Spadaro, 2006).

Models that take behavioural responses into consideration, on the other hand, are called behavioural microsimulation models. Unlike the arithmetical models, these models take into account the second order effects of a reform and thus enables a more detailed welfare analysis to be conducted. The type of behavioural reaction taken into account depends on the research interest and thus may vary across models, although labour supply and consumption are usually the focus of interest.

Timing issues are treated based on the object of the analysis and also the type of behavioural reaction being examined (Bourguignon & Spadaro, 2006). For example, if a researcher is interested in examining the effects of a benefit policy that depends on the number of children in the household in the short run, then an arithmetical

microsimulation model would be sufficient. A dynamic microsimulation, rather than a static framework may be necessary if households are followed over time. Unfortunately, most microsimulation models do not account for these general equilibrium effects but this is compensated for by considering explicitly agent heterogeneity (Spadaro, 2007).

Advantages of Microsimulation Modelling

Brown and Harding (2002), highlighted two main advantages of microsimulation techniques: firstly, these models are designed to replicate the complexity of policy structures and secondly, they can be used to predict the outcomes of a policy change and answers "what if" scenarios, that is, the counterfactual scenario where the results describe what may happen to a particular group or individuals, under certain specified conditions. These counterfactuals are important as they shed light on the "morning after" impact evaluation of a reform in the tax-benefit system. Also, by developing a counterfactual scenario, the researcher is able to disentangle ex-post what would have happened if a particular policy had not been implemented (Figari *et al.*, 2015).

Microsimulation models are tailor-made to conduct both ex-post and ex-ante evaluation of the impact of policies. Even though ex-post analysis is normally carried out using quasi-experimental methods which is based on difference-in-difference, matching and selection estimators, the cross-fertilisation between ex-ante and ex-post approaches has contributed to the increasing credibility of analysis based on microsimulation models, making them a core part of the causal policy evaluation literature (Figari *et al.*, 2015). With microsimulation modelling, it is possible to quantify the impact of existing policies on income inequality or poverty in a given

context without collecting information after the implementation of the policy. This allows a wide range of policy scenarios to be evaluated. By conducting an ex-ante evaluation of a policy reform, policymakers are able to recognise ineffective policies prior to their implementation (Zucchelli, Jones & Rice, 2010).

Again, the results obtained from microsimulation which is at the individual level can be aggregated at the macro level, making it possible for the analyst to evaluate the effect of the policy on the government budget (Bourguignon & Spadaro, 2006). This enables researchers to assess the approximate budgetary cost associated with a policy reform given its objectives.

Challenges or Limitations of Microsimulation Models

Even though microsimulation models have several advantages, they have some drawbacks as well. One of them is the difficulty in reconciling simulated income with recorded income and macro statistics (Figari *et al.*, 2015). As discussed previously, microsimulation models are built on micro dataset and a common problem associated with the use of micro datasets for the analysis of policies and income distribution is that, aggregate values do not usually match estimates from national accounts or other sources of macro-economic statistics. Microsimulation estimates of income taxes may either be over or under estimated compared to what is reported by external fiscal data. It may be underestimated because the market incomes that make up the tax base are under reported in the survey or the survey may not adequately represent high income taxpayers. On the other hand, tax-benefit model calculations of benefit entitlements may match administrative totals better than information on recorded receipt in the data, if there is a problem of under-reporting of these sources of income in the survey.

Another source of inaccuracy related to microsimulation analysis is the problem of non-take-up of benefits and tax evasion (Spadaro, 2007) which are not accounted for in these models. These models are usually developed based on the assumption that all taxpayers declare their income and honour their tax obligation. But tax evasion is a common practice in reality. Hence, income tax for instance may be over-estimated because of tax evasion that has not been accounted for. Furthermore, it is assumed that all individuals eligible to receive certain benefits actually receive them. But for several reasons such as lack of information, social stigma, complexity of administrative procedures, etc., some individuals do not claim benefits even though they are entitled to it by law.

Lastly, microsimulation models do not provide any information about the efficiency of the various tax and benefit programmes (Spadaro, 2007). Ignoring behavioural responses to tax-benefit policies do not allow the analyst to evaluate the total effect of a policy reform. If the reform is specifically designed to induce changes in agent behaviour, then there is the need to have a microsimulation that can reproduce agents' behaviour.

3.1.4.2 Assessing the Impact of Fiscal Policy on Redistribution

The design of a social programme affects the distribution of household incomes in diverse ways hence the need to evaluate its effectiveness in redistributing incomes. Examining the distributional impact of fiscal policies involves comparing the observed or the true distribution with a counterfactual which refers to the hypothetical distribution that exists in the absence of the policy to be assessed (Pedersen, 1994).

As noted by Luebker (2014), researchers have the option of measuring the impact of fiscal policy on redistribution by using either the absolute difference of the Gini coefficient (or the inequality measure) before and after the policy intervention or the relative difference which measures the change in the Gini coefficient (or the inequality measure) due to transfers or taxes relative to its initial level. Both measures are often employed in the literature on redistribution and inequality, however, the justification for the choice of measure critically depends on the research context. Kenworthy and Pontusson (2005) however recommend the use of absolute measures of redistribution. This is because a relative measure of redistribution can be affected by short-term trends in market income inequality (Mahler, 2010). Based on this, the study relies on the absolute measure of redistribution.

With regard to measuring inequality, both graphical and mathematical approaches are used to accomplish this task. All of these approaches portray the concentration of income, enable the comparison and ranking of different income distributions and lastly make it possible to evaluate the effects of alternative policy scenarios.

In order to have a good inequality measure, these principles must be satisfied:

- *Mean independence:* Assuming that the incomes of individuals are doubled, the measure of inequality must remain unchanged.
- *Population size independence*: This implies that a change in the population should not change the measure of inequality, all things being equal.
- *Symmetry:* If any two individuals swap incomes, the measured value of inequality must remain unchanged.

- *Pigou-Dalton Transfer Sensitivity*: This states that if all other income sources are held constant, transferring income from the rich to the poor (but not so much that the poor does not become richer than the person who was rich initially), reduces measured inequality.
- *Decomposability:* That is the ability to breakdown the inequality measure across population subgroups or income sources or any other dimensions.

Unfortunately, no single measure satisfies all the properties highlighted above. Hence choosing one measure over the others involves trade-offs. For this reason, it is important to consider several inequality measures in every inequality analysis.

The Lorenz Curve

The Lorenz curve represents of the distribution of income for a group of individuals. It shows the relationship between the cumulative percentage of income against the cumulative percentage of the corresponding population. The diagonal line indicates perfect equality. This implies that, each percentage group of income recipients receives the same percentage of the total income. The extent to which the Lorenz curve bows downward below the diagonal line shows the magnitude of inequality in the distribution of income. From Figure 3.1, A may be described to be more equal compared to D. However, if the curves cross each other, the Lorenz criterion states that, there is the "need for more information" in other to determine which curve is more (un)equal (Todaro & Smith, 2009).

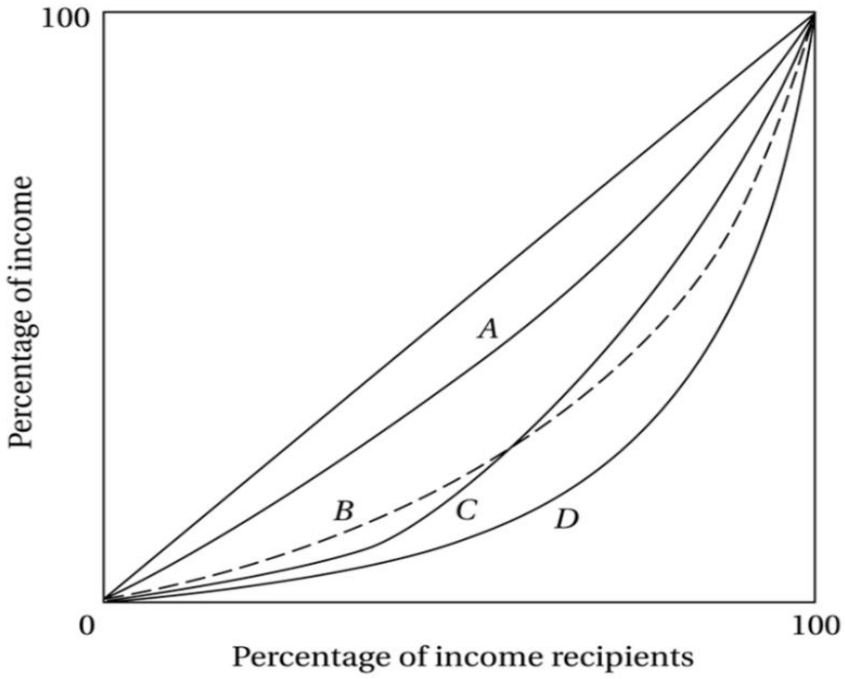

Figure 3.1: Illustration of the Lorenz Curve
Source: Todaro & Smith (2009)

The Gini Coefficient

Even though the Lorenz curve is a powerful tool for measuring inequality, its major drawback is that, it only works on condition that the Lorenz curves do not cross each other or intersect. If the Lorenz curves intersect (as shown in Figure 3.1), then there is the need to consider a single inequality measure. The Gini coefficient, derived from the Lorenz curve, is one of the most widely used single measures of inequality. It measures the extent to which the Lorenz curve departs from the line of equality. From Figure 3.2, the Gini coefficient is equivalent to $\frac{shaded\ area\ A}{total\ area\ BDC}$. If the Gini coefficient is 0, it implies perfect equality, this is where the Lorenz curve coincides with the diagonal or the 45-degree line. On the other hand, a Gini coefficient equal to 1 implies complete inequality, that is, all income accrues to a single individual.

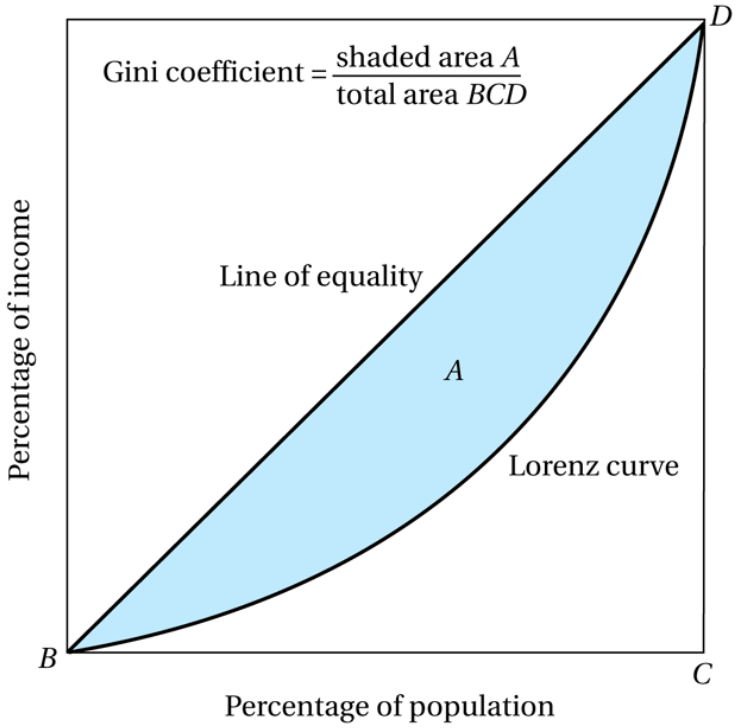

Figure 3.2: Deriving the Gini Coefficient
Source: Todaro & Smith (2009)

According to Shah (2005), although the Gini coefficient satisfies the Pigou-Dalton transfer property, maximum weight is given to transfers near the mode of the distribution instead of the tails. The author stressed that if the society is concerned about the poor, then the inequality measure should give maximum weight to the poorest member and weight should decrease monotonically with the level of income. For this reason, the Gini coefficient may not be a good measure if the society is concerned about the poor. Furthermore, the Gini index is neither additive nor decomposable across groups. This implies that, the Gini index for the total population is not the same as the sum of the Gini coefficients of the population subgroups.

Generalised Entropy (GE) Measures

Since the Gini coefficient does not satisfy all the above criteria, Theil (1967) recommended new measures which are based on the concept of entropy in information theory. These measures include: the Theil index and the mean log deviation. As compared to the Gini coefficient, these measures can be decomposed into within-group and between-group income inequality. Hence,

$$TI = WGI + BGI \qquad (1)$$

where *TI, WGI* and *BGI* denote the total inequality, within-group inequality and between-group inequality respectively. Whilst WGI represents the weighted average of the inequality within each subgroup, BGI is the inequality that exists if each observation were replaced by the mean income of the group that share similar features. The ratio of BGI to TI shows how much inequality is contributed by each of the subgroups.

The general formula for the generalised enthropy is:

$$GE(\beta) = \frac{1}{\beta(\beta-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{\beta} - 1\right] \qquad (2)$$

where $\bar{y}$ is the mean income per person (or expenditure per capita).

The generalised enthropy measures vary between zero and infinity. When the value is zero, it implies that, there is equal distribution. Higher values on the other hand denote higher inequality levels. The parameter β can take up any real value since it denotes the weight that is given to distance between incomes at different parts of the income distribution. However, the most widely used values of β are 0, 1, and 2.

When β=0, it is called the "Theil's L" or the "mean log deviation" measure. When $\beta = 1$, it's called the "Theil's T" index or the "Theil index". When $\beta = 2$, the index is called the "coefficient of variation".

Atkinson Inequality Measures

Atkinson (1970) inequality index is the most widely used welfare-based inequality measure. In his influential text *The Economics of Inequality*, Atkinson concluded that inequality "cannot, in general, be measured without introducing social judgements". Measures such as the Gini coefficient are not purely 'statistical' and they embody implicit judgements about the weight to be attached to inequality at different points on the income scale". The index therefore incorporates a sensitivity parameter which ranges from 0 (meaning that the researcher is indifferent about the nature of the income distribution), to infinity (where the researcher is concerned only with the income position of the very lowest income group). The theoretical range of Atkinson values is 0 to 1, with 0 being a state of equal distribution. The Atkinson index becomes more sensitive to changes at the lower end of the income distribution as it approaches 1. Conversely, as the level of inequality aversion falls (that is, as approaches 0) the Atkinson index becomes more sensitive to changes in the upper end of the income distribution.

An important feature of Atkinson indices is that it can be decomposed into within and between-group inequality. Moreover, unlike the other measures discussed previously, Atkinson's indices can provide welfare implications of alternative policies and allows the researcher to include some normative content to the analysis (Bellù & Liberati,

2006). Atkinson argues that this index is a way to incorporate Rawls' concept of social justice into the measurement of income inequality.

3.1.4.3 Assessing Policy Progressivity

Another approach used to evaluate the distributive impact of fiscal policy is assessing the progressivity of the transfer or tax. To determine if a fiscal policy is progressive or not, the study employed the concentration curves and concentration coefficients.

Concentration Curves

Concentration curves are constructed similar to Lorenz curves but the difference between Lorenz curves and concentration curves is that, the vertical axis of concentration curves measures the proportion of the transfer (tax) received (paid) by each quantile. Concentration curves (for a transfer targeted to the poor, for instance) can lie above the 45-degree line. Since concentration curves do not quantify the extent of progressivity, it cannot be compared conveniently to other policy scenarios. Hence the study also employs concentration indices in addition to the concentration curves to examine the progressivity of the transfer. Figure 3.3 provides an illustration of how concentration curves are interpreted.

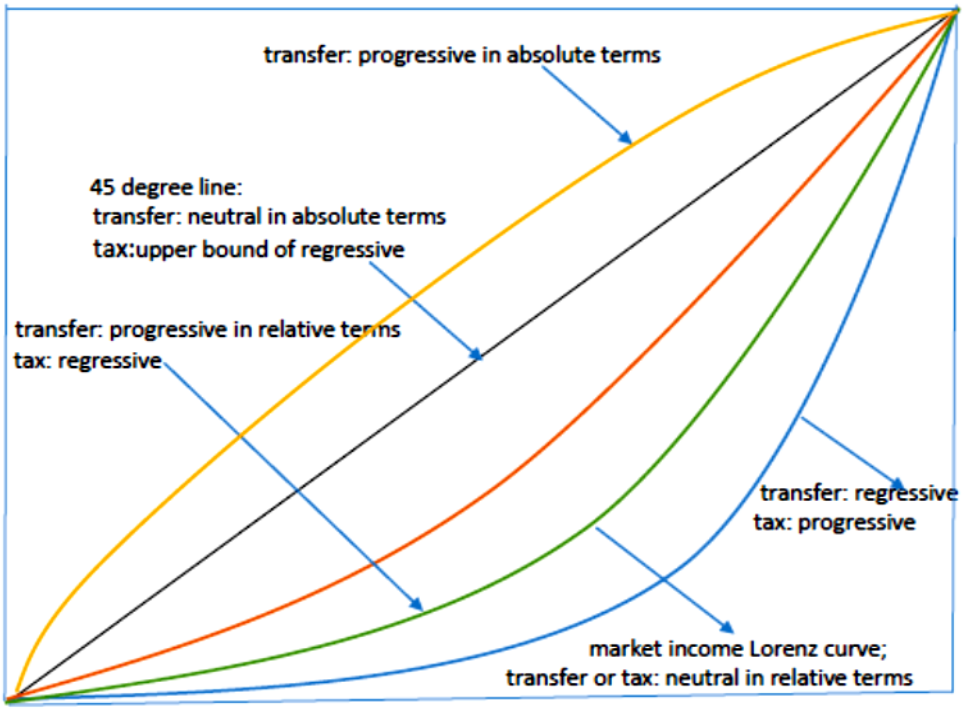

Figure 3.3: Interpretation of Concentration Curves
Source: Enami *et al.*, (2017)

The Concentration Coefficient

Concentration indices measure inequality in one variable over the distribution of another variable (Kakwani, 1977). To calculate this index, income units are ranked according to the simulated equivalized expenditure and then the tax/transfer is distributed along this continuum. This index is referred to as the "index of concentration". The index ranges from -1.0 to +1.0. A concentration index of zero indicates that all income units get equal amount of transfers in absolute terms. This corresponds to the 45-degree line of the Lorenz curve. A distinction can be made between strong and weak pro-poorness. Strong pro-poorness corresponds to a negative concentration coefficient (this is shown by area A in Figure 3.4). Weak progressivity is captured by a concentration coefficient between zero and the value of

the Gini coefficient of income (area B in Figure 3.4). When the value of the concentration coefficient is greater than the value of the Gini coefficient of the variable on which its ranking is based, it implies that the benefit is pro-rich (area C). The opposite implies that the benefit is pro-poor.

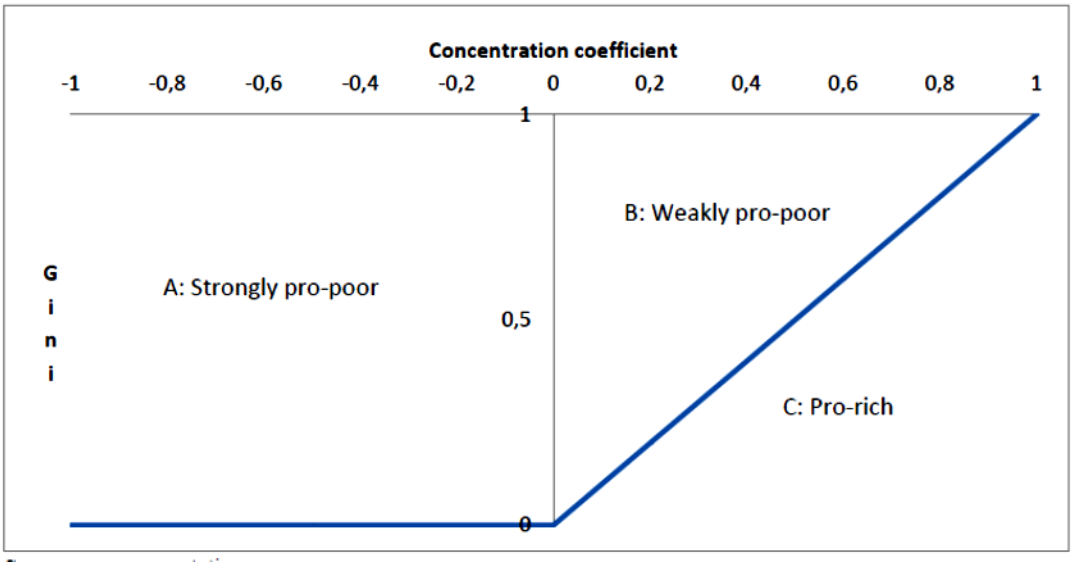

Figure 3.4: Interpretation of Concentration Index
Source: Marx *et al.*, (2013)

3.2 Determinants of Redistribution

3.2.1 Theoretical Literature Review

Downsian Analysis of Redistribution

The median voter model by Downs (1957) has served as the basis for research on inequality and redistribution. According to the theory, if voters' utility is single peaked and the policy space is unidimensional, the median voter will be key in majority decision-making. Since political parties strive to gain more votes, policies are determined strictly by majority vote in a system of democracy.

The Downsian model has been used by several researchers to explain income redistribution through fiscal policy. Romer (1975) and Roberts (1977) earlier developed models for this analysis and was later popularised by Meltzer & Richard (1981). According to the authors, the objective of income redistribution is achieved if a flat tax rate is charged on all incomes and then using the tax revenues to pay a lump-sum benefit to all citizens such that the public budget is balanced. Based on the balanced budget assumption, a change in the tax affects the benefits equally. This implies that by voting on the tax rate, the voter indirectly votes for the benefit that will be distributed.

Assume that *t* represents the tax rate and *N* denotes the number of citizens with mean income given as m, then the total tax revenue is equal to *tNm* and benefit per capita is given as *tm.* If the tax rate is constrained to lie between 0 and 1 (that is, no negative tax or above 100 percent is allowed). Then any citizen whose income is above the mean will prefer zero tax rate. On the other hand, citizens whose income is below the mean will vote positive taxes. The preferred tax rate will be decreasing in income. That is, poorer voters will prefer higher taxes since their contribution will be lower relative to what they receive. Again, the model assumes that there is perfect information hence the median voter knows that there is a negative relationship between the tax rate and total income and thus finds it optimal to vote for a tax rate below 100 percent. However, for a given efficiency cost of taxation, higher inequality will increase the desire for redistribution of the median voter and therefore the equilibrium tax rate. The authors conceptualise this as a "Robin-Hood" process. This is where the rich pay more taxes than what they receive in terms of benefits or transfers but the poor benefit from redistribution.

According to Meltzer & Richard (1981), income distribution in most countries is generally skewed to the right which implies that the median income falls below the mean. Hence a country with high inequality will redistribute more compared to those with low inequality. This implies that inequality in pre-tax income drives redistribution.

3.2.2 Empirical Literature Review

By using the SWIID dataset, version 5.0., Gründler & Köllner (2017) conducted a study to examine the determinants of governmental redistribution. The study tested for the validity of the Meltzer-Richard median voter hypothesis and also accounted for a plethora of cultural, political and institutional factors that might affect the magnitude of income redistribution. In terms of methodology, the study employed the system GMM estimation technique. The results of the study confirmed the validity of the Meltzer-Richard hypothesis. The study further revealed that, to some extent, the Meltzer-Richard hypothesis on some cultural factors. However, in communist societies, the hypothesis was less pronounced since members in these societies act as a social safety net. Regarding the role socio-economic groups, the study found that the middle and top class significantly influenced the magnitude of income redistribution. For low-income groups, the findings of the study showed that, governments do not include the objectives of the poor in determining the amount of redistribution. Surprisingly, political institutions had no significant impact on the extent of redistribution. Governments who occupy an office by fraudulent means tend to redistribute more in order to discourage any political uprisings. With regard to religion, the results of the study showed that in countries in which the government is

committed to a particular religion, the poor is considered when making decisions regarding redistribution. Finally, the study showed that in determining the magnitude of redistribution, perceived inequality is vital as compared to actual inequality. This is because people hold erroneous perceptions regarding their position on the income distribution ladder. Hence, there is a strong demand for redistribution whenever voters think the distribution of income is strongly unequal, even though actual market income inequality may be low or moderate.

Jäntti *et al.*, (2016) also re-examined the determinants of redistribution using the WIID dataset. In terms of methodology, the study employed cross-country panel estimation methods. The results of the study without country fixed effects indicated that the level of income inequality as well as, the inherent or underlying inequality are both positively related to redistribution but inherent inequity is associated with greater redistribution. Countries with a lot of ethnic divisions tend have a lower level of redistribution. Again, countries with plural electoral system or commodity exports have lower redistribution. Surprisingly, the study found that more democratic countries redistribute less. The authors noted that if the trade-off between efficiency and equality should hold, then, this could create an endogeneity problem since the level of GDP per capita (a right-hand side variable) could be influenced by the extent of redistribution. In order to solve this problem, the authors estimated models where all the explanatory variables are lagged by one period. As compared to the full sample, the results from this model remained unchanged except for ethnic heterogeneity and democracy that were no longer statistically significant. The mechanical correlation present in the redistribution equation however did not cause a large bias.

By using the European Social Survey (ESS, from 2002 to 2010) data, Schmidt-Catran (2016) examined the relationship between economic inequality and public demand for redistribution. The study employed a hierarchical mixed model for the analysis. This is a hybrid model which allows for the estimation of both within (longitudinal) and between (cross-sectional) effects at the country level and at the same time, controls for individual-level compositional effects. The study found a positive within-country effect of inequality on the demand for redistribution. The findings provide a strong support for the median voter hypothesis. Even though there was a positive within–country effect of inequality on the demand for redistribution, the study did not find such a relationship between countries.

Finley (2016) examined the factors that explained variations in levels of income redistribution across former communist countries. The study employed longitudinal data from 26 former communist countries from 1992 to 2013. In order to examine the factors that account for the variations in levels of income redistribution across countries, the study pooled individual countries' time series data and further employed Ordinary Least Squares (OLS) with panel corrected standard errors (PCSE) in order to correct for the biased standard error resulting from the pooling of the time series data. The study also reported only the results from the fixed effect model since the Hausman test rejected the random effect model. The study found that fluctuations in levels of economic growth or unemployment did not significantly affect the level of income redistribution. Hence, economic shocks did not influence redistributive policies. Again, integration into global financial markets was found to affect level of redistribution. Using the PCSE model, the study found that the level of foreign direct investment (FDI) was significant and it negatively affected income redistribution. The

fixed effect model however showed no significant relationship between the levels of income redistribution and FDI. The relationship between income redistribution and ethnic heterogeneity was rather ambiguous. While the PCSE model reported that a heterogeneous population is significantly associated with low levels of redistribution, the fixed effects model found no significant relationship. In both models, democratization was found to positively affect income redistribution. The relationship was significant even when controlling for all cross-country variation. In analysing the channels through which democracy affect the extent of redistribution, the study found that the degree of elective executive recruitment is very important. According to the author, executive recruitment may create electoral incentives which may possibly encourage executives to implement redistributive policies. Therefore, in democratic countries, executives may be more likely to respond to popular demands for redistribution because they can be removed from office.

Huber and Stephens (2014) undertook a similar study. In this study, the data on market income inequality was from the Luxembourg Income Study (LIS) database. The data is made up of 18 post-industrial countries with households whose members are between the ages of 25 and 59 years. The study employed cross-country panel estimation techniques, particularly, random effect (RE) models. The results of the study showed that most of the increase in redistribution was as a result of an increase in need (higher level of unemployment and also large number of single mother households), the generosity of the welfare state and the presence of left cabinet.

Luebker (2012) conducted a study to test the Meltzer-Richard hypothesis by using data from the LIS database. The data was made up 110 observations from 26

countries. In the study, Luebker argues that the appropriate measure of redistribution should be relative redistribution but not absolute redistribution as widely used in the literature. In terms of methodology, the study employed panel regression estimation models (random, between and within-effects models) for the analysis. The outcome of the study showed that the significant relationship between inequality of private sector and relative distribution not significant. The study further examined the role of social norms and values, fairness and altruism in explaining the choices of people with regard to redistribution.

In Switzerland, Feld, Fischer and Kirchgässner (2006) analysed the impact of direct democracy on income redistribution. The study further examined some of the determinants of income redistribution. A panel dataset spanning from 1981 and 1997 as well as a cross section of individual data from 1992 was used for the analysis. The empirical analysis was therefore conducted by using a pooled cross-section time-series data. In terms of the methodology, the study employed the OLS estimation technique with panel-corrected standard errors. By examining the differences between the distribution of income before and after the imposition of taxes, the study found that direct democracy negatively affected redistribution. However, given the fact that redistribution is important, direct democracy completely loses its negative impact on redistribution when pre-tax income is not equally distributed.

