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The Effects of a CAADP-Compliant Budget on Poverty and Inequality in Ghana

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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Abstract

Ghana has accepted the CAADP commitment to dedicate 10 percent of government spending to the agricultural sector. In a 2014 paper, Benin argues that Ghana falls short of that goal, and in a 2016 paper, Younger shows that despite the current fiscal crisis, there is fiscal space to meet the commitment. Benin estimates the rates of return to increased public expenditure on agriculture, finding that they are quite high, especially if the investments are made in the noncocoa sector. This paper uses Benin's estimates to examine the poverty and inequality consequences of increasing public expenditure on agriculture. Key conclusions are that public expenditure on agriculture is surprisingly progressive, especially if spent in the grains subsector. This progressivity, combined with the high rate of return, means that public investment in agriculture may actually be more efficient at reducing poverty than LEAP, Ghana's targeted conditional cash transfer program.

Keywords: Ghana, CAADP, poverty, inequality

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1. Introduction

In 2004, members of the African Union agreed to the Comprehensive Africa Agriculture Development Programme (CAADP), which includes a commitment to dedicate at least 10 percent of public expenditures to agriculture. Ghana was one of the early countries to accept this commitment, signing its CAADP compact in October 2009, and the government claims to be in compliance (Ghana, Ministry of Food and Agriculture 2013). Benin (2014), however, shows that public spending for agriculture in Ghana falls short of the CAADP commitment by about 3.4 percent of total government expenditure in 2012. In light of the current fiscal crisis, Ghana seems unlikely to be able to increase agriculture spending by such a large amount; however, Younger (2016) shows that, in fact, some fiscal space exists to increase agricultural spending, though perhaps not by enough to meet the CAADP commitment.

What would be the consequences of a large increase in agriculture spending? Benin (2016) estimates the historical rates of return to agriculture spending in Ghana in terms of value-added per hectare, finding them to be quite high: 141 to 190 percent in the noncocoa subsector, and 11 to 39 percent in the cocoa subsector. This paper uses those estimates to answer another question: how much would poverty and inequality decline if Ghana increased its public expenditure on agriculture significantly? In particular, we examine the effects of doubling current agricultural spending, an increase of about 0.7 percent of gross domestic product (GDP).[1]

2. Methods

We use Benin's rate-of-return estimates along with information on public expenditure on agriculture and the total value-added in the cocoa and noncocoa subsectors to estimate the increase in agricultural value-added that would result from a more CAADP-compliant budget. To be precise, we estimate the increase in value-added resulting from an increase of 538 million cedis (at 2012 prices) in public spending on agriculture. If the entire investment were dedicated to the noncocoa subsector, this would yield an increase in noncocoa agricultural value-added of between 6 and 14 percent. If the entire investment went to cocoa, it would yield an increase of 3 to 33 percent in value-added.[2]

To understand the poverty and inequality consequences of these investments, we make use of the most recent round of the Ghana Living Standards Survey, GLSS-6, carried out in 2012–2013. To be precise, the survey ran from October 2012 to October 2013. However, most of the agricultural questions involve a 12-month recall period, so the agricultural data are more closely tied to 2012 than 2013. For that reason, we do all our calculations with 2012 data. GLSS-6 includes detailed questions on households' use of agricultural inputs, including factors such as land and capital, along with total agricultural output by product.

[1] All calculations are based on data from 2012, the year of the most recent Ghana Living Standards Survey (GSS 2014).

[2] These values reflect the lower and upper limits of the elasticities estimated in Benin (2016) and the fact that an increase of 538 million cedis in public agricultural expenditures is 100 percent of noncocoa expenditures or 47 percent of cocoa expenditures.

To calculate a household's value-added in noncocoa agriculture, we add up the value of all noncocoa agricultural production, including home consumption, subtract any payments for land and equipment rental, including shares given to landlords on sharecropped land, and then add receipts from the renting out of the household's own land or capital. We do not subtract payments for hired labor, which are anyway small, because it is difficult to identify earnings as a hired agricultural laborer in the GLSS. So value-added from labor stays with the farmer.

