THE IMPACT OF REFORMING ENERGY SUBSIDIES, CASH TRANSFERS, AND TAXES ON INEQUALITY AND POVERTY IN GHANA AND TANZANIA

Stephen D. Younger

CEQ INSTITUTE
COMMITMENT TO EQUITY
Tulane University

Working Paper 55
November 2016
(Revised June 2017)

The CEQ Working Paper Series

The CEQ Institute at Tulane University works to reduce inequality and poverty through rigorous tax and benefit incidence analysis and active engagement with the policy community. The studies published in the CEQ Working Paper series are pre-publication versions of peer-reviewed or scholarly articles, book chapters, and reports produced by the Institute. The papers mainly include empirical studies based on the CEQ methodology and theoretical analysis of the impact of fiscal policy on poverty and inequality. The content of the papers published in this series is entirely the responsibility of the author or authors. Although all the results of empirical studies are reviewed according to the protocol of quality control established by the CEQ Institute, the papers are not subject to a formal arbitration process. The CEQ Working Paper series is possible thanks to the generous support of the Bill & Melinda Gates Foundation. For more information, visit www.commitmentoequity.org.

The CEQ logo is a stylized graphical representation of a Lorenz curve for a fairly unequal distribution of income (the bottom part of the C, below the diagonal) and a concentration curve for a very progressive transfer (the top part of the C).

THE IMPACT OF REFORMING ENERGY SUBSIDIES, CASH TRANSFERS, AND TAXES ON INEQUALITY AND POVERTY IN GHANA AND TANZANIA*

Stephen D. Younger†

CEQ Working Paper 55

NOVEMBER 2016; REVISED JUNE 2017

THIS WORKING PAPER IS CHAPTER 16 IN LUSTIG, NORA, EDITOR. 2018. *COMMITMENT TO EQUITY HANDBOOK. ESTIMATING THE IMPACT OF FISCAL POLICY ON INEQUALITY AND POVERTY* (BROOKINGS INSTITUTION PRESS AND CEQ INSTITUTE, TULANE UNIVERSITY).

THE ONLINE VERSION OF THE HANDBOOK IS AVAILABLE HERE: HTTP://WWW.COMMITMENTOEQUITY.ORG/PUBLICATIONS-CEQ-HANDBOOK/

ABSTRACT

The paper explains methods developed by the Commitment to Equity Institute to simulate policy changes and uses them to assess the distributional consequences of three types of policy reform in Ghana and Tanzania: removal of energy subsidies, expansion of conditional cash transfer programs, and shifts in the balance between indirect and direct taxation. The methods are simple to implement and provide a first-order approximation to the true distributional effects. In both countries energy subsidies are substantial and popular but regressive despite the use of lifeline tariffs for electricity consumption. Their removal would reduce inequality but also increase poverty by a non-trivial amount because the poor do garner some benefit from the subsidies. A simultaneous expansion of cash transfer

* Launched in 2008, the CEQ project is an initiative of the Center for Inter-American Policy and Research (CIPR) and the department of Economics, Tulane University, the Center for Global Development and the Inter-American Dialogue. The CEQ project is housed in the Commitment to Equity Institute at Tulane. For more details visit www.commitmentoequity.org.

† Stephen Younger is Associate Director for Africa, Asia, and Europe of the CEQ Institute. For questions, please contact stephen.younger@ceqinstitute.org.

programs could offset the poverty consequences at significantly lower fiscal cost than that of the energy subsidies. In both countries direct taxes are more progressive than indirect taxes, yet shifting taxation from indirect to direct taxes has relatively little effect on inequality and poverty because the incidence of the two is not so different as, for instance, the difference between taxes and a strongly progressive expenditure like conditional cash transfers.

Keywords: fiscal incidence, poverty, inequality, subsidy reform, Ghana, Tanzania

JEL classification: D31, H22, I14

Introduction

A Commitment to Equity (CEQ) analysis aims to give as comprehensive a description as possible of the distributional consequences of government's fiscal policy, focusing on the status quo. This chapter shows how one can use methods similar to CEQ to analyze the distributional consequences of prospective policy changes.[3] Those changes may be driven by a desire to increase redistribution, but it is more common for policy makers to make changes to close budget deficits while trying to minimize the poverty impact. In both situations, simulations of policy changes provide useful information.