Milanovic (2000) conducted a study to test the validity of the hypothesis that suggests of an inverse relationship between redistribution and inequality in the distribution of factor incomes. The study also investigated the possible explanation for redistribution

which is firmly rooted in the median-voter hypothesis. The study was based on household budget surveys drawn from 24 democracies. The dependent variable, which measures the extent of redistribution, is given as the income share gain which is based on factor incomes for the various segments of the income distribution ladder: the lower half ("the poor"), bottom quintile ("the very poor"), or the middle class (that is, the fifth and sixth decile). For the independent variable, the study used inequality of factor incomes or the position of the middle class in factor income distribution. The study employed panel regression estimation models for the analysis. The results of the study confirmed the Meltzer-Richard hypothesis since countries with high rate of factor income inequality redistribute more to low-income households. But, the evidence that the median-voter hypothesis describes adequately the collective choice mechanism is not strong enough.

Two main conclusions can be drawn from the empirical literature on the median-income voter hypothesis. First and foremost, income inequality tends to positively affect the extent of income redistribution. This suggests that the demand for more redistribution is greater in more unequal societies. This conclusion is very strong particularly in studies that employ direct measures of redistribution (that is, the difference between the post and pre-redistribution Gini coefficients) as compared to more indirect measures of redistribution (social expenditure that measures the extent of total government expenditure). Secondly, empirical studies have produced varied findings with regard to the validity of the theory. Hence, this chapter intends to re-examine the median voter theory by using the most recent inequality data provided by UNU-WIDER, that is, the WIID data.

3.3 Cash transfers and Intra-household Labour Market Decisions

3.3.1 Theoretical Literature Review

3.3.1.1 The Impact of Cash Transfers on Labour Supply

The Basic Static Model

The static model presented in this section is based on Moffitt (2002). Assume that the individual is faced with a well-behaved preference function over hours of leisure, denoted by L and consumption, also denoted as C. This is represented by the utility function, $U(L, C)$. The budget constraint facing the individual is also represented as $N + W(T - L) = PC$, where N represents the exogenous unearned income, W represents the hourly wage rate, T and P denote the total time and price of consumption goods respectively. The hours of work is defined as $H = T - L$. By normalising P, C may be relabelled as Y (income). The utility function facing the individual can now be expressed as $U(H, Y)$. This function is maximised with respect to $N + WH = Y$. A cash transfer programme generally provides benefit (B) which is expressed as $B = G - t(WH + N)$, where G is the amount guaranteed to individuals whose income is zero and t represents the marginal tax rate. By adding the benefit to the budget constraint, we get $W(1 - t)H + G - tN = Y$.

In Figure 3.5, the budget constraint is given by the tine CD with the slope given as $-W(1 - t)$. The distance AC represents the guaranteed amount (G). The arrows that are labelled 1 and 2 shows two types of labour supply resulting from the cash transfer programme. It can be observed that in both cases, the programme leads to a reduction in the supply of labour.

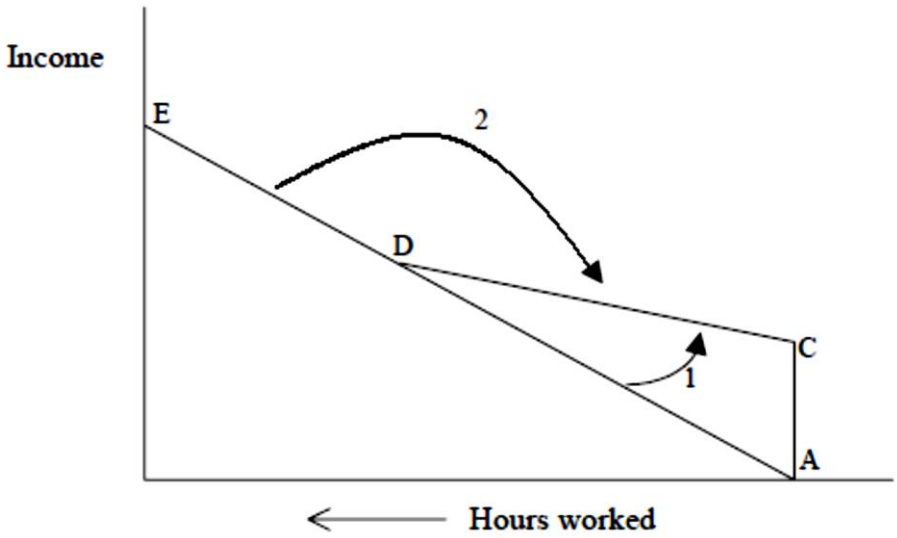

Figure 3.5: The Basic Static Model of Cash Transfer Programmes and Labour Supply
Source: Mottiff (2002)

The static model presented above indicates that cash transfers increase the non-labour income of beneficiary households which triggers a pure income effect. This implies that beneficiaries are able purchase more goods with the extra income. Accordingly, this income effect allows beneficiaries to increase the consumption of normal goods which include leisure (on the assumption that leisure is a normal good).

3.3.1.2 Intra-household Bargaining Theories

In order to know the mechanisms through which transfers may affect the labour supply decisions of beneficiary households, the analysis resorts to intra-household bargaining theories. Theories reviewed in this chapter include the unitary models (Becker, 1974; 1981) and non-unitary models — collective bargaining models (Chiappori, 1988; 1992), cooperative bargaining models (Manser & Brown, 1980; McElroy & Horney, 1981), and non-cooperative bargaining models (Lundberg & Pollak, 1994).

Unitary Household Models

Traditional models of household behaviour assume the existence of a single household utility or welfare function that represents an aggregation of the welfare of all members in the household. In order to make such an aggregation, the household is assumed to have similar tastes and preferences and there exists an altruistic or a benevolent head (Becker, 1981). The unitary models are therefore referred to as the "common preferences", the "altruism" or the "Benevolent Dictator" model.

The unitary model assumes that, the altruist head maximizes the joint utility function of the household subject to a budget constraint. The welfare of each member of the household therefore depends on these factors: the extent to which the altruist head values each member's welfare and the magnitude to which the household budget constraint can be pushed out. Unitary models also assume that, within the household, there is pooling of income (Samuelson, 1956). By implication, it does not matter which member controls the income of the household as this would not have any effect on the resource allocation of the household as well as labour decisions (Lundberg & Pollak, 1996).

It has become increasingly clear that Becker's unitary household model, although attractive and convenient, has come under serious criticisms (McElroy & Horney, 1981; Manser & Brown, 1980). Methodologically, the model has been criticized because it lacks the basic requirements of methodological individualism. This emphasizes that social theories must be based on the behaviour of individual agents (Chiaporri, 1988). Naturally, the household consists of several individuals hence it can be described as a micro society consisting of individuals who have their personal

rational preferences. The implication of this is that, household behaviour should be analysed on the basis of several individual rational decisions. By implication, each member should be characterized by his (her) own utility function.

Another argument against the unitary model is the income pooling hypothesis assumption. This assumption has been rejected strongly in a number of empirical studies, for example, Lundberg *et al.,* 1997; Browning *et al.,* 1994; Bourguignon *et al.,* 1993; Thomas, 1990.

Non-Unitary Models

Due to the lack of empirical evidence in support of the unitary household model as well as its weak theoretical foundations, researchers have developed other alternative approaches that take into account the distribution of power within the household as well as individual preferences among household members. This approach is referred to as the collective household models.

The collective model by Chiappori (1988; 1992) treats the household as a group of individuals with each person having distinct preferences. These persons interact constantly with each other in order to arrive at a decision through an exogenous and unobservable process which is assumed to yield Pareto efficient outcomes — which implies that if resources remain unchanged, the wellbeing of one household member cannot be increased without decreasing the wellbeing of others. Collective household models are made up of non-cooperative and cooperative models.

Non-cooperative models are based on the concept of Nash equilibrium in non-cooperative games. It is assumed that each member of the household strives to

maximise his own utility function by taking the decisions of other members as given (Ashworth & Ulph, 1981; Browning, 2000). In other words, each individual in the household maximizes his or her own utility, with respect to his budget constraint. Since the Nash equilibrium does not necessarily need to be Pareto efficient in a non-cooperative framework, these models do not provide the most adequate scenario for analysing intra-household labour supply decisions.

On the other hand, in cooperative models, the behaviour of household members is assumed to be an outcome of a cooperative game which is based on a Nash's solution (McElroy & Horney, 1981; Manser & Brown, 1980). The model assumes that:

i. each household member has a distinct preference or taste which cannot be summed up as a single household utility function.
ii. The bargaining power of household members determine the outcome of intra-household allocation of resources.

The driving force underlining cooperative household models are the "threat points" of each member in the household. Bargaining power is therefore measured by using indicators which are often linked to the individual's threat points. These are the external opportunities faced by the individual should bargaining become unfavourable (McElroy & Horney, 1981; Manser & Brown, 1980). The outcome of failing to cooperate is referred to as "the fall-back position", "the break-down point" or "the status quo position" which implies the termination of the marriage. Any arrangement apart from the fall-back position is assumed to be better. The fear of the fall-back position therefore governs the bargaining process.

To conclude, collective household models incorporate certain aspects that cannot be analysed using the unitary household model. These include the intra-household decision making-process, elaboration of individual preferences and subsequent multiple utility functions within one household. With regard to the research objective, the cooperative bargaining model is deemed most appropriate for the analysis since the model assumes that individuals within the household pursue their common interests given their relative bargaining positions in the household which is largely influenced by the outside opportunities of the spouse.

3.3.1.3 Channels through which Cash Transfers affect Labour Supply

The Time and Household Production Theory (Becker, 1965)

The model posits that, time allocation decisions require a trade-off between the time allocated for domestic activities (which includes domestic production and leisure) and the time allocated for paid labour. The model also asserts that, whereas the time devoted for domestic activities yields utility, the time allocated for paid labour yields income. Hence, if we assume that the beneficiaries of cash transfers devote their time for only leisure and work, then standard economic theory predicts that cash transfers unambiguously affect labour supply negatively. The reason for this prediction is due to the fact that, an increase in household income that is unrelated to work leads to an increase in the value of time that is dedicated to the household activities relative to the time dedicated to paid work. Recipients of cash transfers therefore decide how much of labour to supply by trading off the gain from working for more hours of leisure. Since leisure is regarded as a normal good, an increase in non-labour income leads to an increase in its demand.

Other Channels through which Cash Transfers affect Labour Supply

Cash transfers affect labour market decisions through substitution effect. This may occur when adults increase their supply of labour so as to compensate for the reduction in the supply of labour by children in response to the conditionalities attached to the transfer in terms of school attendance. Hence, meeting the conditionalities attached to the transfer is another channel through which cash transfers may affect adult labour supply. Again, the time spent on meeting the programme's conditionalities may conflict with time spent on paid work. The conditionalities attached to the transfer may require parents to increase the time devoted for childcare (for example, taking the child to the health centre for immunisation or sending the child to school). In this case, the transfer may have a negative impact on labour supply. On the other hand, the positive impact of cash transfers on children's school attendance has the potential of freeing up the time previously spent on childcare (Blau & Tekin, 2007) thereby increasing the time spent on paid labour activities.

According to Fiszbein & Schady (2009), cash transfers may affect labour supply through a channel referred to as 'price effect'. This is where beneficiaries of the transfer may have the motive of modifying their labour supply so they can continue to be eligible for the transfer especially if it is a means tested one. In another dimension, the authors explained that since recipients of cash transfers are households who are extremely poor, the income elasticity of leisure is low for such households. Hence there is no incentive for recipients to substitute labour for leisure. In this case, the transfer may not have any significant impact on labour market outcomes. According

to Alzúa *et al.*, (2010), the impact of cash transfers may vary by gender— given cultural norms and the constraints of caring for children, income effects may cause women to withdraw from the labour market while men may increase their leisure.

3.3.1.4 Determinants of Women's Bargaining Power

Intra-household bargaining is defined as the negotiations that take place among household members with the purpose of arriving at a decision within the household. Bargaining power therefore refers to the ability of one party to dominate the other or exert influence over the other in a negotiation in order to arrive at an outcome which is favourable to them. Although bargaining power is quite simple to define, it is a difficult concept to measure. Researchers rely on proxies to measure bargaining power. Popular among these proxies are explained below:

Income and Employment

A woman's earned income is expected to have a direct influence on her bargaining power (Hoddinott & Haddad, 1995). The literature argues that a woman who is financially independent or a woman who is more established financially as compared to her husband usually has more say in household decisions. Due to her financial status, she exhibits more power in household decision making (Doss, 2013). A woman's earnings indicate her ability to survive independently when there is a break-up in the marriage as it reflects how she can cope financially in the absence of the man. The earnings of the woman therefore give her direct control over bargaining.

Doss (1996) noted that measuring bargaining power using earnings is quite problematic because income earned by each partner may not be exogenous. This is

because the ability of a woman to work and the number of hours she works may be determined by her husband and should this be the case, her earnings are unlikely to reflect her bargaining position. Nevertheless, it is equally true that irrespective of the dynamics underlying the initial decision to work, once she has been allowed to work and contributes to household income, her position in the household improves as compared to what existed previously and this of course, may change her bargaining power.

Employment outside the household is one of the key factors that influences the woman's bargaining position (Anderson & Eswaran, 2009; Fafchamps *et al.*, 2009). This is because being employed offers both a fall-back position in case of marital dissolution and also provides a perception of increased female contribution to household wellbeing (Doss, 2013) thereby increasing her bargaining position in the household.

Education

Education is another indicator that is considered important for measuring the bargaining position of the woman in the household. It exposes the woman to new ideas which are expected to make her more independent. More so, education makes it possible for the woman to overcome some cultural and traditional norms (Malhotra & Mather, 1997). In conclusion, education influences the woman's outside options and hence, her bargaining power.

In the literature, education is measured in several different ways: Smith *et al.*, (2003) used the difference in years of education; other studies created dummies for schooling

level for the woman and her husband (Anderson & Eswaran, 2009); Quisumbing & Maluccio, (2003) used the number of years of schooling; Novella *et al.*, (2012) measured bargaining power by dividing the number of years of schooling completed by the woman by the number of years of schooling completed by the man.

Age

The age of the woman has been documented as an important variable that determines her bargaining power. According to McElroy (1990), the age of the spouse indicates whether or not each partner can do well in the marriage or remarriage market. For instance, wives who are younger may possess more bargaining power. However, if experience is measured by age, wives who are older than their husbands are assumed to have greater bargaining power or more influence on household decisions (Chari *et al.*, 2017). Other approaches have been employed in the literature to measure bargaining power using age: Vermeulen (2005) measured bargaining power by using the age difference of the couple; Smith *et al.*, (2003) also used age at first marriage of the woman and the percentage difference between the woman and her husband's age.

Assets

Ownership of and control of assets in the household is also used to measure bargaining power. Assets are likely to generate income directly or indirectly. Income is generated directly if they rented out or indirectly if the assets are used for productive activities. Again, assets may provide a sense of security which may increase the person's threat point. However, the use of assets to measure bargaining power has been difficult to prove quantitatively given the many endogeneity

challenges (Doss, 2013). In order to deal with the concern that the woman's current asset is as a result of her bargaining power rather than the source of it, several studies have used assets brought into marriage (for example, Quinsimbing & Mallucio, 2003).

Kishor (2000) summarized these indicators as: factors that provide evidence of female autonomy (for example, control over resources); sources of empowerment (for example, education attainment); and the settings of power (for example, the age at first marriage or age differences between the couple).

3.3.2 Empirical Literature Review

The empirical literature reviewed in this section is based on the following subheadings: the impact of cash transfers on labour supply and the impact of women's bargaining power on labour supply.

3.3.2.1 The Impact of Cash Transfers on Labour Supply

Osei and Lambon-Quayefio (2021) examined the impact of cash transfers on the labour supply of poor households in Ghana by using the Livelihood Empowerment Against Poverty (LEAP) programme as a case study. The data used for the analysis was based on the LEAP programme evaluation dataset collected by ISSER in collaboration with the University of North Carolina, Chapel Hill. Specifically, the study examined the impact of transfers on labour transitions, that is, shifting from being unemployed to self or wage employment. The analysis employed propensity score matching with difference-in-difference estimation techniques. The results of the

study indicate that cash transfers have productive impacts and therefore reject the argument that transfers make recipients perpetually dependent.

Using the same data, Mochiah *et al.*, (2014) examined the impact of this cash transfer programme on the labour supply decisions of households in Ghana using the difference-in-difference approach. The results of the study indicated that, whereas the LEAP grant led to a decline in agricultural labour supply, it encouraged the supply of labour for paid employment.

In another study using the same data, Handa *et al.*, (2013) used the difference-in-difference approach to evaluate the impact of the LEAP grant on several variables. With regard to labour supply, the study found that the LEAP programme had a positive effect on own labour supplied to the farm by both women and men. However, there were reductions in labour hired by households even though this reduction is lesser than the increase in own labour.

Bergolo and Galván (2018) explored the behavioural responses of couples to Asignaciones Familiares-Plan de Equidad (AFAM-PE), a cash transfer programme in Uruguay by considering its impact on labour market decisions, marital dissolution and decision making with regards to money use. The methodology employed in the study was the regression discontinuity design. The outcomes of the study in terms of labour supply, can be summarized as follows: firstly, there was a significant negative relationship between cash transfers and the formality choice of women but no significant effect was found for men; and secondly, lower rates of migration from the informal to formal employment as well as lower probabilities of women remaining in

registered employment were the lead cause of the negative effect on women's labour formality.

A similar study was conducted in Iran by Salehi-Isfahani & Mostafavi-Dehzooei (2018). The authors employed both fixed effects and difference-in-differences to examine the impact of cash transfers on labour supply. In the study, labour supply was measured using labour force participation rate as well as hours of work of individuals who belong to the bottom 40% of the expenditure distribution. The outcomes of the study indicated that cash transfers did not affect labour supply negatively. The results showed rather showed either a positive impact or statistically insignificant impact when the outcome was negative. The study however found positive impact for some specific groups of people: men and women in service and industrial sectors. To sum up, the results of the study showed that, the programme has not significantly reduced the incentives to work.

In the literature reviewed by Corona & Gammage (2017) titled, "The impact of cash transfer programmes, poverty reduction and women's economic empowerment: experience from Mexico", the authors found no significant impact of cash transfers on adult labour force participation in households who received the transfers. For instance, Parker & Skoufias (2000), using Mexico's PROGRESA, found no evidence to support the assertion that cash transfers reduced the time devoted to labour force participation. Similar conclusion was drawn by Skoufias & Di Maro (2006) and Lindert *et al.,* (2006).

In Colombia, Barrientos & Villa (2015) analysed the impact of a human development conditional cash transfer programme, Familias en Acción, on adult labour market

outcomes. The study employed a regression discontinuity model using a panel dataset. The labour market outcomes considered in the study were labour force participation, employment, informality and job search. By using the total sample of adults who live in the urban communities, the study found that, the impact of Familias en Acción was not statistically significant even though it was positive. Thus, confirming earlier findings that cash transfer programmes do not adversely affect the labour supply of adults. However, disaggregating the sample using household composition yielded positive impact in households with only one adult and children who were less than 6 years. Furthermore, among women, the study found a significant impact on the probability of being in the formal sector. The result was generally positive for adult women. It was however negative if the woman lived in a two-adult household with children who are young. The study identified a positive impact on the length of job search among men, even though the impact was negative for households with one adult and young children.

Using a unitary discrete choice model, Mideros & O'Donoghue (2014) examined the impact of Bono de Desarrollo Humano, an unconditional cash transfer programme, on the labour supply of adults in Ecuador. The findings of the study indicated a non-negative impact of transfers on the labour supply decisions of household heads. This result however holds for a specific amount transfer. This implies that, a negative effect may result if the amount of transfer is big enough. The study however found that the transfer had a negative impact on the labour supply of spouses (who were largely women) as well as adults who were single. According to the authors, the labour participation of adults was influenced by the needs of the household (that is, caring for other members). Therefore, the number of working hours for paid-labour

declined in households with high dependency ratio or in households where the number of children under 5 years old were more. It means that partners allocate more time to childcare.

In Kenya, Asfaw *et al.,* (2014) evaluated the impact of Cash Transfer for Orphans and Vulnerable Children (CT-OVC) on household labour market decisions and other productive activities. The data used for the study was based on a randomised experimental design. The difference-in-differences approach was used for the analysis. Regarding labour supply decisions, the study examined two main forms which include labour used on own farm and wage labour supply. Furthermore, for each type, the study focused on investigating the decision to participate which is referred to as the extensive margin and then the intensity of participation which is referred to as the intensive margin. The latter was measured by the number of days worked per year. The findings of the study revealed that, there was no significant impact of the programme on participation in wage labour as far as groupings of all the types of labour as well as for all adults were concerned. Additionally, the programme was found to have facilitated labour force participation for all individuals and more especially women who resided farther away from the local markets as it reduced transaction cost. Further findings also revealed that, the programme had a negative impact on the participation in agricultural wage labour, however, with regards to non-agricultural wage labour (especially for males), the programme had a positive impact. The programme also had a negative impact on the intensity of participation for wage labour. Nonetheless, as far as both females and males were concerned, the programme brought about an increase in the intensity of own farm labour.

By using a cooperative household model, Novella *et al.*, (2012) explored the impact of cash transfers on the labour supply of parents in rural Mexico [Programmea de Educación, Salud y Alimentación (PROGRESA), Honduras [Programmea de Asignación Familiar (PRAF)] and Nicaragua [Red de Protección Social (RPS)]. The study was restricted to households with couples who lived together within the period the study was conducted. An index for bargaining power was calculated by dividing the woman's years of schooling by the man's years of schooling. Two measures of labour supply were considered: weekly hours of work (intensive margin) and labour force participation (extensive margin). By using the difference-in-difference estimator, the study found that conditional cash transfers had a limited impact on the labour supply of couples. For PROGRESA, the study found a reduction in maternal labour supply (that is, the likelihood of participating in the labour market). The programme however increased the labour supply of husbands (that is, weekly hours of work). But Nicaragua's RPS, reduced the weekly hours of work of husbands. Furthermore, the results showed that the impact of conditional cash transfer on the labour supply of couples varied with how power is distributed within the household. For PRAF, when wives who have more powers relative to their husbands, they limit their labour supply. Husbands, on the other hand, supply more labour. In general, the study found that the impact of these selected transfer programmes on the labour supply of couples was small and, in most cases, insignificant.

In another study, Foguel and Barros (2010) analysed the effects of conditional cash transfer programmes on adult labour supply in Brazil. The study employed a panel of municipalities that were investigated continuously by the Pesquisa Nacional por Amostra de Domicílios (PNAD/IBGE) from 2001 to 2005. The labour market

outcomes considered in the study were: average number of working hours and participation rate at the municipal level. In terms of methodology, the study employed various linear regression models for the analysis. Results were obtained separately for all males and females. The authors further investigated whether the results would differ for poorer individuals, that is, those living in families with income per capita below the median per capita family income in the municipality in which they live. The findings of the study showed that the impact of cash transfer programmes on the participation rate of females is not statistically significant. This can be seen for all females and those who fall below the median income. With regard to hours of labour supply, the study found a significant negative impact even though the magnitude was small. The impact of cash transfers on the participation rate for males was positive, even though the magnitude was small. Similar results can be observed for all males and whose who fall below the median income. Concerning hours of labour supply, the findings from the study indicated a significant negative impact (even though the magnitude was small) on all females but this was not significant for those living below the median income. The results showed that the cash transfer programme did not have any significant impact for both groups of males. To sum up, the results of the study did not provide evidence of a significant impact of conditional cash transfer programmes on either the hours of labour supply or the labour market participation of both women and men.

Studies such as Galiani (2009) analysed the impact of cash transfers on changes in economic activities. According to the study, households that received PROGRESA increased their participation in microenterprise activities. Additionally, the study also showed that, these households invested more in agricultural production which was

anticipated to have long-term effects. Another study by Skoufias *et al.* (2008) also focused on the analysing the impacts of an unconditional cash transfer and an in-kind programme named Programmea de Apoyo Alimentario in the poor rural areas in southern Mexico. The results of the study showed that, the effect of the programme on labour market participation was not significant. It rather caused beneficiaries to move from one sector of employment to the other, that is, from the agricultural to non-agricultural activities.

3.3.2.2 The Impact of Household Bargaining on Labour Supply

Noman *et al.,* (2018) evaluated the decision-making process of females in Pakistan by taking into account, endogenous intra-household empowerment and labour force participation. The theoretical framework underpinning the study was the collective household bargaining model. The study employed cross sectional data from the Pakistan Social and Living Standard Measurement Survey (PSLM) from 2013 to 2014. The Instrumental Variable (IV) approach then was used to capture the endogeneity of women empowerment in the household. The result of the study revealed a strong significant endogenous association between labour force participation and bargaining power.

Van Biljon *et al.,* (2018) analysed the impact of female autonomy on the labour market decisions of females who lived in South Africa. The authors used the roll out of banking cards as an exogenous shock to show that financial inclusion improves women's decision-making power in the household. By using the difference-in-difference estimator, the results showed that recipients experienced higher rates of financial inclusion and thus internal bargaining power after the introduction of the

bank cards. Based on the non-cooperative bargaining household model, the study found that if recipients of child support grant are given bank cards, they gain more control of their incomes. The results of the study further showed women who were the primary decision makers in their households had a 92 percent increase in the probability of being in the labour market compared to women who were not.

A similar study was conducted by Heath and Tan (2020). The study used the Hindu Secession Act as an exogenous shock to show that participation in the labour market by women improved due to the change in inheritance laws (women were now allowed to inherit property). Within a non-cooperative household model, the study showed that the unearned income of women improved her autonomy. This causes the utility she derives from working to increase and thus, leads to an increase in her labour supply. Hence, the Hindu Succession Act raised the autonomy of women and labour supply.

Another study by Majlesi (2016) sought to examine the effect of women's decision-making power and labour market opportunities in households in Mexico. To achieve this, the study employed a longitudinal data and administrative records data from the Mexican Social Security Institute. The findings of the study revealed that, women's decision-making power improved with an increase in labour market opportunities while effects of relative changes were also recorded for men and women of both working and non-working class decision making when an increase in labour market opportunities occurred. Finally, the study also found that, an increase in labour market opportunities resulted in an increase in women's decision making which consequently led to an improvement in the health status of children.

Moeeni (2015) examined the relationship between the labour supply of married women and intra-household bargaining power in Iran. In the study, bargaining power was measured using the ratio of the wife's education relative to her husband's. Based on the collective household model, the outcome of the study indicated an inverse U-shaped relationship between women's bargaining power and labour force participation. This means that the labour force participation of women increases initially with bargaining power but it decreases after bargaining power reaches a certain level.

In the United States, Knowles (2012) developed a model of marital bargaining based on a time-use survey data. In this model, time allocations were jointly determined with equilibrium marriage and divorce rates. The outcome of the study showed that whilst bargaining raised the labour supply of married men by about 2.1 hours weekly, it reduced that of married women by 2.7 hours. The study indicated that even though bargaining had a relatively small impact on aggregate labour supply, it was key for determining the trends in female labour supply. Furthermore, the reduction of the wage gap between both genders accounted for a weekly 1.5 hour increase in aggregate labour supply. In Uganda, Kasirye (2011) found that women with greater bargaining power contribute more to agricultural production and vice versa.

Sinha (2012) conducted a similar study by using data from rural India. The aim of the study was to examine the labour supply decisions of households by taking into account non-participation, endogenous intra-household bargaining as well as nutritional status. The study employed the Heckman two-step procedure to deal with the bias arising from restricting the sample to only working couples. The bargaining

variables used for the analysis include: age difference, proportion of years of education of the woman to the partner and the proportion of female wage income. The outcome of the study showed that the bargaining power of the woman increased with better educational status and higher wages. The study found that whereas bargaining negatively affected the labour supply of husbands, it positively affected the labour supply of wives.

3.3.2.3 Conclusion

Empirical studies on the impact of cash transfers on labour supply have found results that are not consistent in terms of magnitude, direction and statistical significance. In most of the cases, conditional cash transfers do not seem to significantly affect the labour supply of adults. Furthermore, most of the studies employ unitary household models thus leaving behind the intra-household dimension. This aspect however provides another possible channel through which cash transfers may affect intra-household labour market decisions. But this has not been investigated in the empirical literature as far as the Ghanaian literature is concerned. This study contributes to the scarce literature that seeks to examine the heterogeneous impacts of cash transfer programmes by using a collective household model that takes into consideration intra-household bargaining.

CHAPTER FOUR

THE IMPACT OF FISCAL POLICY ON INCOME REDISTRIBUTION

The chapter presents the methodology as well as the empirical results for the first research objective which seeks to examine the impact of fiscal policy (hypothetical child support grant financed with domestic tax revenues) on income redistribution. The first section presents the methods employed in conducting the analysis with specific emphasis on microsimulation modelling. The second section presents the empirical results which include the descriptives as well as the simulation results.

