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The redistributive and welfare impact of fiscal policies in Ghana: new evidence from CEQ methodology

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ABSTRACT

This study presents evidence on the effect of fiscal policies on poverty and inequality in Ghana for the 2017 fiscal year based on the Commitment to Equity (CEQ) assessment framework. Also, the CEQ framework was used to simulate the short-term distributional consequences ('morning-after' effects) of Ghana's Free Senior High School (SHS) Policy and utility subsidies during the COVID-19 pandemic. We find that government spending and taxation in Ghana lowered inequality (Gini coefficient) by 5.94 percentage points. We also find a reduction in poverty rates, but this was mainly driven by in-kind benefits associated with public spending on health and more so education, without which poverty rate would have been higher. In its blanket form, the 'morning-after' effects of the Free SHS Policy was a marginal reduction in both inequality and poverty. We find further that in contrast to the effect of the blanket subsidy on water, the subsidies on electricity which had some elements of targeting reduced both poverty and inequality, but marginally. The findings underscore the need for more targeted subsidy and spending programmes to enhance their short-term poverty reduction and redistributive impacts.

IMPACT STATEMENT

This study investigates the effect of fiscal policies on poverty and inequality in Ghana using the Commitment to Equity (CEQ) assessment framework. The study has far-reaching implications on development policy and also makes an empirical contribution to the literature with respect to the relationship between fiscal policies and welfare in developing countries. The study sheds light on the effectiveness of government fiscal policies at redistributing income, and how specific adjustments to taxation and social spending would mean for poverty and inequality. Indeed, the subject area of this study relates directly to Sustainable Development Goal (SDG) 10, which seeks to reduce inequality within and across countries, of which the redistributive impact of fiscal policy has been adopted as an official indicator. While the key results from this study are important for tracking SDG 10 in Ghana, they are also useful in guiding policy makers on choosing fiscal policy instruments that do not only address prevailing macroeconomic imbalances but also improve on poverty and inequality situation in Ghana.

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1. Introduction

Ghana has experienced a relatively high and steady economic growth of over 6% on average since 2005 (World Bank, 2022), and this has been accompanied by a general improvement in welfare (Atta-Ankomah et al., 2023, 2024; Ghana Statistical Service, 2018). However, the benefits from this high growth have not been equitably distributed (see Atta-Ankomah et al., 2020; Cooke et al., 2016; Ghana Statistical

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Service, 2018), a situation which seems to undermine the extent of poverty reduction that could result from the high economic growth (Ghana Statistical Service, 2018). Analyses using the past four rounds of the Ghana Living Standards Surveys (GLSS) show a large reduction in the rate of decline in the incidence of poverty between 1991/92 and 2016/17 while inequality has increased within the same period (Ghana Statistical Service, 2018). The changing dynamics between growth and welfare (poverty and inequality) in Ghana is partly associated with the nature of structural change in Ghana, where there has been a steady shift in output and employment from agriculture to services, particularly informal activities in services which offer relatively low productivity gains (Atta-Ankomah & Osei, 2021; Osei et al., 2022; Osei & Jedwab, 2016). However, an equally important issue to understanding the trends in welfare in Ghana is the role of policy, particularly the extent to which various government spending and taxation policies independently and together affect poverty and inequality. The relevant research questions here are: (1) What is the impact of government's fiscal policy regime and its components on poverty and inequality? (2) How regressive (or progressive) are the various spending and taxation instruments?

The purpose of this study is to contribute to addressing the above questions which have not been properly dealt with in the extant literature on Ghana and other sub Saharan African contexts. Previous studies on Ghana, for example, have in one way or the other attempted addressing these questions (Akazili et al., 2011; Aryeetey et al., 2010; Younger, 1996). Often, however, these studies have narrowly focused on an aspect of the fiscal policy system such as taxes or social spending and how they impact on poverty and/or inequality. The studies focusing on taxes usually pay more attention to indirect taxes especially value-added tax (VAT) (Aryeetey et al., 2010; Bhasin, 2012; Andoh & Nkrumah, 2022) with some of them using time series econometric techniques (see for example Adu et al., 2023; Adukonu & Ofori-Abebrese, 2016) which are not amenable for incidence analysis in ascertaining the progressivity or otherwise of a fiscal instrument. Other studies have also focused on subsidies on petroleum products (Coady & Newhouse, 2006; Gillingham et al., 2006; Cooke et al., 2016) as well as the subsidies on utilities and social service delivery (Akazili et al., 2011; Gaddah et al., 2015; Nkrumah et al., 2021; Wodon, 2012). Some other studies only paid attention to targeted cash transfers particularly Ghana's Livelihood Empowerment Against Poverty (LEAP) programme (Dzigbede & Pathak, 2020).

Unlike the previous studies that narrowly focused on an aspect of the tax and social spending programmes, this study offers a comprehensive assessment of government fiscal programme using the Commitment to Equity (CEQ) framework for incidence analysis, developed by the CEQ Institute. The study examines and quantifies the extent to which a gamut of taxes (both direct and indirect), government subsidies, transfers and social spending affect poverty and inequality in Ghana in given a fiscal year. Thus, the use of CEQ approach allows us to conduct a more comprehensive and systematic analysis of the distributional impact of multiple fiscal measures at the same time, which methods used in most of the earlier fiscal incidence analyses for Ghana are not able to accommodate. We address three specific research questions: (1) How much income redistribution and poverty reduction was accomplished with the various fiscal instruments deployed in 2017 and what was the overall effect of these policies? (2) How progressive or regressive were specific taxes and spending in 2017? (3) What is the impact of recent fiscal policy measures like the free secondary school policy (Free SHS policy) and the COVID-19 relief subsidies on electricity and water on poverty and inequality? The decision to evaluate fiscal policies in 2017 is largely informed by the fact that the micro data (that is, the latest of the Ghana Living Standards Survey (GLSS) Round 7) used for the assessment was collected between October 2016 and September 2017.

We acknowledge that this study does not represent the first attempt at conducting CEQ analysis for Ghana (Younger et al. (2017) for perhaps the first and similar analysis on Ghana), however, our study is unique in several respects with significant value addition to the insights from Younger et al. (2017), and by extension, the existing body of literature on fiscal incidence analysis. First, unlike Younger et al. (2017) which relied on data from the sixth round of GLSS, collected in 2012/13, this study uses data from the seventh round of GLSS which was conducted four-five years later in 2016/17. Thus, although this study is methodologically similar to Younger et al. (2017), it provides insights into whether the poverty and distributional impact of taxes and government spending have changed since 2012/13 as well as the direction and quantum of any changes. Second, unlike Younger et al. (2017) which used 2013 version of the CEQ diagnostic tool (Lustig & Higgins, 2013), the analysis in this study relies on the latest and relatively more robust version of the CEQ tool (Lustig, 2018). Third and more importantly, this study departs significantly

from Younger et al. (2017) in terms of the policy simulations explored. Our policy simulations were informed by current exigencies particularly the need to address controversies surrounding the distributional impact of most recent government fiscal programmes in Ghana, specifically, the Free Senior High School (SHS) policy and COVID-19 instigated subsidies on utilities. Fourth, administrative structures delivering tax and spending policies as well as the structure of tax and government social spending are constantly being reformed in Ghana to ensure efficient fiscal policy implementation and this can lead to changing outcomes for poverty and inequality. Thus, although this current work employs similar methods as that of Younger et al. (2017), it provides insights into whether the distributional impacts of government fiscal policies have changed following any changes in fiscal policy administration after 2012/13.

This study therefore bears significant policy relevance and also makes an empirical contribution to the literature on the link between fiscal policy and welfare particularly in Ghana and sub-Saharan Africa where scholarly evidence on the effect of taxes, social spending and subsidies on poverty and inequality is generally scanty. The study sheds light on the effectiveness of government fiscal policies at redistributing income, and how specific adjustments to taxation and social spending would mean for poverty and inequality. Within the context of the on-going unstable macroeconomic environment in Ghana, being manifested by low growth, high inflation and exchange rate depreciation, high fiscal deficit and debt distress (Bank of Ghana, 2022; Ghana Statistical Service, 2022), such information would be highly useful in guiding policy on choosing fiscal policy instruments to address the imbalances while improving on poverty and inequality situation in Ghana.