Particularly for poorer countries, it is common for a CEQ assessment to find that redistribution is minimal, often much less than policymakers expect. This is certainly true in Ghana and Tanzania, where the taxation and expenditure activities of the fisc measured in this study reduce the Gini coefficient by 0.035 and 0.037, respectively. Results for poverty reduction are even less encouraging. Were it not for the in-kind benefits from health and education spending, the fisc would actually increase poverty in Ghana and Tanzania by 0.022 and 0.025, respectively, for the headcount index at the national poverty lines. This effect is almost entirely because poor people pay indirect taxes, as in every other country. Assuming that the governments of Ghana and Tanzania would like their taxation and social expenditure policies to be more redistributive than is currently the case, what can it do? This chapter simulates several policy changes and analyzes their impact on inequality and poverty.

Both Ghana and Tanzania also face chronic budget deficits, limiting their ability to reduce poverty by simply increasing social expenditures. Faced with such strictures, both governments would like to find ways to reduce expenditures and increase taxes in ways that least hurt the poor. The chapter also simulates policy changes directed at budgetary savings to assess their distributional consequences.

The methods used here are descriptive, like the methods in a standard CEQ analysis. But because the simulated policies are hypothetical, we cannot simply describe those policies' beneficiaries as observed in the data but must rather make some assumptions about who would benefit from each of the proposed policies. Some changes mainly affect existing payers of a tax or beneficiaries of an expenditure. In other words, these changes refer to what is known as a policy's intensive margin, as opposed to the extensive margin, which would involve increasing the number of taxpayers or beneficiaries. Modeling these changes is straightforward because the survey indicates who the existing tax payers and expenditure beneficiaries are. For example, if the value-added tax (VAT) rate were increased, because the consumers of items subject to VAT are already known, their tax burden would simply be increased by the amount of the proposed change. This approach is applicable to any policy reform that changes the rate on an existing direct or indirect tax or an indirect subsidy. In the examples that follow, we consider changes to indirect subsidies to electricity and petroleum products and changes to direct and indirect tax rates.

3. This study is based on Younger, Osei-Assibey, and Oppong (2015) and Younger, Myamba, and Mdadila (2016). The Commitment to Equity Institute collaborated with the University of Ghana and the World Bank in Ghana and REPOA in Tanzania. These studies were possible thanks to the generous support of the Bill & Melinda Gates Foundation.

On the other hand, some policy proposals change an extensive margin: they expand taxes or benefits to people who are not currently affected. For these changes, stronger assumptions must be made about who the new tax payers or beneficiaries would be and those people must be identified in some way in the survey data. A common example might be expanding the VAT to informal enterprises that currently evade it. It might be possible to identify in the survey the households with informal enterprises, but it is difficult to know which of these households are likely to be captured by the reform efforts and which will continue to evade them. Still, for some extensive margins, it is possible to model the households affected by the change. For example, governments sometimes fund campaigns to ensure that vaccination rates are 100 percent. Survey data often record data on childhood vaccinations, allowing us to identify the unvaccinated as the likely beneficiaries of such a campaign. In the examples that follow, we focus on expansion of conditional cash transfer (CCT) programs to previously unaffected households. In most cases, the targeting mechanism for these programs is well defined, usually including a proxy means test (PMT). The sorts of data that such a test uses are usually available in household surveys, allowing us to calculate a proxy means score for the survey households and thus identify the likely beneficiaries of a program expansion on the extensive margin.

As with the main CEQ analysis, the results of these simulations provide a first-order approximation of the actual distributional consequences of the policy changes, ignoring behavioral and general equilibrium effects. See figure 1-1 in chapter 1 of this volume

1 Examples

The following section estimates the effects of four possible policy changes that involve eliminating energy subsidies and, in some cases, expanding conditional cash transfers.

1.1 Eliminating Energy Subsidies

Governments looking for ways to trim expenditures face a difficult task. Large parts of the budget go to items that are difficult or impossible to cut, such as health and education spending, debt service, and public employees' compensation. One line item that stands out for both its size and economic inefficiency is the subsidy for electricity and petroleum products.[4] This is the case in both Ghana and Tanzania. In Ghana in 2013, the year of this study, the government spent 1.1 billion cedis (1.2 percent of GDP) on electricity subsidies and indirectly subsidized fuel imports by offering the bulk oil companies an artificially low exchange rate, saving them about 600 million cedis that year. In Tanzania in 2011/12, the government spent 0.5 percent of GDP on electricity subsidies and 0.4 percent on fuel subsidies. In both countries, then, removing these subsidies would offer significant savings. Nevertheless, subsidy removal is unpopular, often bringing protesters to the streets. The strongest complaint against subsidy removal is that it hurts the poor. A distributional analysis allows us to assess the validity of that complaint.

