TaxDev

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Distributional analysis of Ghana's tax system

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Preface

This report was prepared by the Centre for Tax Analysis in Developing Countries (TaxDev) at the Institute for Fiscal Studies (IFS) in collaboration with partners in the Tax Policy Unit in the Ministry of Finance of Ghana. TaxDev aims to contribute to more effective tax policymaking in low- and middle-income countries (LMICs) through research and applied policy analysis.

The views expressed in this report are, however, those of the authors and do not necessarily reflect the views of those of the funders nor of the other individuals or institutions mentioned here, including IFS, which has no corporate views, and the Ministry of Finance, Ghana.

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Executive summary

In recent years, policymakers across the globe have become increasingly interested in not only the revenue consequences of tax policies but also their distributional impacts: that is, their impacts on different segments of the population. Such evidence can promote a more equitable and welfare-enhancing tax and benefit system, helping distinguish policies which may help meet a government's objectives for inclusive development from those which may have unintended or undesirable effects on low- and middle-income households.

In this context, the Centre for Tax Analysis in Developing Countries (TaxDev), in collaboration with the Tax Policy Unit (TPU) at the Ghanaian Ministry of Finance, has built a microsimulation model of Ghana's tax system. This model (called GHATAX) uses micro-level data on household incomes and characteristics from the Ghana Living Standard Survey (GLSS) and macro-data based on the structure of Ghana's economy from Ghana's Social Accounting Matrix (SAM) in order to estimate the distributional effects of the main elements of Ghana's direct and indirect tax systems, such as personal income tax (PIT) and value added tax (VAT).

In this report, we use GHATAX to analyse the distributional effects of Ghana's tax system as of December 2022, as well as the effects of reforms announced in the 2023 Budget.

Key findings

1   Ghana's personal income tax (PIT) is strongly progressive, reflecting the fact that the marginal rate (and hence average rate) of tax paid increases with income. For example, as of December 2022, the marginal rate was 0% on incomes below GH¢ 4,380 per annum, and increased up to a maximum of 30% on incomes over GH¢ 240,000 per annum. As a result, PIT payments are estimated to amount to around 2.4% of consumption for the poorest tenth of Ghanaian households, compared to around 10.3% of consumption for the richest tenth. In cash terms, the richest tenth of households are estimated to pay around 80 times as much income tax, on average, as the poorest tenth.

2   Ghana's indirect tax system as a whole is slightly progressive. However, there are significant differences between different indirect taxes:

(a) Value added tax (VAT) and the associated levies (Ghana Education Trust Fund Levy, National Health Insurance Levy and COVID-19 Health Levy) are mildly progressive. This reflects two factors: first, that goods and services exempted from VAT and the levies form a bigger share of the budget of poorer households; and second, that home production, on which no taxes are levied, contributes a bigger share of overall consumption for poorer households.

(b) The excise duty system is regressive, on average; measured as a fraction of their consumption, poorer households pay a higher amount of excise duty. This reflects the fact that poorer households spend a higher fraction of their budgets on excisable products, and that excise taxes are designed to discourage the consumption of harmful products, rather than to contribute to the progressivity of the tax system.

(c) Ghana's Communication Services Tax (CST) system and petroleum taxes (e.g. Road Fund Levy) are generally progressive. This can be attributed to the relatively greater access to telecommunication and digital electronic devices and the use of motor vehicles and other fuel-consuming equipment by the rich than the poor. Over time though, we anticipate that these taxes may become less progressive and contribute more significantly to revenues as poorer households' demand for these products and services increases.

3   These patterns mean that, taken together, Ghana's PIT and indirect tax system are progressive, reducing inequality by 3 percentage points as measured by the Gini coefficient. On average, these taxes are estimated to amount to 14.1% of consumption for the poorest tenth of households, around 15.9% for households in the middle of the consumption distribution, and around 24.6% for households in the top tenth of the consumption distribution. PIT and indirect taxes are, on their own, estimated to increase poverty by around 3 percentage points. But previous research shows that poor households benefit from a larger share of public spending than they contribute in taxes, meaning the overall effect of tax and spending together will be to reduce poverty.

4   Considering impacts by gender, female-headed households pay less in tax, both in cash terms and as a share of their overall consumption. This largely reflects the fact that they have lower incomes, which means that they pay

less under Ghana's progressive income tax system. They also report spending a lower share of their budgets on excisable products.

5   Recent changes to the tax system including the revision of the tax-free PIT band, the increase in the standard VAT rate and the changes to the excise duty regime all have important distributional consequences:

(a) The increase in the standard rate of VAT from 12.5% to 15% is mildly progressive, again reflecting the impact of exemptions and home production.

(b) The increase in the tax-free PIT band has the biggest benefit measured as a proportion of consumption for households in the middle of the consumption distribution, and in cash terms has the biggest benefit for the richest households in Ghana. However, the introduction of a new top marginal tax rate of 35% will reduce the net incomes of households with very high incomes.

(c) The change in the excise duty regime for cigarettes and tobacco products is regressive but has only a very small impact on households' overall budgets right across the consumption distribution. The poorest tenth of households will spends an additional 0.06% of their total consumption budget on excise duty payment compared to just 0.004% for the richest tenth.

(d) Finally, the new 20% excise duty on fruit juices is strongly progressive but very small in the context of households' overall budgets, with duty payments estimated to be equivalent to close to 0% of consumption for the poorest tenth of households and 0.07% for the richest tenth.

(e) The impacts of these policies vary by gender. Female-headed households are estimated to benefit less as a percentage of their consumption from the increase in the income tax-free allowance (although they will also be less likely to be affected by the new 35% top rate of income tax). Their lower reported expenditure on cigarettes and tobacco products means that they are also estimated to be less affected by this policy change. Female-headed households are however estimated to be affected in the same way as male-headed households by the new duty on fruit juice, given their similar average levels of expenditure on these products.

1.   Introduction

Across the world, there is a growing demand for detailed analysis of the impacts of government tax and spending policies, including how these impacts vary across the population. This includes how impacts vary across the income distribution (i.e. between richer and poorer households), across places (such as between urban and rural areas) and between different types of households (such as male- versus female-headed households).

A tax for which the rich pay more than the poor as a fraction of their income or consumption is considered progressive.[1] Conversely, if the poor pay more as a fraction of their income or consumption, the tax is considered regressive. It is generally agreed that a progressive tax system is a desirable policy goal, with richer individuals or households expected to contribute larger relative shares of their resources. This does not mean that every individual tax must be progressive though: it is the effect of the tax system as a whole that matters to households' post-tax incomes and consumption, and the nature and purpose of some taxes mean that making them progressive has drawbacks or is, indeed, impossible. Nonetheless, it is still useful to evaluate the distributional effects of specific tax policies in isolation, in order to understand the factors underlying the progressivity (or regressivity) of the tax system as a whole.

A number of studies have considered the distributional effects of Ghana's tax system previously. For instance, Younger, Osei-Assibey and Oppong (2017) found that a number of Ghana's taxes, including personal income tax (PIT), were strongly progressive, and that some items of expenditure were well targeted at poorer households, but that the overall extent of redistribution undertaken via taxes and social spending was small.[2]

There have been a number of changes to the tax system in Ghana since these studies have been produced – including the introduction of new taxes. This report therefore updates previous analysis, using a microsimulation model (GHATAX) to analyse the distributional effects of Ghana's tax system as of December 2022, as well as the impact of recent policy changes announced in the 2023 Budget.

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[1]   More precisely, this concept is termed 'relative progressivity'. A tax can be considered progressive in absolute terms if the rich pay a higher cash amount as tax. However, this cash amount could still represent a significantly lower share of rich households' income than that of a poor household, meaning it would be relatively *regressive*. We therefore focus on relative definitions of progressivity and regressivity to avoid confusion.

[2]   See also Rossignolo (2017), Gasior et al. (2018) and Fuchs et al. (2021) for evidence of the distributional implications of tax and benefit systems in other contexts.

Specifically, we seek to address the following research questions:

1. What are the distributional effects of Ghana's PIT and main indirect taxes?
2. What is the combined distributional effect of these taxes?
3. What are the distributional implications of the recent tax policy changes in Ghana?

It is important to note that our focus is on those taxes whose incidence falls most directly on individuals and households. For instance, we include PIT, which is levied on individuals' incomes, but we exclude corporate income tax (CIT), which is levied on the profits of corporate institutions. Similarly, we include value added tax (VAT) and associated levies, excise duties, petroleum taxes and communication services tax (CST) but not import duties. Analysing the distributional effects of taxes whose incidence does not fall directly on individuals and households (such as CIT and import duty) is a very complex exercise, requiring strong assumptions, and is beyond the scope of this report.

The rest of the report proceeds as follows. Chapter 2 presents an overview of the Ghanaian tax system, focusing on the taxes we analyse in this report. Chapter 3 presents the key features of the model and underlying data used in our analysis. Chapter 4 is the heart of the report, where we present our findings on the distributional effects of Ghana's existing tax system and recent tax policy changes. In Chapter 5, we conclude and identify some potential areas for further work in the future.

2.   Ghana's current tax system

Here we present a brief overview of Ghana's tax system as of December 2022. The Ghana Revenue Authority (GRA) classifies taxes into three broad categories: taxes on income and profits (direct taxes); taxes on goods and services (indirect taxes); and taxes specifically on international trade (customs taxes). Table 2.1 presents the composition of Ghana's tax revenues in 2022 for individual taxes, grouped by these broad categories.

The major sources of tax revenue in Ghana are PIT (16.0% of revenues), CIT (22.2% of revenues), VAT (19.9% of revenue, or 31.5% of revenues including the associated levies) and import duties (12.8% of revenues); these taxes combined accounts for approximately three-quarters of total tax collections in Ghana.

For clarity, the tax handles analysed in this report are marked with an asterisk (*) in Table 2.1 and we discuss the key features of these taxes in turn in the ensuing paragraphs.[3] It is noteworthy that the tax handles considered in this report account for close to three-fifths of the total tax-take in Ghana and their incidence largely falls directly on individuals and households.

Personal Income Tax (PIT). Under the PIT system, individuals who are resident in Ghana are taxable on their worldwide income from employment, business and investment, less any allowable deductions. Some income sources and benefits are however exempt – pensions and interest paid by resident financial institutions or on bonds issued by the Government of Ghana, for example. Ghana has a progressive PIT schedule for residents with six bands as of 2022; these bands are adjusted over time to account for changes in the minimum wage.[4] Table 2.2 presents Ghana's PIT schedule as of December 2022. (Note, as discussed in Chapter 4 of this report, the bands were revised and a new top rate of 35% introduced.)

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[3]   A detailed discussion of Ghana's tax system is presented in Iddrisu et al. (2021).
[4]   The chargeable income of non-resident individuals is generally taxed at a flat rate of 25%.

Table 2.1. Composition of Ghana's tax revenue (2022)

Tax type	Revenue (GH¢' million)	Percentage of total
Direct taxes		
Personal Income Tax*	12,724.57	16.0%
Corporate Income Tax	17,650.36	22.2%
Mineral Royalties	1,796.19	2.3%
National Fiscal Stabilisation Levy	693.48	0.9%
Airport Tax	789.58	1.0%
Other direct taxes	683.14	0.9%
Indirect taxes		
VAT and levies	25,024.38	31.5%
of which,		
*Value Added Tax**	*15,788.63*	*19.9%*
*National Health Insurance Levy**	*3,759.94*	*4.7%*
*Ghana Education Trust Fund Levy**	*3,759.92*	*4.7%*
*COVID-19 Health Levy**	*1,715.89*	*2.2%*
Communication Service Tax*	532.29	0.7%
Excise duty*	604.82	0.8%
Other indirect taxes*	8,749.64	11.0%
Customs taxes		
Import duty	10,139.39	12.8%
All taxes	79,387.84	100.0%

Note: Taxes marked with an asterisk (*) are included in the distributional analysis in this report. Other direct taxes include National Fiscal Stabilisation Levy, the Financial Sector Clean-up Levy, Royalties from oil and Company taxes on oil. Other indirect taxes include Petroleum taxes, Special Petroleum Tax, E-Transfer Levy, Energy Sector Recovery Levy, Energy Debt Recovery Levy and Pollution & Sanitation Levy; all the indirect taxes listed here are included in the distributional analysis except for the E-Transfer Levy.

Source: Ghana Revenue Authority.

Table 2.2. Annual individual income tax rates in Ghana (2022)

Chargeable income (GH¢)	Tax rate (%)
First 4,380	0
Next 1,320	5
Next 1,560	10
Next 36,000	17.5
Next 196,740	25
Exceeding 240,000	30

Source: Income Tax (Amendment) (No.2) Act, 2021 Act 1071.

Pay-As-You-Earn is the mechanism used for paying tax on employment income in Ghana where employers deduct the tax due on the employment income of individual employees at the end of each month and remit the tax to the GRA. The PIT schedule also applies to self-employed individuals and they are required to file and pay their tax due in four equal instalments in each year.[5] The PIT system provides for personal reliefs that may reduce an individual's assessable income by the specified amount – for example, disability and age-dependent reliefs. The system also provides for allowable deductions such as for employees' and self-employed individuals' contributions to social security.

Bonus payments below 15% of a worker's base salary are subject to a 5% tax rate while anything above this threshold is added to their gross salary and taxed accordingly under the standard PIT rates. Dividends are subject to a final withholding tax of 8%, with tax withheld at source on dividends paid to resident and non-resident individuals in Ghana. The taxation of rental incomes differs between resident and non-resident individuals in Ghana. For residents, rental incomes from residential and commercial property are subject to final withholding tax rates of 8% and 15%, respectively. For non-residents, all rental income is taxed at a rate of 15%. However, Iddrisu et al. (2021) indicate that part of the income from the rental of property is often subsumed under personal and corporate incomes and hence subject to standard PIT and CIT rates.

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[5] The Vehicle Income Tax (VIT) and tax stamp system are additional collection mechanisms for the PIT (for more on this, see Iddrisu et al., 2021).