The remainder of the study is structured as follows: Section 2 presents a review of the related literature while Section 3 discusses the CEQ assessment framework. Section 4 presents the data used including administrative data on various tax and expenditure items. In section 5, we present the main results including those of the policy simulations while Section 6 provides a conclusion.

2. Review of relevant literature

The redistributive impact of fiscal policy has received significant attention over the years. There has been a growing number of studies to understand how fiscal policies impact on poverty and inequality. In theory, progressive fiscal policies such as direct income taxes redistribute income from higher-income earners to lower-income earners so that income inequality is reduced (Atkinson et al., 2011; Saez & Zucman, 2016). The extent of progressivity, however, tends to be influenced by factors such as the tax structure, compliance levels and administration effectiveness (Slemrod, 1992). Its effect on poverty occurs through the impact on disposable income and the purchasing income for different income groups. Largely based on studies on developed economies, indirect taxes on the other hand tend to be generally regressive such that the incidence disproportionately falls on lower-income households leaving them more impoverished and increased inequality (Decoster et al., 2010; Keen & Lockwood, 2010; O'donoghue et al., 2004). However, depending on consumption patterns, the incidence of indirect taxes on poverty and inequality can vary. The incidence is likely to be high for low-income households who spend a higher proportion of their income on essential goods and services that attract indirect taxes (Chetty et al., 2009; Keen & Lockwood, 2010). Regarding social spending, concepts such as the social protection floor suggest that providing income support and social insurance relating to access to essential services are important in reducing poverty and inequality (Bachelet, 2012). For social spending to be effective, factors such as coverage, sustainability of financial sources, targeting efficiency and the effectiveness of service delivery must be given significant attention (Deaton, 2003; World Bank, 2014). The subsections below present a brief review of the existing studies on the redistributive and welfare effect of taxes, subsidies and transfers (both cash and in-kind) in Ghana.

2.1. Taxes, poverty and inequality

Empirical studies on incidence analysis of fiscal policy on Ghana and other SSA countries are generally scanty, compared to those on developed economies. The few existing empirical studies on Ghana suggest that direct taxes tend to be progressive (Younger, 1996; Younger et al., 2017) although the extent of progressivity is negatively affected by challenges such as tax evasion and the large informal sector (Ahima-Adonteng, 2023; Boakye & Anaman, 2018; Dube & Casale, 2016). In the case of indirect taxes, however,

Ando and Nkrumah et al. (2021) using input-output simulation method found that the poor tend to bear a disproportionate high burden of increases in the rate of Value Added Tax (VAT) in Ghana. Bhasin (2012) using the Computational General Equilibrium (CGE) model found that replacing import taxes with Value Added Tax (VAT) improves income distribution as well as reducing the incidence of poverty; but this is not the case for replacing export taxes with VAT where the results show an increase in both poverty and inequality. Adukonu and Ofori-Abebrese (2016) used the Johansen cointegration technique on a macro time series data for Ghana from 1984 to 2013 and showed that indirect taxes raised the level of poverty in Ghana while direct taxes have reducing effects on poverty. Similarly, Adu et al. (2023) relied on a macro time series data on Ghana from 1983 to 2016 but argued that rather than assuming symmetric effects of tax systems and imposing linear specifications, possible asymmetries may exist. The authors therefore employed the Nonlinear Autoregressive Distributed Lag estimation model and found that the relationship between tax systems and poverty is asymmetric while that for inequality is symmetric.

The evidence from Ghana on the effect of taxes on poverty and inequality resonates with the experience of other African countries. In Kenya for example, Maina (2017) investigated how consumption taxes influence poverty and income distribution and found that consumption taxes are regressive. In a recent study in Nigeria, Musa et al. (2024) employed the Autoregressive Distributed Lag Model to investigate the effectiveness of government's recurrent and capital expenditures as well as oil and non-oil revenues on poverty reduction. The results of the study show that government's capital expenditure relates negatively with the poverty incidence while recurrent expenditures increase poverty incidence. With respect to taxes, oil tax revenues negatively impact on poverty incidence while other non-oil tax revenue have significant poverty reduction effect. In a related study, Choga and Giwa (2023) investigated the impact of property taxes on income distribution in seven selected African countries. Using the Panel Autoregressive Distributed Lag methodology for the period 1990 to 2019, the study revealed that property taxes have a positive and significant effect on income redistribution in the long run – suggesting that an effectively administered property tax system can be a powerful tool for income redistribution.

2.2. The welfare and redistributive effect of subsidies

The argument for government providing subsidies stems from the idea that higher prices can undermine household welfare (Ackah & Appleton, 2007; Kane et al., 2015). Opponents to this idea raise concerns regarding the lack of efficient targeting mechanisms, which allows the rich to benefit more than the poor. For instance, Del Granado et al. (2012) show that the wealthiest quintile in Africa enjoy about 70% of the benefits from subsidies on gasoline with the poorest enjoying just 2.2%. The study further reveals that for kerosene, which is expected to be a product for the poor, only 16% of the subsidy benefits accrue to them. The empirical evidence on the distributional effects of fuel subsidies is rather mixed for Ghana (as in most developing countries). While Coady and Newhouse (2006) and Gillingham et al. (2006) show that fuel subsidies in Ghana are regressive, Cooke et al. (2016) found that the removal of fuel subsidies caused increases in prices posing a negative impact on household welfare with the poor being the most affected.

A more recent study by Nkrumah et al. (2021) examined the effect of government subsidies for mitigating the welfare impact of COVID-19 pandemic on poverty and inequality. Using GLSS 7 and employing a Quadratic Almost-Ideal Demand System (QAIDS) model, the authors simulated household consumption changes associated with the COVID-19 instigated electricity and water subsidies in Ghana. They found the overall effect of the subsidies to be regressive such that for both water and electricity subsidy, poorest households irrespective of location (whether urban or rural) were less advantaged in welfare redistribution.

2.3. Welfare and redistributive effect of cash and in-kind transfers

Cash transfer programmes in Ghana particularly the Livelihood Empowerment Against Poverty (LEAP) initiative have been found to have a positive effect on poverty and welfare improvements among vulnerable populations (Wodon, 2012; Younger et al., 2017). However, the extent of its impact is limited by several challenges such as inadequate funding and limited coverage (Adjei et al., 2020; Sackey, 2019; Agbaam & Dinbabo, 2014). According to Osei-Assibey (2014), about three fourths of the LEAP transfers reaches the bottom two quintiles of the population, with about 57.5% reaching the poor. Using the

seventh round of the Ghana Living Standards Survey (GLSS 7), Dzigbede and Pathak (2020) simulated the distributional effects of an increased government spending on existing direct cash transfer policy as a strategy for mitigating welfare shocks from the COVID-19 pandemic. The study revealed that the pandemic was associated with a significant increase in poverty incidence over time, and that an increase in government spending under an existing cash transfer program could extenuate the adverse effects of the shocks while improving outcomes for poverty and inequality.

Aside from direct cash transfers, public spending in Ghana is also characterized by in-kind transfers in the form of social spending on education and health, with a few studies examining the incidence of such spending. Gaddah et al. (2015), for example, examined the incidence of public education subsidies in Ghana. Employing both standard benefit incidence methods and the willingness to pay method, the study revealed a consistent ordering of progressivity with pre-school and primary education being the most progressive. However, the authors found further that own price and income elasticities tend to be higher for private schools than public schools and for secondary than basic schools in Ghana. Younger et al. (2017) also found similar ordering of progressivity for public education using the CEQ methodology.

