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Policy Research Working Paper 5210

The Short-Term Impact of Higher Food Prices on Poverty in Uganda

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Poverty Reduction and Economic Management Network
Poverty Reduction and Equity Group
February 2010

Policy Research Working Paper 5210

Abstract

World prices for staple foods increased between 2006 and 2008, and accelerated sharply in 2008. Initial analysis indicated that the adverse effects of higher food prices in Uganda were likely to be small because of the diversity of its staple foods, high level of food self-sufficiency, and weak links with world markets. This paper extends the previous analyses, disaggregating by regions and individual food items, using more recent price data, and estimating the impact on consumption poverty. The analysis finds that poor households in Uganda tend to be net buyers of food staples, and therefore suffer welfare losses when food prices increase. This is most pronounced in urban areas, but holds true for most rural households as well. The diversity of staple foods has not been an effective buffer because of price increases across a range of staple foods. The paper estimates that both the incidence and depth of poverty have increased—at least in the short run—as a result of higher food prices in 2008, increasing by 2.6 and 2.2 percentage points, respectively. The increase in poverty is highest in the Northern region, which is already the poorest in Uganda. The need for mitigating social protection measures appears to be greater than previously recognized. Not only are the negative impacts larger, but they are also much more widespread geographically. This suggests the need for continued close monitoring of the situation, including monitoring the adequacy of existing safety nets and feeding programs.

This paper—a product of the Poverty Reduction and Equity Group, Poverty Reduction and Economic Management Network—is part of a larger effort in the department to assess the poverty and distributional impacts of rising food prices and other changes in global and domestic food markets. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at ksimler@worldbank.org.

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Produced by the Research Support Team

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The author thanks Rui Benfica, Todd Benson, Louise Cord, Louise Fox, Madhur Gautam, Jesko Hentschel, Kathie Krumm, Varun Kshirsagar, Albert Musisi, Willie Odwongo, Paul Okwi, Ana Revenga, Bob Rijkers, Johan Swinnen, Hassan Zaman, and conference participants at the University of Oxford and Cornell University for helpful comments on earlier versions of this paper. The author is solely responsible for any remaining errors. This paper has not undergone the review accorded to official World Bank publications. The findings, interpretations, and conclusions expressed herein are those of the author and do not necessarily reflect the views of the International Bank for Reconstruction and Development / The World Bank and its affiliated organizations, or those of the Executive Directors of The World Bank or the governments they represent.

1. Introduction

World prices of staple foods have increased since 2006, with particularly dramatic increases in cereal prices during 2007–08. As shown in Figure 1, world wheat prices more than doubled between March 2007 and March 2008, rising from $200 to $440 per ton. Rice prices on international markets nearly tripled in the four months from January to April 2008, rising to more than $900 per ton. Maize prices increased from $150 per ton to nearly $300 per ton between July 2007 and June 2008 (World Bank 2008a). Prices of oilseeds also increased rapidly over this period. The impact on consumers in developing countries has been profound, with an estimated 100 million people pushed into poverty (Ivanic and Martin 2008), and an even larger impact on the estimated 1.4 billion people who were already living on less than $1 per day before the food price shock (Dessus et al. 2008).

The spike in world food prices is attributable to several factors, most prominently increased diversion of food grain and oilseeds to biofuels production, the weak US dollar, increased food production costs from higher energy and fertilizer prices, and adverse policy responses to the initial shock, which pushed prices even higher (Mitchell 2008). Although prices have subsided from their peaks in the first half of 2008, they still remain considerably above their levels from early 2006, and are projected to remain more than 50% higher (in US$ terms) than their 2003 levels (World Bank 2008a).

In this context, low- and middle-income countries are trying to understand better how higher food prices affect their citizens, especially the poor and vulnerable. Uganda is no exception. Higher food prices could lead to a slowdown, or even a partial reversal, of the significant progress Uganda has made in reducing absolute poverty over the past 15–20 years. Moreover, the impacts within Uganda are likely to be distributed very unevenly. In general, the worst impact is suffered in areas with the steepest price increases and by those for whom market purchases of staple foods represent a large share of total consumption. Subsistence-oriented rural households that produce most of their staple food needs are partially buffered from the food price shocks, as are those whose main staples are foods that have not increased in price. Finally, rural households that produce marketable surpluses may potentially benefit from higher crop prices, although that benefit may be partially offset by higher production costs.

Uganda has a relatively diverse mix of staple foods, including maize, cassava, sweet potatoes, and matooke (plantains or cooking bananas). Benson et al. (2008) concluded that the likely impact of rising food prices on Ugandan households would be modest for several reasons, most notably Uganda's relative isolation from global food markets, the large share of food staples that are not traded internationally, and the high levels of autoconsumption among rural Ugandan households. That said, Benson et al. (2008) also identified three groups that consume most of their calories from maize and are likely to be adversely affected by higher maize prices: the urban poor, residents of internally displaced persons (IDP) camps, and residents of institutions such as schools, prisons, hospitals, and military bases. Benson et al. (2008) also noted the need for continued monitoring of the situation, especially the possibility of persistently high maize prices and increasing prices of other staple foods.

This paper extends the analysis by Benson et al. (2008) in three important directions. First, it uses a continuous measure—the net benefit ratio (NBR)—rather than discrete categories to assess the impact of higher food prices on household well-being. A continuous measure is advantageous because it captures the important differences in impact between households that are marginally net buyers or sellers and those who depend on food markets for most of their consumption (net buyers) or income (net sellers). Another advantage of the NBR is that it measures the impact of higher food prices relative to a household's overall expenditure level. Second, this paper disaggregates the food price data, using region-specific prices for five staple food crops in the calculation of the NBR. This disaggregation is critical because of strong evidence of large regional variation of staple food prices in Uganda. It also has the advantage of using more recent price data, covering the period through October 2008 for most crops. Third, this paper estimates the short-run change in poverty in Uganda as a result of higher food prices. We estimate both the incidence (headcount) and depth (poverty gap) of poverty, disaggregating by region and rural/urban area of residence.