Value Added Tax (VAT) and levies (NHIL, GETFL and CHL). As of December 2022, VAT was applied at a standard rate of 12.5% on the supply (i.e. sales) of both domestically produced and imported goods and services, with VAT-registered businesses able to deduct the VAT paid on their input purchases when calculating their tax liability. This means the tax was (and still is) levied on the value added at each stage of the production process; or equivalently, the value of supplies (i.e. sales) to final consumers (or unregistered businesses).[6] Ghana's VAT system provides for a range of exempt supplies where businesses supplying such items do not charge VAT on their sales, although neither can they deduct (or reclaim) VAT paid on their input purchases. VAT-exempt items in Ghana include: raw agricultural products such as maize and rice; selected livestock that are bred or raised in Ghana; medical services and supplies; education services and related equipment; and financial services where no fee is paid.

The National Health Insurance Levy (NHIL) and the Ghana Education Trust Fund Levy (GETFL) are applied as straight levies on the supply of goods and services at the rate of 2.5% each.[7] The COVID-19 Health Levy (CHL) applies a 1% tax rate on the supply of goods and services. NHIL, GETFL and CHL paid on input purchases are not deductible when calculating liability for these taxes (or VAT). Items exempted from VAT are also exempted from these levies.

Communication Service Tax (CST). The CST applies at a 5% tax rate on the fees charged by the telecommunications industry for the supply of communication services including electronic communication services and Internet connection services.

Excise duty. The excise duty regime in Ghana imposes differing rates on a range of excisable products. The excise duty rate ranges from 0% to 175% and it is applied on the ex-factory price or the CIF value of imports (i.e. the value of imports at the point of import to Ghana including the cost of transport and insurance from the exporting country). Goods covered under this regime include beer, spirits and tobacco. There is also an environmental excise tax of 10% on plastic and plastic products. Table 2.3 presents the excise duty schedule as of 2022 for Ghana.

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[6]   Retailers and wholesalers with a turnover between GH¢ 200,000 and 500,000 are required to pay a flat 3% rate on their sales, but are unable to deduct the VAT paid on their input purchases.

[7]   Straight levies are levies that apply on consumption irrespective of whether it is final or intermediate. Thus, such levies apply on intermediate business-to-business transactions.

Table 2.3. Excise duty rates in Ghana

Commodity description	Rate of duty
Waters, including mineral waters of all description	17.5%
Distilled, bottled water	17.5%
Sachet water	0%
Malt drink, by percentage use of local raw materials:	
Less than 30% local raw materials	17.5%
30–50% local raw materials	12.5%
50–70% local raw materials	7.5%
More than 70% local raw materials	2.5%
Beer, stout, other than indigenous beer, by percentage use of local raw materials:	
Less than 50% local raw materials	47.5%
50–70% local raw materials	32.5%
More than 70% local raw materials	10%
Wines, including sparkling wine	22.5%
Spirits, including 'Akpeteshie':	
Distilled or rectified	25%
Blended or compounded	25%
For use solely in laboratories or in the compounding of drugs	0%
Denatured to the satisfaction of the Commissioner-General	10%
'Akpeteshie'	20%
Tobacco products:	
Cigarettes	175%
Cigars	175%
Negrohead	GH¢ 12 per kg
Snuff and other tobacco	170.65%
Plastic and plastic products listed under Chapters 39 and 63 of the Harmonised System and Customs Tariff Schedules	10%

Note: Rates apply as a percentage of ex-factory price or CIF value, unless otherwise specified.

Source: Excise Duty Act 2014 (Act 878), as amended.

Special petroleum tax (SPT). The SPT is charged by licensed oil-marketing companies in Ghana on the sale of finish petroleum products such as petrol, diesel and kerosene. The tax applies at specific rates per litre or kilogram of the product, as shown in Table 2.4.

Table 2.4. Special petroleum tax rates

Petroleum product	Tax per litre (GH¢)	Petroleum product	Tax per kg (GH¢)
Petrol	0.46	Liquefied petroleum gas	0.48
Diesel	0.46	Natural petroleum gas	0.35
Kerosene	0.39		

Source: Special Petroleum Tax (Amendment) Act 2018 (Act 965).

Other taxes on petroleum and energy products. A number of other taxes apply on petroleum products in Ghana, including the Energy Sector Recovery Levy (ESRL), Energy Debt Recovery Levy (EDRL) and the Sanitation and Pollution Levy (SPL). Table 2.5 summarises the key properties of these taxes, focusing on elements of the scheme that are relevant for the analysis in this report.

Table 2.5. Selected energy sector levies and rates

Levy	Item	Rate
Energy Debt Recovery Levy	Petrol, diesel	GH¢ 0.49 per litre
	Liquefied petroleum gas	GH¢ 0.41 per kg
Energy Fund Levy	Petrol, kerosene, diesel, fuel oil	GH¢ 0.01 per litre
Energy Sector Recovery Levy	Petrol/diesel	GH¢ 0.20 per litre
	Liquefied petroleum gas	GH¢ 0.18 per kg
Sanitation and Pollution Levy	Petrol/diesel	GH¢ 0.10 per litre
Price Stabilisation and Recovery Levy	Petrol	GH¢ 0.16 per litre
	Diesel	GH¢ 0.14 per litre
	Liquefied petroleum gas	GH¢ 0.14 per kg
Road Fund Levy	Petrol, diesel	GH¢ 0.48 per litre
National Electrification Scheme Levy	Electricity	2% of the price per kWh
Public Lighting Levy	Electricity	3% of the price per kWh

Source: Energy Sector Levies Act 2015 (Act 899), Energy Sector Levies (Amendment) Act 2017 (Act 946), Energy Sector Levies (Amendment) Act 2019 (Act 997) and Energy Sector Levy (Amendment) Act 2021 (Act 1064).

3.   Method of analysis and data

To analyse the distributional effects of Ghana's tax system, we utilise the GHATAX microsimulation model, which has been built through a collaboration between the Tax Policy Unit (TPU) at the Ghanaian Ministry of Finance and the Centre for Tax Analysis in Developing Countries (TaxDev), based at the Institute for Fiscal Studies (IFS), UK. The model relies on detailed micro-level data drawn from the latest wave of the Ghana Living Standard Survey (GLSS7), which was conducted in 2016/17 by the Ghana Statistical Service (GSS). The GLSS dataset is a nationally representative survey and contains detailed information on the socio-economic characteristics of individuals and households. This includes information on the employment status of household members, income from employment (both cash and in-kind) and expenditure on various goods and services. The information on employment and income is collected at the individual level while information on expenditure on goods and services is collected at the level of the household. The model also uses data from Ghana's 2015 Social Accounting Matrix (SAM) to allow for the modelling of the effect of taxes on intermediate inputs used in the production of goods and services used by households, which is particularly important for fuel taxes.

Because the main underlying datasets are several years old, we use data on macro-economic indicators such as population, gross domestic product (GDP) and the consumer price index (CPI) sourced from the GSS to uprate the model's underlying data to 2022. The downside of this approach however is that it makes strong assumptions about the distribution and composition of expenditure and incomes over time. In essence, modelling the effects of tax changes for 2022 based on data from 2016/17 (or 2015) assumes that the distribution of expenditure and income within and across households has not changed since then. However, in the absence of more recent data on the distribution and composition of expenditure and income, the alternative would be to use ad hoc assumptions to differentially adjust the expenditure and incomes of different households. Moreover, other available models also suffer from such issues, and GHATAX is the only available microsimulation model for Ghana that is based on the latest wave of the GLSS, that clearly accounts for the idiosyncratic features of the Ghanaian tax system, and that allows for the modelling of taxes on intermediate inputs.

The key modelling assumptions that underline the GHATAX model are:[8]

- **It is a static (or non-behavioural) model** – the model does not account for behavioural responses to changes in policy. Hence the evidence produced by the model assumes that economic agents do not change their behaviour (e.g. either how much and where they work, or how much and what they consume) in response to tax policy changes. This assumption is made by most microsimulation models but does have implications for the results produced. In particular, estimates that are generated based on this assumption are likely to overstate both the revenue increase and (negative) welfare effects of tax increases. This is because, in general, if people change their behaviour following a reform, it will be to reduce the impact of the tax increase on them. Conversely, estimates are likely to overstate the revenue decrease and understate the (positive) welfare effects of a tax decrease. This is because, in general, a tax decrease will encourage people to undertake more of the activity in question, and any change in behaviour would only be made if it further enhanced taxpayers' welfare.
- **Taxes on income are borne by the employee** – the model assumes that taxes imposed on income or earnings are incident on the worker (i.e. their net incomes are reduced one-for-one with the tax imposed). In addition, given that individuals are less likely to pay taxes on incomes from their secondary jobs in Ghana as in many other contexts, the model assumes that personal income taxes are paid on only primary employment incomes and bonuses.
- **Full pass-through of taxes on to consumer prices** – the model assumes that indirect taxes are fully borne by the consumer (i.e. the post-tax cost of the items they buy increases one-for-one with the tax imposed). This is consistent with the view expressed in most of the academic literature that the majority of the incidence of indirect taxes falls on the consumer.

The model also allows for a range of flexible assumptions – that is, assumptions that can be adjusted by the user. These include: (i) whether to account for indirect taxes that fall on intermediate inputs; (ii) whether to allow for changes in employer contributions to the Social Security and National Insurance Trust (SSNIT) to affect individual incomes; (iii) whether to allow for non-compliance with VAT on domestic transactions by fixing a share of sales on which these taxes are assumed to be paid (the default is 85%);[9] and (iv) whether to allow for non-compliance with VAT on imports and other indirect taxes (e.g. CST, excise taxes and petroleum taxes) by fixing a share of sales on which these taxes are assumed to be paid (the default is 100%).

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[8] The model further assumes a constant level of tax non-compliance for all households and the presence of identical production technologies for certain sectors; see the GHATAX manual for more on this.

[9] While we acknowledge that the level of formality in domestic transactions is around 50% in Ghana, we chose this figure to reflect the fact that most finished goods in Ghanaian markets are imported and all such goods are subject to VAT and related taxes at the port.

The model is able to broadly match aggregate tax revenues in Ghana under these default assumptions. Table 3.1 presents a comparison between the GHATAX model's revenue estimates with actual collections reported by the GRA for 2022 across the key tax handles.

Table 3.1. Revenue estimates from GHATAX versus actual collection (2022)

	GHATAX estimate (GH¢ million)	Outturn (GH¢ million)
Personal Income Tax	14,398.97	12,724.57
Value Added Tax	15,015.56	15,788.63
National Health Insurance Levy	3,170.77	3,759.94
GETFund Levy	3,170.77	3,759.92
COVID-19 Health Levy	1,268.31	1,715.89
Excise duties	271.94	604.82
Communication Service Tax	265.47	532.29
Special Petroleum Tax	1,367.09	2,237.68
Energy Debt Recovery Levy	1,360.58	2,269.64
Energy Sector Recovery Levy	531.50	959.86
Sanitation and Pollution Levy	195.98	452.01

Note: The information presented here contains only a subset of the tax heads available in either the GHATAX model or the government revenue data.

Source: GHATAX model estimates; GRA.

Overall, considering the taxes that are modelled in GHATAX, the aggregate revenue estimate for 2022 closely aligns with the reported revenues for that year with a difference of just 8.7%. In particular, the model closely approximates revenues from PIT, VAT and the levies (i.e. NHIL, GETFL and CHL) but significantly underestimates revenues from other, more specific, taxes.

Our approach to examining the distributional effects of the current tax system and of recent changes to the tax system is as follows:

- To analyse the effect of the December 2022 tax system, we simulate two scenarios: a baseline scenario where the system in place is the December 2022 tax system; and a counterfactual scenario where all tax rates are set to 0. This approach allows us to calculate how much revenue government would forgo if these taxes did not exist, as well as how much individuals and households are losing by way of disposable income or purchasing power due to the presence of these taxes.

▪ To analyse the effect of the recent tax policy reforms, we simulate two scenarios: a baseline scenario where the system in place is the December 2022 tax system; and a counterfactual scenario where the system in place is the reform system which reflects the conditions of the policy reform we are focusing on. For example, to analyse the effect of the change in the standard rate of VAT from 12.5% to 15%, we use as our baseline a system where the standard VAT rate is 12.5% and for our reform scenario we use a 15% standard VAT rate.

A comparison of the results from the baseline and counterfactual scenarios is conducted in order to identify the direction and magnitude of the impact; this is done for the overall population and for various population subgroups. In particular, we explore how impacts vary according to both the consumption level of households and their gender composition. In particular, our consumption-level analysis is based on grouping households into ten equal-sized decile groups based on their equivalised consumption, as calculated by the GSS (the equivalisation process accounts for the fact that if there are two households with the same level of consumption, the household with fewer members is 'better off' than the one with more members). For gender, we present results separately for households with at least one adult male and those where all adults are female ('female-headed households').

4.   Results and discussion

## 4.1 Effect of the existing tax system

As discussed in Chapter 2, Ghana's domestic tax system consists of a mixture of direct and indirect taxes. In this chapter, we simulate the distributional effects of the Ghanaian tax system that prevailed in December 2022 as set out in Chapter 2. The analysis here looks at the effects of specific domestic tax handles (i.e. PIT, VAT, Excise duty, among others), and of the overall (combined) tax system.

The distributional effect of PIT

Before looking at the impact of PIT across households, Figure 4.1 shows the marginal and average PIT rates that individuals with different incomes faced under the tax rate structure in place in December 2022 (as set out in Table 2.1). Ghana's system of increasing marginal tax rates means that, by design, individuals with higher incomes pay a higher average PIT rate than those with lower incomes. For example, individuals with an annual income of around GH¢ 8,000 face an average PIT rate of 4.4% while for those with an annual income of GH¢ 30,000 and GH¢ 100,000 it is 14.0% and 20.7%, respectively.