The importance of in-kind transfers for poverty reduction has been more emphasised in the strand of literature that investigates the impact of multiple fiscal policies on income redistribution and poverty is relatively new in the literature. Proponents of this initiative suggest that while fiscal systems can be inequality reducing, same cannot always be said about poverty. Such analysis has largely been carried out using methods developed by the CEQ Institute which allows for a systematic assessment of the effects of government taxation, social spending, and subsidies on income redistribution and poverty using various income concepts. In a comparable incidence analysis for 28 low- and middle-income countries where the CEQ framework was applied, Lustig (2017) found that in about five countries, extreme poverty was higher after adjusting for taxes and transfers (excluding in-kind transfers). Lustig (2017) highlights consumption taxes as the main culprits for such fiscally induced poverty. Further results from Lustig (2017) shows that expenditures on early years of education (pre-school and primary) tend to be pro-poor in almost all countries while secondary and post-secondary education are only progressive in relative terms but not pro-poor. The previous CEQ assessment on Ghana by Younger et al. (2017) using the sixth round of the GLSS showed some progressivity for some taxes and well-targeted expenditures, but their redistributive impacts were small. Younger et al. (2017) showed that although the overall effect of the fiscal system reduced poverty in Ghana, this was largely associated with in-kind benefits from health and education.

3. Materials and methods

3.1. The CEQ methodology

The analysis in this study follows the CEQ assessment framework, developed by the CEQ Institute and presented in the CEQ Handbook (Lustig, 2018). As mentioned earlier, unlike other approaches for fiscal incidence analysis which are only amenable for conducting incidence analysis for a specific tax or expenditure, the CEQ assessment framework can accommodate as many fiscal policy elements as possible at the same time and provide a comprehensive analysis of their redistributive impact (Lustig, 2018). This is made possible by assigning the benefits or losses from various fiscal policy measures or actions to individuals and households in a micro-level socioeconomic survey and comparing various income concepts which constitute the CEQ building blocks (Figure 1). Figure 1 shows the relationships between various income concepts and the key fiscal policy instrument(s) that connect one income concept to the other. Starting from market income, each of the subsequent income concepts is generated by adding or subtracting an element of the fiscal system in a stepwise manner, and after each step, the measures of poverty, inequality and progressivity are computed to determine the influence of the relevant fiscal instrument(s) on welfare as well as the incidence of the policy instrument(s).

Market income includes all earned and unearned income before government transfers and receipts from contributory pensions; thus, it is income before any government influence through taxes and expenditures. There is however a debate about whether pensions should be treated as deferred compensation for previous employment, so that they are earned income, or they should be treated as government transfers. Our approach follows the study by Younger et al. (2017), which argues that the

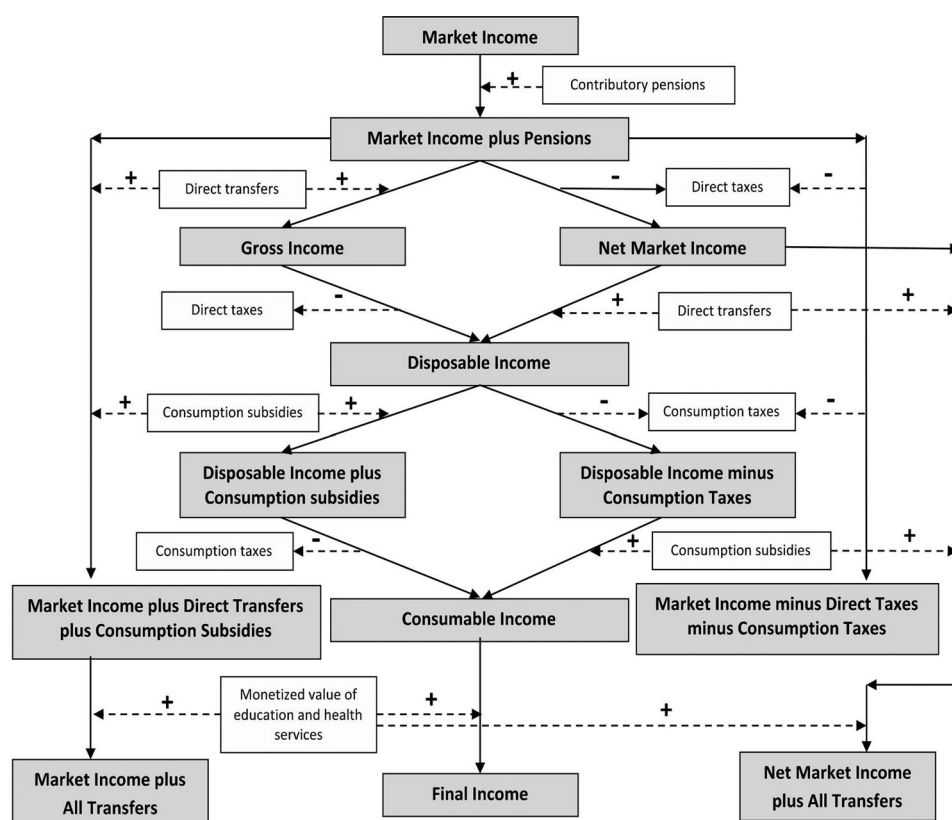


Figure 1. Income concepts and their relationship with fiscal policy instruments. *Source:* Younger et al. (2017).

retirement benefits in Ghana are best viewed as deferred compensation, and hence, the pre-fiscal income for Ghana can best be considered as market income plus pensions.

Net market income refers to the cash income available after government has deducted direct taxes such as personal income tax from pre-fiscal income. Disposable income can be constructed by adding direct transfers to net market income. To consider the independent influence of direct transfers, we construct gross income by adding direct transfers to the pre-fiscal income.

Further, government policies can indirectly influence households' real income by altering the prices of goods and services using indirect taxes and subsidies. Consumable income is therefore constructed by adding indirect subsidies to disposable income and then deducting indirect taxes such as value added tax (VAT), import duties, and excise taxes. Lastly, the distribution of income can indirectly be influenced by government through the provision of free or subsidized services such as health and education. Adding the value of these in-kind transfers minus any user fees paid for those services to consumable income leads to final income. The move from consumable to final income brings to light the distributional effect of public health and education expenditures.

Although the CEQ framework is highly robust for fiscal incidence analysis, compared to other existing methods, it still has certain deficiencies. For example, CEQ allows for only static analysis and also excludes some taxes and spending such as corporate income tax, and spending on infrastructure and defense (see Lustig (2018) and Goldman et al. (2021) for details on inadequacies of the CEQ framework).

3.2. Data and measurement of the income concepts for Ghana

Using the CEQ methodology requires a nationally representative household survey. This survey must at the minimum have modules on income and consumption as well as health and education modules which can be used to construct income distributions for each income concept discussed in the previous section, and compute summary statistics for those distributions. In this study, we use the seventh round and the most recent GLSS, which was conducted in 2016/17. This survey was conducted over a 12-

Table 1. Income concepts and relevant fiscal adjustments.

Transitions across different income concept	Relevant fiscal adjustments (instruments) applied
From market income plus pensions to gross income	Add direct transfers: 1. LEAP cash transfers 2. School feeding
From gross income to disposable income*	Subtract direct taxes: 1. Personal income tax (Pay-As-You-Earn i.e. PAYE) for paid employees 2. Taxes on the self employed
From disposable income to consumable income	Subtract Indirect taxes: 1. Value-Added-Tax (VAT) 2. Import duties 3. Excise duties including - ○ Petroleum products such as diesel, petrol, and kerosene ○ Non-alcoholic drinks such as sodas and malt drinks ○ Alcoholic drinks such as beer and spirits 4. Tobacco excise 5. Communication service excise Add Indirect subsidies: 1. Electricity subsidy 2. Fertilizer subsidy
From consumable income to final income	Add subsidized in-kind services: 1. Benefits from public education ○ Pre-school ○ Primary school ○ Junior secondary/High school ○ Senior secondary/High school ○ Vocational education ○ Teacher and nursing training ○ Universities ○ Polytechnics 2. Health service benefits – In-patient health benefits – Out-patient health benefits

Notes: *Another route to arriving at disposable income is through a two-step process; first by subtracting direct taxes from market income plus pensions to arrive at net market income and then adding direct transfers to get disposable income.

month period beginning in October 2016 and covered 14,009 households. We obtained an anonymized version of this national survey data the Ghana Statistical Service; hence, the authors did not have any direct engagement with the human subjects involved in the survey. In other words, there are no concerns about ethical issues involved in this study.