4.1 Methodology

4.1.1 Conceptual Framework

Tax-benefit microsimulation models give detailed data on the distribution of disposable income of the household based on different policy scenarios. This allows the impact of different policies to be examined by comparing the various scenarios. Microsimulation modelling therefore begins by defining the baseline and then, the counterfactual scenario.

Following Figari *et al.,* (2015), the socio-demographic features of the household is denoted by a vector c, and the original income[5] of the household is also denoted by x. Let k denote net transfers which is the difference between the total cash transfer and

[5] That is, income of the household before cash transfers are added and direct taxes are deducted

the total direct taxes for each household. This is represented by the function: $f_k(c, x, m_k)$. Following Bargain & Callan (2010), we differentiate between the structure of the tax-benefit system f_k and the various monetary parameters m_k(which includes; benefit amounts, tax bracket). The function is positive if the total benefits exceed the direct taxes paid by the household, and it is negative if otherwise.

The household disposable income (y) is expressed as:

$$y_k(c, x, m_k) = x + f_k(c, x, m_k) \quad (1)$$

If we assume that the household characteristics and original income are constant, then the effect of a policy reform (from policy A to B) on disposable income is

$$\Delta y = y_B(c, x, m_B) - y_A(c, x, m_A) \quad (2)$$

Equation (2) measures the effect of changes in the tax-benefit system. It typically measures the 'morning-after' effect of policy reforms.

4.1.2 The Ghana Tax-Benefit Microsimulation Model (GHAMOD Version 1.3)

GHAMOD emerged from the SOUTHMOD project. This is a project by the United Nations University — World Institute for Development Economics Research (UNU-WIDER) in collaboration with the South African Social Policy Research Insights (SASPRI) and the EUROMOD team at the Institute for Social and Economic Research (ISER) at the University of Essex. The project seeks to build tax-benefit microsimulation models for several countries in the Global South. These models, collectively referred to as SOUTHMOD, have been constructed based on the EUROMOD platform.

EUROMOD is a tax-benefit microsimulation model developed for countries in the Europe. It is a static model that simulates benefit entitlements and tax liabilities based

on the rules that govern the policy as well as any reforms that may have taken place for each member country. Due to its wide coverage, EUROMOD allows policy analysts or researchers to estimate comparatively, the effects of benefits and taxes on household incomes for each country and for the EU at large.

GHAMOD basically runs on the EUROMOD software which is based on the European Union Statistics on Income and Living Conditions (EU-SILC). Hence GHAMOD has also been built based on variables of the (EU-SILC). For this reason, the input dataset of the model which is based on the Ghana Living Standards Survey round 6 (GLSS-6), has been adjusted to conform to the EU-SILC data requirement in terms of variable names. Similar to EUROMOD, the baseline systems in GHAMOD have been validated against external or administrative statistics. Table 4.1 provides a description of policies simulated in GHAMOD.

Table 4.1: Policies Simulated in GHAMOD

Policy	Treatment in GHAMOD Policy Year			
	2013	2014	2015	2016
Benefits				
LEAP transfer programme	S	S	S	S
State pension	E	E	E	E
School Capitation Grant	S	S	S	S
Direct Taxes				
Labour Income Tax	S	S	S	S
National Health Insurance Levy	S	S	S	S
Fringe benefit tax	E	E	E	E
Gift Tax	-	-	-	-
Property Tax	-	-	-	-
Capital Gains Tax	S	S	S	S
Presumptive Tax	S	S	S	S
Indirect Taxes				
Value Added Tax	S	S	S	S
Other Indirect Taxes	S	S	S	S
Stamp duty	E	E	E	E
Vehicle Income Tax	E	E	E	E
TV Licence Fee	E	E	E	E
Social Contributions				
Employee Social Security Contributions	S	S	S	S
Employer Social Security Contributions	S	S	S	S

Note: 'S' means the policy has been *simulated* even though some rules may not have simulated; 'E' means the policy was *excluded* from the model as it is neither included in the microdata nor simulated; '—'policy did not exist in that year.
Source: Adu-Ababio *et al.,* (2017)

From Table 4.1, it can be observed that GHAMOD does not simulate all taxes and benefits. Adu-Ababio *et al.,* (2017) provided three major reasons for this:

i. firstly, some taxes/benefits are completely beyond the scope of the model and hence they were excluded from the GHAMOD database or in the output income variables;
ii. secondly, it is difficult to simulate some taxes or benefits accurately with the underlying dataset; and
iii. finally, the rules governing some of the benefits are complicated and/or there is insufficient information in the survey in order to simulate the benefit in detail.

Uprating

In order to account for time differences regarding the input data and the policy years, uprating parameters are employed. In GHAMOD, uprating is done by using the compounded consumer price index (CPI) which is generated by the Ghana Statistical Service. Each monetary variable has been uprated in order to account for any change in the average value of an income concept between the year of the data collection which is 2012/2013 and the policy year under review.

4.1.3 Modelling the Hypothetical Child Support Grant

In line with the UN Convention on Child's right and as used in many other studies, a child is defined as an individual below eighteen years (Chen & Corak, 2008; Chzhen & Bradshaw, 2012). A child described as 'poor' if he or she lives in a household with low standard of living or in a household that lacks the resources to enable them

purchase the goods and services needed in the household (Gordon *et al.*, 2003). A low standard of living is measured either by using the household's consumption expenditure or by using indicators of deprivation. A low level of household consumption expenditure or a high level of deprivation implies a low standard of living. Due to limited data on the deprivation indicators in the GLSS, we measure the household's standard of living using the equivalized consumption expenditure.

The two most important issues that emerge in the literature in designing transfer programmes are structure of the benefit which relates to whether the benefit is targeted or universal, or whether beneficiaries receive a flat amount or differentiated amount based on certain characteristics and the second issue relates to how the benefit is financed. Based on these, we simulate three major child support grant schemes:

i. Scenario 1: Targeted child support grant
ii. Scenario 2: Universal child support grant with flat benefit
iii. Scenario 3: Universal child support grant with differentiated benefits.

As noted by Lee (1987) programmes that redistribute income may encourage dependency social assistance which may worsen the rate of poverty and also inequality. Hence with respect to the benefit amount, in most cases, the level is set such that it is just enough to move the beneficiary household to the poverty line (Sedlacek *et al.*, 2000).

The monthly minimum wage rate is used as the basis for setting the benefit amount. The monthly minimum wage rate is calculated by multiplying the daily minimum wage by 27 days**.** The daily minimum wage as at December, 2018 is GH 9.68 cedis. Hence the monthly minimum wage is given as $(\text{GH } 9.68 \text{ cedis} \times 27 days) =$

GH 261.36 cedis. But in order not to encourage beneficiaries to be dependent on the transfer, the benefit amount for the targeted scheme is equal to half of the daily minimum wage rate which is calculated as $(\text{GH } 0.5 \times 261.36) = \text{GH } 130.68$ cedis. For the flat benefit, the amount is equal to $(0.4 \times 261.36) \cong \text{GH } 105$ cedis. Scenario 3 is a universal child support scheme however children from poor households are given extra benefit in addition to the flat benefit of GH 105 cedis. Even though the choice for the additional benefit which is GH 13 cedis arbitrary, the total benefit amount should not be more than half of the monthly minimum wage in order not to encourage dependency.

4.2 Analysis and Discussion of Results

The section attempts to:

1. analyse the redistributive effects of a non-contributory child support grant on income distribution;
2. assess the progressivity of the transfer;
3. estimate the budgetary cost associated with this policy;
4. examine the extent to which direct tax reforms can affect government revenues; and
5. determine the net impact of the child support grant.

4.2.1 Descriptive Statistics

4.2.1.1 Demographic Characteristics

The data used for the analysis is the 6th wave of the GLSS provided by the Ghana Statistical Service which is designed to provide a national as well as regional

indicators of wellbeing. The survey sampled 16,772 households with an individual response rate of 72,372. Out of this number 33,955 (46.92 percent) are children whilst the remaining 38,417 (53.08 percent) represent the adult population. Out of the total households surveyed, 29.61 percent (4,967) had no child.

4.2.1.2 Poverty Analysis

With regard to the upper poverty line of GH¢1,314.00, 24.23 percent of the Ghanaian population are said to be living in poverty. Again, the poverty gap is 7.76 percent. This indicates that, the average income of the poor falls below the poverty line by 7.76 percent. In terms of sex of household heads, household headed by females tend to have a lower poverty rate (19.09 percent) compared to households headed by males (25.92 percent). Poverty incidence among households with children is 26.78 percent and that of households with older persons is 33.34 percent.

Table 4.2: Poverty Rate in Terms of Household Composition

	FGT (0)	FGT (1)
Overall poverty rate	24.23	7.76
Poverty rate in terms of …		
households headed by males	25.92	8.43
households headed by females	19.09	5.69
households with children	26.78	8.60
households with elderly persons	33.34	10.77

Note: FGT (0) = poverty headcount ratio
FGT (1) = average normalised poverty gap
Source: Author's Calculation using GLSS 6, (2019)

Figure 4.1 further provides a disaggregation of poverty rate by rural/urban location. The incidence of poverty is higher in households living in rural areas (37.9 percent) compared to households who live in urban areas (10.6 percent).

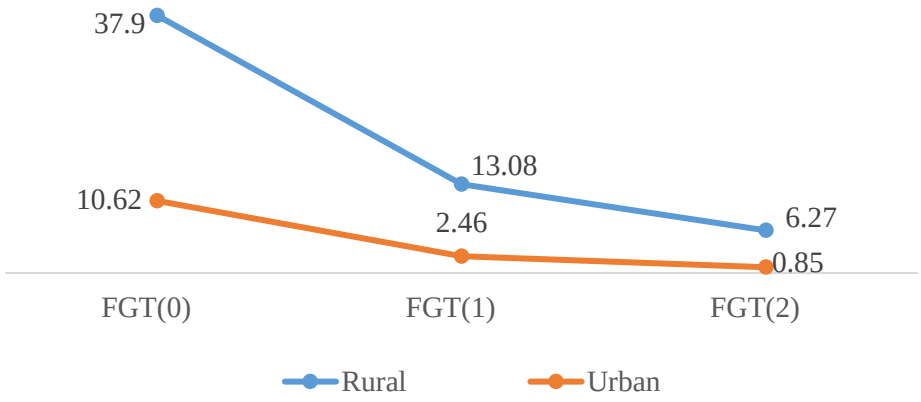

Figure 4.1: Poverty Rate by Rural/Urban Location
Source: Author's Construction using GLSS 6, (2019)

Figure 4.2 shows the incidence of poverty in terms age category, that is, children and adults. Considering the poverty line of GH ¢1314.00, it can be seen that more children (28.3 percent) are living in poverty compared to the adult population which is 20.6 percent. Unfortunately, the number of children who live in poverty is even more than the average population of 24.2 percent. Similarly, the percentage of children who are extremely poor is 9.9 percent compared with the adult population of 7 percent.

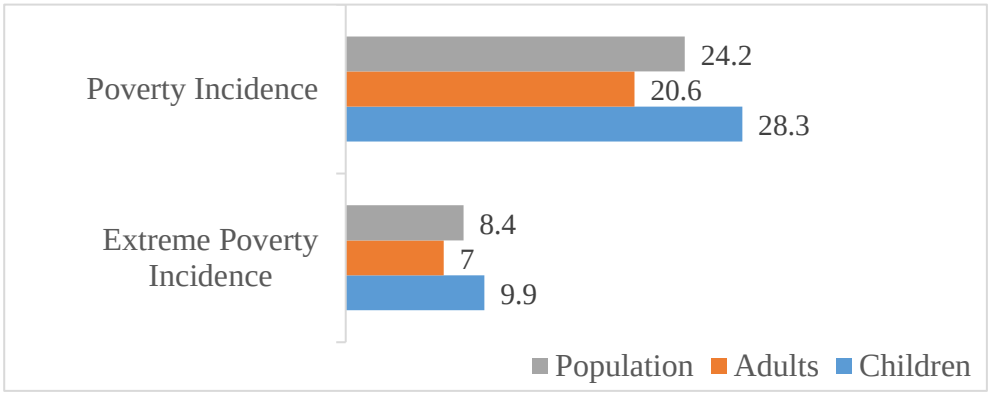

Figure 4.2: Poverty Rate by Age Category
Source: Author's Construction using GLSS 6, (2019)

The Incidence of Child Poverty by Rural/ Urban Location

The incidence of poverty among children who live in rural areas is higher as compared to those who live urban areas. Table 4.3 presents a disaggregation of the incidence of child poverty by rural/urban location. In fact, child poverty in the rural areas exceeds the national child poverty rate. Out of the total number of children, about 42 percent of those who live in the rural areas are poor relative to their counterparts who live in the urban areas (13 percent). In fact, rural child poverty contributes as much as 78.5 percent of the total incidence of child poverty.

Table 4.3: Incidence of Child Poverty by Rural/ Urban Location

	Headcount	Population Share	Absolute Contribution	Relative Contribution
Urban	0.130	0.468	0.061	0.215
Rural	0.418	0.532	0.222	0.785
Population	0.283	1.000	0.283	1.000

Source: Author's Calculation using GLSS 6, (2019)

4.2.1.3 Inequality Analysis

Overall inequality as reported by the Gini index is 40.94 percent. Table 4.4 further presents a disaggregation of the rate of inequality by rural-urban location using the Gini as well as the Theil indices. Both measures indicate a higher inequality rate in rural areas. Again, inequality rate is higher within each area than across areas. This implies that a greater percentage of inequality is as a result of the wide variations in welfare within each area.

Table 4.4: Inequality Rate by Rural/Urban Location (in percentages)

Group	Gini	Theil
Urban	37.31	24.18
Rural	38.91	27.72
Within urban/rural	-	25.44
Between urban and rural	-	4.14
National	40.94	29.59

Source: Author's Calculation using GLSS 6, (2019)

With respect to age categories, it can be observed from the Lorenz curve in Figure 4.3 that, children face higher inequality compared to adults.

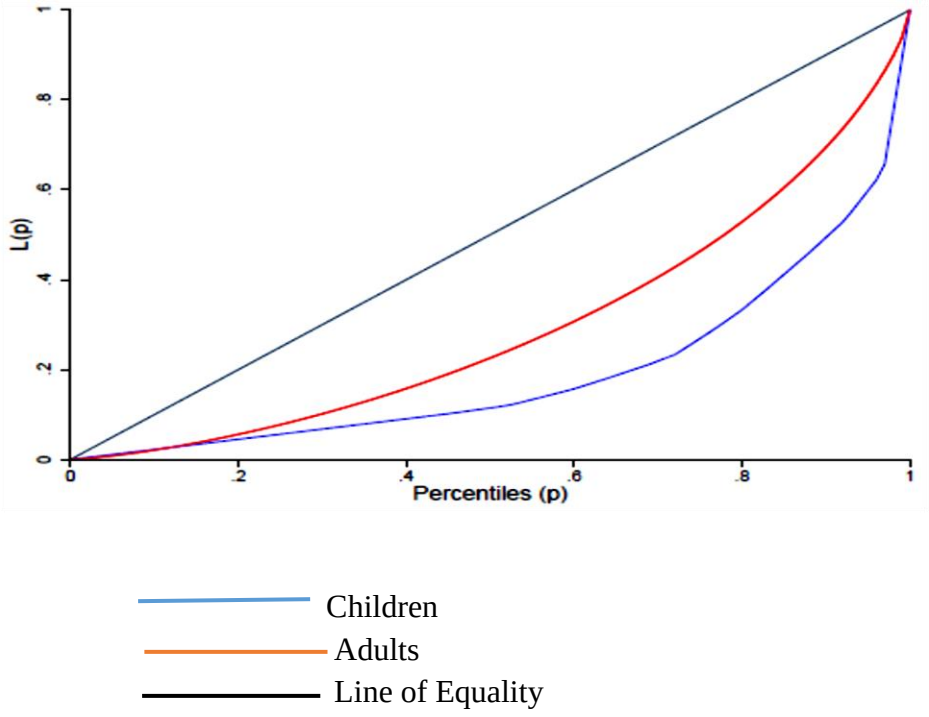

Figure 4.3: Inequality among children and adults
Source: Author's construct using GLSS VI, (2019)

It can also be observed from Table 4.5 that, about 29.05 percent of the total sample belongs to the lowest quintile. A breakdown of the sample by age categories indicates that majority of children, about 33.16 percent, are found within this quintile compared to 25.42 percent of the adult population. Furthermore, whilst 19.10 percent of the adult population are located in the highest quintile, only 10.45 percent of children belong to this group.

Table 4.5: Welfare Quintile by Age Categories

Welfare Quintile	Children	Adults	Total
1	11,261 (33.16)	9,765 (25.42)	21,026 (29.05)
2	7,627 (22.46)	7,277 (18.94)	14,904 (20.59)
3	6,255 (18.42)	6,931 (18.04)	13,186 (18.22)
4	5,264 (15.50)	7,106 (18.50)	12,370 (17.09)
5	3,548 (10.45)	7,338 (19.10)	10,886 (15.04)
Total	33,955	38,417	72,372

Note: Figures in bracket represent the percentage of the population
Source: Author's Construction using GLSS VI, (2019)

The descriptive statistics indicate greater number of children live in poverty compared to adults. Also, rural child poverty contributes more than half of the overall incidence of child poverty. With regard to inequality, children face higher rate of inequality compared to adults. Given the intergenerational nature of inequality and child poverty and given the fact that child poverty contributes more to the national poverty

rate, this suggests that policies related to child wellbeing must be the focal point of government policy.

4.2.2 Results from the Microsimulations

The first step of the analysis simulates the baseline scenario. This serves as the reference point for the subsequent simulations. The next step is to simulate the various reform scenarios. These reform scenarios are then used to evaluate the impact of changes in the baseline system. This is done by comparing the outcomes of the reform scenario with that of the baseline scenario.

The results presented are based on the simulated household equivalized consumption expenditure. This is because in Ghana, inequality and poverty rates are measured using household consumption expenditure, but the benefits and the taxes that model calculates is based on disposable income. GHAMOD therefore reports poverty or inequality rates which are calculated on based on disposable income as well as an amended consumption concept. The lattter refers to the simulated consumption possibilities, which are equal to actual consumption expenditure plus reported taxes minus simulated taxes plus simulated benefits minus reported benefits. Furthermore, since the underlying data does not capture reported taxes directly, it is computed by subtracting net income from gross income (Adu-Ababio *et al.*, 2017).

4.2.2.1 Baseline Simulation Results

The baseline estimate of the rate of poverty is presented in Table 4.6. With regard to the upper poverty line (GH ¢1314.00), the percentage of the entire population living in poverty is estimated as 24.91 percent. This is marginally overestimated as

compared to what is reported by (GSS, 2014; Cooke *et al.*, 2016). Poverty headcount for male and female household heads is 26.64 percent and 19.70 percent respectively. The incidence of poverty for households with children is estimated as 27.47 percent and that of elderly persons is 33.70 percent. The overall average shortfall of income from the poverty line is 8.12 percent. For male and female headed households, the poverty gap is given as 8.81 percent and 6.02 percent respectively. For households with children, the poverty gap is given as 8.94 percent and that of households with elderly persons is 11.07 percent.

Table 4.6: Poverty Rates for Baseline Scenario (in percentages)

	Baseline
FGT(0): Headcount Ratio (Proportion Poor)	
Overall poverty rate	24.91
Poverty rate in terms of …	
households headed by males	26.64
households headed by females	19.70
households with children	27.47
households with elderly persons	33.70
FGT(1): Average normalised poverty gap	
Overall poverty rate	8.10
Poverty rate in terms of …	
households headed by males	8.80
households headed by females	6.01
households with children	8.93
households with elderly persons	11.07

Source: Author's calculation using GHAMOD V1.3, (2019)

Table 4.7 provides the estimate of inequality rate using the Gini index, the Generalized Entropy indices, the Atkinson indices, the quantiles of distribution and median and percentile ratios. It must be noted that the Gini index ranges from 0 to 1. If the Gini coefficient is 0, it implies perfect equality and on the other hand, a Gini coefficient equal to 1 implies complete inequality. Also, the generalised enthropy measures vary between zero and infinity. When the value is zero, it implies that, there is equal distribution. Higher values on the other hand denote higher inequality levels. Lastly, the Atkinson index also ranges from 0 to 1, with 0 being a state of equal distribution and 1 being perfect inequality. All the indices presented in the study are multiplied by 100.

The overall inequality rate as reported by the Gini index is 41.71 percent. This is slightly lower compared to what is reported by (GSS, 2014). This is because the model employs income to arrive at consumption using the abovementioned formula and income data contains more variation than consumption data (Adu-Ababio *et al.,* 2017). Disaggregation of the annual simulated equivalized household consumption expenditure by quintiles shows that the highest quintile spends almost four times (GH¢4,102.50) more than the lowest quintile (GH¢1552.12).

Table 4.7: Inequality Rates in 2013 (in percentages)

Inequality Measure	Baseline (Indices in percentages)
Gini Index	
Gini	41.71
Generalized Entropy Index	
GE(0)-Mean log deviation	29.88
GE(1)-Theil Index	31.39
GE(2)-Coefficient of variation	53.29
Atkinson Index	
A(0.5)	14.26
A(1)	25.83
A(2)	44.56
Quantiles of distribution and median	
20^{th}	1,163.88
40^{th}	1,786.53
50^{th}	2,148.03
60^{th}	2,594.04
80^{th}	4,102.50
Percentile Ratios	
p90/p10	6.874
p90/p50	2.689
p10/p50	0.391
p75/p25	2.701

Source: Author's calculation using GHAMOD V1.3, (2019)

Table 4.8 presents a breakdown of government revenues and expenditure on social transfers in 2013. Total expenditure, which made up of LEAP and pensions, is GH¢534.01 million cedis. Expenditure on pensions, accounts for the greater proportion of the overall government expenditure on social transfers and the remaining GH¢3.34 million represents expenditure on LEAP. With regards to tax

revenues, direct taxes contribute most (GH¢3,629.11 cedis), followed by indirect taxes (GH¢1,617.02 cedis) and then SSC (GH1,552.12 cedis).

Table 4.8: Government Expenditure on Transfers and Tax Revenues for 2013 Baseline Scenario (annual, million GH ¢ cedis)

Government Expenditure/Revenue	
Government Expenditure on Social Transfers	534.01
Social Assistance (LEAP)	3.3
Pension Benefits	530.67
Government Revenue through Taxes, SSC and Indirect taxes	6,798.25
Direct taxes	3,629.11
Indirect taxes	1,617.02
SSC (employee and employer)	1,552.12

Source: Author's calculation using GHAMOD V1.3, (2019)

4.2.2.2 Counterfactual Simulations

The analysis presented in this section is in line with the research objectives. For each scenario, we examine the impact of the policy reform on poverty and inequality, assess its progressivity, examine the associated cost and lastly analyse the net impact of the policy reforms.

Scenario 1 — Targeted Child Support Grant

Analysing the Redistributive Impact of Targeted Child Support Grant

This child support scheme provides an amount of GH¢ GH 130.68 cedis monthly to poor children only. From Table 4.9, it can be seen that the policy does not have any

impact on the poverty headcount even though there was a marginal reduction in average poverty gap. This could be attributed to the programme's low coverage and perhaps, the size of the transfer. The results confirm the claim by Jacques & Noël (2018) that targeting transfers only to the poor does not necessarily benefit them.

Table 4.9: Impact of the Targeted Child Support Grant on Poverty Rate

	Baseline	Scenario 1	Difference
FGT(0): Headcount Ratio (Proportion Poor)			
Overall poverty rate	24.91	24.91	0.0
Poverty rate in terms of …			
households headed by males	26.64	26.64	0.0
households headed by females	19.70	19.70	0.0
households with children	27.47	27.47	0.0
households with elderly persons	33.70	33.70	0.0
FGT(1): Average normalised poverty gap			
Overall poverty rate	8.10	7.80	-0.3
Poverty rate in terms of …			
households headed by males	8.80	8.49	-0.31
households headed by females	6.01	5.73	-0.28
households with children	8.93	8.58	-0.35
households with elderly persons	11.03	10.65	-0.38

Source: Author's Calculation using the GHAMOD V1.3, (2019)

With regard to the rate of inequality, it can be observed that there was a marginal reduction in the Gini index from 41.71 percent to 41.53 percent, which is equivalent to 0.2 percent. Similarly, all the generalised enthropy indices as well as the Atkinson indices recorded a reduction in inequality. The average equivalized consumption expenditure of the bottom quintile also increased by GH¢0.08.00 even though this very insignificant.

Table 4.10: Impact of the Targeted Child Support Grant on Inequality Rate

	Baseline	Scenario 1	Difference
Gini Index			
Gini	41.71	41.53	-0.2
Generalized Entropy Index			
GE(0)-Mean log deviation	29.83	29.07	-0.76
GE(1)-Theil Index	31.37	31.07	-0.3
GE(2)-Coefficient of variation	53.28	53.02	-0.26
Atkinson Index			
A(0.5)	14.24	14.04	-0.07
A(1)	25.80	25.23	-0.57
A(2)	44.38	42.34	-2.04
Quantiles of distribution and median			
20^{th}	1,163.88	1,163.96	0.08
40^{th}	1,786.53	1,786.53	0.0
50^{th}	2,148.03	2,148.03	0.0
60^{th}	2,594.04	2,594.04	0.0
80^{th}	4,102.50	4,102.50	0.0
Percentile Ratios			
p90/p10	6.874	6.854	-0.02
p90/p50	2.689	2.689	0.0
p10/p50	0.391	0.392	0.001
p75/p25	2.701	2.701	0.0

Source: Author's Calculation using GHAMOD V1.3, (2019)

Assessing the Progressivity of the Transfer

Figure 4.4 is a plot of the concentration curve for the targeted child support scheme. Since the curve lies entirely above the 45-degree line (that is, the line of equality), it is unambiguous that this scheme is pro-poor. The concentration index (ranked on simulated equivalized household consumption expenditure) is -0.9242. Since the

value is negative and almost equal to one, it implies that the programme is progressive which implies that the poor benefit most from the transfer.

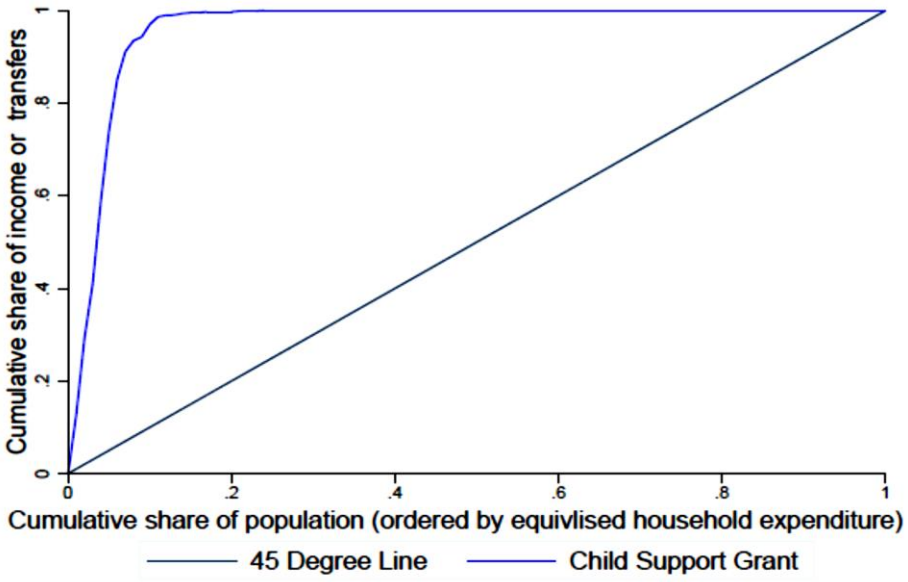

Figure 4.4: Concentration Curve for Scenario 1 (Targeted child support grant)
Source: Author's Construct, (2019)

Even though this policy scenario is highly progressive, the redistributive impact is very small. This finding confirms the assertion by Korpi & Palme (1998) that more targeted systems usually produce smaller systems, hence they less redistributive, even though the policy is designed to that effect.

Examining the Impact of the Targeted Child Support Grant on Government Budget

Table 4.11 presents the impact of the child support grant on government revenues and expenditure. It can be seen from the Table that, the transfer increased government revenues by GH¢1.70 million cedis which is as a result of an increase in indirect tax revenues. With respect to expenditure, assuming a full take-up of benefits, it will cost the government an amount of GH¢78.63 million cedis to implement this policy. Now

the question is, how can the government mobilize extra revenues in order to fund this policy? We resort to increasing the PIT rate for the 4th and 5th bands. The impact of this reform is discussed in the next section.