For the cocoa sector, we use output, not value-added. This is because it is not possible to identify inputs used specifically for cocoa in the GLSS. Because other crops constitute the bulk of agricultural production, we assume that all inputs are used for noncocoa crops, and subtract them from their value-added, while for cocoa, we assume that output equals value-added.[3]

To understand the inequality and poverty consequences of increased agricultural spending, we assume that each agricultural household in the GLSS receives a benefit proportional to its agricultural value-added and consistent with Benin's rate-of-return estimates. For example, if a household has noncocoa value-added of 1,000 cedis in the GLSS, we assume that its value-added, and therefore consumption, will increase by 60 cedis (6 percent) in the most pessimistic case and 140 cedis (14 percent) in the most optimistic. We then recalculate inequality and poverty measures on this simulated household consumption and compare them to those derived from the original GLSS data using software provided by the Commitment to Equity Institute (Higgins 2017).

This is an important and perhaps unrealistic assumption: each farmer shares in the simulated increased agricultural production in proportion to her or his existing value-added. It is easy to imagine that richer farmers could lobby successfully to capture a greater share of the increased agricultural spending, making our results too optimistic. But it is also possible that government could target the spending to poorer areas of the country as it has done with the Livelihood Empowerment Against Poverty (LEAP) Programme and school meals, or to crops favored by poorer farmers.[4] That would make our results too pessimistic. Lacking any clear evidence on how the benefits of increased spending would be distributed across farmers, we simply assume a pro rata share for all.

All of our simulations are static in the sense that we do not model behavioral responses to the policy changes. Given the large increase in public spending involved, this is also unrealistic, but it is simple and does provide a first-order approximation to the actual change in agricultural value-added.[5]

3. Simulations

We run nine simulations in all:

[3] We test the sensitivity of this assumption by comparing the incidence of noncocoa value-added to noncocoa output, ignoring inputs in that analysis as we do in the cocoa sector. The results are very similar.
[4] The LEAP Programme is a targeted conditional cash transfer program under the Ministry of Gender, Children, and Social Protection (http://leap.gov.gh/).
[5] Lustig and Higgins (2017) include a discussion of this.

1. Noncocoa value-added low: government increases noncocoa agricultural spending by 538 million cedis and thus generates a 6 percent increase in noncocoa agricultural value-added. This is the lowest estimate from Benin (2016).
2. Noncocoa value-added high: government increases noncocoa agricultural spending by 538 million cedis and generates a 14 percent increase in noncocoa agricultural value-added. This is the highest estimate from Benin (2016).
3. Cocoa output low: government increases cocoa spending by 538 million cedis and generates a 3 percent increase in noncocoa agricultural value-added. This is the lowest estimate from Benin (2016).
4. Cocoa output high: government increases cocoa spending by 538 million cedis and generates a 33 percent increase in noncocoa agricultural value-added. This is the highest estimate from Benin (2016).
5. Grains output low: government increases spending on grains—maize, millet, sorghum, and rice—by 538 million cedis and generates a 27 percent increase in grains output. This is consistent with Benin's lowest estimate for the rate of return to noncocoa agriculture, but with the increased production coming only in grains, which have relatively larger yield gaps (Nin-Pratt et al. 2011).
6. Grains output high: government increases spending on grains by 538 million cedis and generates a 63 percent increase in grains output. This is consistent with Benin's highest rate-of-return estimate.
7. LEAP, actual targeting: government spends 538 million cedis on LEAP, distributing it to all eligible households in the country as per the program criteria,[6] but also increasing the value of the LEAP payment by 60 percent in order to exhaust the funds available.
8. LEAP, PMT targeting: government spends 538 million cedis on LEAP, distributing it to all households in the country who meet the proxy means test (PMT) criterion for LEAP, but ignoring the other program criteria. Because the recipient population is large in this example, it requires *de*creasing the value of the LEAP payment by 41 percent in order to stay within the 538 million cedi budget.
9. VAT paid: government reduces value-added tax (VAT) by 538 million cedis, in proportion to current VAT collections.

The first four simulations follow directly from the discussion above and Benin's estimates for the rate of return to additional agricultural spending in the noncocoa and cocoa subsectors, respectively. The fifth and sixth simulations are motivated by the fact that grains production is more concentrated among poor households than other agricultural production, a surprising result we will show in a moment.

The last three simulations serve as benchmarks. As a cash transfer targeted to the poor, LEAP is one of the most progressive government expenditures in Ghana (Younger, Osei-Assibey, and Oppong 2017). As such, it might serve as an upper bound on the poverty and inequality reduction possibilities for a public expenditure of this size. However, Younger, Osei-Assibey,

[6] Eligibility is based on four social categories: 65 years of age and above without any form of support; severely disabled without productive capacity; orphaned and vulnerable children; and extremely poor or vulnerable households with pregnant women and mothers with infants (http://leap.gov.gh/). At the time of the GLSS-6 survey, LEAP was a small pilot program limited to certain districts in the country.

and Oppong (2017) show that a change in targeting to consider only the PMT would actually be more progressive than the current program conditions, which require that a beneficiary be an orphan, elderly, or disabled, as well as satisfying the PMT. Focusing only on the PMT is almost perfect targeting, which we can take as an upper bound on the progressivity of expenditures in Ghana.