We estimate an increase in the poverty headcount ratio of approximately 2.6 percentage points in the short term as a result of the recent food price increases. This is equivalent to as many as 700,000 more Ugandans living below the poverty line. Even more significant is the increased depth of poverty, with the poverty gap index increasing by 2.2 percentage points, which is a 25% increase over the most recently available estimates. Despite the perception that Uganda is relatively insulated from distant world markets, food prices increased sharply in 2008 not only for cereals like maize and rice that are traded on

world markets, but also for less widely traded substitutes such as cassava and matooke. As noted by Benson et al. (2008), increased demand from regional trading partners such as Kenya and southern Sudan has exerted upward pressure on food prices in Uganda. Although prices dipped somewhat following the harvest in mid-2008, prices for staple foods in Uganda started rising again in late 2008 and early 2009.

This paper is organized as follows. Section 2 provides background information on staple food consumption patterns in Uganda, and on the magnitude and timing of food price increases. Section 3 describes the calculation of the net benefit ratio (NBR), the analytical methods used to estimate changes in poverty, and the underlying household survey data. Section 4 presents results on which income groups and regions are most affected by food price increases. Section 5 reports the impact of food price increases on poverty levels in Uganda. Section 6 summarizes and offers concluding remarks.

2. Background

Uganda is a predominantly rural country, with only 15% of its 27 million inhabitants living in urban areas (UBOS 2006). Almost three-quarters (73%) of the country's work force is employed in agriculture (UBOS 2006), which accounts for 29% of GDP (World Bank 2008b). Although most rural households are engaged in food crop production, most (57%) are also net buyers of staple foods; in urban areas 92% of households are net buyers of staple foods (Benson et al. 2008).

Unlike many countries in Asia or southern Africa where a single commodity is the dominant food energy source (rice and maize, respectively), Uganda has a relatively diverse mix of staple foods, including maize, cassava, sweet potatoes, and matooke. Table 1 shows the average budget shares in Uganda, disaggregated by region and rural/urban area of residence. The primary staple has a pronounced regional pattern, corresponding with production environments. Matooke figures prominently in Central and Western regions, whereas maize and cassava are the dominant staples in the Eastern and Northern regions. On average, slightly more than one-half of the household budget goes to food in Uganda (including valuation of home-produced food).

As a landlocked country, Uganda is not well-integrated with international markets, especially for low value commodities such as cereals. Thus price trends within Uganda deviate somewhat from the global price trends shown in Figure 1. Local market conditions

figure more prominently in the determination of staple food prices in Uganda. Particularly prominent in late 2007 and early 2008 is the civil unrest in neighboring Kenya, which is the conduit for Uganda's fuel supplies and also a large importer of Ugandan maize. Another significant factor is the sharply increased demand for Ugandan roots and tubers by southern Sudan following the peace accords in that country (Benson et al. 2008). Figure 2 plots price indices in Uganda for maize, rice, cassava, and matooke, with May 2003 as the base (1.00). Maize prices had been fluctuating around the same level from 2003 through 2007, and then doubled between January and April 2008. Although maize prices fell slightly in August–September, they increased again in October 2008. The prices of matooke, cassava, and rice had been rising steadily from 2004 through 2007, and then increased rapidly in 2008. Note that Figure 2 illustrates national average prices in Uganda, and that in some regions and markets the increase in food prices has been even more pronounced. For example, the rapid increase in cassava prices in 2008 is entirely due to increases in the Northern region, driven in part by rising demand from southern Sudan. Similarly, although the national average sweet potato price is still near 2003 levels, prices for sweet potatoes have risen sharply in the Northern region in 2008. Sub-national price trends are discussed further in section 5.

3. Methods and Data

The impact of rising food prices on poverty in an individual country depends on several factors including: (1) the magnitude of the price increase (which is affected by local market forces and the extent to which world market prices are passed through to domestic prices), (2) the initial poverty level and number of people clustered around the poverty line, (3) the number of net buyers or net sellers of the food commodities in question, (4) the share of poor people's budgets devoted to food overall and key staples in particular, (5) the extent of own-consumption relative to market purchases, and (6) the effect of food price increases on real wages of poor people.

Deaton (1989, 1997) provides a straightforward approach for estimating the short-run impact of an increase in food prices on household welfare. The impact on a household can be measured by the net benefit ratio (NBR). The NBR is the value of net food sales (total food production minus total food consumption) divided by total household consumption. It captures the positive or negative impact on household welfare by measuring the change in real income arising from changes in food prices as a proportion of total consumption.

Ravallion (1990) extended Deaton's model to incorporate wage effects of higher food prices. Higher producer prices increase the derived demand for agricultural labor and likely increase the wages of agricultural laborers, with a possible ripple effect for labor in other sectors. Where agricultural wage labor is an important income component, the positive wage effect may significantly offset the negative price effect for net buyers. Wage responses may also occur in other sectors as workers negotiate for higher wages to compensate for higher food prices. The Deaton model, with or without the Ravallion labor extension, has been widely used to assess the first-order welfare effects of a food price increase (Budd 1993; Barrett and Dorosh 1996; Loening and Oseni 2007; Vu and Glewwe 2008; Wodon and Zaman 2008).