Table 4.11: Impact of the Targeted Child Support Grant on Government Revenues and Expenditure (annual, million GH ¢ cedis)

	Baseline	Scenario 1	Difference
Government revenue through taxes	6,798.25	6,799.95	1.70
Direct taxes	3,629.11	3,629.11	0.0
Indirect taxes	1,617.02	1,618.72	1.70
SSC (employee & employer)	1,552.12	1,552.12	0.0
Government expenditure on social transfers	534.01	612.64	78.63
child benefits	0.0	78.63	78.63
social assistance	3.34	3.34	0.0
pension benefits	530.67	530.67	0.0

Source: Author's Calculation using GHAMOD V1.3, (2019)

Assessing the Impact of PIT Reforms on Government Revenues

Analysing the redistributive impact of transfers is not enough if one does not examine the methods of financing the cost. Hence there is the need to generate internal revenue to finance the cost. As discussed in the literature, PIT is deemed ideal for inequality reduction. Hence the PIT rate for each income bracket is adjusted upwards in order to generate enough fiscal space to fund the universal child support.

Three main factors motivated the extent of increase in the personal income tax rate:

i. The tax rate generates revenues which is sufficient enough to fund the cost of each of the policy scenarios hence, it is revenue neutral.
ii. The tax rate chosen has positive welfare implications. It further reduces the rate of inequality and poverty. Hence, it increases the net impact of the policy reform.
iii. Again, the proposed tax rate for the top income bracket is similar to what pertains in some African countries for example Rwanda, Tanzania

The impact of PIT reform on government revenues is presented in Table 4.12. It can be observed that the reform increases direct tax revenues by GH¢78.74 million cedis. However, indirect tax revenues reduce by GH¢710,000 cedis. This is because an increase in the rate of direct taxes reduces the level of disposable income thereby reducing the demand for goods and services. The reduction in demand consequently reduces indirect tax revenues.

Table 4.12: Impact of PIT Reform on Government Revenues (in million cedis) for the Targeted Child Support Grant.

	Baseline	Scenario 1	Difference
Government revenue through taxes	6,798.25	6876.28	78.03
Direct taxes	3,629.11	3707.85	78.74
Indirect taxes	1,617.02	1616.31	-0.71
SSC (employee and employer)	1,552.12	1552.12	0.0

Source: Author's Calculation using GHAMOD V1.3, (2019)

Analysing the Net Impact of the Targeted Child Support Grant

The overall impact of this reform is rather surprising. It can be seen from Table 4.13 the net impact of the targeted child support grant worsens the incidence of poverty. The incidence of poverty rather increases from the initial 24.91 percent to 24.92 percent. This confirms the findings of Fosu (2010) who concluded that for low-income countries, redistributing income in order to achieve more equality may make more individuals poor, since those whose income is above the poverty line is reduced thereby, possibly pushing them below the poverty line. Again, there is a marginal reduction in the poverty gap (0.29 percentage points). For households with children, poverty gap reduced by 0.34 percentage points. Even though this grant is highly progressive, the results suggest two things: the size of the grant is too small or the extent of coverage too small.

Table 4.13: Net Impact of the Targeted Child Support Grant on Poverty (in percentages)

	Baseline	Scenario 1	Net Impact	Difference
FGT(0): Headcount Ratio (Proportion Poor)				
All	24.91	24.91	24.92	0.01
Poor households out of ...				
male headed households	26.64	26.64	26.66	0.02
female headed households	19.70	19.70	19.70	0.0
households with children	27.47	27.47	27.49	0.02
households with older persons	33.70	33.70	33.70	0.0
FGT(1): Average normalised poverty gap				
All	8.10	7.80	7.81	-0.29
Poor households out of ...				
male headed households	8.80	8.49	8.50	-0.30
female headed households	6.01	5.73	5.73	-0.27
households with children	8.93	8.58	8.59	-0.34
households with older persons	11.03	10.65	10.65	-0.38

Source: Author's Calculation using GHAMOD V1.3, (2019)

The overall impact of the targeted child support grant on inequality is shown in Table 4.14. Inequality as measured by the Gini index reduced from the initial 41.71 percent to 41.51 percent, which represents a net reduction of 0.2 percentage points. Similar result is reported by the generalized entropy and the Atkinson measures. Unfortunately, increasing the rate of personal income taxes for the top two bands rather caused the average equivalized expenditure for each quintile to fall except for the highest quintile. The results of the targeted child support grant suggest that a transfer policy that targets only the poor in fact, produces the least impact on redistribution thus confirming the conclusions drawn by Korpi & Palme (1998).

Table 4.14: Net Impact of the Targeted Child Support Grant on Inequality (in percentages)

	Baseline	Scenario 1	Net Impact of Scenario 1	Difference
Gini Index				
Gini	41.71	41.53	41.51	-0.2
Generalized Entropy Index				
GE(0)-Mean log deviation	29.83	29.07	29.04	-0.79
GE(1)-Theil Index	31.37	31.07	31.04	-0.33
GE(2)-Coefficient of variation	53.28	53.02	52.96	-0.32
Atkinson Index				
A(0.5)	14.11	14.04	14.04	-0.07
A(1)	25.80	25.23	25.20	-0.6
A(2)	44.38	42.34	42.32	-2.06
Quantiles of distribution and median				
20^{th}	1,163.88	1,163.96	1,163.33	-0.55
40^{th}	1,786.53	1,786.53	1,784.37	-2.17
50^{th}	2,148.03	2,148.03	2,145.78	-2.17
60^{th}	2,594.04	2,594.04	2,592.19	-2.25
80^{th}	4,102.50	4,102.50	4,102.50	0.0
Percentile Ratios				
p90/p10	6.874	6.854	6.835	-0.039
p90/p50	2.689	2.689	2.682	-0.007
p10/p50	0.391	0.392	0.392	0.001
p75/p25	2.701	2.701	2.699	-0.002

Source: Author's Calculation using GHAMOD V1.3, (2019)

Scenario 2 — Universal Child Support Grant with Flat Benefits

Analysing the Redistributive Impact of a Universal Child Support with Flat Benefits

This grant provides a flat benefit of GH¢105.00 monthly to all children irrespective of household characteristics. From Table 4.15, it can be observed grant reduced overall incidence of poverty by 1.1 percentage points. For households with children, the incidence of poverty fell from 27.47 to 26.21 percent representing a reduction of 1.26 percentage points. Overall poverty gap also reduced to 6.94 percent. For household with children, poverty gap reduced by 1.16 percentage points.

Table 4.15: Impact of the Universal Child Support Grant (with Flat Benefit) on Poverty (in percentages)

	Baseline	Scenario 2	Difference
FGT(0):Headcount Ratio (Proportion Poor)			
All	24.91	23.81	-1.1
Poor households out of ...			
male headed households	26.64	25.42	-1.22
female headed households	19.70	18.98	-0.72
households with children	27.47	26.21	-1.26
households with older persons	33.70	32.79	-0.91
FGT(1): Average normalised poverty gap			
All	8.10	6.94	-1.16
Poor households out of ...			
male headed households	8.80	7.49	-1.31
female headed households	6.01	5.28	-0.73
households with children	8.93	7.59	-1.34
households with older persons	11.03	9.65	-1.38

Source: Author's Calculation using GHAMOD V1.3, (2019)

With regard to inequality, it can be observed from Table 4.16 that, all the inequality measures report a reduction in the level of inequality. The Gini coefficient for instance, reduced from 41.71 percent to 40.99 percent. It can also be observed that the universal child support grant increased the average equivalized expenditures for the bottom two quintiles (that is, the 20th and 40th quintiles) as well as the median. The mean income of the 60th and 80th quintile however remained unchanged.

Table 4.16: Impact of the Universal Child Support Grant (with Flat Benefit) on Inequality (in percentages)

	Baseline	Scenario 2	Difference
Gini Index			
Gini	41.71	40.99	-0.72
Generalized Entropy Index			
GE(0)-Mean log deviation	29.83	28.02	-1.81
GE(1)-Theil Index	31.37	30.39	-0.98
GE(2)-Coefficient of variation	53.28	52.19	-1.09
Atkinson Index			
A(0.5)	14.11	13.67	-0.44
A(1)	25.80	24.43	-1.37
A(2)	44.38	40.75	-3.63
Quantiles of distribution and median			
20th	1,163.88	1,203.21	39.33
40th	1,786.53	1,791.78	5.25
50th	2,148.03	2,149.15	1.12
60th	2,594.04	2,594.04	0
80th	4,102.50	4,102.50	0
Percentile Ratios			
p90/p10	6.874	6.438	-43.6
p90/p50	2.689	2.685	-0.4
p10/p50	0.391	0.417	2.6
p75/p25	2.701	2.637	-6.4

Source: Author's calculation using GHAMOD V1.3, (2019)

Assessing the Progressivity of the Universal Child Support Grant with Flat Benefit

The concentration curve of the universal child support in Figure 4.5 shows that the distribution of the universal child support is pro-rich (regressive) at the bottom quintile but pro-poor(progressive) beyond the bottom quintile. The concentration index (ranked on simulated equivalized household consumption expenditure) gives a value of -0.4196. Since the concentration index is negative, it implies that the transfer is concentrated more among the poor. Also, since the concentration index is smaller than the pre-transfer Gini index, it implies that the universal child support is progressive.

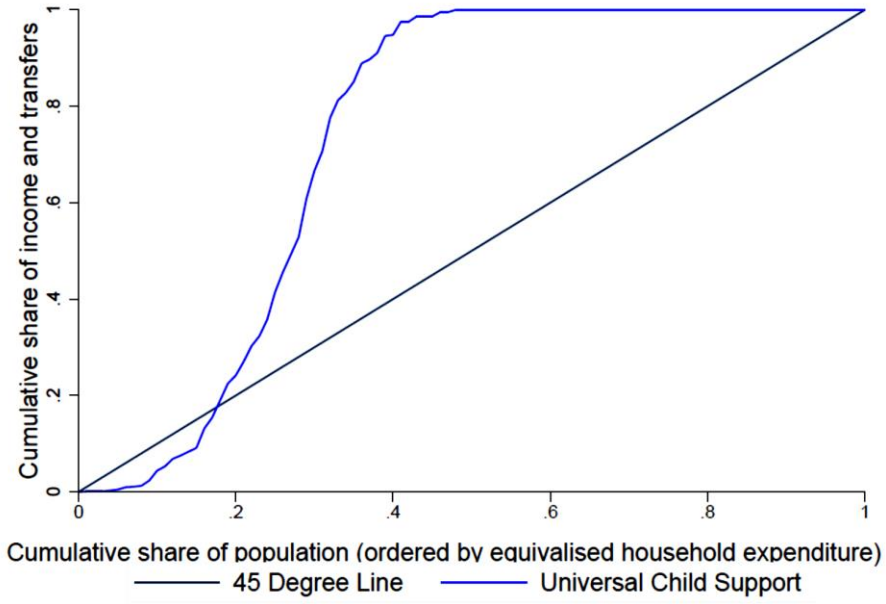

Figure 4.5: Concentration Curve for Scenario 2 (Universal Child Support with Flat Benefit)
Source: Author's Construction using GLSS6, (2019)

Analysing the Impact of the Universal Child Support (with Flat Benefit) on Government Revenues and Expenditure

Table 4.17 shows the impact of the universal child support (with flat benefit) on government revenues and expenditure. With respect to revenues, it can be observed that the universal child support increases indirect tax revenues by GH ¢7.48 million cedis. On the expenditure side, again assuming full take-up of benefits, it will cost the government GH ¢ 354.39 million cedis to implement this policy.

Table 4.17: Impact of the Universal Child Support Grant (with Flat Benefit) on Government Revenues and Expenditure (annual, million GH ¢ cedis)

	Baseline	Scenario 2	Difference
Government revenue through taxes	6,798.25	6,805.74	7.48
Direct taxes	3,629.11	3,629.11	0.0
Indirect taxes	1,617.02	1,624.50	7.48
SSC (employee and employer)	1,552.12	1,552.12	0.0
Government expenditure on social transfers	534,01	888.40	354.39
child benefits	0.0	354.39	354.39
social assistance	3.34	3.34	0.0
pension benefits	530.67	530.67	0.0

Source: Author's calculation using GHAMOD V1.3, (2019)

Analysing the Impact of PIT Reforms on Government Revenues

Based on several simulations, the following rates were finally arrived: the PIT rate for the 4th and 5th income bracket was increased by 3.6% and 4% respectively. Adjusting

the upwards the tax rate for the 4th and 5th income bracket increases revenues from direct taxes by GH¢354.13 million cedis. As expected, this has a negative impact on indirect taxes. From Table 4.18 it can be observed that revenues from indirect taxes reduce by GH¢3.36 million cedis. Hence the PIT reform increased government revenues by GH¢350.77 million cedis.

Table 4.18: Impact of PIT Reform on Tax Revenues (annual, million GH ¢ cedis) for the Universal Child Support Grant (with Flat Benefit)

	Baseline	Scenario 2	Difference
Government revenue through taxes	6,798.25	7149.03	350.77
Direct taxes	3,629.11	3,983.24	354.13
Indirect taxes	1,617.02	1,613.66	-3.36
SSC (employee and employer)	1,552.12	1,552.12	0.0

Source: Author's calculation using GHAMOD V1.3, (2019)

Analysing the Net Impact of the Universal Child Support Grant (with Flat Benefit)

Table 4.19 presents the net impact of the universal child support with flat benefit on poverty. Compared to targeted child support, it can be observed that this scheme leads to a greater reduction in poverty. Poverty headcount reduced from 24.91 percent to 23.9 percent, representing a total reduction of 0.98 percentage points. For households with children, the rate of poverty reduced by 1.13 percentage points. Furthermore, overall poverty gap reduced also by 1.10 percentage points.

Table 4.19: Net Impact of the Universal Child Support Grant (with Flat Benefit) on Poverty (in percentages)

	Baseline	Scenario 2	Net Impact	Difference
FGT(0): Headcount Ratio (Proportion Poor)				
Overall poverty rate	24.91	23.81	23.9	-0.98
Poverty rate in terms of …				
households headed by males	26.64	25.42	25.55	-1.09
households headed by females	19.70	18.98	19.06	-0.64
households with children	27.47	26.21	26.34	-1.13
households with elderly persons	33.70	32.79	32.96	-0.74
FGT (1): Average normalised poverty gap				
Overall poverty rate	8.10	6.94	7.0	-1.10
Poverty rate in terms of …				
households headed by males	8.80	7.49	7.55	-1.25
households headed by females	6.01	5.28	5.36	-0.65
households with children	8.93	7.59	7.66	-1.27
households with elderly persons	11.03	9.65	9.66	-1.37

Source: Author's calculation using GHAMOD V1.3, (2019)

The net impact of the universal child support grant (with flat benefit) on inequality is presented in Table 4.20. It can be observed that, the increase in the rate of the PIT for the top two income brackets caused the inequality rate to further reduce from 40.99 percent to 40.94 percent, that is based on the Gini index. Similar effect is reported by the generalized entropy indices as well as the Atkinson indices. Furthermore, the universal child support grant increased the average simulated consumption expenditure for persons in the 20th and 40th quintile. By comparing the universal child support grant to the targeted scheme, it can be observed that, the universal child support yields better results as it leads to a greater reduction in inequality.

Table 4.20: Net Impact of the Universal Child Support Grant (with Flat Benefit) on Inequality (in percentages)

	Baseline	Scenario 2	Net Impact	Difference
Gini Index				
Gini	41.71	40.99	40.94	-0.77
Generalized Entropy Index				
GE(0)-Mean log deviation	29.83	28.02	27.88	-1.95
GE(1)-Theil Index	31.37	30.39	30.25	-1.12
GE(2)-Coefficient of variation	53.28	52.19	52.05	-1.23
Atkinson Index				
A(0.5)	14.11	13.67	13.67	-0.58
A(1)	25.80	24.43	24.33	-1.46
A(2)	44.38	40.75	40.64	-3.74
Quantiles of distribution and median				
20^{th}	1,163.88	1,203.21	1,201.30	37.42
40^{th}	1,786.53	1,791.78	1,787.63	1.10
50^{th}	2,148.03	2,149.15	2,144.87	-3.16
60^{th}	2,594.04	2,594.04	2,585.02	-9.02
80^{th}	4,102.50	4,102.50	4,097.04	-5.46
Percentile Ratios				
p90/p10	6.874	6.438	6.389	-0.485
p90/p50	2.689	2.685	2.669	-0.02
p10/p50	0.391	0.417	0.418	0.027
p75/p25	2.701	2.637	2.632	-0.069

Source: Author's calculation using GHAMOD V1.3, (2019)

Scenario 3 — Universal Child Support with Differentiated Benefits

Analysing the Redistributive Impact of a Universal Child Support with Differentiated Benefits

Scenario 3 is a child benefit scheme that provides a flat amount of GH¢105.00 monthly to all children and an extra GH¢ 13.00 to poor children. Unlike the previous scenarios examined, this scheme reduces the rate of poverty the most, with poverty headcount decreasing from 24.91 percent to 23.60 percent and poverty gap reducing from 8.10 percent to 6.90 percent.

Table 4.21: Impact of the Universal Child Support (with Differentiated Benefits) on Poverty (in percentages)

	Baseline	**Scenario 3**	**Difference**
FGT(0): Headcount Ratio (Proportion Poor)			
All	24.91	23.60	-1.31
Poor households out of ...			
male headed households	26.64	25.17	-1.47
female headed households	19.70	18.90	-0.8
households with children	27.47	25.97	-1.5
households with older persons	33.70	32.51	-1.19
FGT(1): Average normalised poverty gap			
All	8.10	6.90	-1.2
Poor households out of ...			
male headed households	8.80	7.45	-1.35
female headed households	6.01	5.25	-0.76
households with children	8.93	7.55	-1.38
households with older persons	11.03	9.58	1.45

Source: Author's calculation using GHAMOD V1.3, (2019)

Regarding the rate of inequality, it can be observed in Table 4.22 that all the inequality measures recorded a reduction. The Gini index reduced from 41.71 percent to 40.93 percent, which is equal to 0.78 percentage point. Also, the transfer caused the average simulated consumption expenditure for all quintiles to increase except the highest quintile.

Table 4.22: Impact of the Universal Child Support (with Differentiated Benefits) on Inequality (in percentages)

	Baseline	**Scenario 3**	**Difference**
Gini Index			
Gini	41.71	40.93	-0.78
Generalized Entropy Index			
GE(0)-Mean log deviation	29.83	27.94	-1.89
GE(1)-Theil Index	31.37	30.32	-1.05
GE(2)-Coefficient of variation	53.28	52.07	-1.21
Atkinson Index			
A(0.5)	14.11	13.64	-0.47
A(1)	25.80	24.38	-1.42
A(2)	44.38	40.68	-3.7
Quantiles of distribution and median			
20^{th}	1,163.88	1204.84	40.96
40^{th}	1,786.53	1796.59	10.06
50^{th}	2,148.03	2149.43	1.40
60^{th}	2,594.04	2595.34	1.30
80^{th}	4,102.50	4102.50	0
Percentile Ratios			
p90/p10	6.874	6.418	-0.456
p90/p50	2.689	2.684	-0.005
p10/p50	0.391	0.418	0.027
p75/p25	2.701	2.623	-0.078

Source: Author's calculation using GHAMOD V1.3, (2019)

Assessing the Progressivity of the the Universal Child Support (with Differentiated Benefits)

The concentration curve for the universal child support with differentiated benefits indicates that the transfer is regressive at the bottom quintile but progressive afterwards. Furthermore, the concentration index (ranked on simulated equivalized consumption expenditure) is -0.3353. This implies that the transfer is pro-poor.

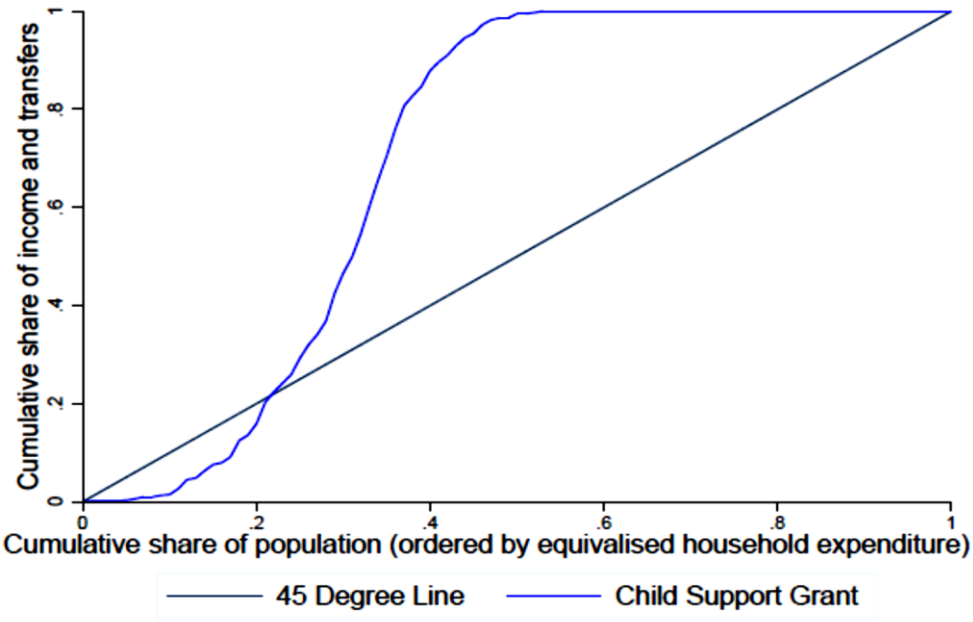

Figure 4.6: Concentration Curve for Scenario 3 (Universal Child Support with Differentiated Benefit)

Source: Author's construct using GLSS6, (2019)

Examining the Impact of the Universal Child Support with Differentiated Benefits on Government Revenues and Expenditures

Table 4.23 presents the impact of universal child support with differentiated benefits on government revenues and expenditure. It can be observed that cash transfers increased indirect tax revenues by GH¢8.41 million cedis hence causing the overall

tax revenues to increase. With respect to expenditures, universal child support with differentiated benefits increases total government expenditure on transfers by GH¢398.27 million cedis, assuming there is full take-up of benefits.

Table 4.23: Impact of Universal Child Support (with Differentiated Benefits) on Government Revenues and Expenditures (annual, in million cedis)

	Baseline	Scenario 3	Difference
Government revenue through taxes	6,798.25	6806.66	8.41
Direct taxes	3,629.11	3,629.11	0.0
Indirect taxes	1,617.02	1,625.43	8.41
SSC (employee and employer)	1,552.12	1,552.12	0.0
Government expenditure on social transfers	534.01	932.28	398.27
child benefits	0.0	398.27	398.27
social assistance	3.34	3.34	0.0
pension benefits	530.67	530.67	0.0

Source: Author's calculation using GHAMOD V1.3, (2019)

Examining the Impact of PIT Reform on Government Revenues

In order to finance the cost of implementing this policy, the following adjustments were made to the PIT rate: the tax rate for the 3rd income tax bracket is increased by 2.3 percentage points and that of the 4th and 5th income tax bracket are increased by 4 percentage points. It can be seen from Table 4.24 that; this tax reform generates direct tax revenues of GH ¢398.87 million cedis whilst indirect tax revenues to reduce by GH ¢3.87 million cedis. Hence the overall fiscal space increase by GH ¢395.00 million cedis.

Table 4.24: Impact of PIT Reform on Tax Revenues (annual, million GH ¢ cedis) for the Universal Child Support (with Differentiated Benefits)

	Baseline	Scenario 3	Difference
Government revenue through taxes	6,798.25	7193.25	395.00
Direct taxes	3,629.11	4,027.98	398.87
Indirect taxes	1,617.02	1,613.15	-3.87
SSC (employee and employer)	1,552.12	1,552.12	0.0

Source: Author's calculation using GHAMOD V1.3, (2019)

Assessing the Net Impact of the Universal Child Support (with Differentiated Benefits)

Table 4.25 reports the net impact of universal child support with differentiated benefits on the rate of poverty. Overall poverty headcount reduced from 24.91 percent to 23.75 percent. For households with children, poverty rate reduced by 1.34 percentage point and for that of male headed households, the rate of poverty reduced by 1.32 percentage point. For households with elderly persons as well as households headed by females, poverty rate reduced by 0.94 and 0.68 percentage point respectively. Overall poverty gap reduced by 1.14 percentage points. Surprisingly, the transfers reduced the poverty gap for households with elderly persons the most, followed by households with children, then male headed households and lastly, female headed households.

Table 4.25: Net Impact of the Universal Child Support (with Differentiated Benefits) on Poverty (in percentages)

	Baseline	Scenario 3	Net Impact	Difference
FGT(0): Headcount Ratio (Proportion Poor)				
Overall poverty rate	24.91	23.60	23.75	-1.16
Poverty rate in terms of …				
households headed by males	26.64	25.17	25.32	-1.32
households headed by females	19.70	18.90	19.02	-0.68
households with children	27.47	25.97	26.13	-1.34
households with elderly persons	33.70	32.51	32.76	-0.94
FGT(1): Average normalised poverty gap				
Overall poverty rate	8.12	6.90	6.98	-1.14
Poverty rate in terms of …				
households headed by males	8.81	7.45	7.52	-1.29
households headed by females	6.02	5.25	5.34	-0.68
households with children	8.94	7.55	7.63	-1.31
households with elderly persons	11.07	9.58	9.59	-1.49

Source: Author's calculation using GHAMOD V1.3, (2019)

With regard to inequality, it can be seen from Table 4.26 that universal child support with differentiated benefit has the largest redistributive impact. With the Gini index reducing from 41,71 percent to 40.87 percent. Similar results hold for the generalised entropy indices as well as the Atkinson indices. With regards to the quintile distributions, it can be observed that the reform policies increase the average simulated consumption expenditure of the bottom quintile whilst the highest quintile experience a reduction.

Table 4.26: Impact of the Universal Child Support (with Differentiated Benefits) on Inequality Rate

	Baseline	Scenario 3	Net Impact	Difference
Gini Index				
Gini	41.71	40.93	40.87	-0.84
Generalized Entropy Index				
GE(0)-Mean log deviation	29.83	27.94	27.80	-2.03
GE(1)-Theil Index	31.37	30.32	30.17	-1.2
GE(2)-Coefficient of variation	53.28	51.91	51.93	-1.35
Atkinson Index				
A(0.5)	14.11	13.64	13.63	-0.48
A(1)	25.80	24.38	24.27	-1.53
A(2)	44.38	40.68	40.70	-3.68
Quantiles of distribution and median				
20^{th}	1,163.88	1204.84	1203.21	39.32
40^{th}	1,786.53	1796.59	1791.29	4.75
50^{th}	2,148.03	2149.43	2144.58	-3.45
60^{th}	2,594.04	2595.34	2582.92	-11.12
80^{th}	4,102.50	4102.50	4096.51	-5.98
Percentile Ratios				
p90/p10	6.874	6.418	6.363	-0.511
p90/p50	2.689	2.684	2.665	-0.024
p10/p50	0.391	0.418	0.419	0.028
p75/p25	2.701	2.623	2.612	-0.089

Source: Author's Calculation using GHAMOD V1.3, (2019)

Generally, the results from the simulations suggest that there exists is a trade-off between fiscal cost and the extent of redistribution or inequality reduction. This implies that more generous policies yield better redistributive impact but at a higher cost. This confirms that redistributive effect does not only depend on the extent of

progressivity of the transfer. Rather, the redistributive effect depends on both the extent of progressivity and the relative size of the transfer. In other words, the redistributive effect of transfers is strongly associated with their size and less so with their targeting.

CHAPTER FIVE

DETERMINANTS OF INCOME REDISTRIBUTION

This chapter presents the methodology and the empirical results for the second research objective which seeks to examine the determinants of income redistribution. The first section presents the methodology used for the analysis and the second section presents and discusses the empirical results.

5.1 Methodology

5.1.1 Estimating the Determinants of Income Redistribution

Studies that have examined the factors that influence redistribution usually measure the magnitude of redistribution by using either the absolute reduction in the measure of income inequality, this refers to the difference between market income and net (disposable) income inequality or the relative reduction in the income inequality measure, that is, the reduction of the income inequality measure relative to its initial level. Following the recommendation by Luebker (2012) and Kenworthy and Pontusson (2005), the study employs the absolute measure of redistribution. This is expressed as:

$$REDIST_{ab} = GINI(M) - GINI(D) \quad (1)$$

where $REDIST_{ab}$ represents absolute redistribution; $GINI(M)$ is the market income Gini and $GINI(D)$ is the disposable or net income Gini.