**Figure 4.1. Average and marginal PIT rates (2022)**
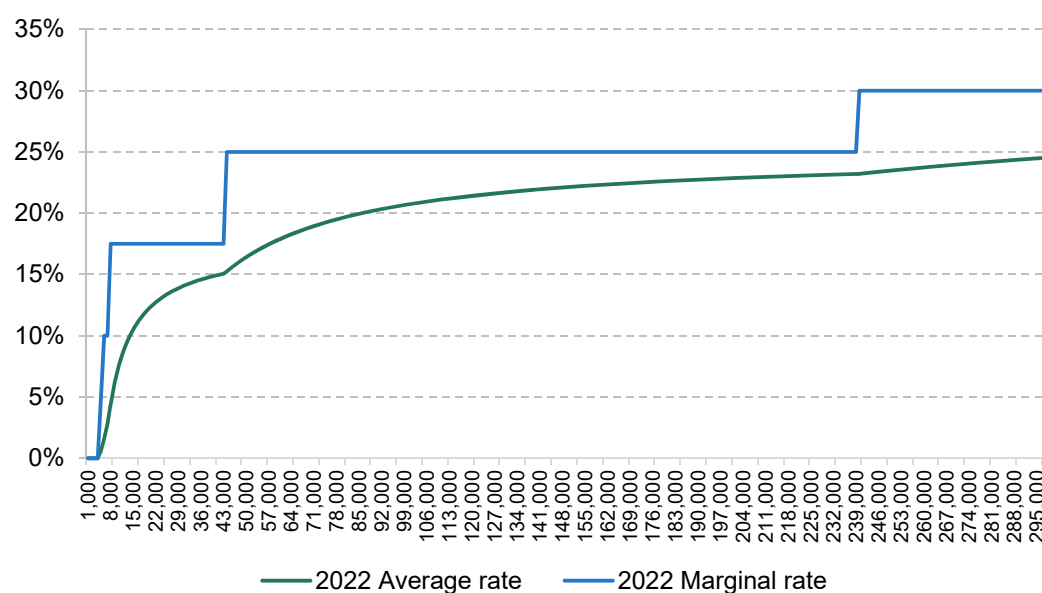
Note: The average tax rates are derived based on the 2022 income tax schedule.

Source: Authors' illustration.

This pattern of the average PIT rate increasing with individual income, together with the fact that many lower-income individuals have informal jobs on which income tax is not paid, means that the average PIT rate faced by *households* increases with household income and consumption. Figure 4.2 shows estimates of the average amount of PIT paid on employment and self-employment income for ten equal-sized household decile groups, ranked from those with the lowest consumption to those with the highest consumption. Cash-terms payments are shown by the line (and the right axis), while payments measured as a percentage of household consumption are shown by the bars (and the left axis).

Figure 4.2. Distributional effect of the PIT system
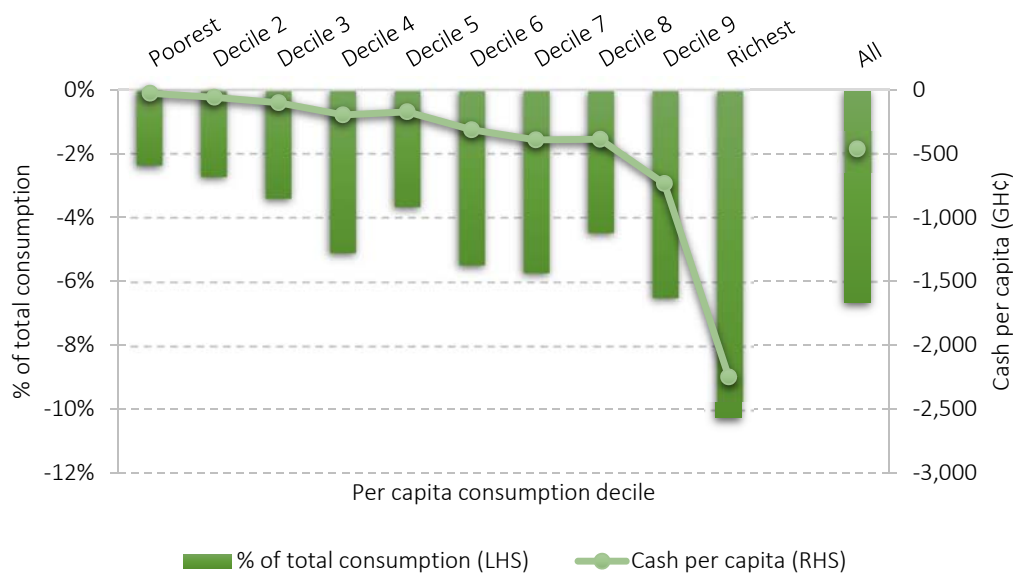
Note: The PIT system modelled here reflects the system as at December 2022. A schedular system with a tax-free threshold of GH¢ 4,380 is used in Ghana.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

The figure shows that Ghana's PIT system is highly progressive. Across all households, PIT payments under the tax system as of December 2022 are estimated to amount to GH¢ 464 per person, or 6.7% of household consumption. For the poorest tenth (i.e. the tenth with the lowest consumption), however, payments are estimated to average GH¢ 28 per person (2.4% of consumption), compared to GH¢ 2,249 per person (10.3% of consumption) for the richest tenth. In cash terms this is a difference of a factor of around 80, and in proportional terms a difference of a factor of over 4.

In addition to income tax, social security contributions are levied on and deducted from employees' earnings. These differ from income tax because they are directly linked to subsequent entitlement to unemployment, disability and retirement benefits, and these

contributions are not classified as taxes in Ghana, so we exclude them from our analysis. However, payments to the SSNIT do represent an upfront cost to households.[10]

Distributional effect of domestic indirect tax system

Figure 4.3 shows how indirect tax payments vary across the consumption distribution, both in cash terms (the line and the right axis) and measured as a percentage of consumption (the bars and the left axis). On average, under the system as of December 2022, households are estimated to pay GH¢ 926 in indirect taxes annually, equivalent to 13.3% of their consumption. These payments are mildly progressive, with the poorest tenth of households paying the equivalent of 11.8% of their consumption, on average, while the richest tenth of households are estimated to pay the equivalent of 14.4% of their consumption. These differences are much larger when viewed in cash terms, however: the poorest tenth are estimated to pay GH¢ 138 in indirect taxes annually, on average, compared to GH¢ 3,144 among the richest tenth. The different indirect taxes in place in Ghana have different distributional effects, though, as shown in Figures 4.4–4.7.

Figure 4.3. Distributional effect of the indirect tax system
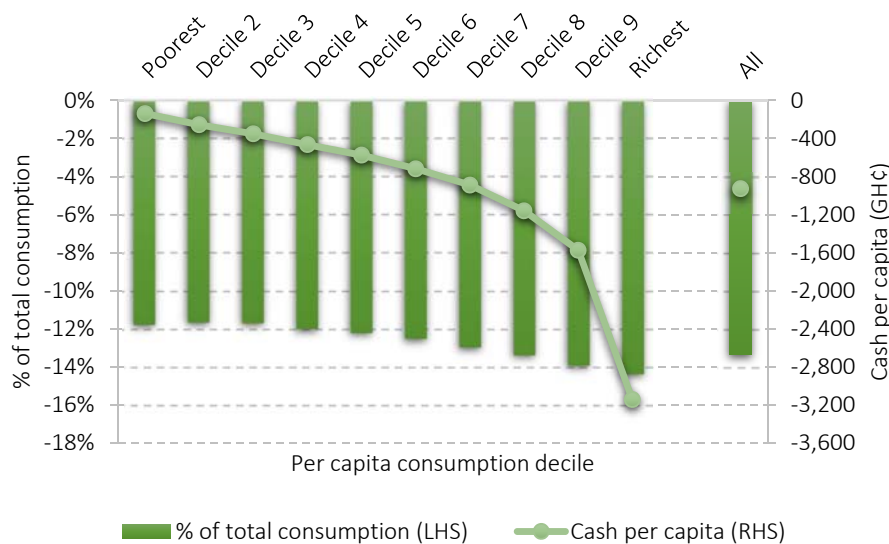
Note: Ghana's domestic indirect taxes include VAT, NHIL, GETFL, CHL, excise duty, CST, and a host of petroleum levies such as SPT.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

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[10] The SSNIT payment in Ghana is made in two parts: 5.5% of gross employment income is contributed by the employee while 13% of gross employment income is contributed by the employer.

Similar to the aggregate pattern observed in Figure 4.3, Ghana's VAT and associated system are mildly progressive, as shown in Figure 4.4. For instance, for the poorest tenth of households in Ghana, VAT and levy payments under the December 2022 system are equivalent to an estimated 9.7% of consumption, compared to 10.6% for the richest tenth. In cash terms, the differences are much larger, however: estimated VAT and levy payments amount to an average of GH¢ 113 per person for the poorest tenth of households, compared to GH¢ 729 per person across all households, and GH¢ 2,329 for the richest tenth of households. This mildly progressive pattern can be explained to a significant extent by the fact that goods and services that are exempt from VAT and levies represent a larger share of poorer households' budgets than those of richer households (and the common set of exemptions for VAT and each of the levies means that the distributional effects of each of these taxes is very similar to that of the overall VAT and levies system, as can be seen in Figures A.2–A.5 in the Appendix). It also partly reflects the greater importance of home-produced goods and services for poorer households. Furthermore, recent research (Bachas, Gadenne and Jensen, 2020) suggests that a higher share of the budgets of poor households is spent with informal traders who are not registered for taxation, which would reduce the effective rate of VAT on their purchases. The data used in this report do not contain information on place of purchase and so, as discussed in Chapter 3, we assume a fixed share of informal purchases across households. This means that the results presented here are likely to be a lower bound on how progressive the VAT and levies system is.

**Figure 4.4. Distributional effect of the VAT and associated levies system**
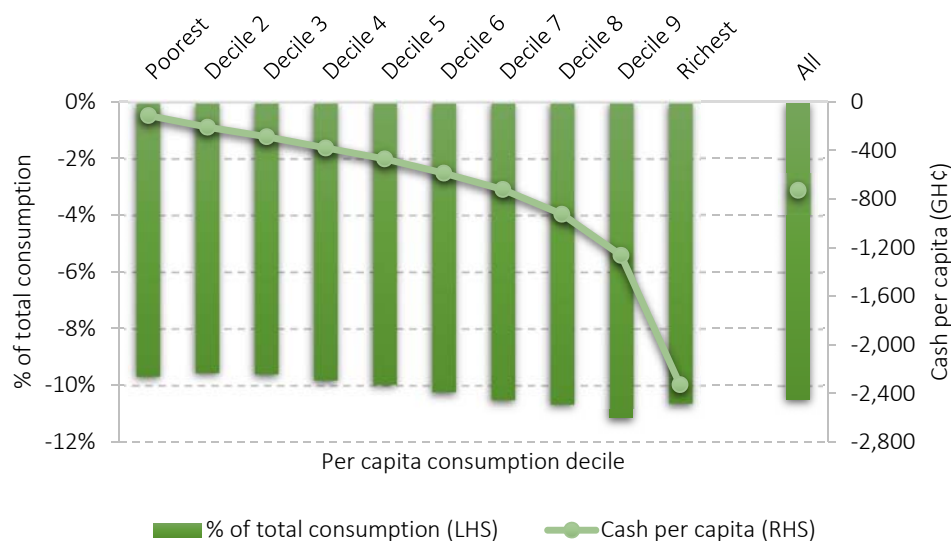
Note: Ghana's VAT system applies to only final consumption as it follows the input–output mechanism but the levies do not follow the same treatment as they are non-reclaimable; the presence of exemption in the system indicates that VAT might be imbedded in intermediate transactions (such as the levies) as producers of exempt goods cannot reclaim input VAT and they would likely pass this on to the consumer if they are either in the middle or at the final stage of the VAT chain. This effect has been accounted for in this paper.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Figure 4.5 examines the distributional effects of Ghana's excise duty regime, and shows that excise duty payments are relatively small but are somewhat regressive. In cash terms, estimated excise duty payments are broadly flat across the bottom of the consumption distribution. This means that measured as a share of consumption, excise duty payments under the December 2022 system fall from an average of 0.3% of consumption for the poorest tenth of households to about 0.1% of consumption for households in the middle of the consumption distribution. Estimated cash-terms payments do increase with consumption in the top of the consumption distribution (to around nine times the level in the bottom half of the distribution), so that measured as a share of consumption, estimated excise duty payments amount to 0.2% of consumption for the richest tenth. This pattern may reflect the fact that excisable products are consumed by households with low, middle and high levels of consumption, with high-consumption households purchasing more expensive varieties of products (taxed more highly under Ghana's ad valorem excise duty regime). It may also reflect demographic patterns, with the middle of the consumption distribution containing more middle-aged households, which may consume relatively less excisable products than younger households.

As discussed in the introduction of this report, what ultimately matters is the progressivity of the overall tax system, not the progressivity of each individual tax. Excise duties are not designed to be redistributive, but instead to ensure the price of products such as alcohol and tobacco reflects the negative 'externalities' associated with consuming them, in turn helping to discourage their consumption.