Table 16-1 shows the results of four separate simulations of the elimination of electricity subsidies in Ghana and Tanzania. These subsidies existed at the time that I performed the

4. Coady and others (2015).

original CEQ analyses, so I had already calculated the benefits to each household. These four simulations remove those benefits in different ways. The original studies first calculated the rate that each household paid for electricity based on its reported total consumption. The subsidy benefit is the difference between that rate and one that was estimated to be sufficient to cover all generation and distribution costs.

Table 16-1: Simulated Effects of Eliminating Electricity Subsidies in Ghana and Tanzania

	Simulation			
Change	(1)	(2)	(3)	(4)
		Ghana		
Extreme poverty	0.0044	0.0036	−0.0108	−0.0032
Poverty	0.0088	0.0053	−0.0128	0.0001
Inequality	−0.0011	0.0004	−0.0101	−0.0051
Budgetary savings (percent GDP)	1.36	0.71	0.00	0.82
		Tanzania		
Extreme poverty	0.0007	0.0005	−0.0185	−0.0053
Poverty	0.0029	0.0024	−0.0148	−0.0004
Inequality	−0.0036	−0.0020	−0.0108	−0.0055
Budgetary savings (percent GDP)	0.43	0.27	0.00	0.34

Sources: Younger, Osei-Assibey, and Oppong (2015); Younger, Myamba, and Mdadila (2016). Simulations are based on data from annual household surveys in Ghana (2013) and Tanzania (2011).

Note: Results are for consumable income (see chapters 1 and 6 in this Handbook). Changes in poverty are measured as the difference between the headcount ratio obtained under the corresponding policy simulation and the headcount ratio before any policy simulation. Analogously, changes in inequality are measured as the difference between the Gini coefficient obtained under the corresponding policy simulation and the Gini coefficient before any policy simulation. Poverty lines are nationally determined.

Simulation descriptions:

(1) Eliminates the electricity subsidy with no compensation.
(2) Eliminates subsidy except for lifeline tariff for first 50kwh, which is held constant.
(3) Eliminates electricity subsidy and uses all the funds to expand CCT coverage by raising PMT threshold.
(4) Eliminates electricity subsidy and uses enough funds to expand CCT to leave poverty roughly unchanged.

The first simulation removes this subsidy completely, requiring every household to pay a new, higher rate sufficient to cover all electricity costs. This measure saves the government a considerable amount of money: 1.4 percent of GDP in Ghana and 0.4 percent in Tanzania.[5] Eliminating the subsidy also reduces inequality in both countries but only by a very small

5. The effect on the budget comes from the fact that central government must make transfers to the electricity providers to cover the losses they incur by charging rates below full cost recovery.

amount. Poverty increases, however, especially in Ghana, as critics of these policies have claimed.

Both Ghana and Tanzania have lifeline tariffs for electricity, which are low rates for the first 50 kilowatt hours of consumption that are meant to concentrate electricity subsidies among those who consume low amounts of electricity and who might be presumed to be poorer than people who consume more. The second simulation maintains the lifeline tariff in each country but increases other rates to full cost recovery, thus removing the subsidy on marginal (but not infra-marginal) consumption for heavier users. This measure reduces the fiscal savings by about half in Ghana and less in Tanzania, but it also reduces the (negative) poverty impact in Ghana by almost half, though by much less in Tanzania. In Tanzania and to a lesser extent in Ghana, the lifeline tariff seems not to benefit the poor very much, most likely because the poor do not have access to the electricity mains.