Following Gründler & Köllner (2015), the redistribution function is specified as:

$$REDIST_{it} = f\left(REDIST_{t-1}, GINI(M)_{it}, X_{it,} \ \xi_t, \ \eta_{i.} \ v_{it} \ \right) \quad (2)$$

where $REDIST_{it}$ represents the extent of redistribution; i = 1,2,3, …, N represent each of the countries; t = 1,2,3,...,T represent the time index; $GINI(M)$ is the market income Gini; X_{it} is an index of control variables; ξ_t and η_i capture the time specific effect and country-specific effect respectively; and lastly, v_{it} represents the error term.

Equation (2) can be transformed into a linear form in as showed in Equation (3)

$$REDIST_{it} = \alpha REDIST_{it-1} + \beta GINI(M)_{it} + \delta' \Delta X_{it} + \xi_t + \ \eta_i \ + \ v_{it} \quad (3)$$

As it has been established in the literature, the lagged dependent variable correlates positively with the country-specific effect (η_i) hence OLS estimate may be upward biased (Blundell & Bond, 1998). To remove the country-specific effects, most researchers employ the fixed effect estimator. To do this, equation (3) is transformed by taking the first difference for the variables for each of the countries. The new equation is then estimated using OLS. A major problem with the fixed effect model is that it employs only variations within countries whilst cross-sectional variations are discarded. Furthermore, since equation (2) includes a lagged endogenous variable, if a time period is not long enough, it may yield inconsistent and biased estimates even if the data may be made up of a large number of countries. Contrary to the OLS estimate, the fixed effect estimates of the coefficient on the lagged dependent variable α are likely to be biased downward (Arellano & Bond, 1991).

Arellano and Bond (1991) proposed the first-difference GMM estimator to account for any observed heterogeneity and endogeneity problems. To eliminate the country-specific effect, Arellano & Bond's GMM estimator first differences equation (3) and then uses all possible lagged levels as instruments. The equation for the first difference estimator is:

$$\Delta REDIST_{it} = \alpha \Delta REDIST_{i(t-\iota)} + \beta \Delta GINI(M)_{it} + \delta' \Delta X_{it} + \Delta \xi_t + \Delta v_{it} \qquad (4)$$

Since $\Delta REDIST_{i(t-\iota)}$ and Δv_{it} are correlated, it implies that estimating Equation (4) using OLS will yield inconsistent estimates. In equation (3), if the error term is assumed not serially correlated, then the level of $REDIST_{it}$ lagged two periods or more can be valid instruments to estimate Equation (4). The reason is that $\Delta REDIST_{i(t-2t)}$ and earlier values are correlated with $\Delta REDIST_{i(t-1)}$, but not correlated with Δv_{it}. Also, if we assume that the X_{it} are predetermined in the sense that X_{it} and v_{it} are not correlated, but X_{it} may be correlated with $v_{i(t-\iota)}$ and earlier errors, X_{it} lagged one period or more are also used as valid instruments. Thus, the relevant moment conditions are:

$$E\left[REDIST_{i(t-s)} \Delta v_{it}\right] = 0 \; for \; s \geq 2t; t = 3, \ldots, T$$

$$E\left[X_{i(t-s)} \Delta v_{it}\right] = 0 \; for \; s \geq t; t = 3, \ldots, T$$

According to Bond *et al.*, (2001) and Blundell & Bond (1998), the first-difference GMM estimator may perform poorly when time series are persistent or if the relative variance of the fixed effects η_i is high. This is because the lagged levels of the series provide weak instruments for the differenced equation which leads to a large finite

sample bias and also, removing the country specific effect by differencing the equation eliminates information on the cross-country variation in levels.

In order to avoid these problems, Blundell & Bond (1998) and Arellano & Bover (1995) proposed the system GMM estimator. This method combines the standard set of moment conditions in first differences with lagged levels as instruments, with an additional set of moment conditions derived from the equation in levels. Following Blundell and Bond (1998), it is assumed that the difference of X_{it} is uncorrelated with the individual effects although X_{it} and η_i are allowed to be correlated.

The additional moment conditions are:

$$E\left[\Delta REDIST_{i(t-\iota)} u_{it}\right] = 0 \;\; where \;\; u_{it} = \eta_i + v_{it} \text{ and } t = 3, \ldots, T$$

$$E[\Delta x_{it} u_{it}] = 0$$

The equations can be estimated by using either one-step or two-step GMM. Whereas one-step GMM estimators use weight matrices independent of the estimated parameters, the two-step variant weights the moment conditions by a consistent estimate of their covariance matrix. Bond *et al.*, (2001) show that the two-step estimation is asymptotically more efficient. But the standard errors of two-step GMM are severely downward biased in small samples. For this reason, we employ the Windmeijer (2005) finite sample corrected estimate of the variance, since this yields more accurate inference.

Generally, the System GMM estimator is more preferred compared to the difference GMM since it is able to control for time-invariant country specific effects; deals with the problem of endogeneity of the lagged dependent variable; allows a certain degree

of endogeneity in the other regressors, and optimally combines information on cross country variation in levels with that on within-country variation in changes.

The use of the system GMM for this study is motivated by the following reasons:

i. Firstly, there is a bi-causal relationship between the dependent variable ($REDIST_{it}$) and $GINI(M)_{it}$ thus creating an endogeneity problem. The system GMM is able to deal with this problem by using the lags of the variables as instruments.
ii. Also, the basic condition for using the system GMM is satisfied: the condition for persistence is apparent because the correlation coefficient between $REDIST_{it}$ and its first lag $REDIST_{it-1}$ is 0.93. This is higher than 0.8 which is rule of thumb to establish persistence in the dependent variable.
iii. Again, the number of cross-sections (that is, 71 countries) is higher than the number of periods in the cross-sections (that is, 27 years)

5.1.2 Description of Variables and a priori Expectation of Explanatory Variables

Market Inequality

Empirical studies that have examined the relationship between income inequality and redistribution have rather produced varied outcomes. Whilst some studies support the theoretical predictions of Meltzer and Richard (Milanovic 2000; Scervini 2012), others found the relationship not to be statistically not significant (Gouveia & Masia, 1998; Kenworthy & McCall, 2008) and even an inverse relationship between the variables (Georgiadis & Manning, 2007). This implies that relationship between redistribution and market inequality is indeterminate.

Democracy

Based on the median voter theorem, since political parties strive to gain more votes, policies are determined strictly by majority voting in a system of democracy. In this case, democracy is expected to have a positive effect on redistribution. In other studies, Scervini (2012) found evidence that democracy does not significantly affect redistribution. According to Acemoglu *et al.*, (2013) a higher level of democracy may generate higher bureaucracy which may hinder the implementation of redistributive policies. Moreover, governments that are more stable tend to redistribute less. This is because redistribution is an instrument used by governments to gain more votes as advocated by Downs (1957). Hence, redistributive policies may perform an important role for governments with a bare majority or in countries that are experiencing political instability (Annett, 2001). The above arguments suggest that the relationship between redistribution and democracy is indeterminate.

Level of Development

The level of development of an economy is measured by using the GDP per capita. An economy's developmental level directly affects the extent of redistribution. Developing countries tend to allocate a relatively smaller percentage of their budget on social transfers (including social assistance and social insurance). It is particularly low in low-income countries in sub-Saharan Africa as well as the Asia and the Pacific region (IMF, 2014). Furthermore, in developing countries, the impact of redistributive policies is reduced by their low coverage as far as low-income groups are concerned.

Trade Openness

Trade openness is given as the share of imports plus exports per GDP. There has been an extensive study on the impact of trade openness on social protections expenditure (for example, Wibbels, 2006; Hays et al., 2005; Garrett, 2001; Scheve & Slaughter, 2004; Mosley, 2003; Wibbels and Arce, 2003; Kaufman and Segura-Ubiergo, 2001). The literature suggests that international market expansion might increase the risk of economic insecurity. The perception of increased economic instability and insecurity as a result of expanding markets might increase the demand for redistribution. (Ruggie 1982; Polanyi 1944). According to Desai & Rudra (2016), in order to maintain political and social stability, the government might respond to this by increasing expenditure on social protection. Garrett and Mitchell (2001) however found that trade openness had a negative effect on total government spending and social security transfers. In other studies, Brady *et al.*, (2005) found no significant relationship between trade openness and total social welfare expenditure or social security transfers.

Foreign Direct Investment (FDI)

Whereas some studies found a positive relationship between foreign direct investment and levels of income redistribution (Garret & Mitchell, 2001), other studies found an insignificant relationship between foreign direct investment and particular types of welfare spending. Huber *et al.*, (2008), for example, found that foreign direct investment is not significantly associated with either welfare spending and social security or spending on education and health in Latin American countries.

External Debt

The impact of external debt on social expenditure is quite controversial. External borrowing is said to boost expenditure on development spending. But debt repayment might affect the government's ability to finance development programmes which include social spending. This implies that the objective underlying external borrowing which is to promote development might not be accomplished as a result of the debt servicing which constitutes a large part of the country's budget. In this case, debt servicing can adversely affect constructive fiscal allocations.

Fertility Rate

Fertility rate is measured by total births per woman. According to Gründler & Köllner (2017), when the fertility rate is high, it restricts the household budget especially for poor households. This may therefore influence the government to redistribute more resources to support such households.

5.1.3 Data Sources

The data on inequality is from the World Income Inequality Database (WIID), version 3.3 from 1988 to 2015. However, the study is based on 71 countries around the world. These countries were selected based on the data availability especially regarding the variables of interest. Refer to appendix Table A1, A2 and A3 for the list and breakdown of the countries used for the analysis. Out of this number, 34 were developing countries.

But data on inequality for developing countries is limited since surveys on household welfare are conducted for some selected years. Hence, following Jäntti *et al.*, (2016), we employed five-year averages by using all possible observations in that five-year window starting from 1988-1992. Data on GDP per capita, trade openness, FDI inflows, external debts and fertility rate are sourced from the World Development Indicators (WDI). The level of democracy is measured by using the polity2 index (Marshall & Gurr, 2018). The variable ranges between −10 and 10, where −10 refers to the most autocratic form of government and 10, the most democratic government.

5.2 Analysis and Discussion of Results

The analysis presented in this section intends to achieve the following research objectives:

1. to test the validity of the median voter theorem; and to
2. account for other determinants of income redistribution.

The section is divided into two: the first part presents the summary statistics and the second part presents and discusses the empirical results.

5.2.1 Summary Statistics

Figure 5.1 illustrates the histogram as well as the kernel density plot using the absolute measure of redistribution. The density plot of absolute redistribution is skewed to the left which implies that in many countries the extent of redistribution is below the mean. The sample mean is 15.1 and the standard deviation is 6.8.

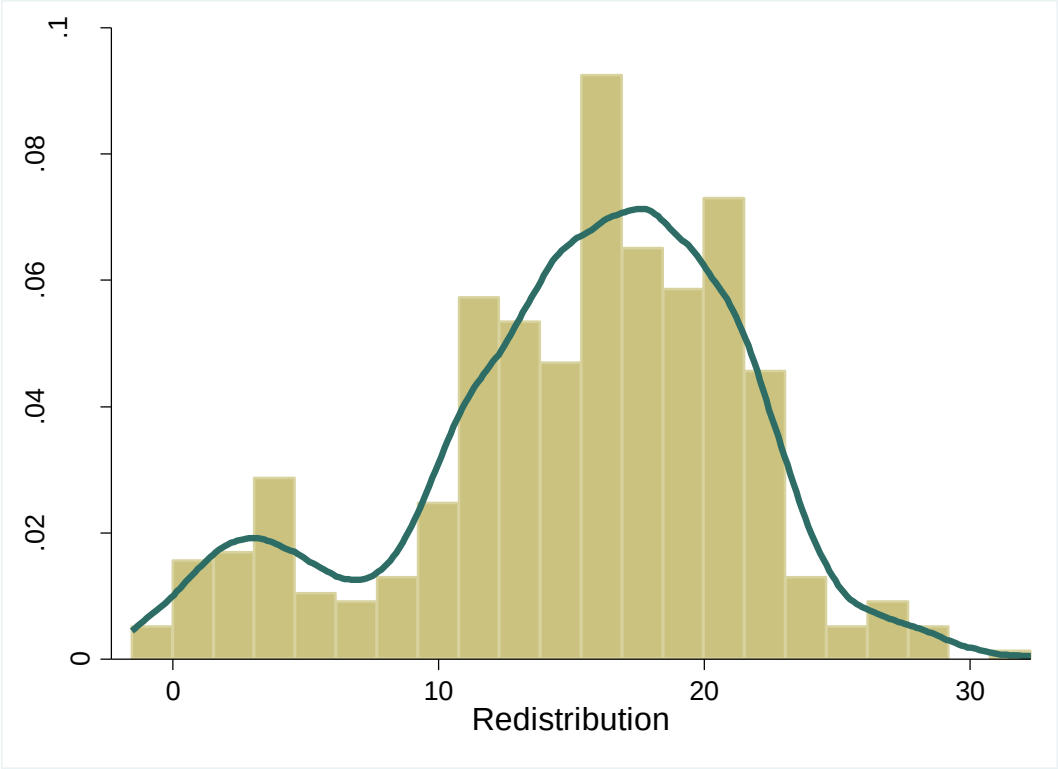

Figure 5.1: Histogram and Kernel Density Plot of Absolute Redistribution.
Source: Author's Construct using the WIID Dataset, (2020)

Figure 5.2 shows the extent of redistribution around the world by using the world bank's classification. It can be seen from the figure that, the region with the highest redistribution is Europe and Central Asia. The next is Sub-Saharan Africa and North America. Latin America and the Caribbean has the least level of redistribution.

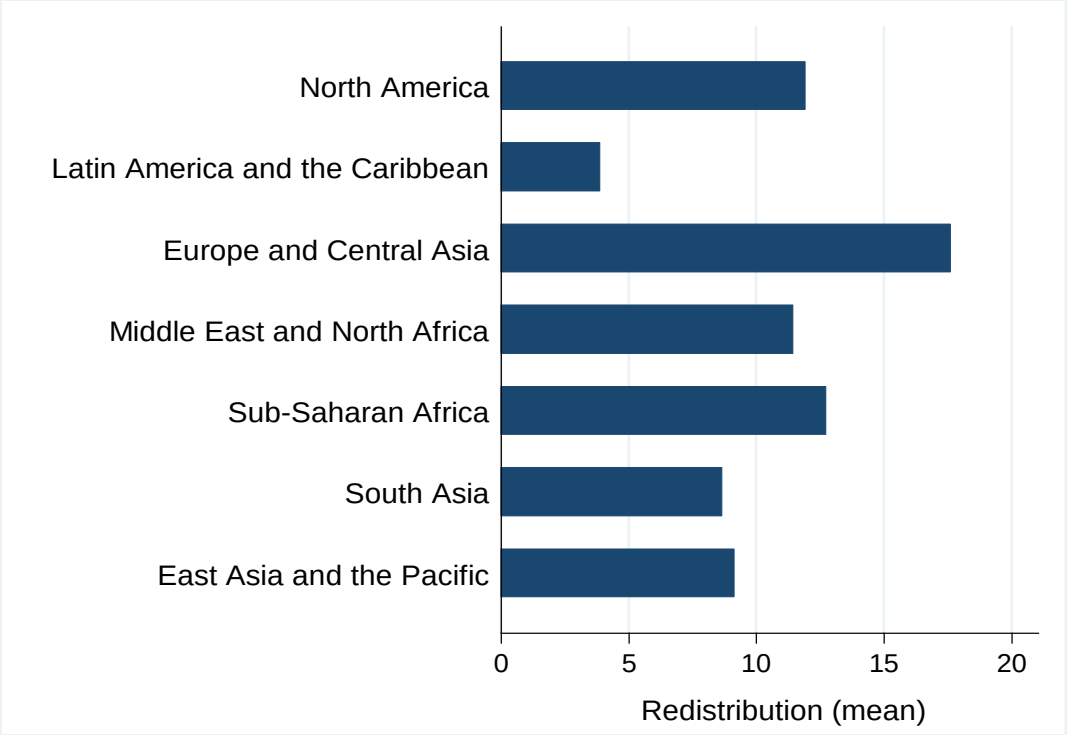

Figure 5.2: Extent of Redistribution across Regions (World Bank Classification)
Source: Author's Construct using the WIID Dataset, (2020)

Figure 5.3 and Figure 5.4 display the extent of redistribution by income groups. It is clear that high income countries redistribute more. The average redistribution in developed countries is 16.51 and that of developing countries is 7.86. It must be noted that a greater number of the observations are from developed countries hence caution must be exercised when interpreting the results for developing countries. This does not however invalidate the outcome as Gründler & Köllner, (2015) found a similar outcome using the Standard World Income Inequality Dataset (SWIID). The result suggests that, there exists a positive relationship between a country's income and the extent of redistribution that can be achieved.

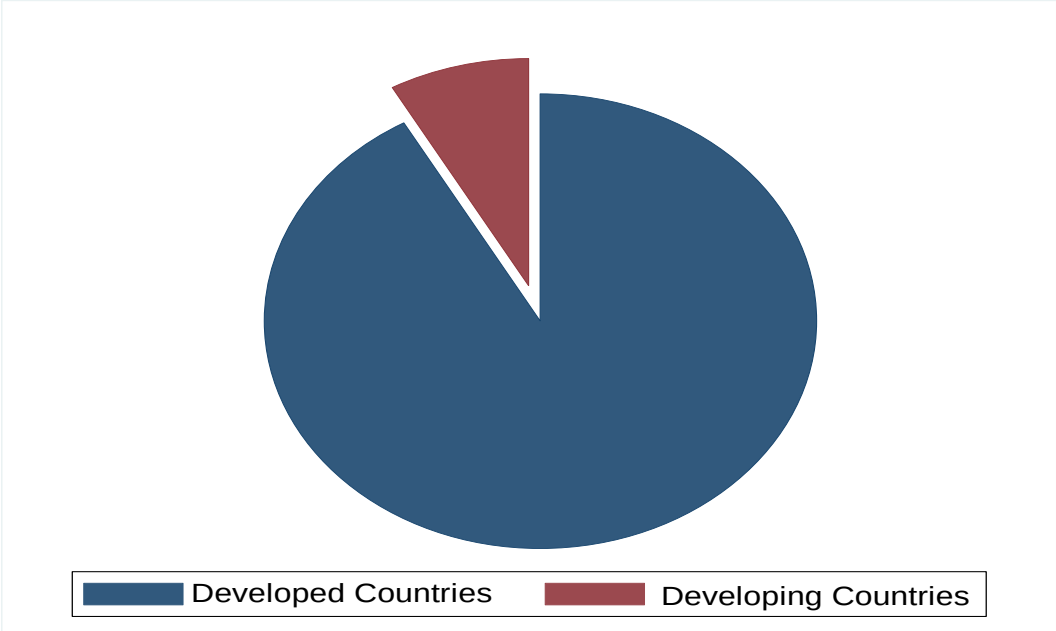

Figure 5.3: Extent of Redistribution by Income Groups
Source: Author's Construct using the WIID Dataset, (2020)

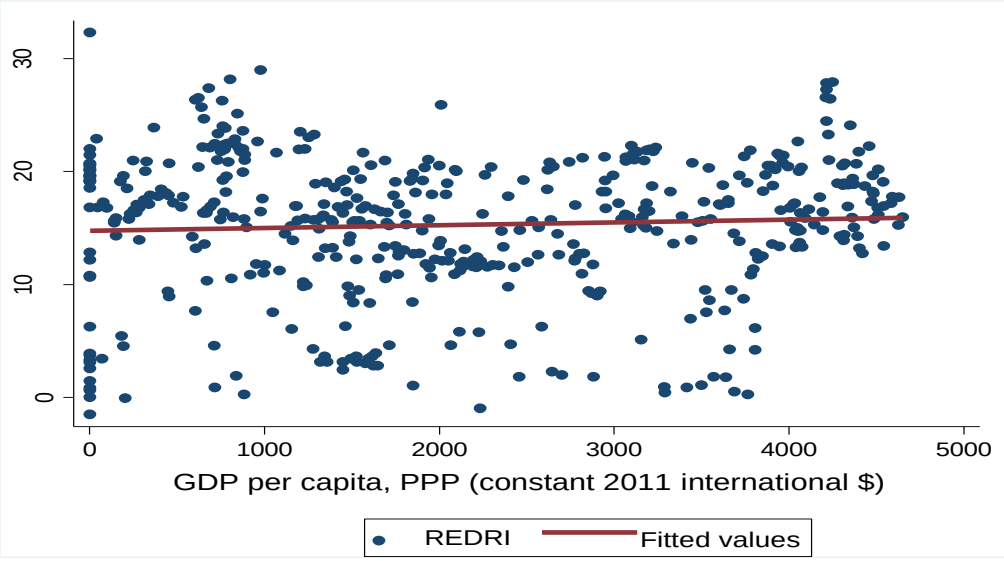

Figure 5.4: The Extent of Redistribution by Income Level
Source: Author's Construct using the WIID Dataset, (2020)

The average value of the market Gini is 46.93. This value reduces to 36.11 after taxes and transfers (redistribution). However, the standard deviation increased from 7.5 to

9.8 which shows that there are substantial differences in the extent of redistribution across the countries. Figure 5.5 illustrates the kernel density plot for market Gini and net Gini. Redistributive policies transform the distribution of the market Gini from a unimodal to a bimodal distribution.

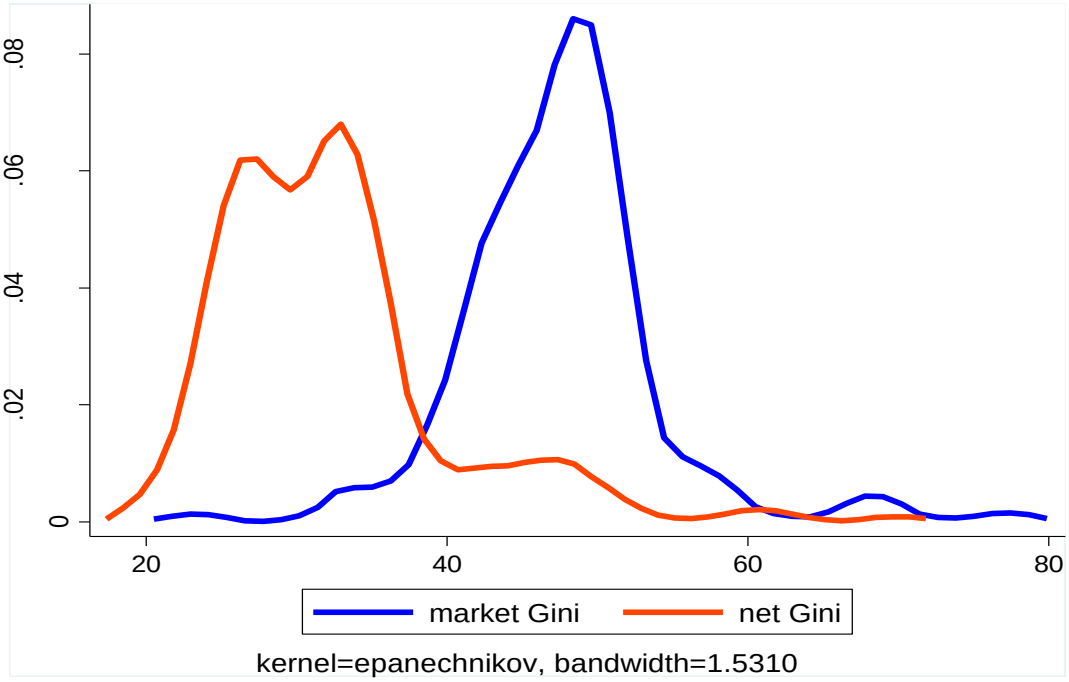

Figure 5.5: Kernel Density Plot for Market and Net Gini

Source: Author's Construct using the WIID Dataset, (2020)

Again, there is a positive relationship between market inequality and the extent of redistribution (see Figure 5.6). This implies that in countries where market Gini is high, redistribution also tend to be high, an observation in line with the median voter theorem.

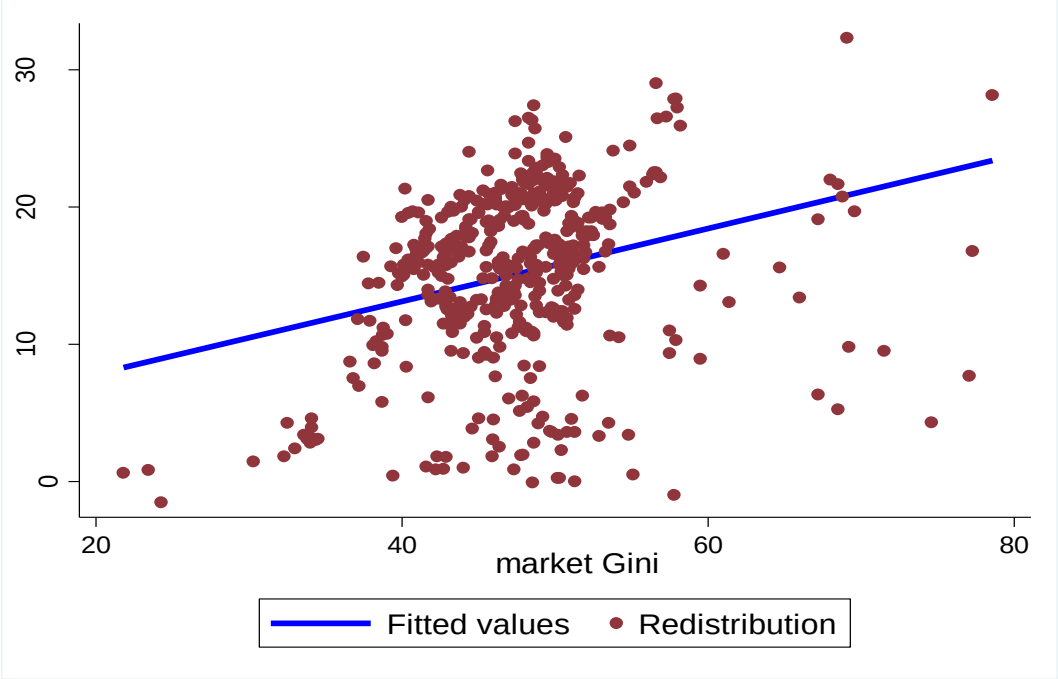

Figure 5.6: Relationship Between Market Inequality and Redistribution
Source: Author's Construct using the WIID Dataset, (2020)

5.2.2 Empirical Results

5.2.2.1 Results from the Baseline Regressions

The results from the baseline regressions are presented in Table 5.1. In order to avoid problems of overfitting which are likely to come up due to the small number of cross-sections, the instrument matrix was collapsed as suggested by Roodman (2009).

Model (1) incorporates only two variables: market income inequality as well as the lagged dependent variable. The results show that, all things being equal, a 1 unit increase in market income inequality leads to 1.3 units increase in redistribution. The results indicate that, market inequality has a statistically significant positive influence on redistribution. This is in line with Meltzer & Richard's median voter theorem. The

result confirms the findings of Gründler & Köllner (2015); Scervini, (2012); Jäntti *et al.,* (2020).

In model (2), polity2 is introduced into the regression model to capture the effect of the degree of democratisation. The variable is significant and negative. This means that a 1 unit increase in the level of democracy will reduce the extent of redistribution by 0.378 units, all other things being equal. This implies that more democratic countries tend to have lower redistribution. According to Acemoglu *et al.,* (2013) a higher level of democracy may generate higher bureaucracy which may hinder the implementation of redistributive policies.

In Model (3) the baseline regression is extended to include the level of development which is measured by GDP per capita. It can be observed that, a country's level of development positively affects the extent of redistribution. The regression shows that, all things being equal, for every 1% increase in GDP per capita, redistribution increases by 0.002%. This indicates that countries with higher incomes redistribute more since such countries can afford more generous redistributive policies. This confirms the findings of Gründler & Köllner, (2015) and Jäntti *et al.,* (2018).

Column (4) captures fertility rate, the degree of openness, the extent of external debt, and foreign direct investment inflows into the regression model. Market inequality and the level of development are still positive and significant. Again, the degree of democratisation is negative. The results also indicate that trade openness positively affects the extent of redistribution. From Table 5.1, it can be observed that, a unit increase in the level of trade openness increases redistribution by 0.007. According to Desai & Rudra, (2016), expansion in international trade creates economic insecurity

leading to an increase in the demand for more social protection. This confirms the findings of Polanyi (1944) and Ruggie (1982). Again, fertility rate has a strong positive effect on redistribution. The results show that, all things being equal, a 1% increase in fertility rate will increase redistribution by 0.02. This is because when the fertility rate is high, it may generate a high demand for social transfers, for example, child support programmes. This result confirms the findings of Gründler & Köllner, (2015).