Figure 4.5. Distributional effect of the excise duty regime
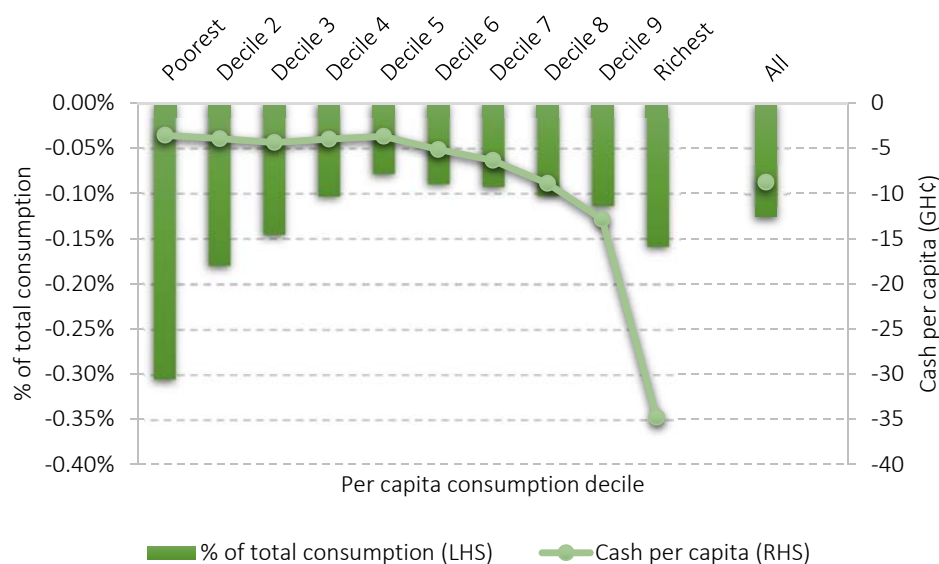
Note: Excise duty applies to the following items: malt drinks, beer, spirits, whisky, cigarettes and tobacco.
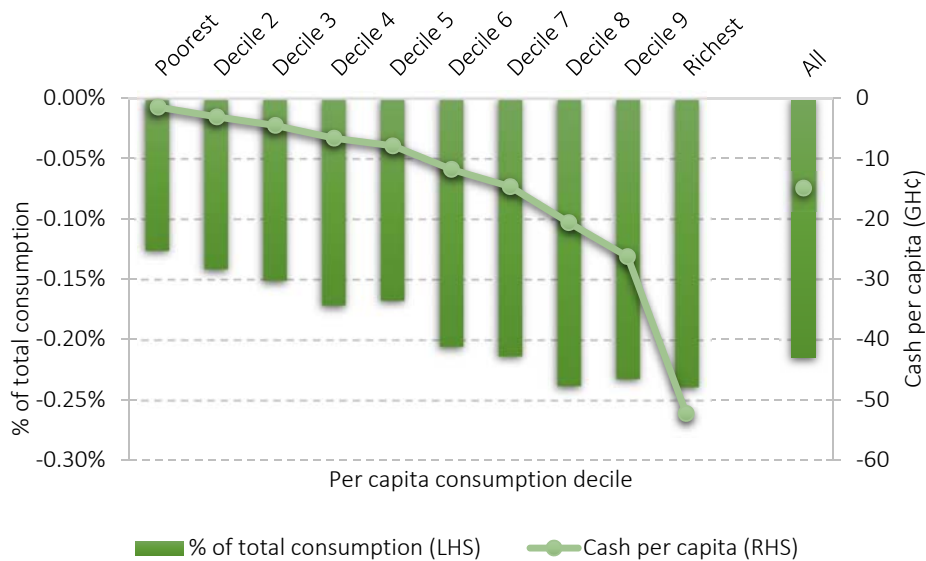
Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Turning to the distributional effects of Ghana's CST, Figure 4.6 shows that this tax is progressive. On average, under the December 2022 system, payments are estimated to amount to GH¢ 1 per person (0.1% of consumption) for the poorest tenth of households compared to GH¢ 52 per person (0.3% of consumption) for the richest tenth of households. This outcome is likely driven by the relatively greater ownership of electronic devices (such as mobile phones, computers and digital television devices) and the resulting higher consumption of telecommunication services including voice and data by richer households compared with poorer households. On average, however, Ghanaian households pay GH¢ 15 per person (equivalent to 0.2% of their consumption) in CST, annually.

**Figure 4.6. Distributional effect of the CST system**

Note: CST applies to the usage of telecommunication and digital electronic services.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Lastly, Figure 4.7 presents the distributional effects of Ghana's petroleum and energy tax regime. Petroleum taxes are both relatively large and progressive, with the poorest tenth of households estimated to pay GH¢ 19 per person (1.7% of consumption) on these taxes compared to GH¢ 727 per person (3.3% of consumption) for the richest tenth. This pattern likely reflects the greater ownership of motor vehicles among richer Ghanaian households. Indeed, much of the impact on poorer households – who are far less likely to own a motor vehicle – will reflect the impact of petroleum taxes on the prices of products that use petroleum products as an input (most notably transport services).

Figure 4.7. Distributional effect of the petroleum tax system
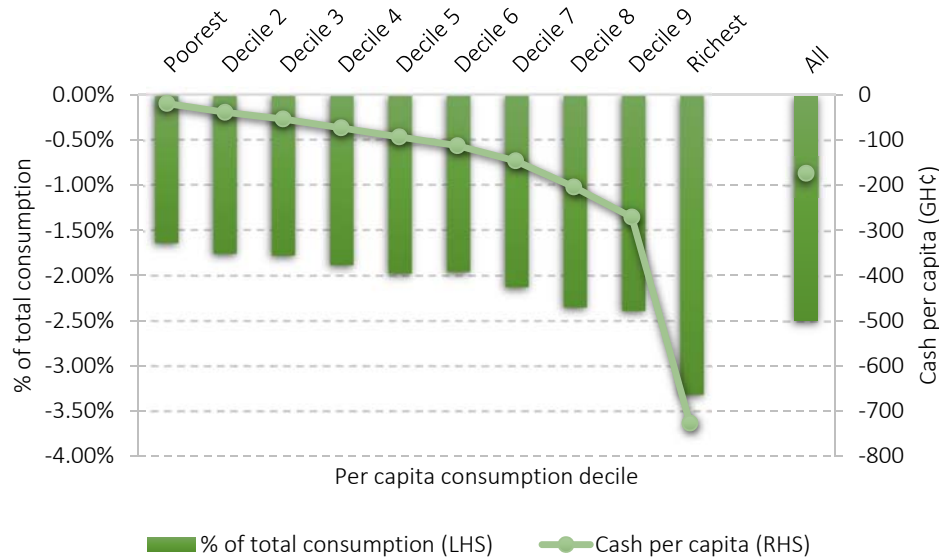

Note: Petroleum taxes included in this chart are: National Electrification Scheme Levy, Public Lighting Levy, Special Petroleum Tax, Energy Debt Recovery Levy, Energy Fund Levy, Price Stabilisation and Recovery Levy, Road Fund Levy, Energy Sector Recovery, and Sanitation and Pollution Levy.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

The combined effect of PIT and indirect taxes

In this section, we present the combined distributional effects Ghana's PIT and indirect taxes. Figure 4.8 shows how payments of these taxes vary across the consumption distribution, both in cash terms (the line and the right axis) and measured as a percentage of consumption (the bars and the left axis). It shows that, taken together, these taxes are progressive. Measured as a share of consumption, while under the December 2022 system these taxes amount to 14.1% of consumption for the poorest tenth of households, they amount to around 24.6% for the richest tenth of households. In cash terms, while the poorest tenth on average pay GH¢ 165 per person, average payments among the richest tenth amount to GH¢ 5,393 per person – almost 33 times as much. This pattern is driven mostly by income tax, and to a lesser extent the VAT and levies system and petroleum taxes, which offset the regressive pattern of the much smaller excise duties regime.

**Figure 4.8. Distributional effect of the total tax system**
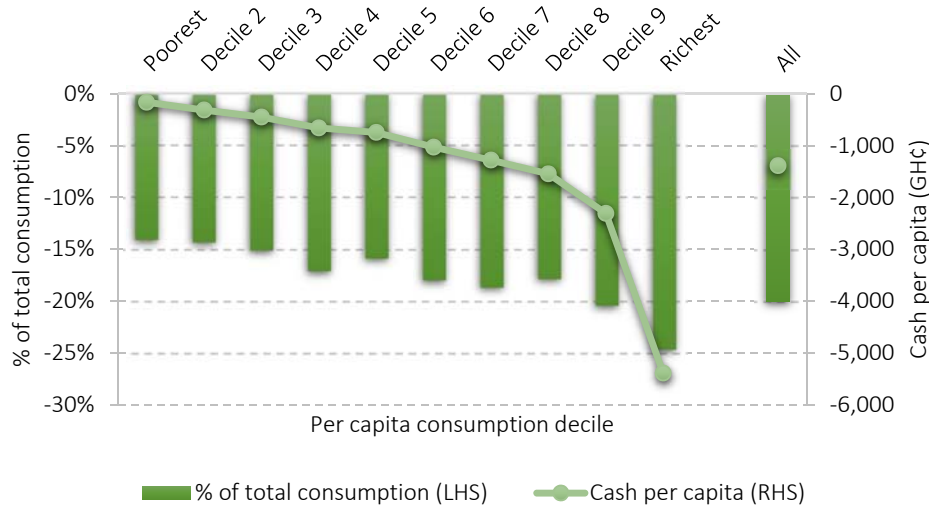
Note: Households are ranked by consumption per equivalent adult indicator computed by the GSS.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

Gender-based differences in the effect of taxes are also of great interest to policymakers. In this vein, Figure 4.9 shows how combined payments of PIT and indirect taxes vary between male- and female-headed households. The figure shows that male-headed households pay more in tax both in cash terms (GH¢ 1,477 per person, on average) and as a percentage of consumption (21.5%, on average) than female-headed households (GH¢ 1,175 per person and 16.4%, on average). For the major taxes, this largely reflects the higher incomes and consumption of households headed by a male: they therefore pay more under Ghana's progressive VAT and levies system, petroleum taxes and especially PIT. For excise duties though it largely reflects the fact that, conditional upon consumption, female-headed households report spending a lower fraction of their budget on excisable products such as alcohol and tobacco.

Figure 4.9. Effect of the total tax system, by gender of household head
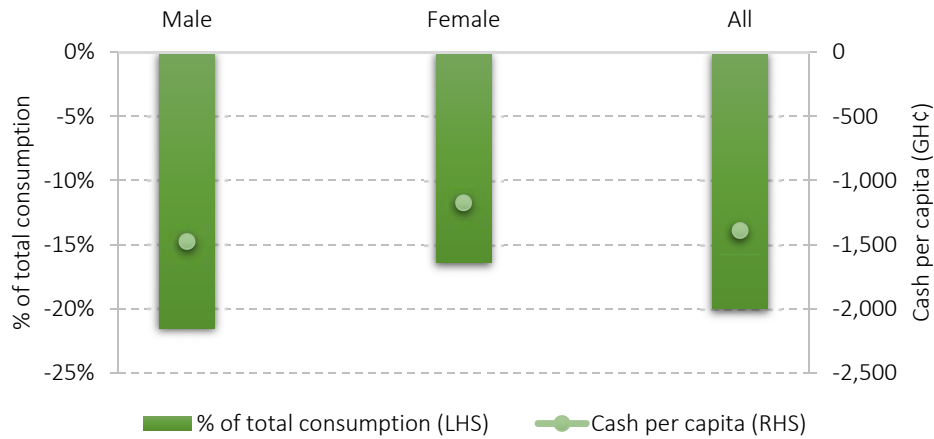
Note: 'Male' and 'female' represent households where the head of the household is a male and female, respectively.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

Table 4.1 presents the effect of the overall tax system on poverty and inequality. It shows that, on their own, PIT and indirect taxes in Ghana increase the incidence of poverty by about 3.3 percentage points, and also increase the poverty gap for those below the poverty line, especially in rural areas. This finding is unsurprising as taxes either reduce income or increase prices, in both cases reducing purchasing power and welfare. However, it is important to recognise that taxes are raised to pay for investment in infrastructure and the provision of public services, and to redistribute through cash and in-kind transfers. For example, Younger et al. (2017) show that spending on education and health is progressive, and the overall effect of Ghana's tax and social spending is to reduce poverty.

Consistent with the progressive nature of PIT and indirect taxes, post-tax inequality is lower than pre-tax inequality. For example, the Gini coefficient inequality index is reduced by 3 percentage points as a result of these taxes. The observed inequality-reducing effect of the tax system in this report is consistent with the findings of Younger et al. (2017) for Ghana and the average fiscal system-induced inequality reduction in a number of non-Latin American countries including Armenia, Ethiopia, Indonesia and South Africa of 3.5 percentage points (Lustig, 2015).

Table 4.1. Effect on poverty and inequality: overall tax system

Indicator	With PIT and indirect taxes	No PIT and indirect taxes
Poverty headcount (%)		
All	17.776	14.445
Urban	4.723	3.059
Rural	31.208	26.164
Poverty gap (%)		
All	6.211	4.914
Urban	1.048	0.645
Rural	11.524	9.308
Inequality measure		
Gini index	0.416	0.443
90/10 ratio	7.267	8.204

Note: The poverty line used in the model is GH¢ 3,232.08 – this is equivalised and adjusted for inflation.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

4.2 Simulating the effects of recent policy reforms

In this section, we analyse the distributional effects of some of the recent tax policy changes which were announced in Ghana's 2023 Budget presented to Parliament in November 2022. In particular, we consider: (i) the increase in the standard VAT rate from 12.5% to 15%; (ii) the adjustment to the PIT thresholds; and (iii) reforms to the excise duty regime – in particular, the changes to the taxation of cigarettes and tobacco and the introduction of fruit juice as an excisable product at the rate of 20% of the ex-factory price.[11]

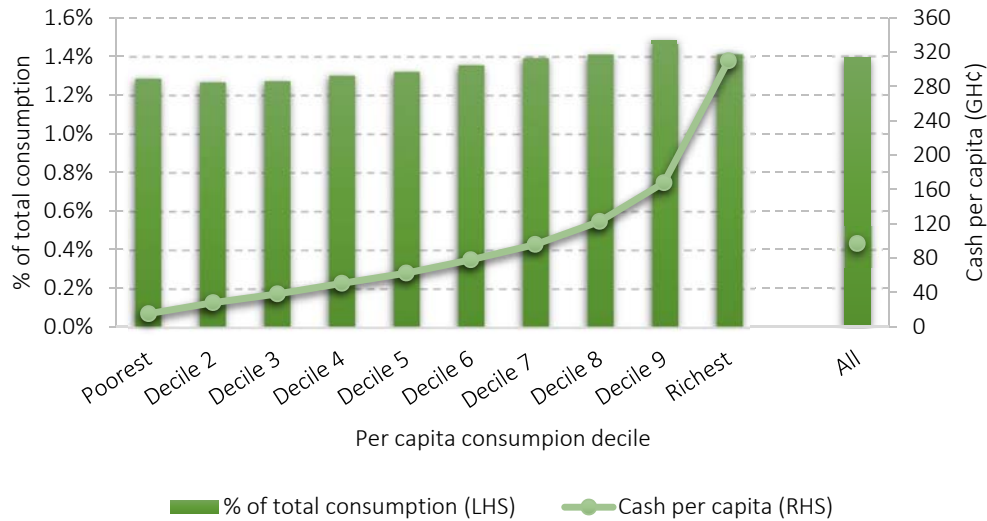## Distributional effect of the 2.5% increase in the standard VAT rate

In the 2023 Budget, the Government of Ghana increased the standard VAT rate from 12.5% to 15% in order to raise an estimated GH¢ 3 billion per year, as part of its fiscal consolidation efforts. Figure 4.10 shows that the resulting increase in VAT payments is estimated to amount to around 1.3% of consumption for the poorest tenth of households, compared to 1.4% for the richest tenth. This mildly progressive pattern mirrors the impact of the existing VAT system

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[11] The Excise Tax (Amendment) Act 2023 also made other sugar sweetened beverages (such as carbonated soda drinks) excisable at a rate of 20%. In this report we consider the impact of the excise duty on fruit juices only, however.

illustrated in Figure 4.3. As rich households spend much more in total than poor households, the richest tenth are estimated to contribute over 20 times as much in additional tax (an average of GH¢ 310) as the poorest tenth (GH¢ 15).