One possible response to the small but negative impact on poverty is to make an off-setting increase in another poverty-reducing expenditure: the conditional cash transfer. In both Ghana and Tanzania, this transfer is one of the most progressive government expenditures and should therefore be more efficient in reducing poverty than expenditure on electricity subsidies. The third simulation completely eliminates electricity subsidies and uses all of the funds saved to expand each country's CCT program. These amounts are huge increases to the CCT budgets of both countries, so it is not reasonable to allocate them only to existing beneficiaries. Instead, we expand the pool of recipients in each country, or in other words, we increase the extensive margin of the CCTs. In Ghana, we did this by calculating the proxy means formula for each household and using its benefit cutoff plus the other criteria for CCT benefits applicable in 2013 to identify all eligible households in the country (see the following section for details on the eligibility criteria in Ghana). Even with this expanded pool, we could not exhaust the savings from the elimination of the electricity subsidy, so we also increased each recipient's benefit by 89 percent. In Tanzania, we expanded the pool of recipients by starting with the lowest proxy means scores and working our way up until all the electricity savings were exhausted. By design, these simulations have zero net benefit for the fisc, but they do show large reductions in poverty, especially in Tanzania, despite the elimination of the electricity subsidies.

The fourth simulation takes a slightly different tack. Here, we eliminate the subsidy entirely but increase the CCT just enough to keep poverty from increasing, providing smaller poverty and inequality reductions than in the third simulation but generating substantial fiscal savings, 0.8 percent of GDP in Ghana and 0.3 percent in Tanzania.[6] Ultimately, then, both Ghana and Tanzania would do better to remove the electricity subsidies, which are poorly targeted, and offset the poverty consequences with an increase in a well-targeted expenditure like CCTs if poverty is the main objection to electricity subsidy removal.

6. Because the poverty increase is different for each income concept and poverty line, we would need to run a slightly different simulation for each one if we want to have poverty stay constant. Instead, we targeted the income and poverty line that showed the worst poverty increase in the first simulation and held it to zero, which implies small poverty reductions for the other income/poverty line combinations.

1.2 Expanding Conditional Cash Transfers

Both Ghana and Tanzania had nascent CCT programs at the time our survey data were collected. In Ghana the program operated only in some districts selected for relatively high poverty rates, whereas in Tanzania, a pilot program was operational in three districts only. Because these programs have among the lowest concentration coefficients of any government expenditure (−0.29 in Ghana and −0.50 in Tanzania), they are prime candidates for increased expenditures meant to reduce poverty and inequality.

Both countries use a PMT along with additional criteria to target households. In Ghana, the CCT targets households in eligible districts headed by a child, an elderly person, or a disabled person, and those that include an elderly person or a vulnerable child (including children who have lost one or both parents or who are disabled). Within this household category, funds available to the district are allocated to the households with the lowest proxy means score. After the survey date, Ghana updated its PMT because there was some concern that the previous test was not targeting poor households effectively. In Tanzania, the pilot CCT targets the vulnerable elderly (those who have no caregivers, are in poor health, or are very poor) and vulnerable children (those who have lost one or more parents, whose parents are chronically ill, or who are chronically ill themselves). The program relies on local communities to identify households that include such vulnerable people, applies a PMT to the identified households, and makes the CCT payment to all households who fall below the cutoff level for the PMT.

Although we took slightly different approaches in the two countries, in general, we simulated several options for expanding each country's CCT to a budget of 0.5 percent of GDP, an amount that is fairly typical for countries with new CCTs. Unlike in many similar simulations, we pay for these additional transfers by increasing the VAT, which offsets the poverty reduction impact somewhat. Table 16-2 shows the results for Ghana and table 16-3 shows those for Tanzania.

For Ghana, we ran five simulations. The first expands the CCT to all eligible persons in the entire country using the old PMT, representing a complete expansion of the existing program. To keep the total cost to 0.5 percent of GDP, this expansion requires scaling down the benefit to each recipient by 30 percent.

The second simulation changes the targeting to the new PMTs, allocating transfers to all people found to be extremely poor by that test's criteria. This change greatly improves the targeting from a concentration coefficient of −0.29 to −0.65, which is better than most middle-income countries.[7] In this simulation, everyone who is extremely poor receives a transfer, not just the elderly, handicapped, and vulnerable children currently targeted. Keeping the total cost to 0.5 percent of GDP requires scaling down the benefit to each recipient by 49 percent in this simulation.

The third simulation targets transfers to the poorest people as judged by the new PMT at current benefit rates (no scaling down), until total payments are 0.5 percent of GDP. This method is in

7. In practice, the new PMT will not work this well. Because it is estimated using the same Ghana Living Standards Survey 6 (GLSS-6) data that we use here, it is particularly well suited to identifying the poor in this sample, but because of sampling error, it will do less well in the general population.

one sense perfect targeting: the money goes to the poorest people in the sample as identified by the PMT (though not, perhaps, the absolutely poorest people because the PMT is not a perfect predictor).