Table 5.1: Determinants of Income Redistribution

Variables	Model (1)	Model (2)	Model (3)	Model (4)
$REDIST_{(t-1)}$	-0.152**	-0.174***	-0.148***	-0.087
	(0.059)	(0.054)	(0.037)	(0.137)
Gini (Market)	1.345***	0.972***	0.997***	0.743***
	(0.371)	(0.113)	(0.114)	(0.198)
Polity2		-0.378*	-0.301***	-0.251**
		(0.203)	(0.103)	(0.101)
$Log(GDP_{pc})$			0.199**	0.549*
			(0.096)	(0.287)
Openness				0.007***
				(0.002)
Log(External debts)				0.068
				(0.208)
log(FERT)				1.551*
				(0.842)
Log(FDI)				-0.108
				(0.322)
Constant	-44.175***	-24.790***	-26.680***	-25.583**
	(17.120)	(5.048)	(5.000)	(11.274)
Observations	321	295	295	295
Countries	36	31	31	31
Hansen p-val	0.854	0.913	0.998	0.859
Diff-Hansen	0.854	0.779	0.978	0.615
AR(1) p-val	0.082	0.049	0.054	0.348
AR(2) p-val	0.269	0.262	0.467	0.132
Instruments	4	7	10	22
Collapse	Yes	Yes	Yes	Yes

Notes: The estimation was conducted using the two-step system GMM approach. Windmeijer-corrected standard errors in the parentheses. The instrument matrix is restricted to lag 2. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's Calculation using the WIID Dataset, (2020)

5.2.2.2 Model Diagnostics

To test for the validity of the results, the test statistics displayed Table 5.1 were used. In each of the regressions, the Hansen test of over-identifying restrictions shows that the instruments are valid. Again, the Difference-in-Hansen test shows that the extra moment conditions are valid. This means that there is efficiency loss when the first-difference GMM is used. Also, the p-value of AR (2) indicates that there is no second-order serial correlation in the residuals.

5.2.2.3 Sensitivity Tests

To assess the robustness of the results presented in Table 5.1, a sensitivity analysis was conducted. This is to investigate if other econometric specifications may produce different results. The Within Group and first-difference GMM estimation techniques were employed. As Nickell (1981) shows, the elimination of country fixed effects via time-demeaning in dynamic panel models results in a severe bias. For this reason, we exclude $REDIST_{(t-1)}$ in the WG estimations. The results for each of the estimations are presented in Table 5.2.

The results of Table 5.2 strongly support the findings of the baseline outcomes which suggest that higher level of market inequality significantly enhances the extent of redistribution. Again, the results of the first-difference GMM as well as the Within-Group model suggest that there is a positive relationship between fertility rate and the extent of redistribution. The first-difference GMM however indicates a positive relationship between the degree of democratisation and the extent of redistribution. In fact, the Within-Group and First-Difference GMM are not suitable for examining the

determinants of redistribution. This is because the Within-Group estimator does not address the problem of endogeneity. Again, this method neglects the information in the equation in levels. This problem also holds true for First-Difference GMM, which would be particularly advantageous if the restrictions on the initial conditions necessary for validity of the additional orthogonality conditions of system GMM were violated. Moreover, the application of Arellano-Bond results in a decline in the number of observations, as the estimator requires having at least three consecutive observations for each of the regressors, thereby magnifying gaps in our sample.

Table 5.2: Sensitivity Analysis (Different Estimation Techniques)

Variables	**Within Group**		**First Difference GMM**	
$REDIST_{(t-1)}$			0.199*	0.158
			(0.120)	(0.112)
Gini(Market)	0.669***	0.712***	0.704***	0.743***
	(0.067)	(0.069)	(0.103)	(0.094)
Polity2	0.024	0.061	0.142**	0.146***
	(0.051)	(0.047)	(0.063)	(0.056)
$Log(GDP_{pc})$	0.052	-0.023	0.111	0.105
	(0.126)	(0.133)	(0.132)	(0.158)
Openness		-0.000		0.001
		(0.001)		(0.002)
Log(External debts)		0.035		0.050
		(0.102)		(0.056)
log(FERT)		1.526***		1.795***
		(0.477)		(0.484)
Log(FDI)		-0.357***		-0.212***
		(0.102)		(0.061)
Constant	-20.277***	-30.170***	-19.947***	-31.904***
	(3.353)	(5.301)	(3.948)	(4.776)
Observations	433	433	261	261
Countries	56	56	28	28
AR(1) p-val			0.4045	0.4543
AR(2) p-val			0.6456	0.5225
Instruments			188	193

Source: Author's Calculation using the WIID Dataset, (2020)

CHAPTER SIX

THE IMPACT OF CASH TRANSFERS ON INTRA-HOUSEHOLD LABOUR MARKET DECISIONS

This chapter presents the methodology and the empirical results for the third research objective which seeks to examine the impact of cash transfers on intra-household labour market decisions. The first section presents the methodological framework used for the analysis and the second section presents and discusses the empirical results.

6.1 Methodology

6.1.1 Conceptual Framework

The study resorted to the collective household bargaining model in order to examine how household members respond to cash transfers in terms of labour market decisions by taking into consideration, the distribution of power within the household.

Model Set-up

Assume the household is made up of only two members: m and f where m refers to the husband and f represents the wife. These individuals consume leisure measured as L^i and a private composite good, C^i where $i = m, f$, the price is however set to one and aggregate consumption of the household is equal to $C = C^m + C^f$. The quantity of labour supplied by each individual is given as: $h^m = T - L^m$ and $h^f = T - L^f$ (where T is the total available time) together with wages w_m and w_f. Assume also that the household receives a non-labour income denoted by D. Since the collective

model assumes that household utility function is given as a weighted sum of the utility functions of each individual, the household utility maximization problem takes the form:

$$\underset{\{h^m,h^f,C^m,C^f\}}{\text{Max}} W = \mu U^m + (1-\mu)U^f$$

subject to

$$w_m h^m + w_f h^f + D \geq C^m + C^f \quad (1)$$

where U^m and U^f represent the utility functions of the husband and wife respectively; Under collective bargaining setting, μ denotes the intra-household bargaining power function which is continuously differentiable in its arguments, $\mu(w_m, w_f, s, D)$, that is, the wages of the couple, a vector of distribution factors *(s)*— these are variables that could affect a households' bargaining process by influencing each partner's opportunities outside the marriage or external options and non-labour income *(D)*.

Assume that the non-labour income (*D*) is shared between these two individuals. Let $\Psi(w_m, w_f, s, D)$ be the amount received by the man and $D - \Psi(w_m, w_f, s, D)$ be the amount received by the woman. The function Ψ is known as the "sharing rule" and it describes how the non-labour income is divided up. This is a function of the couple's wages, a vector of distribution factors and non-labour income. If each individual independently chooses consumption and labour supply subject to the corresponding budget constraint, then the maximization problem for each person is expressed as:

$$\underset{h^i,C^i}{max} U^i(C^i, h^i)$$

subject to

$$w_i h^i + \Psi^i(w_f, w_m, s, D) \geq c^i \qquad i = m, f \qquad (2)$$

$$\Psi^m(w_f, w_m, s, D) = \Psi(w_f, w_m, s, D) \text{ and } \Psi^f(w_f, w_m, s, D) = D - \Psi(w_f, w_m, s, D)$$

Given that Ψ is twice continuously differentiable, then each individual's labour supply function can be expressed as:

$$h^m(w_m, w_f, s, D) = H^m\left(w_m, \Psi(w_f, w_m, s, D)\right) \qquad (3)$$

$$h^f(w_m, w_f, s, D) = H^f\left(w_f, D - \Psi(w_f, w_m, s, D)\right) \qquad (4)$$

where H^f and H^m are Marshallian labour supply functions.

6.1.2 Estimation Procedure

6.1.2.1 Checking for Baseline Balance

The first step in any impact evaluation analysis is to check for baseline balance. In quasi-experiments, the treatment group differ systematically from the control group. This is because the data by nature is non-randomised. As a result, it is not likely that the covariates will be balanced. Covariate balance test is often conducted by using simple t-tests by comparing the mean baseline (pre-intervention) characteristics across groups. Rosenbaum and Rubin (1985) however proposed an alternative method of checking for covariate balance referred to as standardised differences. Unlike the t-test, the sample size does not affect the standardised difference. Again, standardised difference permits the comparison of the relative balance of variables measured in different units. Hence, the study employed the standardised difference to check for the baseline balance.

For continuous variables, the standardised difference is defined as:

$$d = \frac{(\bar{x}_{treatment} - \bar{x}_{control})}{\sqrt{\frac{s^2_{treatment} + s^2_{control}}{2}}}$$

where $\bar{x}_{treatment}$ and $\bar{x}_{control}$ represent the sample mean of the covariate in treated and control groups respectively whilst $s^2_{treatment}$ and $s^2_{control}$ are the sample variance of the covariate in treated and control groups. For categorical variables, the standardised difference is defined as:

$$d = \frac{(\hat{p}_{treatment} - \hat{p}_{control})}{\sqrt{\frac{\hat{p}_{treatment}(1 - \hat{p}_{treatment}) + \hat{p}_{control}(1 - \hat{p}_{control})}{2}}}$$

where $\hat{p}_{treatment}$ and $\hat{p}_{control}$ represent the mean of the categorical variable in the treated and control groups respectively.

According to Rosenbaum & Rubin (1985) a standardised difference greater than 0.10 implies significant imbalance.

6.1.2.2 Propensity Score Methods

Propensity Score Matching (PSM) is often applied when baseline differences between the treatment and control groups need to be accounted for. PSMs simulate the conditions of an experiment in which recipients and non-recipients are randomly assigned. This makes it possible to identify a causal relationship between the outcome and treatment variables (Asfaw *et al.*, 2012).

Assume that the likelihood of receiving the LEAP grant is $P(Z) = \Pr(D = 1|Z)$, Z is a vector of observed control variables which were measured before the start the programme. What PSM does is to create a comparison group by matching individual

control and treatment households. The matching is done based on similarities in $P(Z)$. Two fundamental assumptions underlie propensity models. These are the conditional independence assumption (CIA) and the common support condition.

The first assumption means that possible outcomes are independent of treatment conditional on Z:

$$E[(h(1)_{t=0}|\, Z, D = 1)] = E[(h(0)_{t=0}|\, Z, D = 0)] \quad (1)$$

where D is a dummy variable: D=1 if the household receives the treatment and D=0 if otherwise.

The expression implies that conditional on observed characteristics, individuals who do not receive the intervention have the same mean outcomes as recipients if the latter had benefited from the treatment.

The second assumption is the common support condition. This assumption means that the propensity score needs to be within the range of 0 and 1

Matching Algorithms

For Propensity Score Matching, beneficiaries are matched to non- beneficiaries using the propensity scores. There are a number of matching methods that can be used although there are trade-offs with regard to efficiency and biasness (Caliendo & Kopeinig, 2008). Some of the matching algorithms are discussed below:

With regard to one-to-one matching, a treatment observation is matched to a control observation once. For nearest neighbour matching, treatment observations are paired to control observations with the closest propensity score. This method may produce matches that are poor especially in situations where the nearest neighbour is far. In

situations like that, a tolerance level on the maximum propensity score distance (caliper) can be imposed. For the stratification and interval matching, the common support of the propensity score is stratified and the impact within each strata is calculated. This is done by taking the average difference in outcomes for the control treated observations. Kernel matching is a non-parametric matching estimator. It uses the weighted average of the control group to create the counterfactual outcome. The advantage of this method is that it produces a low variance since more information is used (Caliendo & Kopeinig, 2008).

Another closely related issue with regard to PSM is whether to match with or without replacement. When matching is done with replacement, it implies that the control units are matched multiple times. This option ensures that the propensity score distance between the non-treated and treated units is minimized. Each of the treated units is matched to the closest comparison unit even if the comparison has already been matched. Matching with replacement has the advantage of reducing bias in the estimation. With regard to matching without replacement, the comparison units are matched once. The problem with this option is that, in situations where the number of comparison units that are similar to the treated units are few, the treated units may be matched to comparison units that are not similar with respect to the estimated propensity score. Another problem with matching without replacement is that, the results are likely to be influenced by the order in which the treatment units are matched (Rosenbaum, 1995).

After matching, a balancing test needs to be conducted in order to determine whether or not, the distribution of the covariates in the treated and control groups is balanced.

If balance is achieved, then, the comparison group that has been constructed can be described as a reliable counterfactual. The frequently used balancing test is to compare the pseudo R^2 and p-values of the likelihood ratio test of the joint insignificance of all the regressors obtained from the regression analysis before and after matching the samples. For propensity score methods to be valid, there should be no systematic difference in the distribution of covariates between the two groups. The pseudo R^2 should be lower and the joint significance of covariates should be rejected, (in other words, the p-values of the likelihood ratio should be not be significant).

6.1.3 Estimation Strategy

After checking for the baseline balance and ensuring that the covariates are balanced, the next step is to conduct the impact evaluation analysis. Impact evaluation of a policy intervention entails examining the effects of the policy against an explicit counterfactual, that is, the absence of the policy. Impact evaluation therefore provides an answer to the question, "How would beneficiaries have fared in the absence of the intervention?" The general formulation for an impact evaluation problem suggests two possible outcomes for each household (individual) *i*: 1 if a household (individual) received the intervention and 0 if otherwise.

Now let D_i be a dummy variable and let h^i represent the outcome of interest. The potential outcomes are defined as $h^i(D_i)$. The treatment effect of the programme is:

$$\delta_i = h^i(1) - h^i(0) \qquad (2)$$

Equation (1) formalises the question stated above – that is, what would have been the outcome for treated group if the policy had not been implemented? But it is not

possible to measure outcomes h^i for a household (individual) in two states simultaneously (that is, participating in a programme and not participating where $D_i = 1$ and $D_i = 0$ respectively). This is referred to as "the fundamental problem of causal inference". This is because only one outcome can be observed since there is no information on the counterfactual (Holland, 1986). Thus, an impact analysis is basically a missing data problem. The alternative way of resolving this problem is to select a control group from non-beneficiaries which represents of the group of participants with one key difference — this group did not receive the transfer.

The parameter of interest is the average treatment effect on the treated (ATT). This is expressed as:

$$ATT = E[\delta|D = 1] = E[h(1)|D = 1] - E[h(0)|D = 1] \quad (3)$$

When data on pre and post treatment is available, the estimator in equation (3) can be expressed as:

$$\begin{aligned} ATT &= E[\delta_t - \delta_{t-1}|D = 1] \\ &= E[(h(1)_t - h(0)_t) - (h(1)_{t-1} - h(0)_{t-1}|D = 1] \\ &= E[(h(1)_t - h(1)_{t-1})|D = 1] - E[(h(0)_t - h(0)_{t-1}|D = 1] \end{aligned} \quad (4)$$

Where t-1 and t are the time periods before and after the implementation of the intervention respectively.

6.1.3.1 The Difference-in-Difference Estimator

The difference-in-difference (DD) estimator (or "double difference") is the statistical approach used for the analysis. The method entails estimating the change in an

indicator variable (the indicator variable in this case is labour supply) between the baseline, that is, before the implementation of the programme (pre-intervention) and post-intervention for both the control and treatment groups. Table 6.1 shows the process involved in estimating the difference-in-difference between the comparison (C) and treatment (T) groups.

Table 6.1: The Difference-in-Differences (DD) Estimator

	Baseline (2010)	**Endline (2012)**	**Difference across time**
Treatment	T_{2010}	T_{2012}	$T_{2012} - T_{2010}$
Control	C_{2010}	C_{2012}	$C_{2012} - C_{2010}$
Difference across group	$T_{2010} - C_{2010}$	$T_{2012} - C_{2012}$	Difference-in-difference $(T_{2012} - C_{2012}) - (T_{2010} - C_{2010})$

Source: Handa *et al.,* (2013)

According to Shadish *et al.*, (2002) this method is one of the most efficient estimators for impact evaluation analysis. Handa *et al.*, (2013) highlighted two important characteristics of DD estimators that makes it possible to derive unbiased estimate of the impact of a policy intervention: Firstly, the use of pre- and post-treatment measures enables researchers to 'difference' out any time-invariant features that may influence the outcome. This enables researchers to 'benchmark' the change in the indicator against its value when the treatment is absent. Secondly, measuring the change in a control group makes it possible for researchers to account for trends in the value of the outcome.

The DD estimator is expressed as follows:

$$h_t^i = \beta_0 + \beta_1 T_{it} + \beta_2 D_{it} + \beta_3 (T_{it} * D_{it}) + \sum \beta_i Z_i + \varepsilon_{it} \quad (5)$$

where h_t^i is the outcome of interest (that is, the labour supply of individual; T_{it} represents the dummy for the time period — 0 and 1 for the baseline and the follow-up period respectively; D_{it} represents the treatment dummy — 0 if the household did not receive the intervention and 1 if otherwise; $T_{it} * D_{it}$ represents the interaction between the treatment and the time dummies, and ε_{it} is the error term. β_1 measures general changes over time which is important to control when outcomes are influenced by time trends; β_2 is a measure of the pre-treatment mean difference in h between T and C. The coefficient of the interaction term, β_3 is the DD estimator which measures the impact of the policy. Again, when there are differences between the control and treatment groups at the baseline, then conditioning the difference-in-difference estimator on other covariates minimizes the standard errors provided that the effects are not related to the intervention and are constant over time (Wooldridge, 2002). Hence Z_i is a vector of control variables.

By introducing the bargaining power index (BPI) into the model, equation (5) becomes:

$$h_t^i = \beta_0 + \beta_1 T_{it} + \beta_2 D_{it} + \beta_3 (T_{it} * D_{it}) + \beta_4 BPI_{it} + \beta_5 (BPI * D_{it} * T_{it}) + \sum \beta_i Z_i + \varepsilon_{it} \quad (6)$$

At baseline, T=0 and $h^i = \beta_0 + \beta_2 D + \beta_4 BPI_{it}$ (7)

If D=1, then $h^i = \beta_0 + \beta_2 + \beta_4 BPI_i$ $(7a)$

If D=0, then $h^i = \beta_0 + \beta_4 BPI_i$ $(7b)$

The difference between the control and treatment group at baseline is given as:

$\Delta h^i{}_{2010} = (7a) - (7b)$

$$\Delta h^{i}{}_{2010} = (\beta_0 + \beta_2 + \beta_4 BPI_i) - (\beta_0 + \beta_4 BPI_i)$$

$$\Delta h^{i}{}_{2010} = \beta_2$$

At endline, T=1 and $h^i = \beta_0 + \beta_1 + \beta_2 D + \beta_3 D + \beta_4 BPI_i + \beta_5 (BPI_i * D_{it})$ (8)

If D=1, then $h^i = \beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4 BPI_i + \beta_5 BPI_i$ (8a)

If D=0, then $h^i = \beta_0 + \beta_1 + \beta_4 BPI_i$ (8b)

The difference between the control and treatment group at endline is given as:

$$\Delta h^{i}{}_{2012} = (8a) - (8b)$$

$$\Delta h^{i}{}_{2012} = (\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4 BPI_i + \beta_5 BPI_i - (\beta_0 + \beta_1 + \beta_4 BPI_i)$$

$$\Delta h^{i}{}_{2012} = \beta_2 + \beta_3 + \beta_5 BPI_i$$

Therefore, the impact of the LEAP programme is:

$$DD = \Delta h^{i}{}_{2012} - \Delta h^{i}{}_{2010} = \beta_3 + \beta_5 BPI \quad (9)$$

Based on the collective labour supply model, the empirical model is specified as:

$$h_t^i = \beta_0 + \beta_1 T_{it} + \beta_2 D_{it} + \beta_3 (T_{it} * D_{it}) + \beta_4 BPI_{it} + \beta_5 (BPI * D_{it} * T_{it}) +$$

$$+ \sum \beta_i Z_i + \varepsilon_{it} \quad (10)$$

The outcome of interest is wage labour supply. The analysis took into consideration both the decision to participate in the labour market (extensive margin) and then, conditional on participation, the intensity of participation (intensive margin). The decision to participate is a dummy variable: 1 if the person was engaged in paid labour and 0 if otherwise. In this case, since the outcome of the regression model in Equation (10) is binary, the logistic regression model was employed. The likelihood of a positive outcome, that is, $h = 1$, is modelled as a linear function of the covariates as:

$$\ln\left(\frac{h_i}{1-h_i}\right) = \beta_0 + \beta_1 T_{it} + \beta_2 D_{it} + \beta_3 (T_{it} * D_{it}) + \beta_4 BPI_{it} + \beta_5 (BPI * D_{it} * T_{it}) + \sum \beta_i Z_i + \varepsilon_{it} \quad \sim N(0,1) \quad (11)$$

The likelihood that the $h_i = 1$ is given as:

$$Prob(h_i = 1) = \frac{\exp(\lambda)}{1-\exp(\lambda)}$$

Where

$$\lambda = b_0 + b_1 T_{it} + b_2 D_{it} + b_3 (T_{it} * D_{it}) + b_4 BPI_{it} + b_5 (BPI * D_{it} * T_{it}) + \sum b_i Z_i + \varepsilon_{it}$$

The bs are the estimated coefficients of the model. The coefficients are then used to calculate the odd ratios. This is the ratio of two odds of an event occurring (Demaris, 1992). When the independent variable is continuous, the odds ratio is interpreted as the increase in the odds or the likelihood of an event occurring with a unit increase in the independent variable. When the independent is dichotomous, the odds ratio is interpreted as the increased odds of a positive outcome on the dependent variable for the affirmative category $X = 1$ over the negative one $X = 0$. An odds ratio that is greater than one indicates a positive relationship between the covariate and the labour force participation and an odds ratio less than one indicates a negative relationship (Uthman *et al.*, 2009)

On the other hand, the intensity of participation is measured by using the number of hours worked per day. Since daily working hours depend on whether or not the individual participated in the labour market, it includes zeros which represents those

who did not participate in the labour market. As a result, the inverse hyperbolic sine (IHS) transformation was employed. Log-transformation is not a suitable option because log (0) is undefined. But the IHS approximates the natural logarithm of the variable and allows zero-valued observations to be retained. The IHS is defined as $y = \log\left(x + \sqrt{x^2 + 1}\right)$. Further reading on IHS transformation is found in Burbidge *et al.*, (1988).

6.1.3.2 Difference-in-Difference with Inverse Probability Weighting

Inverse probability weighting (IPW) derives weights from the propensity score, control observations are given weights equal to the inverse of their propensity score – that is, $w = \frac{\hat{P}(Z)}{1-\hat{P}(Z)}$ – whereas treatment observations are assigned a weight equal to 1. The weights are then used in the DD regression. This makes the treated and control observations representative of the population of interest.

Weighting by using the inverse of $\hat{P}(Z)$ makes it possible to achieve a balance in the covariates. This is because IPW put more emphasis on counterfactual observations that have propensity scores close to 1 whereas those with relatively smaller propensity are underweighted. In other words, observations belonging to the control group that are different from the treatment group will be given a propensity score closer to zero and a weight that is near zero. On the other hand, control observations that are similar to the treatment group are given a higher weight. This weighting method is considered to yield consistent estimates and it has been described as 'doubly robust' on condition that the propensity model is specified correctly (Imbens & Wooldridge, 2009).

6.1.4 Measuring Women's Bargaining Power Index

The bargaining power index is made up of variables that could affect a woman's threat point or fall-back position. Since the data used for the analysis does not have variables that directly measure power, we resorted to using indicators of women's bargaining power. Since the concept of women's bargaining power is multidimensional, five indicators were employed. These are:

i. Education difference between the woman and her husband *(ed_diff)*

ii. Age difference between the woman and her husband *(age_diff)*

iii. Whether the woman is the household head *(head)*

iv. If the woman is engaged in paid labour *(paid_work)*

v. Difference between the wage of the woman and her husband *(wage_diff)*

Factor analysis was used to create the women's bargaining power index. This method reduces the set of variables that are assumed to be related to one another to a smaller number of unobserved, more fundamental constructs which are referred to as "factors". This is done by identifying the structure of the relationships among the variables as represented by their correlation matrix. For each factor identified, the analysis generates "loadings," one for each variable, which are estimated drawing only on the shared variance of the variables. They are the correlation between the observed variables and the factor. If, after examining the loadings, the hypothesis is borne out, then new variables (indexes, or "factor scores") that are linear combinations of the observed variables are estimated based on the loadings. The original variables are then standardized so that their variations and ranges do not

affect their index coefficients. The coefficients apply to the variables in their standardized form (Sharma 1996).

6.1.5 Definition of Variables and a priori Signs

Cash Transfers and Labour Supply

The LEAP grant, which represents the non-labour income *(D)*, is a dummy variable — 0 if the household did not receive the grant and 1 if otherwise. The literature highlights several mechanisms through which cash transfers affect the labour market decisions of beneficiaries. Hence the general impact of cash transfers on labour supply decisions for adults is ambiguous from theoretical perspective.

Women's Bargaining Power and Labour Supply

For women, an increase in their bargaining power may possibly lead to a decline in their labour supply due an increase in the consumption of leisure (income effect). On the contrary, when the woman has more bargaining power, she is able to overcome their traditional gender roles and hence increase the supply of labour (Novella *et al.*, 2012). For men, as the bargaining power of the woman increases, it leads to an increase in their labour supply based on the standard income effect under either cooperative and non-cooperative household models (Bergolo & Galvan, 2018).

Controls

In this chapter, we evaluate the impact the LEAP programme on the labour supply of couples within a multivariate framework by controlling for baseline characteristics of the sample households in order to account for the differences across samples that

might account for some of the observed treatment effects. Other control variables included in the regression model include the number of children in the household, income from agricultural activities and non-farm enterprise, debt status of the household and whether or not the household receives remittances.

6.1.6 Data Description

For this particular objective, we employed the LEAP programme evaluation dataset collected by ISSER in collaboration with the University of North Carolina, Chapel Hill Handa *et al.,* (2013). This data is part of a nation-wide household survey by Yale University and ISSER. The sample for the LEAP evaluation is made up of 699 households. This was taken from households who were part of the LEAP expansion which happened in the 2009. The expansion took place in the Volta, Central, Brong-Ahafo regions of the country. The baseline data was collected in the first quarter of 2010 from future beneficiary households in these regions. A comparison group of 'matched' households which is equal to 699 were selected from the ISSER sample by PSM, using one-to-one nearest neighbour approach, and re-interviewed after 24 months along with LEAP beneficiaries. The matched comparison group was drawn from the same three regions as the LEAP households as well as bordering regions with similar agro-ecological conditions.

In all, 1398 households were surveyed in 2012 as part of the evaluation. Out of this number, 699 were LEAP beneficiary households whilst the remaining 699 were ISSER matched samples. During the implementation of the follow-up survey, ISSER re-interviewed AN additional 215 households from the ISSER sample to generate more statistical power. A total of 1289 of these households were actually re-

interviewed for a success rate of 92 percent. With the additional 215 households from the ISSER sample, the total analysis sample consists of 1613 households and a final longitudinal sample of 1504 households (858 ISSER, 646 LEAP). Further information on the survey as well as the propensity score matching (PSM) procedure employed in selecting the control households is found in Handa *et al.*, (2013). Table 6.2 displays the sample used for the analysis.

Table 6.2: Sample for Evaluation

	Baseline (2010)	Endline (2012)
Treatment	699	646
Comparison	914	858
Total	1613	1504

Source: Handa *et al.*, (2013)

6.2 Analysis and Discussion of Results

The analysis presented in this section intends to provide answers to the following research questions:

1. Does the LEAP benefit affect the labour supply decisions of partners differently?
2. Does household bargaining affect the labour market response of couples who receive cash transfers?

We begin by presenting the summary statistics of the variables used for the analysis and also examines whether there is covariate balance for the treatment and control groups. We then go on to present the process of generating an index for women's

bargaining power and subsequently, the econometric results addressing the main questions that we sought to answer in this chapter.

6.2.1 Summary Statistics and Baseline Balance Test

Table 6.3 presents the summary statistics and the covariate balance test for the treatment and control groups. The mean household size of both the treatment and control groups is about 4. Majority of children are within the age bracket of 6 to 12 years with the ISSER sample being 78.8 percent and the LEAP sample, 77.2 percent. There are more orphans in LEAP households compared to those in ISSER households: 34.8 percent and 19.7 percent respectively. Also, the average number of elderly persons in the LEAP sample is more than those in the ISSER sample.

With regard to the characteristics of the household heads, majority of the LEAP households are headed by females (about 59 percent) whereas about 50 percent of households in the ISSER sample is headed by females. Majority of household heads in the ISSER sample are over 64 years whilst majority of ISSER household heads are between 25 and 64 years. Whilst a greater number of ISSER household heads are married (44 percent), majority of LEAP households are widowed (38.5 percent).