The basic model is:

$$\Delta w_{irc} = \Delta p_{rc}\left[\left(PR_{irc} - CR_{irc}\right) + \eta L_{ir}\right] \quad (1)$$

where

- Δw_{irc} = change in welfare for household i in region r arising from a change in the price of commodity c, expressed as a percentage of total expenditures of household i,
- Δp_{rc} = percentage change in the price of commodity c in region r,
- PR_{irc} = food production ratio,
- CR_{irc} = food consumption ratio,
- η = wage rate elasticity with respect to food price change, and
- L_{ir} = wage labor share in household income. [1]

The food production ratio (*PR*) is the value of the food commodity produced by household *i* divided by total household food and nonfood consumption. Analogously, the food consumption ratio (*CR*) is the value of the food commodity consumed divided by total household food and nonfood consumption. Food consumed includes food purchased, produced at home, received as an exchange in kind, or received for free. The net benefit ratio, *NBR*, is (PR_i – CR_i). The NBR can be interpreted as the elasticity of real income to changes in the price of the food commodity. The total welfare change for household *i* from the price changes of several commodities is obtained by summing Δw_{irc} over all commodities

[1] The wage response is not considered in the empirical analysis that follows. In their study of food price inflation in Ethiopia, Loening and Oseni (2007) found the wage effect response to be small because of the low wage elasticity to food prices and the small share of wage labor income among Ethiopian households. It is expected that the wage elasticity and wage labor share are similarly small in Uganda, so that the exclusion of the wage effect will not distort the results appreciably.

c. It bears noting that the ratios are expressed in value terms. Therefore, a household that sells a given quantity the food at harvest time and buys the exact same quantity later at a higher price is considered a net buyer, because their expenditures on the food item exceed their receipts from sales of the item.

The basic model involves four simplifying assumptions that should be highlighted. First, it only captures the short-run impact, and does not take into account the possibility of consumers shifting their consumption patterns in response to higher prices. Normally, one would expect that over time consumers would substitute away from the foods whose relative prices are increasing. As a result it overestimates the negative impact of higher prices on net buyers of a commodity. While common sense and economic theory dictate that consumers will shift to less expensive staples, the magnitude of that substitution is a matter of some debate. In the short run, substitution will be constrained by available supplies from that year's harvest. Thus substitution will push up prices for these other staples, as appears to be the case in Uganda. Recent econometric estimates by Ulimwengu and Ramadan (2009), using the same 2005–06 UNHS data, indicate a remarkably low degree of substitutability between staples for consumers. They estimate Hicksian (compensated) cross-price elasticities of 0.05 and 0.04 for the food groups "cereals" and "roots and plantains." This implies that a 10 percent increase in the price of cereals would increase demand for roots and plantains by only 0.5 percent if the consumers' real incomes were not affected by the cereal price increase. Similarly, a 10 percent increase in the price of roots and plantains would increase cereal demand by only 0.4 percent. Of course, real incomes are affected by the staple food price increases, which is why Ulimwengu and Ramadan's (2009) estimated Marshallian (uncompensated) cross-price elasticities for these food groups are negative, indicating that an increase in cereals prices would lead to a small *reduction* in the demand for roots and plantains, and vice versa.

Second, the analysis assumes that the increase in the producer price is the same as the increase in the consumer price, i.e., sellers capture the full benefits of the price increase. In practice this margin could be diminished by higher margins for middlemen and/or higher production costs, such as the increased costs of transportation or fertilizer. This assumption likely overestimates the positive impact of higher food prices on net sellers of a commodity. This is especially germane in Uganda, where much of the staple food price increase appears to have been driven by increases in transportation costs arising from disruptions in the

supply of fuel because of post-election conflict in Kenya that began in late 2007 and extended well into 2008.

Third, the model does not allow for second-round effects as producers adjust their price expectations when making planting decisions for the subsequent season. If producers, including net buyers, believe the price increase will be sustained they would most likely increase production, which would relieve at least some of the upward pressure on staple food prices as well as increase income from staple food production. The multi-market analysis by Ulimwengu and Ramadan (2009) shows that these second-round effects dampen the adverse welfare effects of the price shock, but do not completely counteract them.

Finally, the analysis does not incorporate possible mitigating measures, such as food subsidies that might be established, or increased, to dampen the impact of the food price shock.

The primary data source for the present analysis is the Uganda National Household Survey (UNHS) 2005–06. The survey was conducted by the Uganda Bureau of Statistics, and interviewed over 7,400 households throughout Uganda between May 2005 and April 2006, inclusive. This comprehensive living standards survey is the source of information about household expenditure patterns and total consumption. Information on food prices comes from FoodNet, a multi-agency agricultural research network operating in several east African countries. The price data were collected for numerous food items in ten agricultural markets spread across Uganda, with weekly observations covering the period from January 2003 to October 2008.

The welfare change in equation (1) will vary for each household, depending on the value of net purchases or sales as a fraction of total household consumption (and the share of wage income in total household income, which is not considered here). The impact will also vary by the magnitude of the price increase, which varies by region. To illustrate how the NBR varies by household expenditure (income) level and region we estimate a series of nonparametric regressions, which trace the relationship of NBR against total consumption, showing how the average impact of the price increases varies by income level.

To estimate the short-run impact of higher food prices on absolute poverty, the change in total expenditure in real terms is simulated for each household, using the calculated NBR for each household and the observed price change in the relevant region. The simulated total consumption is then compared to the poverty line calculated from the

UNHS (UBOS 2006). Results are presented for the poverty headcount ratio and the poverty gap in section 5.