The fourth simulation increases benefits to current beneficiaries only until total transfer payments reach 0.5 percent of GDP---that is, it uses only the current targeting. Because current (2013) beneficiaries are so few, this increase produces a huge and unrealistic payment to them, one that is 16 times larger than the current 24 cedis per person per month.

The fifth simulation keeps the program size constant at the 2013 level of 0.02 percent of GDP, much smaller than the other simulations, and changes the targeting to the new PMT.

Note that all of these simulations except the fourth require us to identify an extensive margin, new beneficiaries who are not receiving benefits at the time of the survey. In the case of cash transfers in these two countries, identifying new beneficiaries is relatively easy because the eligibility criteria are clear and rely on information collected in the survey: age, disability, and orphan status, and a proxy means test that also uses variables readily available in the survey.[8] Accordingly, we can identify the extensive margin in the survey without recourse to any behavioral analysis. That said, our simulations may be overly optimistic if in practice the selection process fails to choose according to the eligibility criteria.

8. In fact, the proxy means test is usually estimated on a survey very similar to the ones we use.

Table 16-2: Simulated Effects of Expanding Conditional Cash Transfers in Ghana

Change		*Simulation* (1)	(2)	(3)	(4)	(5)
Extreme poverty	Disposable income	−0.0065	−0.0173	−0.0188	−0.0066	−0.0015
	Consumable income	−0.0032	−0.0157	−0.0175	−0.0044	−0.0006
Poverty	Disposable income	−0.0085	−0.0159	−0.0124	−0.0077	−0.0004
	Consumable income	−0.0044	−0.0112	−0.0081	−0.0042	−0.0002
Inequality	Disposable income	−0.0035	−0.0082	−0.0081	−0.0040	−0.0002
	Consumable income	−0.0039	−0.0088	−0.0087	−0.0043	−0.0002
Scaling factor		0.70	0.70	0.51	1.00	16.29

Source: Younger, Osei-Assibey, and Oppong (2015). Simulations are based on data from the 2013 household survey in Ghana.

Note: Results are for consumable income (see chapters 1 and 6 in this Handbook). Changes in poverty are measured as the difference between the headcount ratio obtained under the corresponding policy simulation and the headcount ratio before any policy simulation. Analogously, changes in inequality are measured as the difference between the Gini coefficient obtained under the corresponding policy simulation and the Gini coefficient before any policy simulation. Poverty lines are nationally determined.
In all simulations except (5), VAT is increased to pay for the increased program size.
Simulation descriptions:

(1) Expands program to all eligible persons in the entire country using the old PMT, then scales benefits down so the total expenditure is 0.5 percent of GDP.
(2) Expands program to all people judged to be extremely poor using the new PMT, then scales benefits down so the total expenditure is 0.5 percent of GDP.
(3) Expands program to the poorest people as judged by the new PMT at current benefit rates until total payments are 0.5 percent of GDP.
(4) Increases benefits to current beneficiaries only until total payments are 0.5 percent of GDP.
(5) Keeps program payments constant, but converts to the new PMT.

In interpreting the results, recall that disposable income is measured prior to incorporating the effect of VAT, so the impact shown for disposable income reflects the impact of the CCT increase only, whereas impacts for consumable income account for both the additional transfer and its assumed financing via additional VAT. [9]

The first simulation shows that increasing the transfer to nationwide coverage using existing targeting criteria while holding the overall budget to 0.5 percent of GDP would reduce disposable income poverty by 0.85 percentage points and extreme poverty by 0.65 percentage points. Including the effect of the VAT increase (the consumable income row) reduces the gains to 0.32 and 0.44 percentage points. Reductions in the Gini are small: 0.39 percentage points.

9. See chapters 1 by Lustig and Higgins and, especially, 6 by Higgins and Lustig for a description of income concepts.

The second simulation does much better, demonstrating the advantages of better targeting. Here, disposable income poverty declines by 1.59 percentage points and extreme poverty by 1.73 percentage points. Including the losses from imposing additional VAT, the gains are still much larger: 1.12 and 1.57 percentage points, respectively.