**Figure 4.10. Distributional effect of increasing the standard VAT rate**

Note: This figure presents the effect of an increase in the standard VAT rate from 12.5% to 15% across households at different levels of the welfare distribution.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

As with VAT overall, the increase in VAT will increase payments by slightly more in cash terms for female-headed households than for male-headed households (GH¢ 98 versus GH¢ 96 per person); see Figure 4.11. However, measured as a percentage of consumption, the impact will be slightly higher for male-headed households (1.4%) than for female-headed households (1.36%). This is explained as follows: female-headed households have relatively lower household size (3.28 on average) compared with male-headed households (4.09 on average) in Ghana; hence, for smaller absolute differences in additional tax burden due to a given policy change, the burden is likely to be higher for female-headed households than male-headed households in per capita terms.

Figure 4.11. Effect of increasing the standard VAT rate, by gender of household head
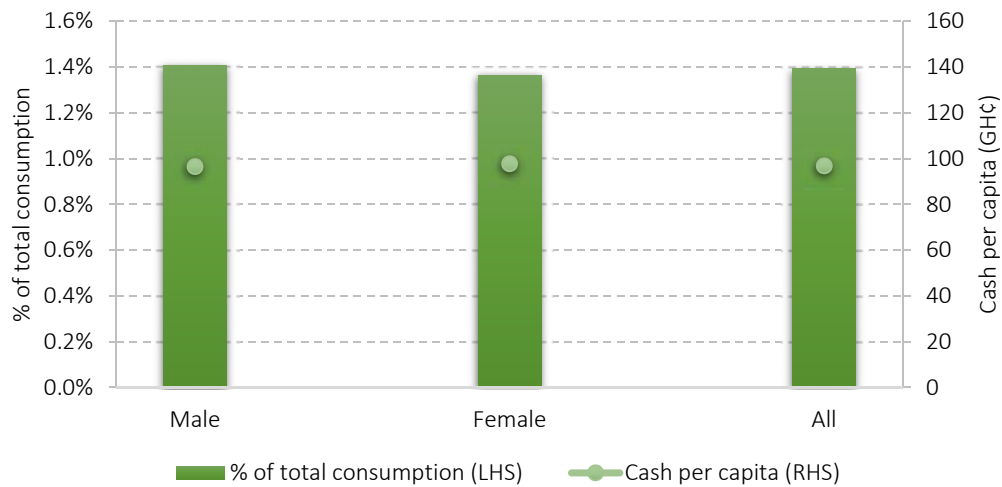
Note: 'Male' and 'female' represent households where the head of the household is a male and female, respectively.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

Table 4.2 shows the effects of the increase in the standard rate of VAT on poverty and inequality. It shows that the increase in VAT will lead to a small increase in poverty, which is larger in rural than urban areas of Ghana. The increase in the standard VAT rate will however lead to a very small reduction in inequality given the mildly progressive nature of this tax increase. It is important to remember though that in the absence of this increase in taxation, there would either have to be bigger increases in other taxes, lower government spending, or higher government borrowing. Reductions in government spending in particular would likely also lead to an increase in poverty (especially if they fell on social spending).

Table 4.2. Effect on poverty and inequality: Increase in standard VAT rate

Indicator	No VAT rate increase	With VAT rate increase
Poverty headcount (%)		
All	17.776	18.257
Urban	4.723	4.974
Rural	31.208	31.928
Poverty gap (%)		
All	6.211	6.362
Urban	1.048	1.103
Rural	11.524	11.775
Inequality measure		
Gini index	0.416	0.416
90/10 ratio	7.267	7.238

Note: The poverty line used in the model is GH¢ 3,232.08 – this is equivalised and adjusted for inflation.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

Distributional effect of changes in the PIT system

The Income Tax Amendment Act (2023), initially announced in the 2023 Budget, has increased the 0% tax band limit by just over 10% to accommodate the increase in the minimum wage. Each of the higher tax bands has been increased by the same cash amount (GH¢ 444 per year), and, in addition, a new 35% marginal rate of tax has been introduced on incomes exceeding GH¢ 600,000 per year.[12] Table 4.3 shows the new PIT schedule, which came into effect on 1 May 2023, alongside the 2022 schedule.

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[12] Other notable provisions contained in the Income Tax Amendment Bill (2022) are the unification of the loss carried forward provisions at 5%, the introduction of a withholding tax rate on the realisation of assets and liabilities and on winnings from the lottery, and a revised treatment of foreign exchange losses.

**Table 4.3. Annual income tax rates: 2022 and 2023 tax rates and bands**

Tax rate (%)	PIT thresholds (2022) (GH¢)	PIT thresholds (2023) (GH¢)
0	0–4,380	0–4,824
5	4,381–5,700	4,825–6,144
10	5,701–7,260	6,145–7,704
17.5	7,261–43,260	7,705–43,704
25	43,261–240,000	43,705–240,444
30	Exceeding 240,000	240,445–600,000
35	NA	Exceeding 600,000

Note: This compares the current PIT thresholds and rate to that of the proposed PIT schedule as contained in the Income Tax (Amendment) Act, 2023.

Source: Income Tax (Amendment) Act 2023.

The increase in the tax thresholds will reduce revenues relative to a policy of freezing them in cash terms at their 2022 levels, which is the policy baseline we compare the new thresholds to (and the 'no reform' baseline used in Ghana's revenue forecasts). Figure 4.12 shows that compared to the 2022 PIT system, the increase in the tax threshold leads to a maximum fall in effective average tax rate by 1 percentage point (for incomes around GH¢ 8,000). However, it is worth noting that the thresholds have increased by much less than inflation, so that compared to a policy of freezing them in real terms at their 2022 levels, the real-terms reduction in thresholds actually implemented will increase revenues. We will return to this issue below.

Figure 4.12. Average effective PIT rates (2022 versus 2023)
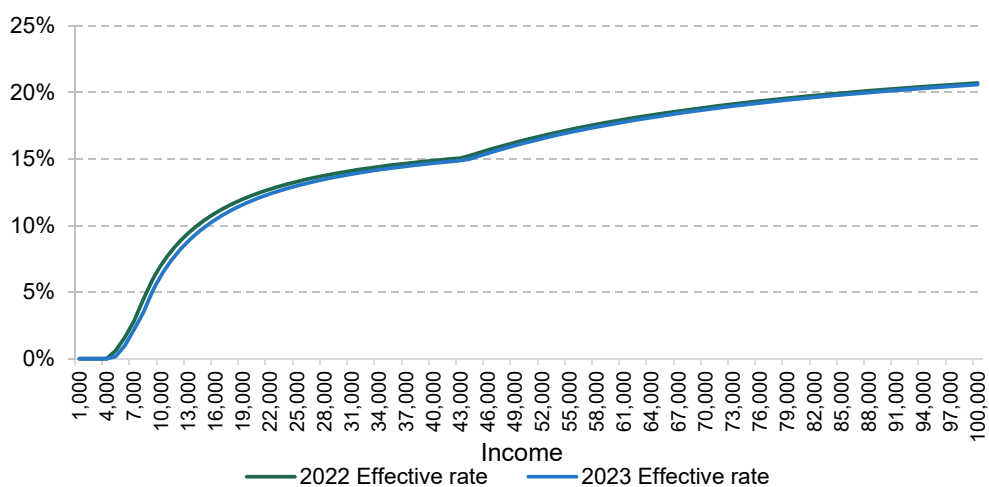
Note: This is calculated based on the PIT schedule presented in Table 4.3 for different levels of incomes.

Source: Authors' illustration.

The increase in the tax rate on incomes above GH¢ 600,000 will clearly increase tax revenues. Unfortunately, however, the data used in this analysis (the GLSS) under-sample people with the very highest incomes, meaning that revenue estimates for this policy change are unreliable. We therefore consider only the impact of the increase in the income tax thresholds, which we estimate will reduce revenues by GH¢ 0.2 billion (or 1.4%) compared to a cash-terms freeze.

In terms of the distributional effect of the increase in the PIT thresholds, the biggest beneficiaries from it are the richest tenth of households (an average of GH¢ 21 per person), while the poorest tenth gain the least (GH¢ 1 per person); see Figure 4.13. This reflects the concentration of income taxpayers in middle- and higher-consumption households in Ghana. Measured as a fraction of consumption, the biggest beneficiaries are those in the middle of the consumption distribution, with those in the 6th consumption decile gaining the equivalent of 0.11% of consumption (compared to 0.06% for the poorest tenth and 0.1% for the richest tenth).

Figure 4.13. Distributional effect of changes to the PIT schedule
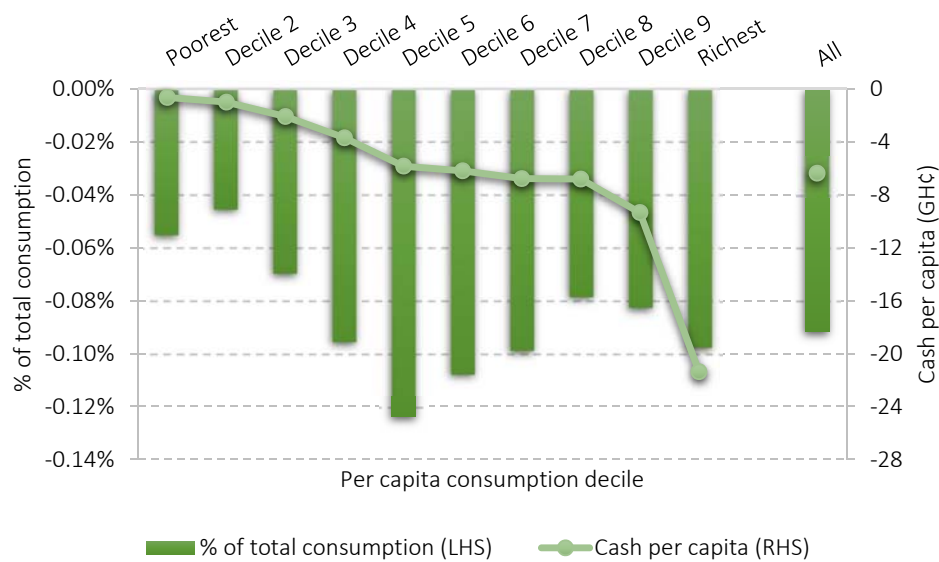
Note: This presents the distributional effect of changes to the PIT thresholds.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

In terms of gender, Figure 4.14 shows that the change in the PIT thresholds will provide a bigger benefit both in cash terms and as a proportion of consumption to households headed by a male than those headed by a female. This will reflect the greater prevalence of income tax payers among males than females.

Relative to a cash freeze in thresholds, the policy will lead to a very small reduction in poverty (0.02 percentage points), with most of this change being in urban areas (0.03 percentage points), reflecting the concentration of income tax payers in urban areas (Table 4.4). The policy will also have a very small impact on inequality – increasing the 90/10 ratio by approximately 0.01 points, reflecting the mildly regressive nature of the reform relative to a cash-terms freeze in the PIT thresholds.