On the other hand, VAT is distributed about as unequally as household consumption, as one would expect, so reducing VAT will have little effect on inequality, though it will reduce poverty. This serves as a distribution-neutral benchmark.

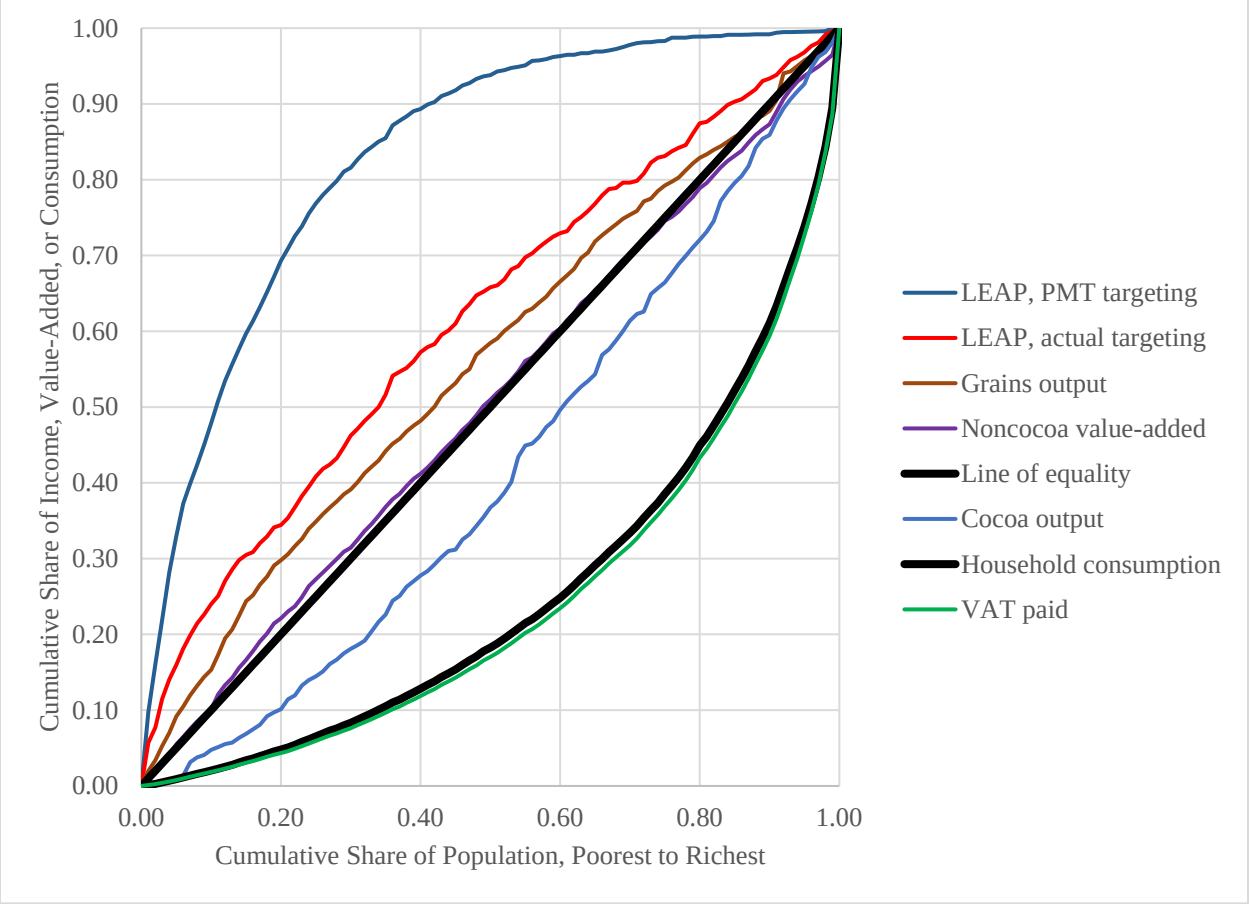
4. Results

Because we assume that each farmer benefits from the additional government spending in proportion to her or his agricultural value-added, the incidence of the policy simulations is the same as the incidence of agricultural value-added or output. Figure 4.1 shows concentration curves[7] for each simulation.[8]

[7] Concentration curves order the population from poorest to richest on the horizontal axis, like a Lorenz curve, but then graph the cumulative share of the benefits associated with each simulation on the vertical axis. The more concave is a benefit's concentration curve, the more concentrated it is among the poorest households. The more convex it is, the more concentrated it is among the richest households.