4. Net Benefit Ratios by Region and Rural/Urban

Who are the net buyers and net sellers of major food staples in Uganda? Figures 3-7 present the results of this analysis. Each graph shows how the NBR (on the vertical axis) varies with household consumption per adult equivalent (AE) on the horizontal axis. The vertical reference line at approximately 21,000 Ugandan shillings per month is the national poverty line: households to the left are below the poverty line and those to the right are above the poverty line. There is also a horizontal reference line at zero: households below zero are net buyers and those above zero are net sellers. The value on the vertical axis is the average value of net purchases or sales for that commodity, expressed as a proportion of household consumption. To facilitate comparison of results across regions and food items, the axis scales are identical for all of the nonparametric regression plots in Figures 3-7. The top graph in each figure shows results separately for rural households, urban households, and households in internally displaced persons (IDP) camps.[2] The next graphs show results by region, in urban and rural zones, respectively. Both disaggregations are relevant as net benefit ratios are significantly different for most crops by location and income

For most crops, the poor are more vulnerable to food price increases, primarily because net food purchases are a larger share in total consumption. Maize (Figure 3) is the staple food for which purchases account for the highest share of total calories on average (Benson et al. 2008). Among rural households (dashed line in the top graph of Figure 3), the poorest spend an average of approximately 7% of their total budget, including autoconsumption, on net purchases of maize.[3] Thus a doubling of maize prices would be equivalent to a real income loss of 7%. Poor urban households (dotted line) have a greater dependence on net purchases of maize, with average net maize purchases reaching as much as 12% of total consumption for the poorest urban households, and about 5% for urban residents living near the poverty line. The importance of net maize purchases in total

[2] The UNHS 2005–06 sample includes 300 households residing in IDP camps. All of them are in the Northern Region, and 290 of them are in rural areas.

[3] Note that the nonparametric regression lines represent the weighted mean of the NBR at different levels of total consumption, and that there is often considerable dispersion around this mean, especially at the tails of the regression lines.

consumption diminishes at higher income levels, although even urban households with monthly consumption up to 100,000 shillings per AE, more than quadruple the poverty line, are net buyers on average. However, at incomes greater than 50,000 shillings per AE per month, average net sales or purchases of maize are an insignificantly small share of total household consumption, so the impact on household welfare is small.

Households living in IDP camps (solid line in the top graph of Figure 3) appear to be relatively unaffected by the increase in maize prices, but the reality is more complex. At the time of the 2005–06 UNHS, over 90% of the maize consumed by IDP camp residents was received free of charge as food aid. Like autoconsumption, receipt of free food aid is not a market transaction, and the increase in the market price of maize has no effect at that level of the distribution chain. However, those in IDP camps could suffer welfare losses if higher maize prices impede the ability of WFP and other organizations to procure and distribute food aid. Unfortunately, the data needed to explore this question in greater depth are not available.

The middle graph in Figure 3 shows that, on average, urban households whose monthly consumption per AE is less than 100,000 shillings are net buyers of maize in each of the four regions. Among the urban poor net maize purchases average from 5 to 16% of total consumption, with that proportion highest in the Eastern region (short dashed line). In the bottom panel of Figure 3 we see that even in rural areas, poor households tend to be net buyers of maize, with net maize purchases averaging more than 10% of consumption in the poorest households in Central region, compared to about 5% for poor households in other regions. Among higher-income rural households only those in the Eastern region tend to be net sellers of maize. In the Eastern region the average NBR reaches approximately 7% in the richest households, meaning that a doubling of maize prices would increase household income by 7%.

Figure 4 shows a similar analysis for rice, which has also experienced large price increases, but only plays a minor role in Ugandan diets. On average, net sales or purchases of rice are an insignificant share of household consumption in urban and rural areas of almost all regions. Therefore even a large increase in rice prices would not have a major impact on household welfare for most Ugandan households. The only exception is poor households in urban Central region, whose net rice purchases average 3 to 8% percent of total consumption (dotted line in the middle graph of Figure 4).

Figures 5, 6, and 7 present analogous results for matooke, cassava, and sweet potato, respectively. Turning first to matooke (Figure 5), we see that most households in the Central, Eastern, and Western regions are net buyers. The share of total consumption is relatively small, except in the Western region, where net purchases of matooke average 5 to 13% of total consumption for poor urban households (solid line in the middle graph of Figure 5). In rural areas of the Central, Eastern, and Northern regions the poor tend to be net sellers of matooke. In the Northern region average net sales and purchases of matooke are nearly zero across all income levels, in both urban and rural areas.

Most of the poor in both urban and rural areas are net buyers of cassava, with the exception of the poorest urban households in the Northern region (Figure 6). Net purchases of cassava as a proportion of total consumption are large in the urban parts of the Central region, and to a lesser extent in the rural areas of the Northern region. Figure 7 shows the net buyer/seller results for sweet potatoes. On average most households in the Central, Eastern, and Western regions are net buyers of sweet potatoes, while average net purchases and sales in the Northern region are negligible for all income groups. Net purchases of sweet potato are more important as a share of total consumption for poor households than for nonpoor households, especially in rural areas. Only in the rural parts of the Eastern region do households tend to be net sellers of sweet potatoes.

5. Poverty Impact of Food Price Increases

The NBR analysis above has shown that poor households in Uganda tend to be net purchasers of staple food commodities, even in rural areas. Because of the multiplicity of staple foods, the net buyer or seller status of individual households is more complex than is the case in countries with only one or two major staples. Analysis of the 2005–06 UNHS reveals that in rural areas, 63% of households are net sellers of at least one staple food, but 87% are also net buyers of at least one staple food. Net buyers of staples typically do not sell any of that staple, as opposed to selling at harvest time and buying in the market later in the year. Net purchases are financed by household income from other sources, including sale of other agricultural products (including cash crops such as coffee), nonfarm enterprises, wage income, and remittances. The finding that most rural farm households are net food buyers is consistent with other studies in Uganda (Benson et al. 2008) and elsewhere in sub-Saharan Africa (Minten and Barrett 2008; Poulton et al. 2006; Jayne and Chisvo 1991). Therefore

food price increases are likely to deepen their poverty, especially in the short term. In addition, those slightly above the poverty line tend to be marginal net purchasers (i.e., on average they are net buyers, but the purchases represent a small share of total consumption). Staple food price increases are likely to push some of these households into poverty.