The third simulation reflects "perfect targeting," but it does only about as well as the second. In fact, it does a little worse on some of the measures. How can this be? Here, transfers are perfectly targeted to the PMT value, not the actual incomes used to calculate the poverty rates, and the rank correlation of the PMT and incomes is therefore not perfect. The fact that the third simulation does not do much better than the second indicates that the PMT does not predict household consumption per adult equivalent perfectly and also that there is not that much difference between the poorest of the extremely poor and the rest of the extremely poor when we use actual household expenditures per adult equivalent to measure well-being.

Results for the fourth simulation are very similar to the first because both use the old PMT. It is interesting to note, though, that the poverty and inequality effects are broadly similar for an expansion of the transfer's extensive margin (adding new beneficiaries as in the first simulation) and intensive margin (increasing benefits to existing beneficiaries as in the fourth simulation).

Finally, the fifth simulation shows almost no change in poverty or inequality measures, despite the switch to the better targeting of the new PMT, because the program size does not change here. Thus even greatly improved targeting of a small program cannot have much impact on poverty and inequality. Larger program size is essential.

Table 16-3 simulates three possible ways of scaling up Tanzania's CCT so that its total expenditures would be 0.5 percent of GDP. The first simulation expands the CCT to all vulnerable children and elderly people, regardless of their score on the PMT. This expansion would require almost 1 percent of GDP in additional expenditures so, to keep the budget to 0.5 percent of GDP, we scale down the benefits for each recipient. The second simulation expands the program to eligible participants by raising the PMT threshold until the additional expenditures total 0.5 percent of GDP. The third simulation opens the CCT to all people, not just vulnerable children and the elderly, and raises the PMT threshold until the additional expenditures total 0.5 percent of GDP.

Table 16-3: Simulated Effects of Expanding Conditional Cash Transfers in Tanzania

Change		*Simulation* (1)	(2)	(3)
Extreme Poverty	Disposable Income	−0.0113	−0.0172	−0.0212
	Consumable Income	−0.0110	−0.0183	−0.0229
Poverty	Disposable Income	−0.0148	−0.0163	−0.0236
	Consumable Income	−0.0104	−0.0138	−0.0146
Inequality	Disposable Income	−0.0045	−0.0073	−0.0087
	Consumable Income	−0.0063	−0.0094	−0.0108
Scaling factor		0.55	1.00	1.00

Source: Younger, Myamba, and Mdadila (2016). Simulations are based on data from the 2011 household survey in Tanzania.

Note: Changes in poverty are measured as the difference between the headcount ratio obtained under the corresponding policy simulation and the headcount ratio before any policy simulation. Analogously, changes in inequality are measured as the difference between the Gini coefficient obtained under the corresponding policy simulation and the Gini coefficient before any policy simulation. Poverty lines are nationally determined.

In all simulations VAT is increased to pay for the increased program size.

Simulation descriptions:

(1) Expands CCT to all eligible persons, then scales benefits down so the total CCT expenditure is 0.5 percent of GDP.

(2) Expands CCT at current benefit rates to the poorest eligible people according to the proxy means test until total CCT payments are 0.5 percent of GDP.

(3) Expands CCT at current benefit rates to the poorest people regardless of VC/elderly according to the proxy means test until total CCT payments are 0.5 percent of GDP.

The first simulation would seem to be the least effective approach to an expansion, both because some of the vulnerable children and the elderly are not poor to begin with and because the additional VAT and reduced benefits levels used to finance the program expansion would impoverish some people. Nevertheless, this simulation does reduce extreme poverty by about one percentage point, and poverty by a little more.

The second simulation has a larger effect on both poverty and inequality, which is to be expected because it limits benefits to those with the lowest PMT scores. The third simulation does even better, suggesting that the government could improve the CCT's targeting by eliminating the restriction of benefits to vulnerable children and the elderly and focusing instead only on those with low PMT scores. But regardless of the approach a fairly limited expansion of the CCT to 0.5 percent of GDP would have significant effects on poverty and inequality in Tanzania as a reflection of this program's excellent targeting.