In addition to the survey data, we use administrative tax and expenditure data from 2017 fiscal year to estimate other required parameters, particularly, the per capita spending on public education and health services. Table 1 summarizes the adjusting fiscal variables that we applied to derive each income concept in this study and represents an operationalized view of the conceptual framework in Figure 1. Section A of the Online Appendix provides further details on how we computed the values for the various tax and expenditure items using both the survey and the administrative data and attributed them to the households. Supplementary Tables A1–A4 in the Section A of the Online Appendix provide information on the various administrative data used in the computations.

3.2.1. Measurement of the income and expenditure variables

There are about two routes to constructing the income concepts. One may start with market income and work forward to final income or start with disposable income and work backwards to the pre-fiscal income and forwards to final income (post-fiscal). In CEQ Assessment, disposable income is taken as being equal to consumption whenever a consumption-based survey such as the GLSS is used (Lustig, 2018). Thus, we consider the official consumption measure of welfare to be equal to disposable income and then work backward to calculate net market income and market income, and finally, work forward from disposable income to consumable and final income.

Because the GLSS is a nationally representative survey, the revenue and expenditure estimates from the GLSS 7 should ideally coincide with those of administrative data, but this is not always the case. Younger et al. (2017) argues that where such inconsistencies significantly vary among the tax, expenditure, and income concepts, it may lead to biases or errors in the estimations of the distributional effects. From Tables 1 and 2, however, the estimates from the GLSS 7, and the amounts from the public accounts are generally consistent for most of the items we consider in this study.

Table 2. Description of taxes and revenues in Ghana in 2017, million Ghana Cedis.

Tax and revenue items	Amount (in millions)	Comparable GLSS-7 estimate	Share of total government revenue (%)	Share of GDP (%)	Included in CEQ analysis?
Total revenue	45,756			22.22	
Taxes	32,228		70.43	15.65	
Direct taxes	13,398		29.28	6.51	
Personal income tax	5,191	6,823	11.34	2.52	Yes
Corporate income tax	6,018		13.15	2.92	No
Other direct taxes	1,646		3.60	0.80	No
Other taxes on income & property	543		1.19	0.26	
Indirect taxes	18,829		41.15	9.14	
VAT ^a	8,549	4,664	18.68	4.15	Yes
NHIL	1,376		3.01	0.67	Yes
Imports duties ^a	5,485	7,838	11.99	2.66	Yes
Excises	3,419		7.47	1.66	
Petroleum tax ^a	2,751	2,237	6.01	1.34	Yes
Communication service tax	329	480	0.72	0.16	Yes
Other excises ^b	339	173	0.74	0.16	Yes
Other taxes, of which	2,814		6.15	1.37	
SSNIT contributions	2,374		5.19	1.15	Yes
Non-pension SSNIT contributions	440		0.96	0.21	Yes
Non-tax revenue	5,325		11.64	2.59	
Internally generated funds	2,849		6.23	1.38	Yes
Other non-tax revenue	2,477		5.41	1.20	No
Other revenue	1,970		4.31	0.96	No
Share of government revenue in analysis			64.87		
Share of GDP included in analysis				14.40	

Notes: ^aOnly direct effect was considered; ^bincludes excise on tobacco, beer, alcohol, and malt.

Source: Authors' computations from records of Ministry of Finance and Economic Planning, SSNIT and GLSS 7 data.

3.2.2. Description of Ghana's taxes and expenditures in 2017

Table 2 provides a breakdown of the major government revenue sources as at 2017. The total revenue as a share of GDP was 22.2%. This is below the average of 24.2% for lower-middle income countries, but above the average of 19.7% for low-income countries (Supplementary Table B1 in the Online Appendix). Indirect tax appears to be the highest source of revenue to government, followed by direct taxes and then non-tax revenues. When we compare the specific revenue items, Table 2 shows that VAT is the most important source of revenue, followed by the corporate income tax, import duties and personal income tax. Similar to Younger et al. (2017), our analysis considers tax items that account for 65% of total government revenues and about 14.4% of GDP. Although corporate income tax appears as the second most important source of revenue, we do not include it in our analysis given that its burden cannot be easily attributed to individuals and households.

Attributing government expenditures to specific beneficiaries is more challenging than revenues. The proportion of government budget spent on public goods such national defense, law enforcement and public administration is huge but these expenditures are not attributable to individuals or households (Younger et al., 2017). It is only social spending areas such as transfer payments, health and education that one can identify specific beneficiaries. Table 3 shows that we are able to incorporate about only 18.3% of total expenditures in our analysis. This proportion however excludes health expenditures on in-patient and out-patient services, for which information was not directly obtainable from administrative sources but were captured in only analysis using information from the survey data. From Table 3, education spending is by far the largest part of social spending in the analysis.

4. Results and discussions

4.1. Effect on poverty and inequality

Table 4 presents the Gini coefficient and poverty headcount ratios for the various CEQ income concepts. Final Income has a Gini of 39.05 percent which is about 4.6 percent lower than the Gini for market income plus pensions, indicating that the government fiscal policies in 2017 together had a decreasing effect on inequality. The overall redistributive effect is higher when considering movement from market income to final income, with Gini decreasing by about 5.94 percentage points. This is close to the

Table 3. Government expenditures in 2017, million Ghana Cedis.

Government expenditure items	Amount (in millions)	Comparable GLSS-7 estimate	Share of total government spending (%)	Share of GDP (%)	Included in CEQ analysis
Total government spending	71,139			34.55	
Primary government spending	52,654		74.02	25.57	
Social spending	15,328		21.55	7.44	
Direct transfers ^a	334		0.47	0.16	
LEAP	97	32	0.14	0.05	Yes
School feeding program ^b	237	213	0.33	0.12	Yes
Total in-kind transfer	11,504		16.17	5.59	
Education ^c	7,302		10.26	3.55	
Pre-school	426	307	0.60	0.21	Yes
Primary school	1,413	1,266	1.99	0.69	Yes
Junior high school	1,169	1,166	1.64	0.57	Yes
Senior high school	918	385	1.29	0.45	Yes
Vocational	59	6	0.08	0.03	Yes
Teacher & nursing training	272	130	0.38	0.13	Yes
Teacher training	85		0.12	0.04	
Nursing school	188		0.26	0.09	
Polytechnic	206	176	0.29	0.10	Yes
University	878	653	1.23	0.43	Yes
Informal & special education	61		0.09	0.03	No
Other education. spending	1,810		2.67	0.92	No
Health	3,965		5.57	1.93	
Contributory ^d	434		0.61	0.21	Yes
Noncontributory (GoG)	3,427		4.82	1.66	Yes
In-patient services		4,020			Yes
Out-patient services		5,224			Yes
Contributory pensions	2,331		3.28	1.13	Yes
SSNIT pensions ^e	1,158	785	1.63	0.56	Yes
Other pensions, gratuities, and end-of-service benefit	1,175	192	1.65	0.57	Yes
Non-social spending					
Indirect subsidies	1,147		1.61	0.56	
Electricity subsidies ^f	942	1,449	1.32	0.46	Yes
Fertilizer subsidies	205	211	0.29	0.10	Yes
Other primary spending	33,611			16.32	No
Debt servicing	18,485		25.98	8.98	No
Interest payments	13,572		19.08	6.59	No
Amortization payments	4,913		6.9	2.39	No
Share of government spending included in analysis			18.29		
Share of GDP included in the analysis				5.81	

Notes: ^aThere are other quasi-cash transfers such as school uniforms, but we have no information on their budget, nor on the total budget for direct transfers; ^bThe government released GH¢285,304,109, out of which 83.1% constituted payments for 2016/2017, while what remained were payments of arrears owed caterers in the previous year; ^cEducation and health do not include spending of internally generated funds; ^dThis comprises SSNIT contributions to the NHIS on behalf of SSNIT members; ^eSSNIT pensions are not usually consolidated into the central government accounts, as it is an independent institution; ^fThis includes planned expenditures on final goods (lifeline tariffs) of about Ghc23m and actual expenditure on inputs (power utility debts and infrastructure support) of Ghc919m.