Figure 4.14. Effect of changes to the PIT schedule, by gender of household head
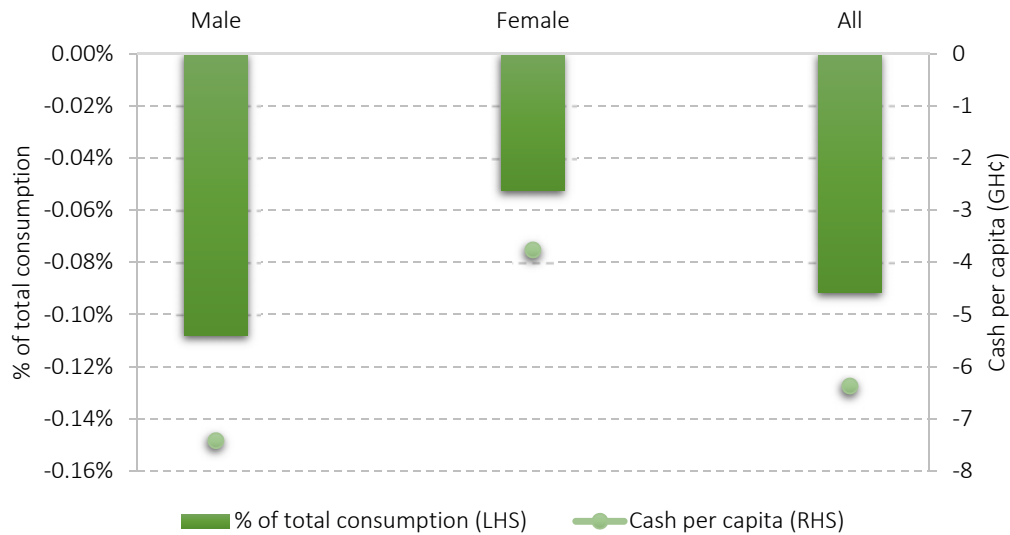
Note: 'Male' and 'female' represent households where the head of the household is a male and female, respectively.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

Table 4.4. Effects on poverty and inequality: reform to the PIT system

Indicator	No change in threshold	With threshold changed
Poverty headcount (%)		
All	17.776	17.759
Urban	4.723	4.690
Rural	31.208	31.208
Poverty gap (%)		
All	6.211	6.205
Urban	1.049	1.045
Rural	11.524	11.516
Inequality measure		
Gini index	0.416	0.416
90/10 ratio	7.267	7.274

Note: The poverty line used in the model is GH¢ 3,232.08 – this is equivalised and adjusted for inflation.

Source: Authors' computation based on GHATAX model; underlying data are GLSS7 and 2015 SAM.

As discussed above though, while increasing in cash terms, the income tax thresholds are being reduced in real terms because they are not keeping pace with inflation. Relative to inflation indexation, the policy therefore increases revenue, raising taxes primarily from households towards the top of the consumption distribution in Ghana, and reducing inequality. In addition, the new 35% rate is increasing revenue and will also reduce inequality.

Distributional effects of changes to excise duty rates

We now consider the impact of two excise duty reforms: changes to the structure and level of excise duty on cigarettes and tobacco products; and the introduction of an excise duty on fruit juices. These changes were made in the Excise Duty (Amendment) Act 2023, which also made changes to duty rates of wine, malt drinks, spirits and a number of other products. Full details of these changes are shown in Table A.1 in the Appendix, but the changes we model here are two of the most significant of those made in this Act.

In 2017, the Economic Community of West African States (ECOWAS) passed a new directive on the taxation of tobacco and related products with a view to having a common framework for the taxation of these products. This seeks to decrease incentives for cross-border shopping and illicit trade due to differences in the price of these products across countries within the block. Member countries are to charge a minimum ad valorem excise tax rate of 50% and also introduce a minimum specific tax of US$ 0.02 per stick on tobacco and related products. As well

as reducing illicit trade, it has also been argued that introducing a specific excise duty rate will improve the revenue and economic efficiency of the excise duty regime relative to only using ad valorem rates (Tesche and Van Walbeek, 2021). For example, the harm caused by smoking is related to the quantity of cigarettes smoked (and their strength), not the price paid for them.

To implement this directive, the Excise Duties (Amendment) Act therefore reduces the ad valorem rate on cigarettes and tobacco products from 175% to 50% of the ex-factory (or import) price of these items, and the introduction of a specific tax of GH¢ 0.28 per stick. For the purpose of the analysis here, we approximate the ad valorem equivalent of the GH¢ 0.28 specific tax on cigarettes and tobacco products based on an average price per cigarette of GH¢ 0.42 per stick.[13] This, together with the 50% ad valorem tax rate, leads to a new higher total ad valorem tax rate of 236.7% for cigarettes and tobacco products. Our simulation therefore takes this new rate as the post-reform rate and the December 2022 excise duty rate of 175% on cigarettes and tobacco products as the counterfactual rate.

Beyond the direct effect of a change in the excise duty rate on excise duty collections, there are also indirect effects of this policy via impacts on other consumption taxes, notably those that apply on top of excise duties (e.g. VAT and associated levies). These together increase the tax burden that households face in the event of a change in excise duty rate. Figure 4.15 presents the overall effect of the change in excise duty rate on cigarettes and tobacco products. It shows that the increase in the excise duty rate for cigarettes and tobacco products has a very small but regressive impact on households, with households in the poorest tenth estimated to pay an additional 0.06% of their consumption in cigarette and tobacco related excise duties and associated taxes, on average, compared to 0.004% for the richest tenth. This reflects the fact that while richer households spend slightly more in cash terms on cigarettes and so pay slightly more in cash terms (GH¢ 0.84 per person compared to GH¢ 0.73 for the poorest tenth), they report spending a much lower share of their budget on cigarettes, on average. In terms of the composition of the various effects, Figure 4.16 shows that these other taxes constitute one-fifth of the overall tax burden faced by households for a given change in the excise duty rate.[14]

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[13] Whether or not this new regime leads to a reduction or an increase in the total excise duty rate on these products depends on what the ad valorem equivalent of the GH¢ 0.28 specific tax is. Using an average retail price of GH¢ 8.31 per pack (or GH¢ 0.42 per stick) for cigarettes in Ghana (see the CostToTravel website, https://www.costtotravel.com/cost/cigarette-in-accra), we calculate the effective before tax price of cigarettes to be GH¢ 3.02 per pack (or GH¢ 0.15 per stick). So, a GH¢ 0.28 per stick specific tax will translate to around 186.7% (= 0.28/0.15*100) ad valorem tax rate. In effect then, Ghana's total effective excise tax rate on these products has been increased from 175% to 236.7% (= 50% ad valorem rate + 186.7%, which is the equivalent of the GH¢ 0.28 per stick specific rate).

[14] See Figure A.5 in the Appendix for the distributional effects of all the various taxes that are affected by this policy via either direct or indirect channels (e.g. VAT and associated levies).

Figure 4.15. Distributional effects of a change to the excise duty rate on cigarettes and tobacco products
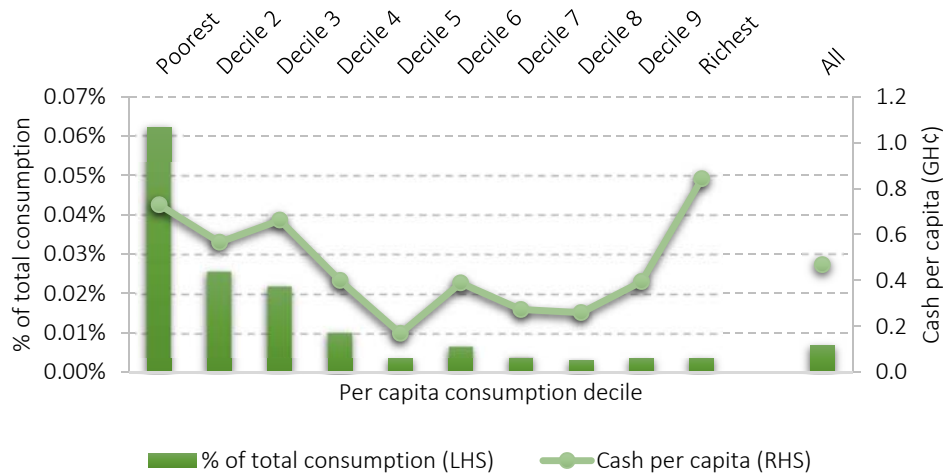
Note: The figure presents the overall effect of increasing the excise duty rate on cigarettes and tobacco products from the current 175% to 236.7%; aside from the direct effects this policy has on cigarette-related excise duty collections, indirectly, the change in excise duty rate will affect revenues from VAT and other sales tax-like taxes which apply on the excise duty inclusive price of these products.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

**Figure 4.16. Direct and indirect effect of excise duties on households**
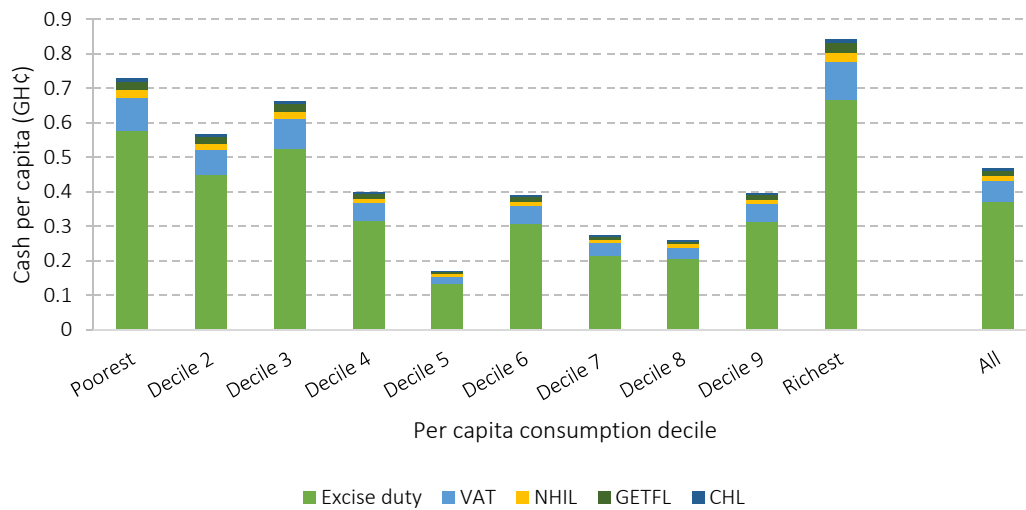
Note: VAT and the levies (NHIL, GETFL and CHL) are applied on top of excise duties.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

In terms of gender, Figure 4.17 shows that male-headed households are estimated to see a bigger increase in excise duty payments as a result of this reform, both in cash terms (GH¢ 0.64 versus GH¢ 0.04) and as measured as a percentage of consumption (0.01% versus 0.001%). This reflects the fact that female-headed households report very low consumption of cigarettes and tobacco products. The very small magnitude of this policy means impacts on poverty and inequality are extremely low.

Figure 4.17. Effect of increasing the excise duty rate on cigarettes and tobacco products, by gender of household head
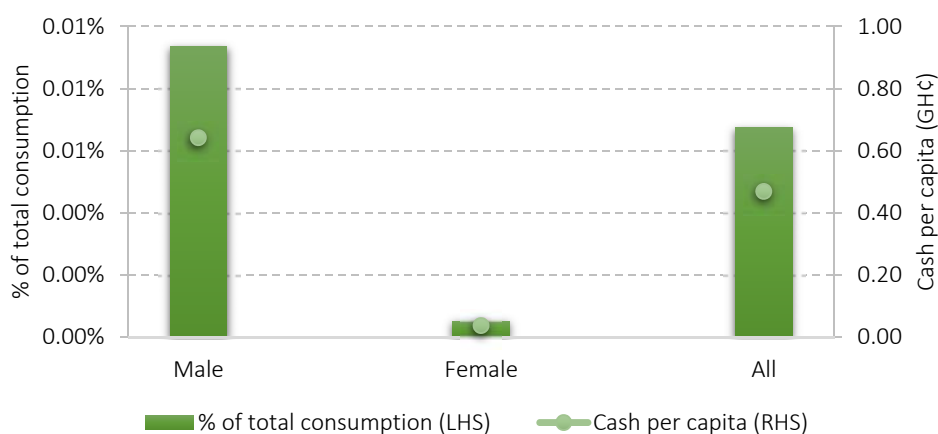
Note: 'Male' and 'female' represent households where the head of the household is a male and female, respectively.

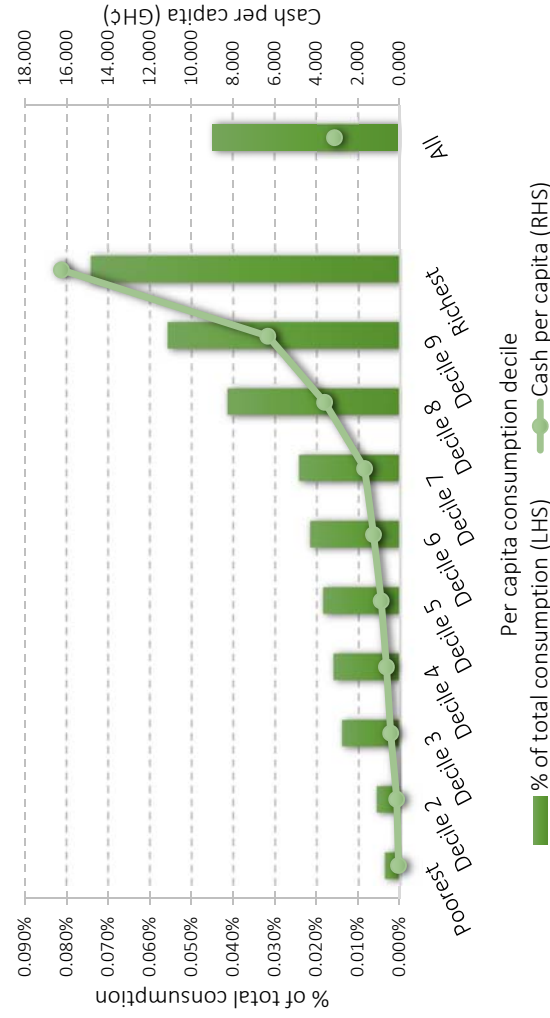Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Next, we examine the distributional effects of introducing a 20% excise duty rate on fruit juices. We estimate that this will raise GH¢ 77 million in excise duty revenues plus an additional GH¢ 20 million in indirect effects through VAT and levies. Figure 4.18 shows that in contrast to the reforms to cigarette and tobacco duties, the fruit juices duty will be very progressive, with payments by the poorest tenth of households averaging the equivalent of 0.004% of consumption compared to 0.07% for the richest tenth, reflecting the fact that richer households allocate a much larger share of their budgets to fruit juice purchases in Ghana. The cash-terms differences are very large, with the richest tenth paying over 300 times as much per person as the poorest tenth, on average (although still only a very modest GH¢ 16 per person). The average impact across all households is GH¢ 3.1 per person, or 0.04% of consumption. The impact of this policy change is lower when one considers only the direct effects of the policy, as the indirect effects of

the policy via impacts on taxes such as VAT and the associated levies jointly accounts for about 20% of the additional tax burden faced by households due to the policy (see Figure 4.19).[15]

Male- and female-headed households are estimated to pay similar amounts in excise duties on fruit juices both in cash terms (GH¢ 3.1 versus GH¢ 3.2 on average) and as a percentage of consumption (0.05%) as shown in Figure 4.20. Impacts on poverty and inequality are, like for the reforms to cigarette and tobacco duties, extremely small.