Furthermore, LEAP households have a lower per capita expenditure compared with ISSER households. Also, the mean monthly wages for paid labour for both husbands and wives is higher among ISSER households compared to LEAP households. Similarly, income from agricultural activities as well as income from non-farm enterprise is higher in ISSER households compared to LEAP households. LEAP households receive more remittances compared to ISSER households and borrowing

is higher among LEAP households. Finally, couples in the control group supply more labour for paid work in terms of hours of work compared to couples in the treatment group.

Table 6.3: Summary Statistics and Covariates Balance Test

Variable	YALE-ISSER Mean/SD	LEAP Mean/SD	Standardised Difference
Demographics			
Household Size	3.783	3.832	0.020
	(2.433)	(2.538)	
Household Size in Categories			
1	0.200	0.215	0.037
	(.400)	(.411)	
2-3	0.326	0.312	0.028
	(.469)	(.464)	
4-5	0.262	0.208	0.129
	(.440)	(.406)	
6-7	0.134	0.172	0.104
	(.341)	(.104)	
8+	0.078	0.093	0.055
	(.268)	(.291)	
Number of household members under 5 years	0.510	0.440	0.086
	(.848)	(.774)	
Number of household members 6-12 years	0.788	0.772	0.015
	(1.002)	(1.038)	
Number of household members 13-17 years	0.510	0.539	0.036
	(.786)	(.817)	
Number of orphans	0.197	0.348	0.193
	(.624)	(.917)	
Number of males 18-64 years	0.518	0.506	0.016
	(.710)	(.818)	
Number of females 18-64 years	0.896	0.769	0.159
	(.795)	(.796)	
Number of males above 64 years	0.212	0.278	0.150
	(.409)	(.467)	
Number of females above 64 years	0.350	0.527	0.336
	(.515)	(.538)	
Number of dependents	2.004	2.223	0.137
	(1.568)	(1.638)	

Table 6.3: Continued

Variable	YALE-ISSER Mean/SD	LEAP Mean/SD	Standardised Difference
Household Head Characteristics			
Sex (Female)	0.502	0.592	0.180
	(.500)	(.492)	
Age			
<25 years	0.030	0.030	0.001
	(.171)	(.171)	
25-64 years	0.562	0.454	0.217
	(.496)	(.498)	
Above 64 years	0.408	0.516	0.218
	(.492)	(.500)	
Marital Status			
Married	0.438	0.352	0.177
	(.496)	(0.177)	
Consensual union	0.077	0.052	0.103
	(.267)	(.222)	
Separated/Divorced	0.176	0.149	0.072
	(.381)	(.357)	
Widowed	0.262	0.384	0.262
	(.440)	(.487)	
Single	0.047	0.063	0.072
	(.211)	(.244)	
Per capita expenditure	131.1	116.8	0.108
	(105.86)	(153.98)	
Owing	.234	.271	0.086
	(.423)	(.445)	
Remittances	.387	.513	0.254
	(.487)	(.500)	
Monthly wage income of husbands	277.8	189.5	0.361
	(316.19)	(140.66)	
Monthly wage income of wives	212.3	155.8	0.331
	(99.402)	(219.54)	
Income from agricultural activities	287	126.8	0.235
	(894.28)	(358.09)	
Non-farm enterprise income	173.5	51.17	0.124
	(1332.1)	(433.78)	
Hours of wage labour (husbands)	8	6.125	2.588
	(0.000)	(1.025)	
Hours of wage labour (wives)	6.4	6.563	0.316
	(.516)	(.512)	

Source: Author's computation using the 1SSER data, (2021)

According to Rosenbaum & Rubin (1985) standardised difference greater than 0.10 implies significant imbalance. From Table 6.3, after assessing the differences between the control and the treatment groups, it is observed that, LEAP households differ from the ISSER as the standardised differences for most of the covariates is greater than 0.10.

To ensure that there is a balance between LEAP and ISSER households, we re-estimated the probability of receiving the treatment at the baseline by using a probit regression model. The set of covariates used in estimating the probability of receiving the LEAP grant were chosen based on the criteria used in targeting the beneficiaries of the LEAP programme. These include the composition of the household: such as the number of orphans and elderly persons in the household; characteristics of the household head such as sex, age, marital and educational status; other welfare indicators including per capita household expenditure, sources of income, asset index is created using principal component analysis (PCA) for about 40 durable assets; household financial position like debt status and whether or not the household receives remittances; and additional information on employment activities. As expected, given the eligibility criteria, the probability of receiving the LEAP grant sample is influenced by the number orphans in the households; households headed by women, widowed and have no schooling and households with relatively lower per capita expenditure are more likely to receive the cash transfer. Detailed results of the probit regression model is shown in appendix Table A4.

We implemented a PSM method using the nearest neighbour matching approach and a caliper of (0.04). The caliper was included in order to decrease the bias that is

associated with using distant neighbours in the matching procedure. The matching was done with replacement and again, the common support condition was imposed. This condition was imposed in order to restrict matching among observations for which there was overlay in the treatment and control propensity scores. From the matching procedure, 86 households were out of the region of common support (see Figure A1 in the appendix). We further examined if the matching technique used was able to balance the distribution of the variables. This is shown in appendix Table A5 and Table A6. After matching, the median and mean standardized difference reduced from 14.8 and 16.2 percent to 3.2 and 4.0 percent respectively.

Figure A2 in the appendix shows the box plot of the propensity scores. The upper panel of the figure shows that, the median of the unmatched distribution for the treatment group is higher as compared to the control group. But after matching, the distribution of the propensity score of the ISSER sample is similar to that of the LEAP sample (this is shown in the lower panel of Figure A2). The matched sample therefore offers a better counterfactual.

6.2.2 Generating an Index for Women's Bargaining Power

Between 2010 and 2012, we observed that 3, 338 individuals lived as couples. Out of this number, 1,619 were males and the rest were females. We hypothesize five indicators that are positively related to women's bargaining power or positively influence the woman's threat point. All the five indicators are assumed to be positively associated with women's bargaining power.

To begin with, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy which is a measure of the homogeneity of a set of variables, is 0.5066 (see Table 6.4)., hence it passes the "acceptability" criteria (≥ 0.50) for factor analysis (Sharma, 1996)

Table 6.4: Kaiser-Meyer-Olkin Measure of Sampling Adequacy

Variable	KMO
Difference in years of schooling between the woman and her husband	0.5049
Age difference between the woman and her husband	0.5239
Whether the woman is the household head	0.5074
If the woman is engaged in paid labour	0.5058
Difference between the wage of the woman and her husband	0.5032
Overall	0.5066

Source: Author's calculation using the 1SSER data, (2021)

The factor analysis was conducted using STATA (version 14) which by default uses the "principal factors" (pf) option. The *pf* option reports the eigenvalues that are both greater than or less than zero. The normal "eigenvalue greater than one" rule for retaining factors does not apply. Eigenvalues that are greater than zero are however retained (StataCorp, 2001). Table 6.5 shows the output of the factor analysis. Out of the five factors identified, only the first two capture sufficient variance to be retained (this is shown in Panel A). The factor loadings are shown in Panel B. The factor loadings for all the indicators are positive for the second factor. This factor was therefore selected to measure women's bargaining power. Panel C shows the index coefficients attached to the various indicators.

Table 6.5: Factor Analysis Output for Women's Bargaining Power Index

Panel A

Factors	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	0.361	0.206	1.6196	1.6196
Factor 2	0.155	0.079	0.6973	2.3169
Factor 3	0.076	0.221	0.3416	2.6585
Factor 4	-0.144	0.081	-0.6482	2.0103
Factor 5	-0.225		-1.0103	1.0000

Panel B **Factor Loadings**

	Factor 1	Factor 2	Factor 3	Uniqueness
Education difference between the woman and her husband	0.0165	0.0249	0.2370	0.9430
Age difference between the woman and her husband	-0.2783	0.2041	0.0916	0.8725
Whether the woman is the household head	-0.1865	0.2606	-0.0951	0.8883
If the woman is engaged in paid labour	0.3553	0.1295	0.0405	0.8553
Difference between the wage of the woman and her husband	0.3496	0.1687	-0.0301	0.8484

Panel C **Scoring Coefficients**

	Factor 1	Factor 2	Factor 3
Education difference between the woman and her husband	0.01211	0.02150	0.22260
Age difference between the woman and her husband	-0.21183	0.18516	0.08979
Whether the woman is the household head	-0.14092	0.23324	-0.09235
If the woman is engaged in paid labour	0.27259	0.11753	0.04023
Difference between the wage of the woman and her husband	0.26960	0.15450	-0.02979

Source: Author's Calculation using the 1SSER data, (2021)

The index for women's bargaining power is therefore calculated as:

$$BPI = 0.02150 * edu\_diff + 0.18516 * age\_diff + 0.23324 * head + 0.11753 * paid\_work + 0.15450 * inc\_diff$$

Finally, in order to ease interpretation, the index is scaled between 0–100. Zero (0) indicates the least bargaining power while a value of 100 denotes maximum power. From Figure 6.1, it can be observed that, majority of observations fall below the 50th percentile. The overall mean of the bargaining power index is 40.771 percent which implies that on the average, women have low bargaining power in both samples. The average bargaining power for a woman in ISSER sample is about 41 percent and that of the LEAP sample is approximately 39 percent.

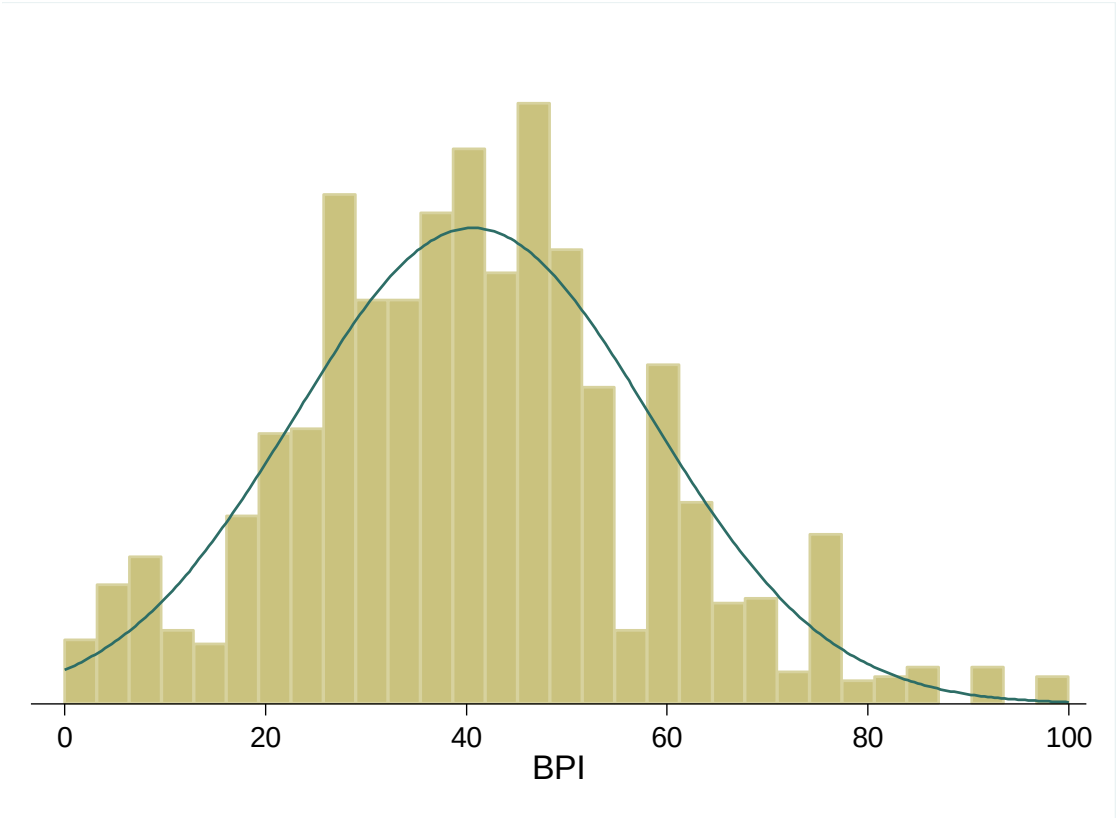

Figure 6.1: Distribution of index of Women's Bargaining Power
Source: Author's construct using the 1SSER data, (2021)

6.2.3 Empirical Results and Discussion

This section is in two parts: the first part presents the empirical results which pertains to the research objectives and the second part discusses the empirical results.

6.2.3.1 Presentation of Results

Cash Transfers, Women's Bargaining Power and Labour Force Participation

Table 6.6 presents the logistic regression results on the relationship between cash transfers, women's bargaining power and labour force participation. In Model (1), we first analyse the relationship between the LEAP grant and the labour force participation of wives and husbands. Model (2) shows the relationship between women's bargaining power and labour force participation and in Model (3), we assess how these two variables affect the labour force participation of wives and husbands.

In Model (1), we find that, there is a negative relationship between cash transfers and labour force participation of men since the odds ratio is 0.594 (less than 1). The negative relationship means that the odds of labour force participation for men reduces when the household receive the cash transfer. In other words, in households that received the LEAP grant, men have 0.594 odds of reducing their labour force participation. In terms of actual probabilities[6], men who live in households that received the LEAP grant have 35% chance of reducing their labour supply. The marginal effect estimates in Model 1 of appendix Table A7 shows that in households

[6] The actual probability is calculated as, $(\frac{odds\ ratio}{1+odds\ ratio}) * 100$

that receive the LEAP grant, a percentage increase in the grant reduces the probability of participating in the labour market by 52 percentage points.

In Model (2), we realise that there is a positive relationship between women's bargaining power and labour force participation for both wives and husbands (the odds ratio for wives is 1.019 and that of husbands is 1.028). This implies that the odds of labour force participation increase as the bargaining power of women increases. The actual probabilities indicate that, as women's bargaining power increases men have 51% chances of participating in the labour market and that of women is 50%. In appendix Table A7 (Model 2) where we estimate the marginal effect, we find that a percentage increase in the bargaining power of women increases the probability of labour force participation of men by about 3 percentage points and that of women is about 2 percentage points.

In Model (3), we estimate a regression model that includes the treatment dummy as well as the bargaining power index. Even though the treatment dummy is not significant for both women and men, the bargaining power index is still significant and positive (the odds ratio is 1.019 and 1.026 for women and men respectively). The results indicate that the odds of participating in the labour market increases as the bargaining power of women increases. In appendix Table A7 under Model 3, we observe that a percentage increase in the bargaining power of women increases the probability of labour force participation of men by about 3 percentage points and that of women is about 2 percentage points.

Table 6.6: Logistic Regression of the Relationship between Cash Transfers, Women's Bargaining Power and Labour Force Participation (without covariates)

	Model (1)		Model (2)		Model (3)	
Variables	P_w	P_m	P_w	P_m	P_w	P_m
Post-treatment period=2012	0.791	1.557	0.774	1.429	0.765	1.475
	(0.250)	(0.430)	(0.240)	(0.382)	(0.241)	(0.386)
Treatment=1	0.968	0.594*			1.126	0.746
	(0.322)	(0.168)			(0.392)	(0.182)
Women's BPI			1.019***	1.028***	1.019***	1.026***
			(0.005)	(0.006)	(0.006)	(0.005)
Constant	0.029***	0.115***	0.023***	0.067***	0.022***	0.079***
	(0.008)	(0.031)	(0.006)	(0.016)	(0.008)	(0.024)
Observations	2,621	2,621	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation using the 1SSER data, (2021)

Table 6.7 presents the logistic regression model on the impact of the LEAP programme on the labour force participation with women's bargaining power and no other covariates. In Model (1), we estimate a regression model with only the treatment dummy and introduce the interaction term, *Treatment*Time*, which measures the impact of the LEAP grant. We can infer from the Table that, both the time variable, the treatment dummy as well as the interaction term are all not significant for both wives and husbands.

In Model (2), we introduce the bargaining power index into the regression model. The treatment variable as well as the interaction term is still not significant but the

bargaining power index is positive (the odds ratio is 1.019 and 1.026 respectively for wives and husbands. This implies that, the odds of labour force participation for both men and women increase as the bargaining power of women increases. Whereas women have 50% chance of participating the labour as their bargaining power increases, that of men is 51 %. Furthermore, Model 3 of appendix Table A8 which reports the marginal effects shows that, a percentage increase in the bargaining power of women increases the probability of labour force participation of men by about 3 percentage points and that of women is about 2 percentage points. This result is similar to what was obtained in Table 6.6 thus indicating that the result is robust.

Table 6.7: Logistic Regression of the Impact of Cash Transfers on Labour Force Participation (with women's bargaining power and no other covariates)

	Model (1)		**Model (2)**	
Variables	P_w	P_m	P_w	P_m
Post-treatment period=2012	1.134 (0.606)	1.793 (0.901)	0.979 (0.538)	1.498 (0.704)
Treatment=1	1.314 (0.627)	0.713 (0.292)	1.383 (0.664)	0.760 (0.326)
Treatment*Year	0.554 (0.361)	0.755 (0.414)	0.669 (0.448)	0.971 (0.498)
Women's BPI			1.019*** (0.006)	1.026*** (0.005)
Constant	0.024*** (0.009)	0.106*** (0.039)	0.020*** (0.008)	0.078*** (0.031)
Observations	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation using the 1SSER data, (2021)

In Table 6.8, we examine the impact of cash transfers on the labour force participation by taking into account women's bargaining power as well as other covariates that

affect labour market decision.

In Model (1), we observe that the LEAP grant does not affect labour force participation decision of wives and husbands even if we control for intra-household bargaining. Women's bargaining power remains significant and positive, the odds ratio is 1.020 and 1.030 for women and men respectively. This means that the odds of labour force participation for women and men increase as the bargaining power of the woman increases. These results are similar to what is reported in Tables 6.6 and Table 6.7. The marginal effects estimates presented in appendix Table A10 shows that a percentage increase in the bargaining power of women increases the probability of labour participation of men by about 3 percentage points. For women, as their bargaining power increases by one percentage point, it increases the probability of participating in the labour market by about 2 percentage points.

In Model (2), we include other covariates that may influence labour force participation. These are: the number of children in the household, income from agricultural activities and non-farm enterprise, debt status of the household and whether or not the household receives remittances. We only report the variables of interest but the full regression model is presented in appendix Table A9. We observe that the results do not change even if other covariates are introduced into the regression model as shown in Model (2). The odds ratio indicates that, the bargaining power index is statistically significant and positive for both men and women. Hence the odds of labour force participation increase as the women's bargaining power increases. In appendix Table A10, we observe that a percentage increase in the bargaining power of women increases the probability of labour force participation of

men by about 3 percentage points and that of women is also about 3 percentage points.

Table 6.8: Logistic Regression of the Impact of Cash Transfers on Labour Force Participation (with women's bargaining power and other covariates)

	Model (1)		Model (2)	
Variables	P_w	P_m	P_w	P_m
Post-treatment period=2012	0.972 (0.537)	1.456 (0.682)	1.474 (0.440)	1.893 (1.166)
Treatment=1	1.387 (0.667)	0.767 (0.337)	1.910 (1.413)	0.814 (0.414)
Treatment*Year	0.683 (0.480)	1.085 (0.536)	0.525 (0.397)	0.901 (0.561)
Women's BPI	1.020*** (0.007)	1.030*** (0.006)	1.027** (0.012)	1.028*** (0.011)
Treatment*Women's BPI * Year	0.997 (0.013)	0.990 (0.008)	0.992 (0.027)	0.990 (0.015)
Constant	0.019*** (0.008)	0.073*** (0.031)	0.022*** (0.018)	0.059*** (0.029)
Observations	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands.
Robust standard errors in parentheses for Model (1) but for model (2) robust standard errors are clustered at the household level.
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation using the 1SSER data, (2021)

Cash Transfers, Women's Bargaining Power and Daily Hours of Work

In this section, we explore the impact of the LEAP grant on the number of hours worked daily by couples. The purpose of this analysis is to examine how much beneficiaries of cash transfers work or the intensity of work of participating workers. Table 6.9 examines the relationship between the of the LEAP grant, women's bargaining power and daily hours of work.

Model (1) presents the results on the relationship between the LEAP grant and hours of work for husbands and wives. The results show that the grant does not significantly affect the labour supply of both men and women as measured by daily hours of work.

In Model (2), we examine the relationship between women's bargaining power and daily hours of work. The results indicate that, women's bargaining power is significant and positively affects the labour supply of couples. For husbands, a percentage increase in the bargaining power of women makes them increase their daily working hours by 0.2 percentage points and for women, a percentage increase in their bargaining power makes them increase their daily hours of work by 1 percentage point.

In Model (3), we examine the relationship between cash transfers and labour supply by controlling for women's bargaining power. The results show that the LEAP grant does not significantly affect the daily hours of work of both husbands and wives. However, women's bargaining power is still significant and positive. The results show that a percentage increase in women's bargaining power increases the daily hours of men by 0.2 percentage point and that of women is 1 percentage point.

Table 6.9: OLS Regression of the Relationship between Cash Transfers, Women's Bargaining Power and Daily Hours of Work (without covariates)

	Model (1)		Model (2)		Model (3)	
Variables	h_w	h_m	h_w	h_m	h_w	h_m
Post-treatment period=2012	0.095 (0.065)	-0.020 (0.020)	0.069 (0.057)	-0.021 (0.020)	0.080 (0.057)	-0.021 (0.020)
Treatment=1	-0.136 (0.083)	0.003 (0.020)			-0.075 (0.064)	0.016 (0.021)
Women's BPI			0.010*** (0.003)	0.002*** (0.001)	0.009*** (0.003)	0.002*** (0.001)
Constant	0.297*** (0.073)	0.074*** (0.020)	0.160*** (0.046)	0.063*** (0.017)	0.204*** (0.064)	0.063*** (0.017)
Observations	2,621	2,621	2,621	2,621	2,621	2,621
R-squared	0.009	0.001	0.047	0.007	0.049	0.007

h_w and h_m represent the daily working hours of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculation using the 1SSER data, (2021)

In Table 6.10, we examine the impact of the LEAP grant on the daily hours of work by introducing into the regression model the interaction term *Treatment*Year* which measures the impact of the LEAP grant and also in Model (2), we control for women's bargaining power. It can be observed in Model (1) that, the LEAP grant does not have any significant impact on the daily hours of work of men and women. However, we still find that there is a strong positive relationship between women's bargaining power and daily hours of work of both husbands and wives. In Model (2), we observe that, the coefficient of the interaction term, *Treatment*Year* which measures the impact of the LEAP programme is not significant. The results however show that women's bargaining power is significant and positively affects the labour supply of couples. Similar to Table 6.9, the results show that a percentage increase in

women's bargaining power increases the daily hours of men by 0.2 percentage point and that of women is 1 percentage point.

Table 6.10: OLS Regression of the Impact of Cash Transfers on Daily Hours of Work (with women's bargaining power and no other covariates)

	Model (1)		Model (2)	
Variables	h_w	h_m	h_w	h_m
Post-treatment period=2012	-0.005	0.161	0.105	-0.017
	(0.033)	(0.153)	(0.129)	(0.034)
Treatment=1	0.017	-0.075	-0.052	0.022
	(0.033)	(0.094)	(0.093)	(0.033)
Treatment*Year	-0.024	-0.109	-0.042	-0.010
	(0.041)	(0.159)	(0.134)	(0.043)
Women's BPI			0.009***	0.002***
			(0.003)	(0.001)
Constant	0.066***	0.264***	0.191**	0.051**
	(0.025)	(0.088)	(0.089)	(0.025)
Observations	2,621	2,621	2,621	2,621
R-squared	0.001	0.010	0.049	0.007

h_w and h_m represent the daily working hours of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculation using the 1SSER data, (2021)

In Table 6.11, we examine the impact of the LEAP grant on the daily hours of work of couples by taking into account women's bargaining power as well as other covariates that have the potential of influencing labour supply. In Model (1), we observe that the LEAP grant does not affect the daily working of wives and husbands even if we control for intra-household bargaining. The index for women's bargaining power is still significant and positive.

In Model (2) we include: the number of children in the household, income from agricultural activities and non-farm enterprise, debt status of the household and

whether or not the household receives remittances in the regression model. Table 6.11 however reports results on the variables of interest but the full regression model is shown in appendix Table A11. We observe that the results do not change when even other covariates are introduced into the regression model as shown in Model (2). For both models we observe that, a percentage increase in women's bargaining power increases the daily hours of work of women by 0.2 percentage point and that of men is 1 percentage point.

Table 6.11: OLS Regression of the Impact of Cash Transfers on Daily Hours of Work (with women's bargaining power and other covariates)

	Model (1)		Model (2)	
Variables	h_w	h_m	h_w	h_m
Post-treatment	-0.018	0.094	-0.008	0.141
period=2012	(0.034)	(0.124)	(0.020)	(0.182)
Treatment=1	0.022	-0.047	0.025	-0.046
	(0.033)	(0.093)	(0.047)	(0.119)
Treatment*Year	-0.009	-0.011	-0.008	-0.048
	(0.043)	(0.123)	(0.048)	(0.168)
Women's BPI	0.002**	0.011***	0.002*	0.010*
	(0.001)	(0.003)	(0.001)	(0.006)
Treatment*Women's BPI *	-0.000	-0.006	-0.001	-0.005
Year	(0.002)	(0.004)	(0.003)	(0.007)
Constant	0.050**	0.176*	0.074*	0.175*
	(0.025)	(0.090)	(0.044)	(0.104)
Observations	2,621	2,621	2,621	2,621
R-squared	0.008	0.057	0.019	0.115

h_w and h_m represent the daily working hours of wives and husbands.
Robust standard errors in parentheses for Model (1) but for model (2) robust standard errors are clustered at the household level.
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculation using the 1SSER data, (2021)

6.2.3.2 Discussion of the Results

To begin with, it can be inferred from the regressions that, the LEAP grant does not significantly affect the supply of labour of husbands and wives as measured by labour force participation as well as intensity of participation. These results conflict previous studies (Osei & Lambon-Quayefio, 2021; Mochiah *et al.,* 2014) who found that LEAP grant had a significant positive impact on labour supply. These conflicting results could be attributed to the fact all the earlier studies were based on the unitary household model but this analysis is based on the cooperative household bargaining model hence the sample used for this analysis is restricted only to only couples who live in the same household. Notwithstanding, other studies around the world have found similar results, for instance, Novella *et al.,* (2012) found that conditional cash transfers had an insignificant impact on labour supply even when heterogeneity resulting from the distribution of power in the household was considered.

According to Fiszbein *et al.,* (2009), conditional cash transfers do not always influence the labour supply of adults. This is because beneficiaries of cash transfers are mostly poor households whose income elasticity of leisure is relatively low. In this case beneficiary households are less likely to substitute work for leisure. As noted earlier, the beneficiaries of the LEAP grant were selected from extremely poor households who constitute the lowest 20 percent of the country's extremely poor households hence they may not necessarily respond to the cash transfer by reducing labour supply.

Furthermore, Handa *et al.,* (2013) highlighted some irregularities regarding the payment of the LEAP benefit over the two-year evaluation period. The benefits were

paid regularly during the first year of the evaluation until May 2011. In fact, payments were not made for eight months. In order to cover the outstanding arrears, a triple payment was made in February 2012. This was to cover for unpaid benefits between May to October 2011. Benefits were paid regularly in April 2012 in order to clear the arrears incurred in November to December 2011. The irregularities in the payment of the benefits made the grant unreliable. In this case, beneficiaries might perceive the grant as temporary rather than permanent income source hence they may not alter their labour supply decisions (Fiszbein *et al.*, 2009).

Apart from the payment irregularities, the authors also noted that, the value of the grant was relatively low since the cumulative rate of inflation over the evaluation period was 19 percent. This implies that the value transfer which was already low was being eroded by inflation. All these factors might have resulted in the insignificant impact of LEAP grant on the labour supply.

Regarding intra-household bargaining, the results indicate that, women's bargaining power significantly affects the labour supply for both wives and husbands in all the regressions. A percentage increase in women's bargaining positively affects the labour supply. This result confirms the findings of Noman *et al.*, (2018) as well as Heath & Tan (2020). According to Novella *et al.*, (2012), when a woman has more bargaining power, it allows her to overcome her traditional gender roles. This enables her to supply more labour. For husbands, as the bargaining power of the woman increases, they supply more labour through a standard income effect under either cooperative and non-cooperative household models (Bergolo & Galvan, 2018).

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

This chapter presents the summary, conclusions and recommendations emanating from the thesis. The summary presents an overview of the background of the thesis, the research problem, objectives, methodology and findings. The concluding section encapsulates the outcomes in terms of the findings for each of the empirical chapters and based on these outcomes, some policy recommendations have been derived. The section also presents some limitations to the thesis which offers directions for future research.