[8] Simulations 1 (noncocoa value-added low) and 2 (noncocoa value-added high) have exactly the same incidence—distribution across the population—though the second will have a larger impact on inequality and poverty because its size is larger. The same is true for simulations 3 (cocoa output low) and 4 (cocoa output high), and for simulations 5 (grains output low) and 6 (grains output high).

Figure 4.1 Concentration curves for simulated expenditure increases, various policies



Source: Authors' calculations based on model results using GLSS-6 data (GSS 2014).
Note: All items are calculated as per adult equivalent in the household, the standard practice for poverty analysis in Ghana. LEAP = Livelihood Empowerment Against Poverty; PMT = proxy means test; VAT = value-added tax.

Of all the possible expenditures, LEAP is most concentrated among the poor, which is to be expected. LEAP is targeted to certain vulnerable population groups (the elderly, orphans, and the disabled) and is available only to those who satisfy a PMT designed to identify the poor.[9] Nevertheless, Younger, Osei-Assibey, and Oppong (2017) show that it is possible to target LEAP more accurately to the poor using only the PMT. This alternative approach is highly concentrated among the poor.

By comparison, noncocoa agricultural value-added is less well-targeted to the poor, being about equally distributed across the population (near the 45-degree line). But grains output is more concentrated among the poor, and nearly as much so as LEAP with the existing targeting mechanism. This means that public spending to support grains production will be absolutely pro-poor, again, assuming that its benefits are distributed in proportion with existing output.

[9] LEAP also includes a final screening of potential beneficiaries within their communities to be sure they are seen as poor and vulnerable. We cannot model that screening here, so we use only the vulnerability and PMT criteria to identify the potential LEAP beneficiaries.

Spending on the cocoa sector is less progressive than that on the noncocoa sector (or LEAP), but it is more equally distributed than household consumption itself, so this spending is relatively pro-poor, but not absolutely so.

VAT is distributed almost identically to household consumption, as one would expect.

Based on this information, one might expect that increased spending on LEAP would have the largest effect on inequality and poverty, while that on the cocoa sector would have the smallest effect. But in addition to the incidence of each possible expenditure, we also must consider its rate of return. We treat LEAP increases and VAT decreases. That is, they do not change total value-added or output. But the first four simulations do increase value-added and output. As such, it is possible that the additional resources made available to households by these activities will allow a larger poverty and inequality impact than pure transfers.

To that end, Table 4.1 gives estimates of the change in inequality and poverty for each simulation. The poverty estimates use the national poverty line (1,314 cedis per adult equivalent per year). We measure "efficiency" as the ratio of the reduction in the absolute poverty gap to the increase in public expenditure for the simulation (538 million cedis).[10] The closer this measure is to one, the more efficient the policy is at reducing the poverty gap. If it is zero, it has no effect on the poverty gap.

As one would expect, LEAP targeted only with the PMT is the most efficient means to reduce poverty, and it is especially good at reducing the poverty gap compared to the alternatives. But perhaps the most interesting result in Table 4.1 is that increased spending on noncocoa agriculture is more efficient at reducing the poverty gap than is LEAP using the actual targeting mechanism if the rate of return is at the high end of Benin's estimates. And if the increased support is focused on grains only, the result is even stronger. Even at the lower rate of return, poverty and inequality reduction from this simulation are similar to those for LEAP with the existing targeting mechanism. This is despite LEAP being better targeted to the poor, reflecting the fact that spending on agriculture can be productive—it can increase the resources available to the economy—while LEAP is a simple redistribution of a fixed amount of resources. But this is true only for the high-return scenario. If returns to agricultural spending are at the low end of Benin's estimates, funding LEAP yields a larger reduction in poverty than would increased spending on noncocoa agriculture. Still, the efficiency of agriculture spending in the low-return scenario is close to that of LEAP.[11]

That grains production is concentrated among the poor is important because recent research suggests that the yield shortfalls in West Africa are higher in grains than they are in root crops (Nin-Pratt et.al. 2011). Thus, it seems more likely that government could make productive expenditures to support grains production, perhaps more likely than would be the case for root crops.