Source of data: Ministry of Education, Ministry of Health, Ministry of Finance, and authors' calculations. Spending figure on the Ghana School Feeding Program was from National Development Planning Commission. Fertilizer subsidies came from Ministry of Food and Agriculture MOFA (2018).

average of 6.3 percentage points we computed for 23 CEQ assessments in 20 lower-middle income countries including the previous study on Ghana but lower than the average of 8.59 percentage points recorded for 19 CEQ assessments in 16 African countries ([Supplementary Table B2 in the Online Appendix](#)). The average for the 19 CEQ assessments must however be interpreted with caution as this result is mainly driven by the upper-middle income countries in Africa (South Africa, Namibia and Botswana). Indeed, the average reduces to 4.94 percentage points when the computation is done without these upper-middle income countries. Ghana's last CEQ assessment using the 2012/13 GLSS-6 survey reported a 3.5 percentage points reduction in Gini over the same income concepts (Younger et al., 2017). This suggests that between 2012/13 and 2016/17, the extent to which government's fiscal policies together benefit 'the poor' compared to 'the rich' has improved.

Consistent with the decrease in the Gini between market income (plus pensions) and final income, all the other income concepts portray a decreasing effect of government taxation and expenditure on inequality ([Table 4](#)). The transition from market income to gross income shows a reduction in the Gini coefficient by 1.67 percentage points. This implies that direct transfers, particularly those associated with the Livelihood Empowerment Against Poverty (LEAP) program and School Feeding Program have a

Table 4. Gini coefficients and poverty indices for CEQ income concepts.

Income concept	Gini (%)	Poverty line at GHC 984.16 per year			Poverty line at GHC 1760.76 per year			US\$1.25 per day at PPP headcount index (%)	US\$2.50 per day at PPP headcount index (%)	US\$4.00 per day at PPP headcount index (%)
		Headcount index (%)	Poverty gap (%)	Headcount index (%)	Poverty gap (%)	Headcount index (%)	Poverty gap (%)			
Market income + Pensions	43.63	8.67	3.16	23.56	8.77	23.56	8.77	9.82	29.80	51.75
Market income	44.99	8.89	3.31	23.75	8.95	23.75	8.95	10.02	30.02	51.88
Gross income	43.32	8.17	2.73	23.10	8.29	23.10	8.29	9.15	29.43	51.62
Net market income	41.96	8.70	3.18	23.89	8.85	23.89	8.85	9.86	30.27	52.97
Disposable income	41.64	8.19	2.75	23.41	8.37	23.41	8.37	9.19	29.89	52.83
Disposable income + Indirect subsidies	41.55	7.82	2.61	22.76	8.06	22.76	8.06	8.92	29.20	51.91
Disposal income - Indirect taxes	41.29	9.11	3.11	25.70	9.28	25.70	9.28	10.51	32.22	55.77
Consumable income	41.20	8.77	2.96	24.82	8.94	24.82	8.94	10.04	31.40	54.84
Consumable income + In-kind education	39.12	5.53	1.52	20.20	6.29	20.20	6.29	6.67	27.20	51.94
Final income	39.05	4.29	1.13	16.69	5.02	16.69	5.02	5.13	22.65	45.89

Note. Data in the columns with US\$ poverty lines at PPP are for per capita incomes to be comparable to other CEQ analyses; those in the columns with cedi poverty lines are per adult equivalent to be comparable to GSS publications.

The national poverty line is GHC1760.76 per adult equivalent per year. The extreme poverty line is GHC984.16 per adult equivalent per year.

Source: Authors' computations using GLSS-7 data.

decreasing effect on inequality. In addition, transitioning from gross income to net income shows a 1.36 percentage points decrease in Gini. This largely reflects the tier structure of direct tax rates in Ghana, particularly, the ‘pay as you earn’ (PAYE) structure. The reduction in inequality resulting from the imposition of direct taxes in this study is slightly higher than what was estimated in the previous analysis by Younger et al. (2017). Also, the reducing effect of direct transfers on inequality has become relatively pronounced compared to what was obtained by Younger et al. (2017), mainly reflecting the fact that the coverage of both LEAP and School Feeding programmes expanded between 2012/13 and 2016/17. For example, the number of beneficiary households for LEAP has increased from 146,074 beneficiaries as at 2015 to about 212,466 beneficiaries as at 2017, representing about 46 percent increase in coverage (National Development Planning Commission (NDPC), 2018). Our finding also aligns with the simulation results of Dzigbede and Pathak (2020) that an expansion in existing cash transfer programme in Ghana could help mitigate the welfare impact of COVID-19 pandemic.

The transition from disposable income to consumable income further reduced inequality but only marginally (by 0.44 percentage points) although it is higher than the estimates from the previous CEQ analysis for Ghana (Younger et al., 2017). A disaggregation of this effect by indirect taxes and indirect subsidies, as shown in Table 4, shows that the decrease in Gini is largely driven by indirect taxes rather than indirect subsidies (which comprises of electricity and fertilizer subsidies). The transition from consumable to final income (where the distributional impact of subsidized in-kind education and health services are dealt with) rather showed a relatively high reduction in inequality, with in-kind education being the main driver of this decrease. In particular, accounting for in-kind education reduces inequality at consumable income by about 2.08 percentage points, which is nearly the same magnitude reported by Younger et al. (2017).

The effects of the fiscal policies in 2017 on the incidence of poverty are also presented in Table 4. Moving across the various income concepts has different effects on headcount and the poverty gap indices. Comparing market income to disposable income shows a marginal decrease in both headcount and poverty gap indices for the upper and lower national poverty lines, and also reflecting the importance of direct transfers through the LEAP and the school feeding programs. From disposable income to consumable income, one observes an increase in poverty rates. The poverty gap and headcount ratios tend to increase as a result of indirect taxes, which is consistent with the results of the time series econometric analysis by Adukonu and Ofori-Abebrese (2016). While indirect subsidies are found to have a reducing effect on poverty, this is outweighed by the increasing effect of indirect taxes. The transition from consumable income to final income, however, resulted in a substantial reduction in poverty rates. Our findings show that the overall impact of fiscal policy on poverty in Ghana has improved by about two percentage points, compared to the findings of Younger et al. (2017), which relied on GLSS 6. Also, by comparing the results on poverty to those on inequality one can learn that a fiscal policy that reduces inequality may not necessarily reduce poverty rates.

4.2. Cui bono – the incidence of specific tax and expenditure items

We use concentration index to explore the incidence of each fiscal policy instrument. Concentration index is derived from the cumulative shares of taxes or benefits that are received across population when the population is ordered from the richest to the poorest based on a given income distribution. The concentration index ranges from -1 to 1 with ‘ -1 ’ indicating that a tax or expenditure falls only on the poorest person. Zero (0) means that a tax or expenditure is distributed evenly across the population whereas ‘ 1 ’ indicates that a tax or expenditure falls only on the richest person. Note further that a tax or expenditure produces a larger distributional impact when that tax or expenditure heavily falls on or benefits one group relative to the other and depending on how large it is in relation to a given income distribution. For the poor to benefit, government expenditure should have more negative concentration coefficients while taxes have more positive concentration coefficients. Among the various tax and expenditure items in Ghana, VAT and education expenditure may have relatively large distributional impacts since they respectively constitute a greater share of government revenues and expenditures.