7.1 Summary and Conclusions

Many countries all over the world are experiencing increasing rate of inequality despite declining absolute poverty rate and Ghana is not an exception to this. Although empirical literature does not provide a definite conclusion about the effect of inequality on the macro economy, there is increasing evidence that inequality does not encourage economic development. That is, inequality makes poor people unable to invest in the development of their human capital, generates both economic and political instability which negatively affect investment, impedes social consensus essential to adjust to shocks in order to sustain economic growth, and above all, inequality slows economic growth.

Governments as well as international bodies have therefore become concerned about how to address this problem. This is why Goal 10 of the SDGs seeks to reduce inequality. In order to achieve this objective, governments are required to reach out to

individuals or groups who are the deprived in order to prioritise their needs. This therefore calls for more innovative policies that could be implemented in order to achieve this goal since inequality can be tackled deliberately by using government policies. Redistribution via fiscal policies are the primary instruments that most governments employ to influence income distribution directly.

Another dimension of the redistribution literature is to ascertain the factors that influence the magnitude of redistribution that is observed across the globe. Meltzer and Richard (1981) postulates that if the policy space is unidimensional and voters' utility functions are single-peaked over the policy dimension, then the voter whose ideal position is the median in the preference distribution will be pivotal in majority decision-making. This implies that in democratic politics, higher initial inequality should positively affect redistribution. However empirical studies on the relationship between redistribution and inequality have found inconsistent results. This thesis seeks to re-test the median voter theorem and also account for other potential factors that might influence the extent of redistribution.

While the redistributive impact of tax and transfer policies seems to affect inequality directly, the anticipated impact may not always be straight-forward should the behavioural changes of economic agents be considered. This is because social protection programmes are perceived to create a 'dependency syndrome' by discouraging beneficiaries to engage in productive economic activities. Accounting for the behavioural responses of beneficiaries of social policies is important in order to reduce the bias associated in measuring the impact of a policy, and therefore eliminates inaccurate policy recommendations.

In general, this thesis investigates the role cash transfers and taxes as policy instruments for redistribution. Specifically, we examine the following issues: the extent to which a hypothetical child benefit policy affects income redistribution; the determinants of redistribution; and the impact of cash transfers on labour supply decisions of beneficiaries.

The first objective of the thesis provides a first attempt to empirically quantify the redistributive impact of a child support grant. Additionally, we estimate the cost involved in implementing this policy. To achieve the objectives of social policies and to ensure its sustainability, the literature indicates that the design of the policy as well as the method of funding the programme play a major role. With regard to policy design, emphasis has been placed on the selection of the programme's beneficiaries. Two main questions have been raised: should cash transfers be universal or targeted at poor households only? and must the amount of cash transfers be the same for all households or be differentiated based on certain conditions (for instance the level of income or demographic characteristics)? These questions remain unanswered hence in designing the child support grant module, all three policy scenarios are examined: — a targeted child support grant, a universal child support with flat benefits and a universal child support with differentiated benefits.

Redistribution is defined as the absolute difference between the inequality measure before and after taxes and transfers. In assessing the progressivity of the transfer, we employ the concentration curves and indices. Ensuring equality in the distribution of income involves poverty reduction hence we also assess the impact of the child

support grant on poverty using the FGT poverty measures. Ghana tax-benefit microsimulation model (GHAMOD) is used for all the simulations.

The simulations results indicate that, universal child benefits where benefit amounts are differentiated is the most effective child benefit scheme to reduce inequality even though it costs the most. In general, the results indicate the existence of a trade-off between fiscal cost and the extent of redistribution or inequality reduction. This implies that the redistributive effect of a policy does not only depend on the extent of progressivity of the transfer but also depends on the relative size of the transfer. Again, the simulations for the income tax reform indicate that increasing the tax rate for the top income bracket provides an avenue of raising revenue to fund the proposed programme and also ensures that the ultimate goal of income redistribution is achieved.

The second research objective examines the factors that affect redistribution. It first tests the validity of the median voter hypothesis and also accounts for some factors that might affect the extent of redistribution. By using the WIID data, we find a significant positive relationship between redistribution and market income inequality. Different model specifications confirm this result. Thus, confirming the validity of the median voter theorem. Furthermore, we find that a country's income level, fertility rate as well as trade openness positively affect the extent of redistribution. With respect to the level of democracy, we find that more democratic countries tend to have lower redistribution.

The third objective of the thesis attempts to evaluate the labour supply responses of beneficiaries of cash transfer programmes based on the cooperative household

bargaining model. The analysis is built on the assumption that, besides the regular channels through which cash transfers may influence the labour supply decisions of beneficiary households, the intra-household bargaining framework provides an additional dimension of evaluating households labour market responses to the LEAP transfer programme but this has not been explored in the literature.

The chapter employs the LEAP programme evaluation dataset collected by ISSER in partnership with the University of North Carolina. The sample for the analysis was however restricted to individuals who were observed as living as a couple in the same household. Factor analysis technique was used to construct an index to represent women's bargaining power. Indicators which are linked to the woman's threat point or fall-back position in terms of cooperative household bargaining were used in generating the index. Labour supply was measured by using two indicators. These include; labour force participation and daily hours of work. The empirical analysis was based on the difference-in-difference approach within a multivariate framework whiles controlling for baseline characteristics. All the regressions were weighted using the inverse probability weighting technique in order to avoid any imbalance in the baseline characteristics.

The regression models show that the LEAP grant does not significantly affect the labour supply decisions of couples. The bargaining power index is significant and positively affects the labour supply of husbands and wives. The results suggest that as the bargaining power of women increases, it allows them to overcome their traditional gender roles which enables them supply more labour. For husbands, an increase in the

bargaining power of their wives prevents them from substituting work for leisure hence, they supply more labour.

7.2 Policy Recommendations

Over the years, Ghana has been experiencing an increasing growth rate accompanied by a declining poverty rate. However, as noted by Ravallion (2005), "*growth is quite a blunt instrument against poverty unless that growth comes with falling inequality".* This implies that the government must take pragmatic steps to address the problem otherwise inequality will eventually make the growth rate unsustainable, thereby undermining the efforts made in reducing the incidence of poverty. It is also important to note that inequality, as well as poverty, take on an intergenerational dimension hence policies aimed at addressing inequality must focus on children. Hence, the government through the Ministry of Gender, Children and Social Protection should implement a universal child support grant programme with differentiated benefit in order to ensure that inequality and poverty are not perpetuated. In order to sustain the policy in terms of funding, the Ministry of Finance and Economic Affairs in conjunction with the Ghana Revenue Authority should increase PIT rate for the top income bracket since this could generate enough revenues to finance the cost of the proposed policy. Again, taxing the rich to finance the programme further reduces the extent of income inequality.

The findings indicate that the child support grant is able to reduce inequality and poverty. But the extent of reduction differs with respect to the design of the policy as well as the method of funding the programme. A targeted child support grant although progressive and least costly, is an ineffective instrument to address the problem of

inequality since this policy only results in an insignificant reduction in inequality and also has no impact on poverty headcount. Hence for a tax / benefit system to yield a strong impact on income distribution, the policy has to cover a greater percentage of the population. This increases magnitude of redistribution. Based on the results from the microsimulation, the study recommends that, the government, through the Ministry of Gender, Children and Social Protection should consider implementing a universal child support with differentiated benefit in order to reduce the rate of inequality.

Furthermore, in order to finance the cost of the proposed policy, the study recommends that the Ministry of Finance and Economic Planning through the Ghana Revenue Authority should reform the structure of the personal income tax rate. The study proposes a tax structure that will not only generate revenues, but will also reduce inequality. For instance, a tax structure such as that simulated in this study increases the tax rate for the third income-bracket from 10% to 12.3%, for the fourth income bracket, from 17.5% to 18.3% and for the fifth income bracket, from 25% to 29%.

Also, knowing that women's bargaining power significantly affects the labour supply decisions of household members implies that women need to be empowered. The study recommends that the Ministry of Gender, Children and Social Protection in collaboration with the Ministry of Education should for instance, set up more training and vocational centers for women. This will enable them develop their human capital so they can be financially independent and thus increase their bargaining power at home.

7.3 Limitations of the Study

With regard to the first paper, the focus has only been on the direct policy effects, otherwise known as the "morning after" effects of policy reforms without considering the indirect effect that is the behavioural responses to cash transfers and tax policy reforms. The assumption of "no behavioural response" may overestimate the extent of redistribution that can be achieved through fiscal policies.

Another problem with GHAMOD is that, it does not account for tax evasion. But there is a problem regarding the filing of tax returns which is widespread in the country because of the large informal sector. The model only takes this into account partially, by calculating direct taxes for those workers who work in the formal sector. For these workers, the model assumes full compliance which may result in overestimation of the simulated taxes. Furthermore, the huge informal sector also makes it difficult to obtain accurate income data. Hence gross income data used in GHAMOD were not directly obtained from input data but imputed using inverse calculations from net incomes recorded in the dataset. Thus, the model developers encourage that all simulation results should be compared to the baseline situation in the model, not to external data.

Regarding the second empirical paper, the two-year interval for the impact evaluation analysis is quite short for beneficiaries to completely alter their labour supply decisions. This could explain why in all cases, the impact cash transfer had statistically insignificant impact on labour supply when other intervening factors were not controlled for.

Lastly, since majority of observations in the WIID data are from developed countries, it is difficult to examine redistribution in developing countries alone due to limited data.

Owing to the above limitations, the results must be interpreted with caution. Nevertheless, these limitations by no means invalidate the findings.

7.4 Future Research

Future studies based on ex-ante analysis must incorporate second-round effect which captures behavioural responses so as to assess the full impact of any redistributive policy. Again, in evaluating household behavioural responses to the LEAP programme, researchers are encouraged to employ an updated version of the LEAP data in order to examine long term impact of cash transfers since the two-year interval is quite short.

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APPENDICES

Table A1: List of countries used in the Panel Analysis

Argentina	Australia	Austria	Bangladesh
Belgium	Bolivia	Brazil	Burkina Faso
Cameroon	Canada	Chile	China
Costa Rica	Czech	Denmark	Ecuador
Egypt	El Salvador	Estonia	Ethiopia
Finland	France	Gambia	Germany
Ghana	Greece	Guatemala	Guinea
Hungary	Iceland	India	Indonesia
Ireland	Israel	Italy	Japan
Korea, Republic of	Latvia	Lesotho	Lithuania
Luxembourg	Madagascar	Mali	Mauritania
Mexico	Nepal	Netherlands	New Zealand
Nigeria	Norway	Peru	Philippines
Poland	Portugal	Russia	Slovakia
Slovenia	South Africa	Spain	Sri Lanka
Sweden	Switzerland	Taiwan (China)	Turkey
Uganda	Ukraine	United Kingdom	United States
Uruguay	Zambia	Zimbabwe	

Source: World Income Inequality Database (WIID), version 3.3

Table A2: Classification of Countries (World Bank)	**Frequency**
North America	2
Latin America and the Caribbean	11
Europe and Central Asia	29
Middle East and North Africa	2
Sub-Saharan Africa	15
South Asia	4
East Asia and the Pacific	8
Total	71

Source: World Income Inequality Database (WIID), version 3.3

Table A3: Breakdown of Countries in Terms of Income Group

Income Group	Frequency
High income	37
Low income	9
Lower middle income	15
Upper middle income	10
Total	71

Source: World Income Inequality Database (WIID), version 3.3

Table A4: Probit result of selection into treatment (LEAP) at baseline (2010)

Variable	Coefficient	Standard Error
Demographics		
Number of household members under 5 years	0.031	-0.055
Number of household members 6-12 years	0.022	-0.045
Number of household members 13-17 years	-0.021	0.054
Number of orphans	0.211***	-0.054
Number of males 18-64 years	0.244***	-0.066
Number of females 18-64 years	-0.112*	-0.062
Number of males above 64 years	1.026***	-0.154
Number of females above 64 years	0.396***	-0.101
Household head characteristics		
Sex		
Female (reference)		
Male	-0.292**	0.139
Age		
17-24 years (reference)		
25-64 years	-0.364	0.237
Above 64 years	-1.018***	0.268
Marital Status		
Widowed	0.321***	0.115
Married	-0.084	0.114

Table A4 Continued

Variable	Coefficient	Standard Error
Educational Status		
Never attended school (Yes)		
Has never attended school (No)	-0.570***	0.092
Household Financial Status		
Log of per capita expenditure	-0.238***	0.052
Debt Status		
Owing (No, reference)		
Owing (Yes)	0.373***	0.096
Remittances		
No (reference)		
Yes	0.331***	0.087
Income Sources		
Log of non-farm enterprise income	0.161***	0.020
Log of agric income	-0.053***	0.019
Log of monthly wages	-0.150	0.126
Household Assets		
Asset Index (PCA index of durable assets)	-0.011	0.011
Labour Activities (log of hours worked)		
Wage Labour (adults)	0.161	0.152
Agric Labour		
Permanent labour (men)	0.262***	0.085
Permanent labour (women)	-0.041	0.090
Casual labour (men)	0.030	0.044

Table A4 Continued

Casual labour (women)	0.229***	0.077
Family labour (men)	0.022	0.044
Family labour (women)	-0.043	0.042
Dwelling Characteristics		
Source of light is candles/torches(flashlight)	0.099	0.098
Cooking fuel is wood	-0.276***	0.097
No exclusive room for cooking	0.202**	0.085
Refuse is disposed at a public dump	0.919***	0.087
Source of water is borehole	-0.105	0.084
No toilet facility (bush, beach)	0.215**	0.097
Floor is made of earth/mud/mud bricks	0.307***	0.097
Number of household members per room	0.050	0.087
Roofing material is iron sheets	-0.184*	0.099
Wall is made of mud/mud bricks	0.735***	0.082
Constant	0.193	0.523
Number of observations	1455	

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

Source: Author's Computation using GLSS6, (2020)

Table A5: Mean Baseline Characteristics, Imbalance and Reweighting

		Mean			% reduct		
		Treated	Control	%bias	| bias |	t-test	p>|t |
Demographics							
# hhld members under 5	U	.489	.510	-2.6		-0.48	0.629
years	M	.473	.490	-2.1	19.3	-0.35	0.730
# hhld members under	U	.831	.801	2.9		0.54	0.591
6-12 years	M	.806	.837	-3.0	-5.4	-0.47	0.638
# hhld members under	U	.589	.520	8.5		1.60	0.110
13-17 years	M	.565	.555	1.3	85.2	0.20	0.845
Number of Orphans	U	.365	.203	20.0		3.89	0.000
	M	.315	.315	0.1	99.6	0.01	0.990
Number of males 18-64	U	.543	.523	2.7		0.50	0.614
years	M	.513	.525	-1.5	42.1	-0.24	0.812
Number of females 18-	U	.840	.910	-8.9		-1.66	0.098
64 years	M	.832	.858	-3.3	62.8	-0.51	0.612
Number of males above	U	.281	.203	17.9		3.41	0.001
64 years	M	.261	.226	8.1	55	1.27	0.206
Number of females	U	.509	.349	30.5		5.73	0.000
above 64 years	M	.479	.534	-8.5	72.2	-1.22	0.222
Household Head Characteristics							
Gender							
Female (reference)	U	.412	.494	-16.5		-3.09	0.002
	M	.425	.415	2.1	87.4	0.33	0.741
Age							
17-24 yrs (reference)							
25-64 yrs	U	.489	.574	-17.0		-3.19	0.001
	M	.475	.487	-2.3	86.5	-0.36	0.717
Above 64yrs	U	.479	.396	16.7		3.12	0.002
	M	.493	.467	5.2	68.5	0.82	0.412

Table A5 Continued

		Mean			% reduct		
		Treated	Control	%bias	| bias |	t-test	p>|t |
Marital Status							
Widowed	U	.376	.262	24.8		4.69	0.000
	M	.375	.342	7.1	71.5	1.08	0.280
Married	U	.371	.444	-14.7		-2.75	0.006
	M	.373	.371	0.5	96.8	0.08	0.939
Educational Status							
Has never attended school (Yes, reference)							
No	U	.319	.502	-38.0		-7.06	0.000
	M	.349	.372	-4.7	87.5	-0.76	0.450
Financial Status							
Log of household per	U	4.551	4.813	-31.0		-5.79	0.000
capita expenditure	M	4.603	4.598	0.6	98.0	0.09	0.930
Debt Status							
Owing (no, reference)							
Yes	U	.253	.192	14.8		2.79	0.000
	M	.246	.271	-6.1	58.8	-0.91	0.361
Remittances							
No (reference)							
Yes	U	.596	.461	27.4		5.11	0.000
	M	.589	.597	-1.7	93.9	-0.27	0.789
Income Sources							
Log of non-farm	U	1.174	.502	35.2		6.64	0.000
enterprise income	M	1.028	1.192	-8.6	75.6	-1.11	0.267
Log of agric income	U	1.788	2.304	-18.7		-3.47	0.001
	M	1.909	1.814	3.4	81.7	0.56	0.578
Log of monthly wages	U	2.413	2.478	-10.5		-1.91	0.056
	M	2.409	2.441	5.2	50.2	-0.90	0.369

Table A5 Continued

		Mean		% reduct			
		Treated	Control	%bias	| bias |	t-test	p>|t |
Asset Index	U	.050	.022	0.8		0.15	0.883
	M	.072	.379	-8.9	-968.7	-1.14	0.254
Labour Activities (Log of Hours Worked)							
Wage Labour (Adults)	U	.126	.145	-3.6		-0.68	0.498
	M	.095	.125	-5.6	-53.5	-0.98	0.327
Hours worked in household farming in the last major season							
Permanent labour (men)	U	.159	.104	9.6		1.84	0.067
	M	.151	.169	-3.1	68.2	-0.44	0.662
Permanent labour	U	.113	.103	1.9		0.35	0.726
(women)	M	.119	.132	-2.5	-31.5	-0.36	0.722
Casual labour (men)	U	.933	1.003	-6.0		-1.12	0.263
	M	.949	.938	0.9	84.3	0.15	0.882
Casual labour (women)	U	.182	.134	8.8		1.68	0.093
	M	.169	.194	-4.7	47.3	-0.68	0.499
Family labour (men)	U	1.110	1.261	-10.7		-2.00	0.045
	M	1.156	1.146	0.7	93.5	0.11	0.913
Family labour (women)	U	1.171	1.378	-15.0		-2.81	0.005
	M	1.187	1.158	2.1	86.2	0.33	0.743
Housing Characteristics							
Source of light is	U	.249	.236	2.9		0.55	0.583
candles/torch	M	.250	.232	4.0	-37.9	0.64	0.522
Cooking fuel is wood	U	.695	.765	-15.8		-2.98	0.003
	M	.695	.671	5.3	66.7	0.79	0.429
No exclusive room for	U	1.680	1.589	19.0		3.53	0.000
cooking	M	1.657	1.657	0.0	99.8	0.01	0.996
Refuse is disposed at a	U	.734	.440	62.6		11.58	0.000
public dump	M	.701	.714	-2.9	95.4	-0.47	0.640
Source of water is	U	.436	.456	-4.0		-0.76	0.450
borehole	M	.427	.391	7.4	-82.0	1.18	0.239

Table A5 Continued

		Mean		% reduct			
		Treated	Control	%bias	| bias |	t-test	p>|t |
No toilet facility (bush,	U	.300	.281	4.1		0.77	0.440
beach)	M	.289	.278	2.4	41.4	0.38	0.700
Floor is made of	U	.359	.277	17.9		3.37	0.001
earth/mud/mud bricks	M	.319	.276	9.4	47.7	1.50	0.133
Number of household	U	.595	.580	2.9		0.54	0.592
members per room	M	.598	.604	-1.3	56.4	-0.18	0.857
Roofing material is iron	U	.635	.692	-12.1		-2.27	0.023
sheets	M	.675	.700	-5.4	55.3	-0.87	0.385
Wall is made of	U	.676	.391	59.7		11.14	0.000
mud/mud bricks	M	.635	.585	10.4	82.5	1.62	0.106

Note: U-unmatched, M-matched
Source: Author's Computation using GLSS6, (2020)

Table A6: Testing of balance between LEAP and non-LEAP Households after PSM Estimation

Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias
Unmatched	0.290	569.86	0.000	16.2	14.8
Matched	0.014	20.00	0.993	4.0	3.2

Source: Author's Computation using GLSS6, (2020)

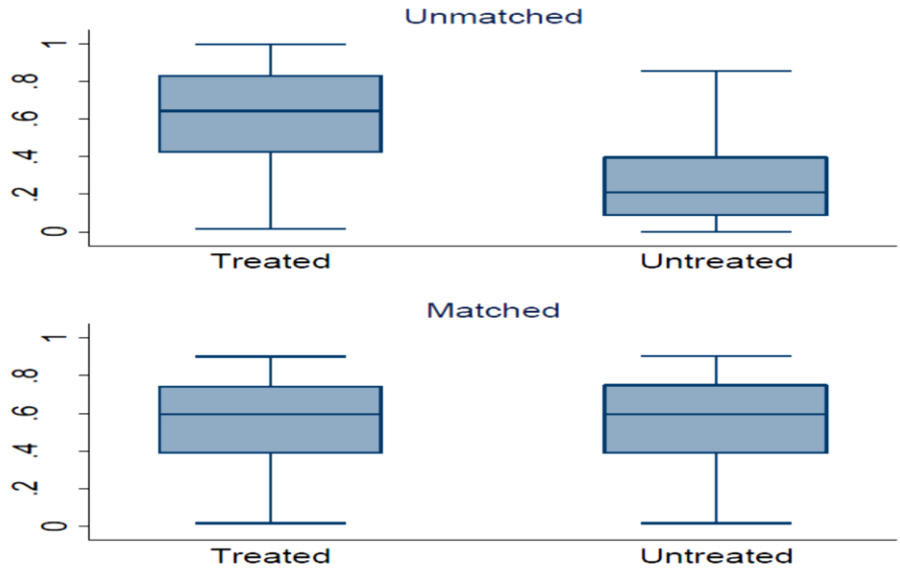

Figure A1: Box Plot of the Propensity Score for the Two Groups
Source: Author's Construct using GLSS6, (2020)

Table A7: Relationship between Cash Transfers, Women's Bargaining Power and Labour Force Participation, without covariates (Marginal Effects from the Logistic Regression)

	Model (1)		Model (2)		Model (3)	
Variables	P_w	P_m	P_w	P_m	P_w	$P_{,m}$
Post-treatment period=2012	-0.234	0.443	-0.254	0.360	-0.265	0.391
	(0.316)	(0.276)	(0.310)	(0.267)	(0.315)	(0.262)
Treatment=1	-0.033	-0.521*			0.117	-0.292
	(0.333)	(0.282)			(0.348)	(0.244)
Women's BPI			0.019***	0.027***	0.019***	0.026***
			(0.005)	(0.006)	(0.006)	(0.005)
Constant	-3.547***	-2.160***	-3.748***	-2.707***	-3.818***	-2.541***
	(0.289)	(0.272)	(0.251)	(0.245)	(0.345)	(0.300)
Observations	2,621	2,621	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation using the 1SSER data, (2021)

Table A8: Impact of Cash Transfers on Labour Force Participation with women's bargaining power and no other covariates (Marginal Effects from the Logistic Regression)

Variables	Model 1		Model 2	
	P_w	P_m	P_m	P_m
Post-treatment period=2012	0.126	0.584	-0.018	0.405
	(0.535)	(0.502)	(0.549)	(0.470)
Treatment=1	0.273	-0.338	0.324	-0.275
	(0.477)	(0.410)	(0.480)	(0.429)
Treatment*Year	-0.590	-0.281	-0.404	-0.027
	(0.651)	(0.548)	(0.669)	(0.513)
Women's BPI			0.018***	0.026***
			(0.006)	(0.005)
Constant	-3.723***	-2.244***	-3.932***	-2.549***
	(0.393)	(0.366)	(0.416)	(0.400)
Observations	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation using the 1SSER data, (2021)

Table A9: Multivariate estimate of the impact of cash transfers on labour force participation (Logistic Regression)

	Model (1)		Model (2)	
Variables	P_w	P_m	P_w	P_m
Post-treatment period=2012	0.972 (0.537)	1.456 (0.682)	1.474 (0.440)	1.893 (1.166)
Treatment=1	1.387 (0.667)	0.767 (0.337)	1.910 (1.413)	0.814 (0.414)
Treatment*Year	0.683 (0.480)	1.085 (0.536)	0.525 (0.397)	0.901 (0.561)
Women's BPI	1.020*** (0.007)	1.030*** (0.006)	1.027** (0.012)	1.028*** (0.011)
Treatment*Women's BPI * Year	0.997 (0.013)	0.990 (0.008)	0.992 (0.027)	0.990 (0.015)
Number of Children in the household			0.939 (0.103)	1.155** (0.081)
Income from agricultural activities			0.963 (0.063)	0.850*** (0.046)
Income from non-farm enterprises			0.652** (0.109)	1.222*** (0.070)
Debt Status Dummy Not owing=0 Owing=1			2.058 (0.929)	0.928 (0.454)
Private Remittances Dummy No=0 Yes=1			0.758 (0.341)	0.657 (0.266)
Constant	0.019*** (0.008)	0.073*** (0.031)	0.022*** (0.018)	0.059*** (0.029)
Observations	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands. Robust standard errors in parentheses for Model (1) but for model (2) robust standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation, (2021)

Table A10: Multivariate estimate of the impact of cash transfers on labour force participation (Marginal Effects from the Logistic Regression)

	Model (1)		Model (2)	
Variables	P_w	P_m	P_w	P_m
Post-treatment period=2012	-0.029	0.375	0.389	0.637
	(0.552)	(0.469)	(0.298)	(0.618)
Treatment=1	0.327	-0.265	0.648	-0.205
	(0.481)	(0.439)	(0.739)	(0.509)
Treatment*Year	-0.345	0.150	-0.593	-0.042
	(0.702)	(0.493)	(0.740)	(0.617)
Women's BPI	0.020***	0.030***	0.027**	0.028***
	(0.007)	(0.006)	(0.011)	(0.011)
Treatment*Women's BPI * Year	-0.005	-0.016*	-0.011	-0.015
	(0.016)	(0.009)	(0.025)	(0.015)
Number of Children in the household			-0.060	0.145**
			(0.106)	(0.069)
Income from agricultural activities			-0.039	-0.164***
			(0.065)	(0.055)
Income from non-farm enterprises			-0.424**	0.201***
			(0.166)	(0.057)
Debt Status Dummy Not owing=0 Owing=1			0.736*	-0.041
			(0.442)	(0.484)
Private Remittances Dummy No=0 Yes=1			-0.275	-0.421
			(0.454)	(0.404)
Constant	-3.950***	-2.614***	-3.834***	-2.836***
	(0.426)	(0.421)	(0.808)	(0.489)
Observations	2,621	2,621	2,621	2,621

P_w and P_m represent the labour force participation of wives and husbands. Robust standard errors in parentheses for Model (1) but for model (2) robust standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1
Source: Author's Calculation, (2021)

Table A11: Multivariate estimate of the impact of cash transfers on Daily Hours of Work (OLS Regression)

	Model (1)		Model (2)	
Variables	h_w	h_m	h_w	h_m
Post-treatment period=2012	-0.018 (0.034)	0.094 (0.124)	-0.008 (0.020)	0.141 (0.182)
Treatment=1	0.022 (0.033)	-0.047 (0.093)	0.025 (0.047)	-0.046 (0.119)
Treatment*Year	-0.009 (0.043)	-0.011 (0.123)	-0.008 (0.048)	-0.048 (0.168)
Women's BPI	0.002** (0.001)	0.011*** (0.003)	0.002* (0.001)	0.010* (0.006)
Treatment*Women's BPI * Year	-0.000 (0.002)	-0.006 (0.004)	-0.001 (0.003)	-0.005 (0.007)
Number of Children in the household			-0.005 (0.006)	0.029* (0.017)
Income from agricultural activities			-0.002 (0.004)	-0.030** (0.012)
Income from non-farm enterprises			-0.015*** (0.005)	0.058*** (0.022)
Debt Status Dummy Not owing=0 Owing=1			0.044 (0.035)	-0.046 (0.109)
Private Remittances Dummy No=0 Yes=1			-0.006 (0.029)	-0.078 (0.095)
Constant	0.050** (0.025)	0.176* (0.090)	0.074* (0.044)	0.175* (0.104)
Observations	2,621	2,621	2,621	2,621
R-squared	0.008	0.057	0.019	0.115

h_w and h_m represent the daily working hours of wives and husbands. Robust standard errors in parentheses for Model (1) but for model (2) robust standard errors are clustered at the household level *** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculation, (2021)