Changes in poverty depend on the size of the price increase as well as the net benefit ratio for a given household. We estimate the change in household welfare (consumption per adult equivalent) by multiplying the household-level NBRs calculated in the preceding section by the actual price changes that have occurred in Uganda from 2007 to 2008. From the price data in Figure 2, one may observe a seasonal pattern in food prices, with prices tending to be lower in January than at other times of the year. To control for these seasonal effects we use the price changes during the most recent 12 months for which data are available, which should purge the seasonal component from the price changes. To facilitate comparison with the previous analysis of Benson et al. (2008), price data were drawn from the same set of six markets used in that study.

The region-specific price data from FoodNet are shown in Table 2. As seen in the table, the price data are not complete for cassava and sweet potatoes. First, cassava and sweet potato prices are only available through May 2008. Therefore, for cassava and sweet potatoes we use the observed price increases for May 2007 to May 2008 instead of October to October. The incomplete price information that is available for cassava roots and cassava flour indicates that the percentage change from May 2007 to May 2008 is a close approximation of the increase from October 2007 to October 2008, including the sharp increase in cassava prices in the Northern region in mid-2008. Second, there are no cassava or sweet potato price data more recent than April 2007 for the Eastern region. This is a major gap, especially because the average budget shares of these foods in Eastern region are 6% and 8%, respectively (see Table 1). In the absence of better information, we close this gap in the data by using the simple average of the percentage price changes in the Central and Western regions. This assumes that the large cassava and sweet potato prices observed in the Northern region did not occur in the Eastern region, and is thus a conservative estimate of the change in prices for these foods in the Eastern region.

One of the more striking observations from Table 2 is the enormous heterogeneity of price changes by region and commodity. As noted earlier, Uganda is not tightly integrated with world food markets, in large part because of its landlocked status and poor

infrastructure. These conditions also contribute considerably to poor integration in Uganda's internal markets.

The short-run impact of higher food prices on the poverty headcount ratio (i.e., the percentage of the population below the poverty line) is shown in Table 3. The figures in the Base column are the actual estimates from the UNHS 2005–06, which is the most recent source of poverty estimates for Uganda. The second column, labeled "All 5 foods," shows the combined impact of higher prices for all five food items in the table, and the remaining columns show the impact of higher prices for each of the five individual food commodities. At the national level, higher food prices are estimated to increase the headcount ratio by 2.6 percentage points, which translates into approximately 700,000 more Ugandans living below the poverty line. The 2.6 percentage point increase is slightly smaller than estimates of the poverty impact of higher food prices globally (Ivanic and Martin 2008) and in west and central Africa (Wodon et al. 2008).

This is a larger poverty impact than other studies in Uganda would suggest, and further investigation of Table 3 helps identify the drivers of the estimated impact on the poverty headcount. As expected, the increase in the poverty headcount ratio is greater in urban areas, increasing by 3.6 percentage points in urban areas and 2.4 percentage points in rural areas. In both rural and urban areas it is maize price increases that account for most of the poverty increases, followed by cassava. Recall that the cassava price data are only available through May 2008, when it was at its highest level up to that time. World prices of other food commodities eased slightly in the second half of 2008 (Figure 1), and if cassava prices in Uganda have also fallen then using the May cassava price data might be slightly exaggerating the poverty impact. At the national level, the observed price increases for matooke and rice have no appreciable impact on the poverty headcount. In rural areas, falling sweet potato prices actually help cushion the poverty impact of rising prices of other foods.

At the regional level, the largest impact is in the poorest region (the Northern region), with the poverty headcount increasing by almost 6 percentage points. The poverty increase in the Northern region is driven mostly by increases in cassava prices in both rural and urban areas. The impact of cassava in the Northern region is influenced in large part by the magnitude of the cassava price increase (161%); here again, the caveat about the incomplete cassava price series should be noted.

The Central region, which is the least poor region, is estimated to have the second highest increase in the poverty headcount as a result of increases in staple food prices. The poverty headcount ratio in the Central region is estimated to increase by 3.2 percentage points, with approximately equal increases in rural and urban areas. Most of the higher poverty rates in the Central region are attributable to maize, which increased in price by 159% in the Central region between October 2007 and October 2008.

The poverty headcount measure tells us how many poor there are, but it tells us nothing about *how poor* they are. The poverty gap measure provides information about the depth of poverty, detecting increases or decreases in the consumption levels of poor households even if they do not reach the poverty line. Table 4 presents simulation results for changes in the poverty gap measure arising from food price increases. It shows a very large increase in the national poverty gap of 2.2 percentage points, which is a 25% increase over the 8.7% recorded by the 2005–06 UNHS. Unlike the poverty headcount ratio, the poverty gap increase is larger in rural areas (2.3 percentage points) than in urban areas (1.6 percentage points). Maize and cassava price increases are the main contributors to the increased poverty gap in both rural and urban areas.

Regional disaggregation of the poverty gap reveals that the sharpest increase is in the Northern region, whose increase of nearly 6 percentage points far exceeds that of the Central (1.9), Eastern (1.4), or Western (0.4) regions. Most of the poverty gap increase in the Northern region comes from cassava price increases. The increase in the poverty gap is largest in rural Northern region, but also very high in urban areas of the Northern region.

Closely related to the poverty gap measure is the concept of the poverty deficit. The poverty deficit is the amount of money required to lift all of the poor exactly to the poverty line. One can think of it as the cost of a perfectly targeted transfer that would eliminate poverty as defined by the consumption poverty line used in Uganda. It is calculated as the poverty gap index multiplied by the poverty line and the country's population. From the results of the 2005–06 UNHS, the aggregate poverty deficit may be calculated as approximately 49 billion Ugandan shillings per month (8.7% x 21,000 Ugandan shillings x 27 million Ugandans), which is equal to approximately 3.7 percent of Uganda's GDP. Based on the estimates in Table 4, that amount would increase by about 25% to 62 billion Uganda shillings per month, or 4.7 percent of GDP.