Figure 4.18. Distributional effects of introducing excise duty on fruit juices at the rate of 20%
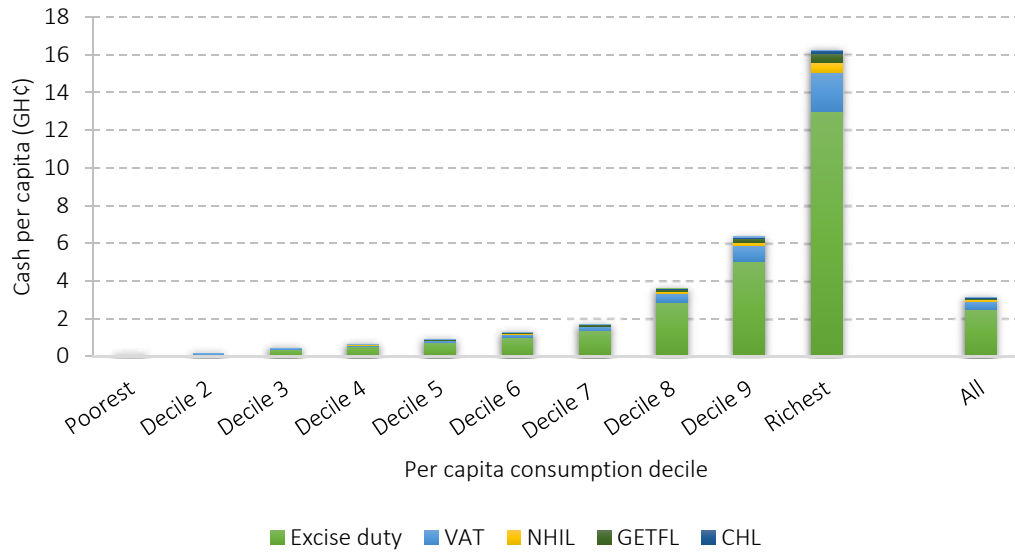

Note: The figure presents the direct effect of introducing excise duty on fruit juices at the rate of 20%; indirectly, the change in excise duty rate will affect revenues from VAT and other sales tax-like taxes which apply on the excise duty inclusive price of these products.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Figure 4.19. Direct and indirect effects of excise duty on households

Excise duty ■ VAT ■ NHIL ■ GETFL ■ CHL

Note: VAT and the levies (NHIL, GETFL and CHL) are applied on top of excise duties.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Figure 4.20. Effect of introducing excise duty on fruit juices at the rate of 20%, by gender of household head

% of total consumption (LHS)   Cash per capita (RHS)

Note: 'Male' and 'female' represent households where the head of the household is a male and female, respectively.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

5.   Concluding remarks

In recent years, policymakers across the globe have become increasingly interested in not only the revenue consequences of tax policies but also the differential impacts of tax policies across different segments of the population. Such evidence can promote the design of a more equitable and welfare-enhancing tax and benefit system. Given the limited amount of studies on this, especially within the context of developing countries such as Ghana, we complement the existing literature by analysing the distributional effects of Ghana's tax system as of December 2022 and recent tax policy changes announced in the 2023 Budget. The recent policy changes that are analysed in this report are the adjustments of the tax-free income tax band, the increase in the standard VAT rate and changes to the taxation of cigarettes and tobacco products as well as the introduction of excise duties on fruit juices.

The key findings from the analysis are:

1.   Ghana's PIT is strongly progressive, reflecting the fact that the marginal rate (and hence average rate) of tax paid increases with income. For example, as of December 2022, the marginal rate was 0% on incomes below GH¢ 4,380 per annum, and increased up to a maximum of 30% on incomes over GH¢ 240,000 per annum. As a result, PIT payments are estimated to amount to around 2.4% of consumption for the poorest tenth of Ghanaian households, compared to around 10.3% of consumption for the richest tenth. In cash terms, the richest tenth of households are estimated to pay around 80 times as much income tax, on average, as the poorest tenth.

2.   Ghana's indirect tax system as a whole is slightly progressive. However, there are significant differences between different indirect taxes:

   (a) VAT and the associated levies (Ghana Education Trust Fund Levy, National Health Insurance Levy and COVID-19 Health Levy) are mildly progressive. This reflects two factors: first, that goods and services exempted from VAT form a bigger share of the budget of poorer households; and second, that home production, on which no taxes are levied, contributes a bigger share of overall consumption for poorer households.

   (b) The excise duty system is however regressive, on average; poorer households pay a higher amount of excise duty as a percentage of their consumption than richer households. This reflects the fact that poorer households spend a higher fraction of their budgets on excisable products, and that excise taxes are designed to discourage the consumption of harmful products, rather than to contribute to the progressivity of the tax system.

   (c) Ghana's CST system and petroleum taxes (e.g. Road Fund Levy) are generally progressive. This can be attributed to the relatively greater access to telecommunication and digital electronic devices and the use of motor vehicles and other fuel-consuming equipment by the rich than the poor. Over time though, we anticipate that these taxes may become less progressive and contribute more significantly to revenues as poorer households' demand for these products and services increases.

3. These patterns mean that, taken together, Ghana's PIT and indirect tax system are progressive, reducing inequality by 3 percentage points as measured by the Gini coefficient. On average, these taxes are estimated to amount to 14.1% of consumption for the poorest tenth of households, around 15.9% for households in the middle of the consumption distribution, and around 24.6% for households in the top tenth of the consumption distribution. PIT and indirect taxes are, on their own, estimated to increase poverty by around 3 percentage points. But previous research shows that poor households benefit from a larger share of public spending than they contribute in taxes, meaning the overall effect of tax and spending together will be to reduce poverty.

4. Considering impacts by gender, female-headed households pay less in tax, both in cash terms and as a share of their overall consumption. This largely reflects the fact that they have lower incomes, which means that they pay less under Ghana's progressive income tax system. They also report spending a lower share of their budgets on excisable products.

5. Recent changes to the tax system including the revision of the tax-free PIT band, the increase in the standard VAT rate and the changes to the excise duty regime all have important distributional consequences.

   (a) The increase in the standard rate of VAT from 12.5% to 15% is mildly progressive, again reflecting the impact of exemptions and home production.

   (b) The increase in the tax-free PIT band has the biggest benefit measured as a proportion of consumption for households in the middle of the consumption distribution, and in cash terms has the biggest benefit for the richest households in Ghana. However, the introduction of a new top marginal tax rate of 35% will reduce the net incomes of households with very high incomes.

   (c) The change in the excise duty regime for cigarettes and tobacco products is regressive but has only a very small impact on households' overall budgets right across the consumption distribution. The poorest tenth of households spend an additional 0.06% of their total consumption budget on excise duty payment compared to just 0.004% for the richest tenth.

   (d) Finally, the new 20% excise duty on fruit juices is strongly progressive but very small in the context of households' overall budgets, with duty payments estimated to be equivalent to close to 0% of consumption for the poorest tenth of households and 0.07% for the richest tenth.

   (e) The impacts of these policies vary by gender. Female-headed households are estimated to benefit less as a percentage of their consumption from the increase in the income tax-

free allowance (although they will also be less likely to be affected by the new 35% top rate of income tax). Their lower reported expenditure on cigarettes and tobacco products means they are also estimated to be less affected by this policy change. Female-headed households are however estimated to be affected in the same way as male-headed households by the new duty on fruit juice, given their similar average levels of expenditure on these products.

There are a number of ways this analysis can be extended and improved upon in future.

First, by using updated household consumption and income data, as well as updated input–output data, when these become available. As well as improving the accuracy of the model for more recent years, these data will enable us to model new taxes. This includes analysing the distributional impacts of the recently introduced electronic transactions levy (E-levy). This was not possible in the current report not only because the tax was not covered by the household survey data used in this report but also the types of electronic transactions targeted by the tax were much less prevalent in 2016/17 than today. The next edition of the GLSS will likely contain information that will allow us to model this tax, however.

Second, future work could also examine in more detail the distributional effects of different *components* of Ghana's taxes, such as particular VAT exemptions, and special income tax rules. This could help inform the reform of taxes to help better achieve the Government of Ghana's distributional goals, while raising necessary revenues.

Third, we could explore how different assumptions about tax incidence affect the distributional effects of Ghana's tax system. For example, in the context of a large informal sector, one may expect less pass-through of taxes even in the formal sector – given the 'outside option' consumers have by buying through the informal sector.

We also plan to continue to analyse the distributional effects of future reforms to Ghana's tax system, where possible, using the GHATAX model.

Appendix

Figure A.1. Distributional effects of the standard VAT system
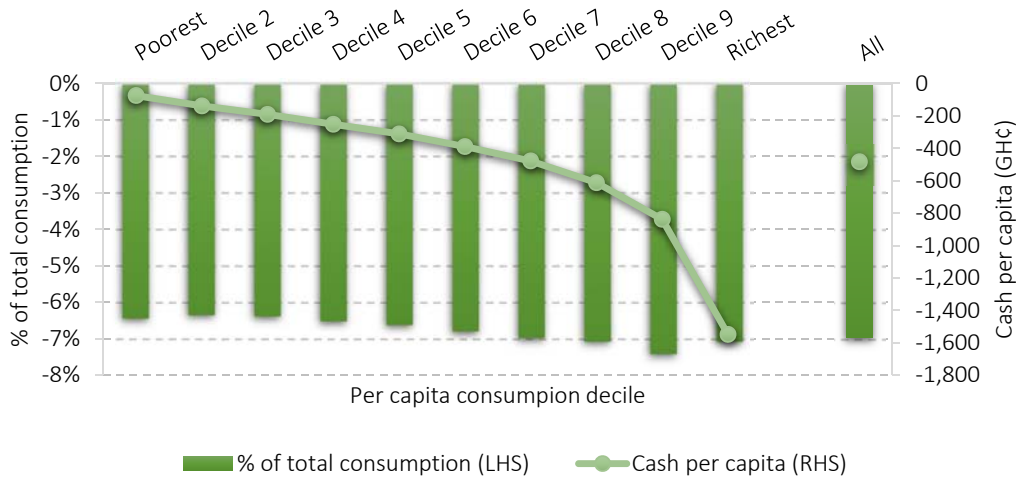
Note: This captures the effects of the standard VAT system which applies to only final consumption as it follows the input–output mechanism, except those that are exempt.

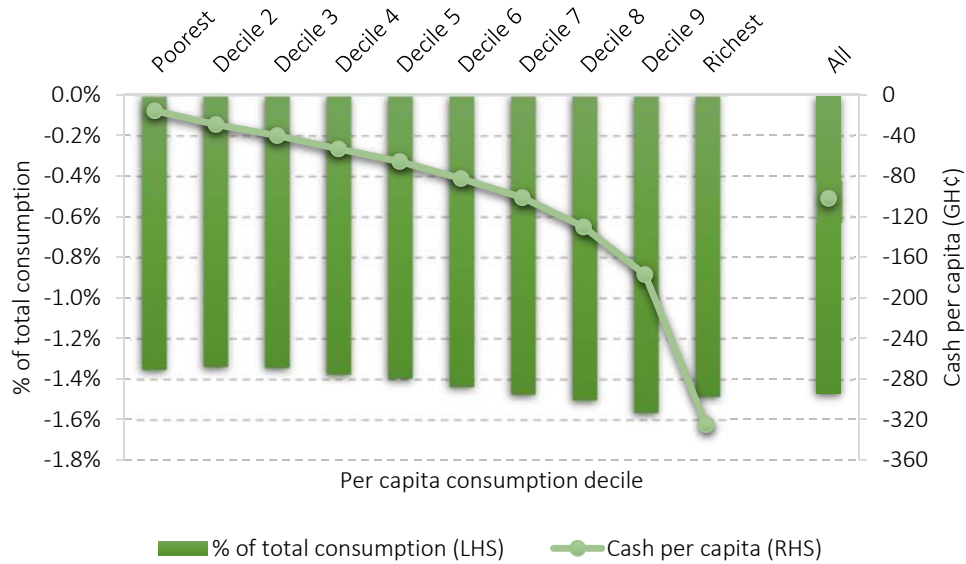Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Figure A.2. Distributional effects of the NHIL system
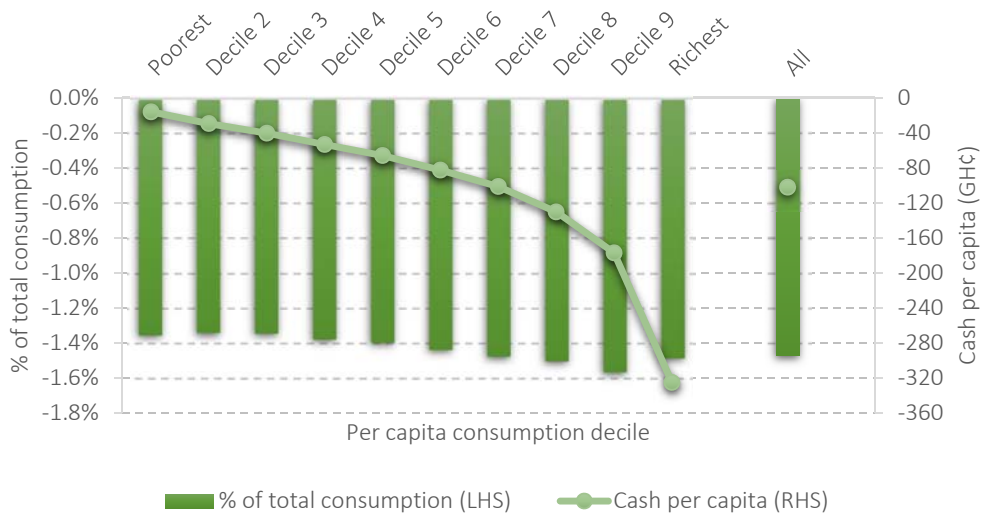
Note: This captures the distributional effects of the NHIL system; NHIL applies on the same tax base as VAT.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.
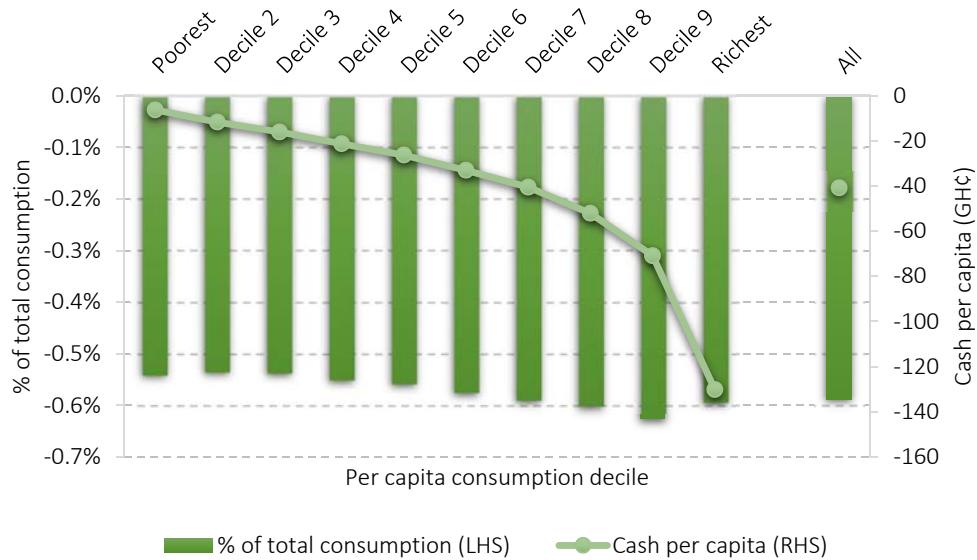
Figure A.3. Distributional effects of the GETFL system