2 Making Taxation More Progressive

In Ghana and Tanzania as in most countries, direct taxation is more progressive than indirect (with the exception of some excise taxes). This is especially true in countries with large informal sectors because direct taxes fall only on formal sector employees who tend to be much wealthier than the rest of the population. Thus, the government might consider shifting from the use of indirect to direct taxation. To explore this possibility, we simulated two very extreme tax policy changes in Ghana and Tanzania. In Ghana, we eliminate both VAT and import duties, replacing the revenue with higher taxes on earned income in the formal sector (pay as you earn [PAYE]) and presumptive taxes on small businesses. In Tanzania, we removed import duties and offset the revenue loss with increased taxes on formal sector earnings (also PAYE) and presumptive taxation.[10] Clearly, neither of these simulations is practical or even possible. Formal sector employees are already heavily taxed, especially in Tanzania, so considerable tax increases would induce a large shift to informality. We pursue these policy changes to show that even shifting very large amounts of revenue, 5.9 percent of GDP in Ghana and 1.2 percent in Tanzania, from indirect to direct taxes has a relatively modest overall effect on poverty and inequality. Table 16-4 gives the results.

Table 16-4: Simulated Effects of Replacing Indirect with Direct Taxation in Ghana and Tanzania

Change	Extreme Poverty Headcount	Poverty Headcount	Gini Coefficient
Ghana	−0.0031	−0.0056	−0.0034
Tanzania	−0.0049	−0.0071	−0.0037

Sources: Younger, Osei-Assibey, and Oppong (2015); Younger, Myamba, and Mdadila (2016). Simulations are based on data from annual household surveys in Ghana (2013) and Tanzania (2011).

Note: Results are for consumable income (see chapters 1 and 6 in this Handbook). Changes in poverty are measured as the difference between the headcount ratio obtained under the corresponding policy simulation and the headcount ratio before any policy simulation. Analogously, changes in inequality are measured as the difference between the Gini coefficient obtained under the corresponding policy simulation and the Gini coefficient before any policy simulation. Poverty lines are nationally determined.

Why are the effects so small? Even though direct taxes are more progressive than indirect, concentration coefficients for indirect and direct taxes are not so different. In Ghana, they are 0.42 for import duties, 0.44 for VAT, and 0.73 for PAYE, by far the largest source of direct taxation in this study. The difference between these is about 0.3, whereas the difference between the concentration coefficients for electricity subsidies and Ghana's CCT studied in the previous section is 0.76. In Tanzania, the concentration coefficients are 0.38 for import duties and 0.91 for PAYE, the highest concentration coefficient for a tax we have ever observed. Still, that difference of about 0.5 is less than the difference of 1.2 between electricity subsidies and the CCT.

10. In Tanzania, the VAT is actually quite progressive, so the difference between VAT and direct taxes is not as dramatic as the difference between import duties and direct taxes.

This result is important for policy makers in two ways. First, broad-based indirect taxes like the VAT are generally considered to be more efficient than direct taxes, whereas direct taxes are more equitable. Thus there is a trade-off between equity and efficiency when choosing tax instruments. But the results here suggest that the trade-off is not too severe. The governments of Ghana and Tanzania can continue to rely on broad-based indirect taxes, knowing that their use instead of direct taxation has only a minor effect on poverty and inequality. Second, the result suggests that to have a large redistributional impact, governments need to consider combinations of taxes with large positive concentration coefficients and expenditures with large negative concentration coefficients, which are usually those like CCTs that explicitly target the poor.

References

Coady, David, Ian Parry, Louis Sears, and Baoping Shang. 2015. "How Large Are Global Energy Subsidies?" IMF Working Paper WP/15/105 (Washington: International Monetary Fund).

Higgins, Sean and Nora Lustig. 2018. "Allocating Taxes and Transfers, Constructing Income Concepts, and Completing Sections A, B, and C of CEQ Master Workbook." Chapter 6 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty* (Brookings Institution Press and CEQ Institute, Tulane University). Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Lustig, Nora and Sean Higgins. 2018. "The CEQ Assessment: Measuring the Impact of Fiscal Policy on Inequality and Poverty." Chapter 1 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty* (Brookings Institution Press and CEQ Institute, Tulane University). Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Younger, Stephen, Eric Osei-Assibey, and Felix Oppong. 2015. "Fiscal Incidence in Ghana," CEQ Working Paper 35 (New Orleans: CEQ Institute, Tulane University, Ithaca College, University of Ghana, and World Bank).

Younger, Stephen, Flora Myamba, and Kenneth Mdadila. 2016. "Fiscal Incidence in Tanzania," CEQ Working Paper 36 (New Orleans: CEQ Institute, Tulane University, Ithaca College, and REPOA).