How much of the increase in the poverty deficit is caused by the increased number of poor people, and how much by the increased depth of poverty among those who were already poor before the food price increases? Based on the simulations reported here, the 2.6 percentage point increase in the poverty headcount ratio due to increased food prices is the net result of 4.9% of the population that is initially nonpoor moving into poverty and 2.3% of the population that is initially poor moving out of poverty (i.e., net staple food sellers who were initially below the poverty line). Thus, 28.8% of the population is below the poverty line both before and after the food price shock, and most of them are pushed further into poverty by the shock. Approximately 72% of the increase in the aggregate poverty deficit stems from welfare losses among those who were below the poverty line both before and after the food price increase the poverty deficit, with the remaining 28% accounted for by net changes among those who moved into or out of poverty. To frame the increase in the poverty gap a little differently, before the price shock the average consumption among poor households amounted to 72% of the poverty line, and after the price shock that average is estimated to have fallen to only 68% of the poverty line (the latter figure includes those who were pushed into poverty by the food price shock).

5. Conclusions

There are many good reasons for expecting a country like Uganda to be relatively unaffected by the recent global food price shock. As a landlocked country with high transportation costs, its trade volumes of low value-per-weight staple crops are relatively small. Uganda's population is overwhelmingly rural and most—although certainly not all—households produce a substantial share of their staple food needs. Ugandan households also consume an unusually wide variety of staple foods, so they are less vulnerable to a maize price shock than southern African countries, or to a rice price shock than East Asian countries. Ugandan staples include foods that are not traded widely on international markets, such as cooking bananas, cassava, and sweet potatoes.

Nevertheless, the data presented here demonstrate that staple food prices in Uganda increased dramatically in early 2008, most likely through a combination of price increases on world markets and local conditions such as sharply higher fuel costs and increases in demand for staple food imports by Uganda's regional trading partners. Our analysis shows that Uganda is vulnerable and has likely suffered significant welfare losses from rising food

prices, including increases in the incidence and depth of absolute poverty. Based on the analysis presented, three factors stand out as the most important contributors to the increase in poverty.

The first is the magnitude of the maize price increase. Maize, an important staple in Eastern and Northern Uganda as well as urban areas, more than doubled in price between October 2007 and October 2008. As described by Benson et al. (2008), much of the upward pressure on maize prices is a result of increased demand from Kenya, which experienced a production shortfall following the civil unrest in December 2007 and early 2008. Kenya is expected to remain a significant source of demand for Ugandan maize.

The second major factor is the large increase in the prices of other staples. Prices of cassava, matooke, and rice have been trending upward in Uganda since 2004–05. These increases have accelerated in 2008, presumably from increased demand as consumers substitute away from maize. There are also indications that increased demand from southern Sudan for roots and tubers is an important contributor to higher prices, especially for cassava. Like maize prices, the higher prices for matooke have persisted through 2008 and into 2009.

The third key factor is that most of the poor are net buyers of staple foods, even in rural areas. As shown in the NBR analysis, the poor tend to be net buyers of maize, cassava, and sweet potatoes. Thus the incidence of the food price shock is highest on those households that are least equipped to deal with it. This is also observed at the sub-national level, as the poverty impacts are highest in the Northern region, which was already the poorest region before the food price shock. Contrast this with the impact in West Africa, where the adverse impact of higher food prices was much less in poorer areas than in richer areas (Wodon and Zaman 2008; Coulombe and Wodon 2008).

Although increased demand from regional trading partners is one of the proximate causes of food price increases in Uganda, it would be a mistake to inhibit this trade in an effort to bring food prices down. In this context, it is important not to blunt the price signals that can help spur agricultural investment and production. Uganda has invested heavily in its Plan for the Modernization of Agriculture, aiming for improvements in agricultural productivity and marketing efficiency. If it succeeds, Uganda will be well placed to supply regional markets as well as its own rapidly growing population. The rural poor can benefit if they are able to become net sellers of these foods. However, it should also be recognized

that a large part of the staple food price increases in Uganda has likely been caused by higher production and marketing costs, especially higher fuel prices. Moves to stabilize input costs and improve marketing efficiency will be important for enabling a supply response by staple food producers, be they net buyers or net sellers.

That said, the need for mitigating social protection measures appears to be greater than previously recognized. Not only are the negative impacts larger, but they are also much more widespread geographically. For example, in the worst affected area, the Northern region, most of the welfare losses appear to have occurred among those living outside IDP camps, encompassing both rural and urban areas. Urban areas of the Eastern region are also badly affected, as are poor households in both rural and urban areas of the Central region. This suggests the need for continued close monitoring of the situation—including monitoring the adequacy of existing safety nets and feeding programs—and contingency planning for new safety net programs to reach those threatened by high food prices.

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Table 1: Average Budget Shares by Region and Rural/Urban Area of Residence