% of total consumption (LHS) ▬▬ Cash per capita (RHS)

Note: This captures the distributional effects of the GETFL system; GETFL applies on the same tax base as the VAT.

Source: Authors' computation using the GHATAX model; underlying data is GLSS7 and 2015 SAM.

Figure A.4. Distributional effects of the CHL system

% of total consumption (LHS) ▬▬ Cash per capita (RHS)

Note: This captures the distributional effects of the CHL system; CHL applies on the same tax base as the VAT system.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Table A.1. Good liable to excise duty (Revised)

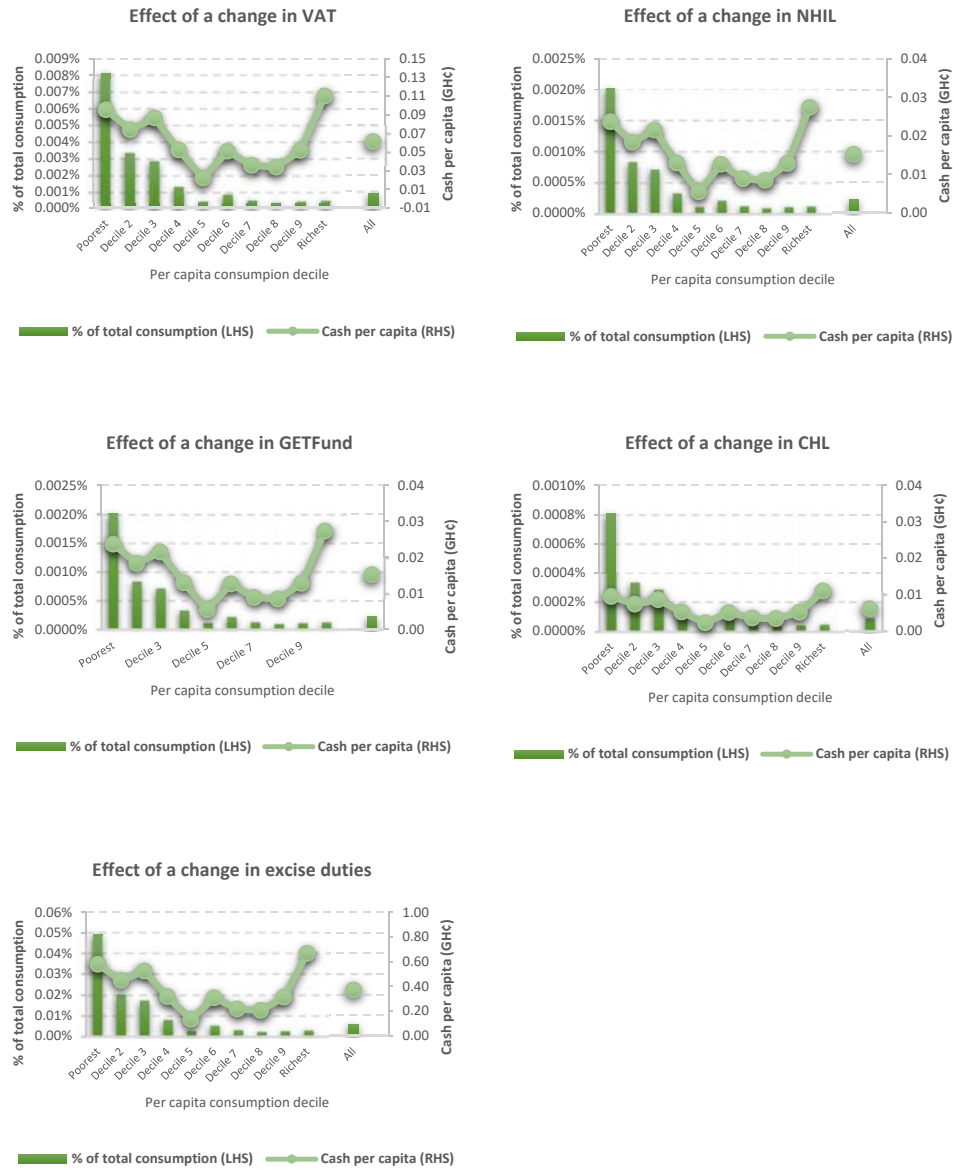| Tariff no.	Commodity description	Rate of duty
1	(a) Waters, incl. mineral waters of all description whether or not containing sugars or other sweetening matter or flavoured, and other non-alcoholic beverages falling under heading 22.01 and 22.02 of the HS and Custom Tariff Schedules, 2017	
	a. Mineral water	20% of the ex-factory price
	b. Aerated water	20% of the ex-factory price
	c. Non-alcoholic beer	20% of the ex-factory price
	d. Energy drinks	20% of the ex-factory price
	e. Other non-alcoholic drinks	20% of the ex-factory price
	(b) Distilled, bottled water	17.5% of the ex-factory price
	(c) Sachet water	0%
	(d) Fruit juices (incl. grape and vegetable juices, unfermented and not containing added spirits whether or not containing added sugar or other sweetening matter falling under heading 20.09 of the Harmonised System and Custom Tariff Schedules, 2017	20% of the ex-factory price
2	Malt drink: percentage use of local raw material	
	(a) Less than 50% of local raw material	20% of the ex-factory price
	(b) 50% to 70% of local raw material	12.5% of the ex-factory price
	(c) Above 70% of local raw material	10% of the ex-factory price
3	Beer, stout other than indigenous beer: percentage use of local raw material	
	(a) Less than 50% of local raw material	47.5% of the ex-factory price
	(b) 50% to 70% of local raw material	32.5% of the ex-factory price
	(c) Above 70% of local raw material	10% of the ex-factory price
4	Cider beer	20% of the ex-factory price
5	Wines incl. sparkling wine	45% of the ex-factory price
6	Spirit incl. 'Akpeteshie':	
	(a) Distilled or rectified	50% of the ex-factory price
	(b) Blended or compounded	50% of the ex-factory price
	(c) Other:	
	a. For use solely in laboratories or in the compounding of drugs	0%
	b. Denatured to the satisfaction of the Commissioner-General	10% of the ex-factory price

Table A.2. Continued

Tariff no.	Commodity description	Rate of duty
7	Tobacco products:	
	(a) Cigarette	50% of the ex-factory price and a specific duty of 28 pesewas per stick
	(b) Cigars	50% of the ex-factory price and a specific duty of 28 pesewas per stick
	(c) Negrohead	GH¢ 280 per kilogramme
	(d) Snuff and other tobacco	GH¢ 280 per kilogramme
	(e) Electronic cigarette liquids falling under heading 24.03 of the Harmonised System and Custom Tariff Schedules, 2022	50% of the ex-factory price and a specific duty of 50 pesewas per millilitre
	(f) Electronic cigarette and similar personal electric vaporising devices falling under heading 85.43 of the Harmonised System and Custom Tariff Schedules, 2017:	
	(i) Electronic cigarettes	50% of the ex-factory price
	(ii) Electronic smoking devices	50% of the ex-factory price
8	Plastic and Plastic products listed under Chapter 39 and 63 of the Harmonised System and Custom Tariff Schedules, 2012	10% of the ex-factory price
9	Other products:	
	(a) Textiles	0%
	(b) Pharmaceuticals	0%

Source: Excise Duty (Amendment) Bill, 2022.

Figure A.5. Direct and indirect effects of excise duty reform on cigarettes and tobacco products

Effect of a change in VAT

Effect of a change in NHIL

Effect of a change in GETFund

Effect of a change in CHL

Effect of a change in excise duties

Note: These figures present the direct and indirect distributional effects of a change in the excise duty regime on cigarettes and tobacco products.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

Figure A.6. Direct and indirect effects of excise duty reform on fruit juices
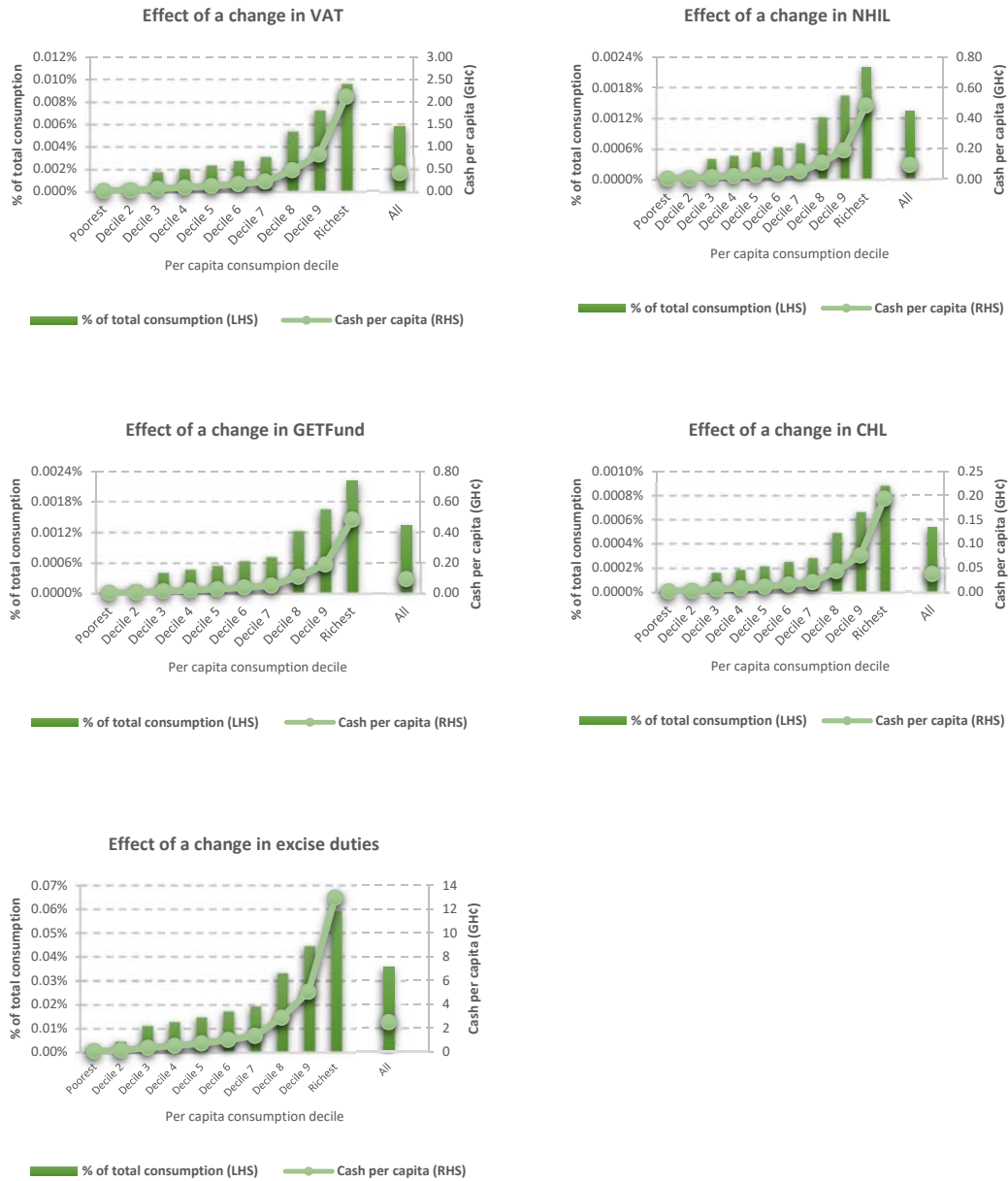
Note: This captures the indirect distributional effects of a change in the excise duty regime on fruit juices.

Source: Authors' computation using the GHATAX model; underlying data are GLSS7 and 2015 SAM.

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