Figure 2 presents the concentration coefficients for various tax and expenditure items, and it can be observed that all pensions including retirement benefits are regressive. This is not surprising given that

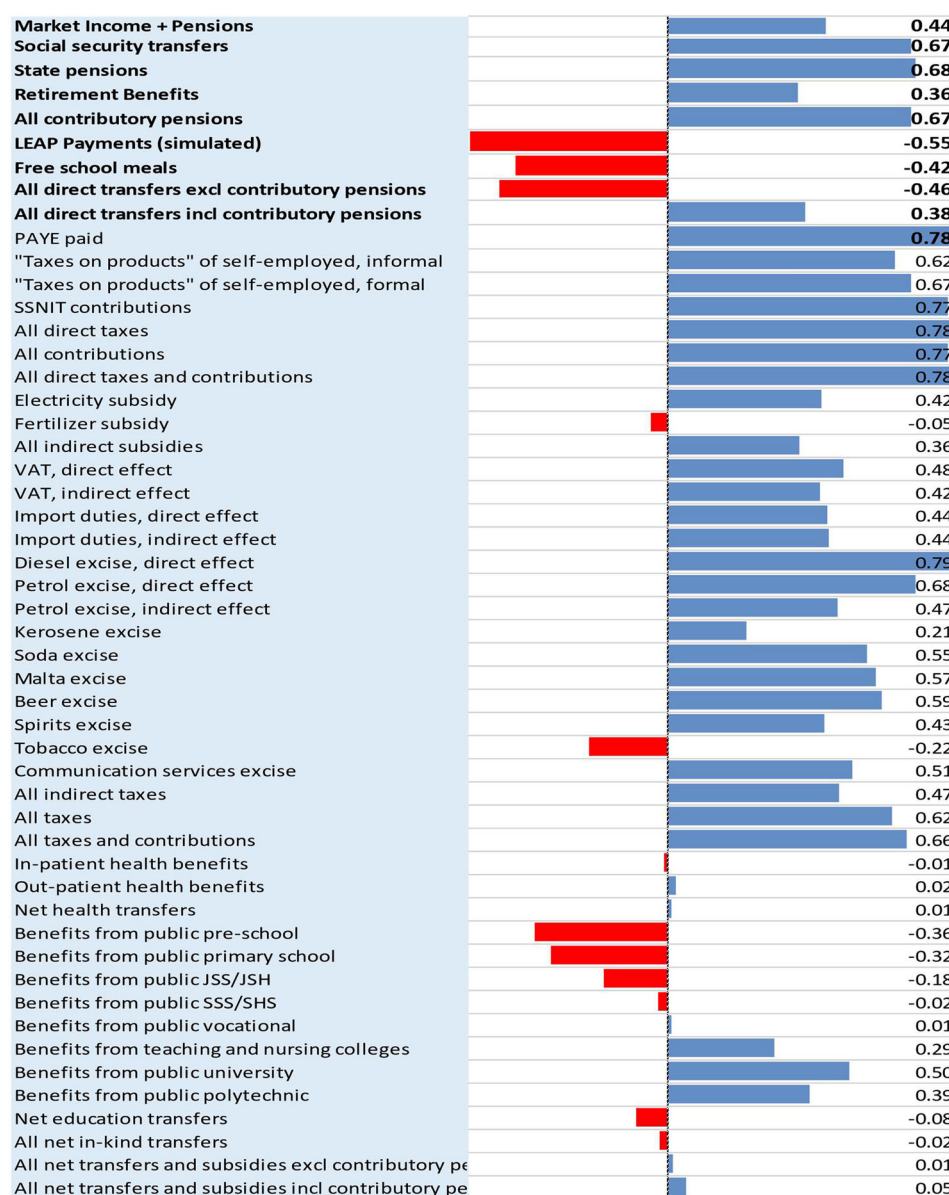


Figure 2. Concentration coefficients over market income plus pension. *Note.* The 'red' and 'blue' bars, respectively indicate negative and positive concentration coefficients. *Source:* Author's analysis.

pensions and SSNIT transfers are mainly for formal sector workers who on average receive higher income than those in farming and the informal sector. The value of the concentration index for all pensions reported in Figure 2 is highly close to the average for lower-middle income countries (Supplementary Table B3 in Appendix) and nearly the same as what was reported by Younger et al. (2017) using the GLSS 6 survey. While pensions are regressive, the LEAP transfers and school feeding programmes are found to be progressive. Interestingly, comparison between a concentration index of negative 0.55 for LEAP transfers reported in Figure 2 and the negative 0.29 obtained by Younger et al. (2017) indicates that the incidence of LEAP on the poor has deepened recently while a similar comparison for school feeding program shows virtually no improvement. However, an earlier study by Joseph and Wodon (2012) on school feeding which utilized the GLSS 5 found a concentration coefficient of positive 0.126, compared to the negative 0.42 reported in Figure 2.

The subsidy on fertilizer appears to be almost evenly distributed with a near zero concentration coefficient while the subsidy on electricity is regressive with a positive concentration coefficient of 0.42 (Figure 2). While the current result for Ghana is slightly less regressive, compared to Ghana's last CEQ

assessment (which reported a positive 0.47), it comes second after Tanzania (which has a concentration coefficient of 0.68) among 11 lower-middle income countries that provide data on the electricity subsidies for their CEQ assessments ([Supplementary Table B3 in the Online Appendix](#)). The result that subsidies on electricity are regressive tend to fly in the face of the fact that Ghana operates a tier electricity tariff structure, intended to offer relatively higher subsidies to poor (or lifeline) consumers. A potentially good reason for why electricity subsidies are regressive in Ghana is that many poor households in Ghana live in shared compound houses where access to electricity is based on shared metering. Consequently, although each household's consumption may be within the lifeline band, the aggregated units of consumption recorded on the shared meter could be way above the lifeline bands. This situation culminates in poor households paying more for electricity and losing out on critical government subsidies. Moreover, although access to electricity in Ghana is about two percentage points above the global average of 83% (Blimpo & Cosgrove-Davies, 2019) about 27% of rural households which account for the majority of the poor are without access to electricity in Ghana compared to an access rate of 91% for urban households (USAID, 2020).

Similar to what Younger et al. (2017) reported, public expenditure on education is progressive at the pre-school, primary school and JSS/JHS levels while expenditure on senior secondary/high school is relatively less progressive. Unlike in-kind education expenditures at the lower levels, expenditures at the tertiary level are regressive and this is more so with public universities, of which a concentration index of 0.50 has been reported in [Figure 2](#). While similar results were obtained for Ghana by Younger et al. (2017) in a CEQ assessment using the GLSS 6 survey, it is important to note that the current estimates show that higher levels of education are now relatively less regressive, suggesting a marginal increase in access to higher education by the poor. However, the reported concentration coefficient for expenditure on tertiary education in Ghana in [Figure 2](#) falls well above the average found for previous CEQ assessments in similar lower middle-income countries ([Supplementary Table B3 in Appendix](#)). Interestingly, Ghana's concentration coefficients for the pre-school and primary school are the lowest among lower-middle income countries with CEQ assessment results. While this may suggest that Ghana is doing better in targeting the poor at these levels of education than these countries, it may also reflect the unpopularity of public schools at these levels among the rich in Ghana. Private basic schools in Ghana enjoy high patronage by richer households, largely because of low investment and poor quality service delivery in the public basic schools, allowing the benefits of public education expenditure at this level of education to be concentrated among the poor. This argument appears more tenable when one compares the concentration coefficients for public pre-school, primary and junior high school to that for senior secondary schools, and more so, to those for the public tertiary schools. This argument is in line with the fact that private sector participation in post-basic school levels has been relatively minimal while nonpoor households highly patronize public education institutions above the basic level.

On in-kind health, both in-patient and out-patient health expenditures have nearly zero concentration coefficient, making them quite equitable in line with the policy objective of Ghana's National Health Insurance Scheme which was established in 2003 to provide improved access to healthcare. The value of coefficient however indicate that expenditure on in-kind health services have become a bit more progressive compared to the previous CEQ assessment results for Ghana (Younger et al., 2017).

Both direct and indirect taxes are found to be progressive although direct taxes are much more progressive ([Figure 2](#)) and this does not align with results of Andoh and Nkrumah (2022) that used an input-output simulation method to show that indirect taxes in Ghana have recently become regressive. Our results however aligns with Younger et al. (2017) that also showed that indirect taxes are progressive but not to the extent associated with direct taxes. Indeed, [Figure 2](#) further shows that each of the indirect taxes included in the analysis, except excise tax on tobacco, are found to be progressive with excise on diesel having the highest concentration coefficient of 0.79 ([Figure 2](#)). The excise tax on tobacco is regressive, indicating the tobacco smoking is probably more prevalent among the poor. It is important to note that concentration coefficients for the direct and indirect taxes for Ghana are all close to the averages for lower-middle income countries ([Supplementary Table B3 in Appendix](#)).