	Rural					Urban					All				
	Central	Eastern	Northern*	Western	Total	Central	Eastern	Northern*	Western	Total	Central	Eastern	Northern*	Western	Total
Matooke	7.0	3.7	0.3	12.2	6.2	4.4	2.3	0.2	7.6	3.8	6.3	3.6	0.3	11.9	5.9
Maize	5.8	7.5	7.2	4.3	6.1	2.8	5.8	6.1	2.7	3.8	4.9	7.4	7.0	4.2	5.8
Cassava	4.3	6.2	9.1	5.0	6.0	1.0	2.5	5.6	2.9	2.3	3.3	5.9	8.6	4.9	5.4
Sweet potato	6.1	8.6	3.5	4.8	5.9	1.8	2.5	2.3	2.8	2.1	4.8	8.1	3.3	4.7	5.3
Beans	3.8	2.6	6.7	6.3	4.8	1.7	2.3	5.0	3.9	2.7	3.2	2.5	6.5	6.1	4.4
Millet & Sorghum	0.2	2.0	3.3	2.4	1.9	0.1	1.1	1.5	0.8	0.6	0.2	1.9	3.1	2.2	1.7
Rice	1.1	1.5	0.2	0.6	0.9	1.9	3.0	0.7	1.1	1.7	1.3	1.6	0.3	0.7	1.0
Meat & Fish	5.9	7.1	6.1	5.9	6.3	4.7	6.8	7.1	5.2	5.5	5.5	7.1	6.3	5.9	6.2
Fruit & vegetables	5.1	6.6	5.3	3.4	5.1	2.9	4.8	4.6	3.1	3.5	4.5	6.4	5.2	3.4	4.8
Milk & eggs	2.5	1.9	0.7	1.8	1.8	2.0	1.8	0.6	2.1	1.7	2.3	1.9	0.7	1.8	1.8
Fats & oils	1.0	1.4	2.9	0.7	1.4	1.0	1.5	2.4	0.9	1.3	1.0	1.4	2.8	0.8	1.4
Sugar	3.1	3.3	1.9	1.4	2.5	2.8	3.3	2.9	2.1	2.8	3.0	3.3	2.1	1.5	2.5
Beverages	1.9	2.2	3.6	2.3	2.4	3.0	2.5	3.7	2.9	3.0	2.2	2.2	3.6	2.4	2.5
Other food	5.8	4.6	7.7	5.6	5.8	9.7	8.3	6.4	8.2	8.7	7.0	4.9	7.5	5.8	6.2
Nonfood	46.4	41.0	41.4	43.1	43.0	60.1	51.4	50.6	53.7	56.4	50.4	41.8	42.7	44.0	45.1

Source: Author's calculations from 2005–06 UNHS
Note: *=includes IDP

Table 2: Staple Food Prices by Region, 2007–08 (Uganda shillings per kg)

		Central	Eastern	Northern	Western
Maize	October 2007	267	220	327	292
	October 2008	690	495	450	613
	Percentage change	159	125	38	110
Matooke	October 2007	234	325	617	209
	October 2008	315	400	950	268
	Percentage change	35	23	54	28
Cassava	May 2007	205	–	383[a]	92
	May 2008	185	–	1000	105
	Percentage change	-10	2[b]	161	14
Sweet Potato	May 2007	275	–	381[a]	280
	May 2008	200	–	550	130
	Percentage change	-27	-40[b]	44	-54
Rice	October 2007	970	967	1400	1350
	October 2008	1625	1450	2150	1750
	Percentage change	68	50	54	30

Source: FoodNet

Notes: Prices are wholesale prices, calculated from weekly data collected in the following markets: Owino (Central), Tororo (Eastern), Arua (Northern), and the average of Mbarara, Kabale, and Kasese (Western).

[a] May 2007 prices are not available in the Northern market for cassava and sweet potatoes, so a linear interpolation of the April and June prices is used.

[b] Because cassava and sweet potato price data are not available for Eastern region, the simple average of the percentage price changes recorded in Central and Western regions is used for the simulations.

Table 3: Estimated impact of food price increases on poverty headcount ratio

		Impact of observed price increases (percentage point change in poverty headcount ratio)					
	Base (2005–06)	All 5 foods	Maize	Matooke	Cassava	Sweet potato	Rice
National*	31.1	2.6	1.7	0.1	0.9	-0.7	-0.1
Urban*	13.7	3.6	2.5	-0.1	0.9	0.0	0.4
Rural*	34.2	2.4	1.6	0.1	0.9	-0.8	-0.2
Central	16.4	3.2	3.1	-0.1	-0.4	-0.9	0.1
Eastern	35.9	1.0	1.4	-0.2	-0.1	-1.7	-0.2
Northern*	60.7	5.9	0.5	0.0	5.2	0.7	0.0
Western	20.5	0.9	1.4	0.7	0.1	-0.6	-0.2
Central urban	5.5	3.0	2.5	0.0	0.0	-0.2	0.6
Eastern urban	16.9	6.4	6.4	0.0	0.0	0.6	0.2
Northern urban	38.3	6.0	0.9	0.0	5.0	0.7	0.3
Western urban	9.3	0.6	0.6	-0.4	0.0	-0.9	0.0
Central rural	20.9	3.3	3.3	-0.2	-0.6	-1.2	-0.1
Eastern rural	37.5	0.5	1.0	-0.2	-0.1	-1.9	-0.2
Northern rural	57.6	8.3	0.6	0.0	7.7	0.8	0.0
Western rural	21.4	1.0	1.4	0.8	0.1	-0.6	-0.2
IDP	77.9	0.9	0.1	0.0	-0.2	0.6	-0.4

Source: Author's simulations based on 2005–06 UNHS
Note: * = includes IDP camps

Table 4: Estimated impact of food price increases on poverty gap

		Impact of observed price increases (percentage point change in poverty gap index)					
	Base	All 5 foods	Maize	Matooke	Cassava	Sweet potato	Rice
National*	8.7	2.2	1.3	0.0	1.0	-0.2	0.0
Urban*	3.5	1.6	0.9	0.0	0.5	0.0	0.1
Rural*	9.7	2.3	1.4	0.0	1.1	-0.2	0.0
Central	3.6	1.9	2.1	0.0	0.0	-0.2	0.1
Eastern	9.1	1.4	1.8	0.0	0.0	-0.4	0.0
Northern*	20.7	5.9	0.3	0.0	5.1	0.4	0.0
Western	5.1	0.4	0.7	0.1	0.1	-0.4	0.0
Central urban	1.1	1.1	0.9	0.0	0.0	0.0	0.2
Eastern urban	4.4	2.0	1.9	0.0	0.0	-0.1	0.1
Northern urban	11.4	3.7	0.6	0.0	3.0	0.0	0.0
Western urban	2.0	0.3	0.3	0.1	0.1	-0.2	0.0
Central rural	4.7	2.3	2.5	0.0	-0.1	-0.2	0.0
Eastern rural	9.5	1.4	1.8	0.0	0.0	-0.4	0.0
Northern rural	18.8	8.1	0.3	0.1	7.5	0.2	0.0
Western rural	5.4	0.5	0.7	0.1	0.1	-0.4	0.0
IDP	29.2	2.2	0.2	0.0	1.0	1.1	-0.1