[10] The absolute poverty gap is the sum of the difference between the poverty line and each poor person's income, *not* normalized by the poverty line. As such, it is measured in cedis, as is the program size. We should also note that the "poverty gap" column is the change in the normalized poverty gap, which is the more familiar measure.

[11] At the midpoint of Benin's estimates the efficiency of noncocoa agricultural spending is 41 percent while that for spending on grains alone is 51 percent, both higher than LEAP with its pre-2016 targeting.

Spending on the cocoa sector is considerably less effective at reducing poverty and inequality despite its higher rate of return in the most optimistic estimates. This is because cocoa production is less concentrated among the poor than noncocoa production and grains production. Any one of those three options thus provides a more attractive alternative for increased agricultural expenditures.

A simple reduction in VAT would be the least effective means to reduce poverty considered here as even cocoa production is more concentrated among the poor than are VAT payments.

Table 4.1 Estimated changes in inequality and poverty for each simulation

Description	Simulation	Change in Gini coefficient	Change in headcount poverty	Change in poverty gap	Efficiency
Noncocoa VA low: HH consumption + 6% increase in noncocoa VA	(1)	-0.003	-0.008	-0.004	0.26
Noncocoa VA high: HH consumption + 14% increase in noncocoa VA	(2)	-0.007	-0.017	-0.009	0.55
Cocoa output low: HH consumption + 3% increase in cocoa output	(3)	0.000	-0.001	0.000	0.02
Cocoa output high: HH consumption + 33% increase in cocoa output	(4)	-0.002	-0.007	-0.002	0.14
Grains output low: HH consumption + 27% increase in grains output	(5)	-0.004	-0.008	-0.005	0.32
Grains output high: HH consumption + 63% increase in grains output	(6)	-0.008	-0.019	-0.010	0.67
LEAP, actual targeting: HH consumption + expanded LEAP pmts to all eligible	(8)	-0.005	-0.009	-0.005	0.35
LEAP, PMT targeting: HH consumption + expanded LEAP pmts to all PMT eligible	(9)	-0.010	-0.019	-0.014	0.91
VAT paid: HH consumption − VAT reduction	(10)	0.000	-0.003	-0.001	0.09

Source: Authors' calculations based on model results using GLSS-6 data (GSS 2014).
Note: Size of increase in agricultural public spending in each simulation is 538 million cedis. HH = household; VA = value-added; LEAP = Livelihood Empowerment Against Poverty; pmts = payments; PMT = proxy means test; VAT = value-added tax.

5. Conclusions

We examine the poverty and inequality reductions that could be achieved if Ghana were to double its public expenditures on agriculture. Although that would amount to a substantial increase, about 0.7 percent of GDP, it is still short of Ghana's CAADP commitment, which would require more than tripling the amount spent (Benin 2014).

Because farmers are much more likely to be poor than other households in Ghana, increased public expenditure on agriculture could have a significant impact on poverty and inequality. The results would vary depending on the exact approach taken, but focusing on the noncocoa sector would lead to reductions in headcount poverty of between 0.8 and 1.7 percentage points. Results focused on grains only are slightly better; those for cocoa sector expenditures are significantly less.

The most interesting result is that if the rate of return is sufficiently high, increased agricultural spending would decrease poverty by more than a comparable increase in LEAP payments, despite the fact that LEAP is better targeted to the poor. This occurs because the agricultural spending has a positive rate of return—it increases the total resources available to the economy—while LEAP is a pure transfer. We find that at the lower end of Benin's (2016) estimates for the rate of return to noncocoa spending, LEAP is still more effective at reducing poverty, though only slightly so. At the higher end of Benin's estimates, that result is reversed.

Two important caveats accompany these conclusions. First, it is possible to target LEAP more effectively to the poor (Younger, Osei-Assibey, and Oppong 2017) than the 2012 program rules achieved, and in fact the Ministry of Gender, Children, and Social Protection has made changes since 2012 that should improve LEAP targeting. Second, we have assumed throughout that the increases in agricultural production that would follow increased public expenditures would be distributed similarly to current agricultural production. It is easy to imagine that richer farmers could lobby to direct the increased expenditures to their advantage, which would make the results less progressive, perhaps much less so, than we find here. If Ghana's effort to meet its CAADP commitment is to have a strong poverty-reduction component, it must focus on the crops and production practices of poorer farmers.

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