5. The ‘morning-after’ effects of COVID-19 utility subsidies and free SHS policy

5.1. COVID-19 utility subsidies

In response to the welfare impact of COVID-19 pandemic in 2020, the Government of Ghana introduced subsidies on utilities (electricity and water). Specifically, all lifeline consumers of electricity (i.e. households whose monthly electricity consumption is less or equal to fifty (50) kilowatt-hours) enjoyed full absorption of their bills for nine months (i.e. April to December 2020) while all other consumers enjoyed 50% absorption of their electricity bills for three months (i.e. April to June 2020). The government also provided 100% subsidy on water for all domestic and commercial consumers for six months (i.e. April–September 2020). In this section we simulate the extent to which the poor benefited from the government’s subsidies on electricity and water. We follow the CEQ approach to treating subsidies and also assume that these subsidies went to only households that had access to and/or were paying for piped water and electricity as of 2017 when the GLSS 7 data was collected. Without allowing any behavioural changes by households in response to the policies, we are able to assess the effects of such policies on poverty and inequality, assuming they were implemented in the survey year. Note that these are indirect subsidies, and hence, affect only two CEQ income concepts – consumable income and final income. Since we have assumed no behavioural changes (that is, the quantity of water and electricity consumed by the beneficiary households do not change after the policy), we characterize the effect we analyse as the very short-term or ‘morning-after’ effect of the policies.

In the case of electricity, we impose the announced policy on the tiered tariff structure in 2017. To be specific, we removed all tariffs for lifeline households for nine (9) months but included the full tariff for the remaining three (3) months in our computations. Similarly, and depending on their consumption thresholds, households above the lifeline were only assigned 50 percent of the tariffs for three (3) months but bore the full tariff for nine (9) months. There is no administrative record on water subsidies in 2017, and unlike electricity, water tariffs for domestic use are not tiered. To compute the subsidies on water, we first estimate the amount paid by households for piped water for drinking and general using the survey data. We then assign half of this amount as the amount for water subsidy, reflecting the six months of free under the policy.

Table 5 gives the results for poverty and inequality measures of consumable income and final income for the subsidies on water and electricity. The water subsidy is found to reduce the headcount poverty at all the poverty lines under consideration. While the poverty rates are reduced, we see an increase in the Gini coefficient at both consumable and final income after the water subsidy. Additionally, Figure 3 shows that the water subsidy was regressive. The results on the electricity subsidy which rather had an element of targeting indicate that it reduces both poverty and inequality in contrast to the blanket subsidy on water (Table 5). It is important to note that the reduction in inequality is largely marginal despite applying higher tariff reductions for the lifeline consumers. Indeed, the COVID-19 electricity subsidy was found to be regressive although it was less regressive compared to the business-as-usual scenario (that is, in the absence of the subsidy) (Figure 3) and this may explain the marginal improvement in inequality

Table 5. Percentage (%) point changes in poverty rates and Gini coefficient associated with COVID-19 related water and electricity subsidies.

		Poverty line = GHC 984.16 per year		Poverty line = GHC 1760.76 per year		US\$1.25 per day at PPP	US\$2.50 per day at PPP	US\$4.0 per day at PPP
Changes in:	Gini	Headcount index	Poverty gap	Headcount index	Poverty gap	Headcount index	Headcount index	Headcount index
Combined effect of water and electricity subsidies:								
Consumable income	0.01	−0.25	−0.06	−0.53	−0.20	−0.20	−0.57	−0.91
Final income	0.00	−0.15	−0.02	−0.45	−0.12	−0.11	−0.47	−0.84
Electricity subsidy only:								
Consumable income	−0.02	−0.22	−0.05	−0.34	−0.13	−0.11	−0.41	−0.51
Final income	−0.02	−0.11	−0.02	−0.17	−0.08	−0.07	−0.30	−0.42
Water subsidy only:								
Consumable income	0.03	−0.04	−0.02	−0.24	−0.07	−0.09	−0.22	−0.38
Final income	0.02	−0.07	0.00	−0.26	−0.04	−0.02	−0.30	−0.24

Source: Authors’ computations.

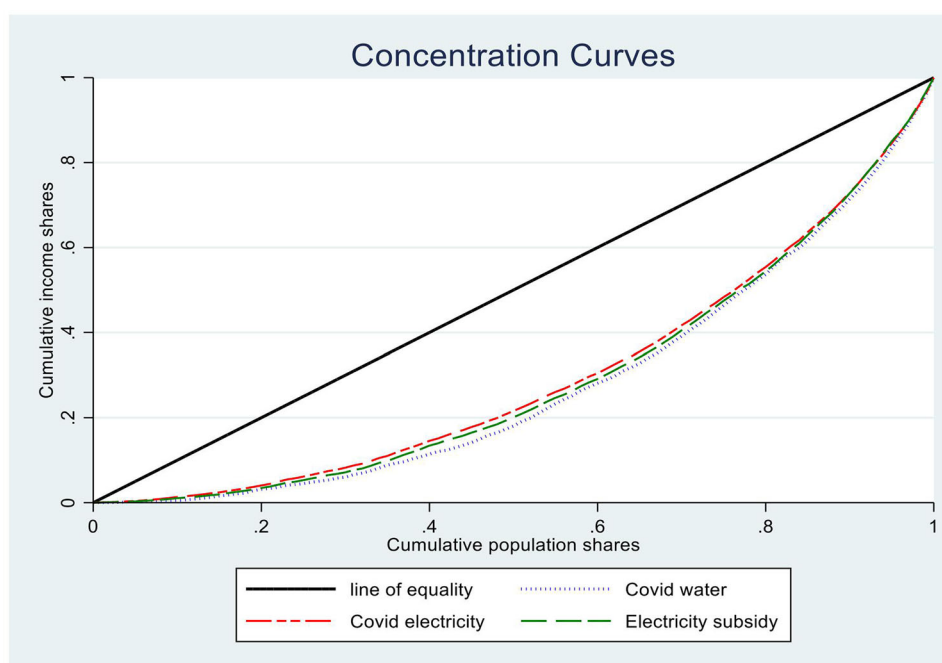


Figure 3. Concentration curves – COVID-19 induced utility subsidies compared with preexisting utility subsidies. *Note.* ‘Electricity subsidy’ represents the business-as-usual scenario (i.e. existing electricity subsidy in the absence of COVID 19 related electricity subsidy). ‘Covid electricity’ stands for COVID 19 related electricity subsidy only while ‘Covid water’ stands for COVID 19 related water subsidy only. There was no existing water subsidy prior to the introduction of COVID 19 related water subsidy.

Table 6. Percentage point changes in poverty and inequality for Free SHS policy.

Income concept	Gini	Poverty line = GHC 984.16 per year		Poverty line = GHC 1760.76 per year		US\$1.25 per day at PPP	US\$2.50 per day at PPP	US\$4.00 per day at PPP
		Headcount index	Poverty gap	Headcount index	Poverty gap	Headcount index	Headcount index	Headcount index
Final income	−0.10	−0.07	−0.01	−0.22	−0.08	−0.06	−0.26	−0.58

Source: Authors’ computations.

associated with the COVID electricity subsidy. The limited redistributive effect of this subsidy can also be explained by the shared metering arrangement among several poor households who live in shared compounds in addition to the relatively low access to electricity by rural households. Our results generally corroborate the idea that the rich tend to have higher access to basic household utilities (such as water and electricity) which allow them to benefit more from the subsidies (Atta-Ankomah et al., 2020). Also, our results are largely consistent with those of Nkrumah et al. (2021) that used a QAIDS model to evaluate these subsidies in Ghana.

5.2. The impact of the Free SHS Policy on poverty and inequality

In the 2017/2018 academic year, the Government of Ghana introduced the Free SHS Policy at public senior high schools with the key objective of providing equal opportunities for all students through the removal of cost barriers. Among other things, students under the free senior high school policy benefit from free tuition fees, uniforms, books, boarding and lodging. We implement our simulation by allocating to each public senior high school student in the household survey a benefit which equals the amount of expenditure incurred on his or her education the past year preceding the survey. Following the CEQ approach, this form of in-kind education subsidy affects only final income. The results, presented in Table 6, indicate that in the short term (i.e. without incorporating any behavioural response to the policy) both poverty and inequality declined only marginally. However, Figure 4 shows that the Free-SHS policy is relatively less progressive, compared to the business-as-usual scenario (that is when there is no Free SHS). Indeed, the concentration curve for the Free SHS largely lies below the line of

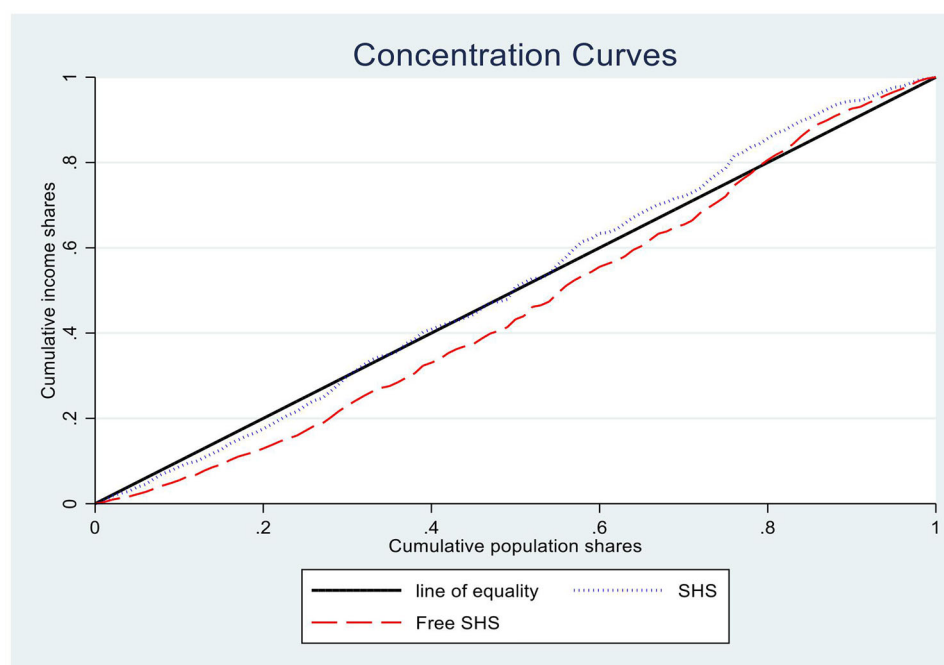


Figure 4. Concentration curves – Free SHS Policy and no Free SHS Policy compared. *Notes:* ‘Free SUS’ stands for in-kind educational subsidies relating to the Free SHS Policy while ‘SITS’ stands for in-kind educational subsidies on senior secondary education prior to the introduction of the free SHS Policy. *Source:* Authors’ analysis.

equality except between 80 – 100% cumulative income shares and lies everywhere below the concentration curve for when there is no free SHS (Figure 4). This result on Free SHS may be largely driven by the universal nature of the policy (with no form of targeting), coupled with the fact that richer households may have higher access to secondary education than poor households. This result, however, comes with a strong caveat that the analysis is static and does not incorporate behavioral responses which may reflect an increased access rate for the poor.

6. Conclusion and recommendations

Prior to the outbreak of COVID Pandemic, Ghana experienced a relatively high and steady economic growth for nearly three decades. However, benefits had not been equitably distributed with declining poverty reduction effects and rising inequality. Using CEQ framework for fiscal incidence analysis, this study sought to shed light on the effectiveness of fiscal policy at redistributing income as well as how the recent Free SHS Policy and COVID 19 relief subsidies may have affected income distribution and welfare in Ghana. The study focused on Ghana’s fiscal policy in 2017 mainly relying on data from the latest round of the Ghana Living Standards Surveys and administrative data.

The findings show that the fiscal policy in 2017 had an overall effect of reducing inequality, measured using the Gini coefficient, by about 5.94 percentage points. This gain came mainly from three sources – public spending on in-kind health and (especially) education, government’s direct transfers (LEAP and school feeding programmes) and Ghana’s highly progressive direct tax system. Government’s public spending on in-kind health and education independently account for 2.15 percentage points of the reduction in the Gini coefficient, with the education component being responsible for 2.08 percentage points. Although the observed reduction in the Gini coefficient seems low when compared to available results from middle-income countries, it is an improvement over the 3.60 percentage points in 2013, estimated by Younger et al. (2017) using the GLSS 6 survey. We also find that the fiscal policies together significantly reduce poverty rates. Much of the reduction in poverty is found to be associated with in-kind benefits from health and education while indirect taxes are generally associated with higher poverty rates. While most of the tax and expenditure items (including direct transfers – LEAP and school feeding - and expenditure on public basic education) are found to be progressive, a few (such as in-kind health

benefits, fertiliser subsidy, and expenditure on public vocational and senior secondary school) are found to be about neutral and a fewer (specifically, tobacco tax, subsidy on electricity and expenditure on all form of tertiary education) are found be regressive. We note however that expenditure on tertiary education has become less regressive compared to what was found by Younger et al. (2017).

Our simulation analysis for the morning-after effect of the Free SHS Policy shows that the policy marginally reduced poverty rates while slightly improving inequality particularly among households in higher consumption decile. Moreover, we find further that the COVID-19 relief subsidies on electricity were more progressive compared to the blanket subsidy on water. While both policies reduced poverty, it was only the electricity subsidy that reduced inequality but slightly and was less regressive than the pre-existing subsidies on electricity.

Based on the key findings, we highlight the following areas for policy attention. First, given that subsidies on electricity are regressive, we suggest that a revision of the tariff structure based on a comprehensive profiling of consumers and making available separate meters for individual households within shared compounds. Second, expanding the net for direct taxes to make room for some reduction in indirect taxes since the latter is generally less progressive compared to the former. Third, it may be prudent to expand the coverage of existing progressive social protection policies such as LEAP and school feeding programmes because they help reduce poverty and inequality. Fourth, increasing investments in (subsidies on) public basic education institutions, especially if such investment enhances the quality education service delivery. Fifth, it may be more beneficial to incorporate a targeting mechanism for social spendings policies to allow the poor to benefit more and help improve income distribution especially if the existing institutional structure by which the subsidy or expenditure is administered would largely allow the nonpoor to appropriate more of the benefits.

Our study offers a comprehensive assessment of the effect of fiscal policy on welfare and inequality in Ghana. The main limitations are rooted in the shortcomings of the CEQ framework particularly the fact that the analysis excludes spending on infrastructure, defense and other public goods as well as corporate income taxes because of the lack of a method for assigning their benefits to individuals and households. Also, the analysis is static and does not incorporate quality issues regarding in-kind transfers through public spending on education and health. Future studies can explore these areas.

Author contributions

Author contribution to the study is as follows:

- Conceptualization and design were carried out by Kwadwo Danso-Mensah, Richmond Atta-Ankomah, Robert Darko Osei, Isaac Osei-Akoto;
- Data analysis and interpretation were carried out by Kwadwo Danso-Mensah, Richmond Atta-Ankomah, Robert Darko Osei, Isaac Osei-Akoto;
- Drafting of the paper was to done by Kwadwo Danso-Mensah and Richmond Atta-Ankomah;
- Reviewing it critically for intellectual content – All authors (Kwadwo Danso-Mensah, Richmond Atta-Ankomah, Robert Darko Osei, Isaac Osei-Akoto) contributed;
- Final approval of the version to be published – All authors (Kwadwo Danso-Mensah, Richmond Atta-Ankomah, Robert Darko Osei, Isaac Osei-Akoto) provided the final approval

All authors (Kwadwo Danso-Mensah, Richmond Atta-Ankomah, Robert Darko Osei, Isaac Osei-Akoto) agree to be accountable for all aspects of the work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data and materials supporting the results or analyses presented in this paper are available upon reasonable request to the corresponding author (Richmond Atta-Ankomah). However, for access to the full dataset on the Ghana Living Standard Surveys, the request should be made to the Ghana Statistical Service.

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