Source: Author's simulations based on 2005–06 UNHS
Note: * = includes IDP camps

Figure 1: World cereals prices, 2005–08 (current US dollars)

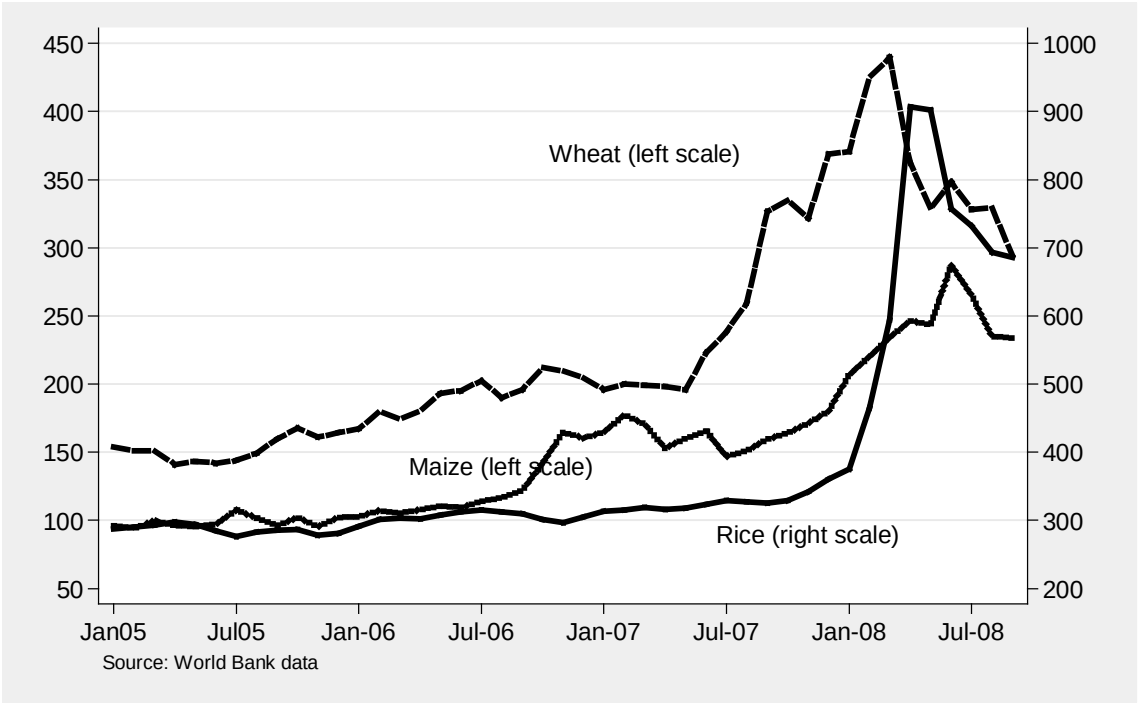


Figure 2: Average staple food prices in Uganda, 2003–08

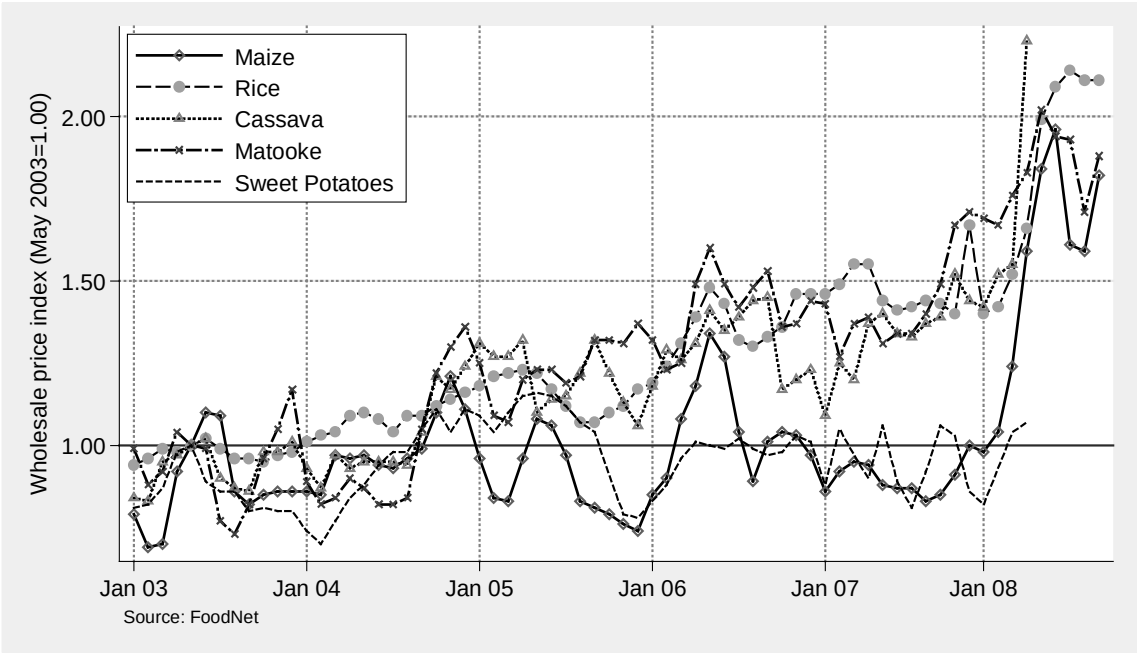
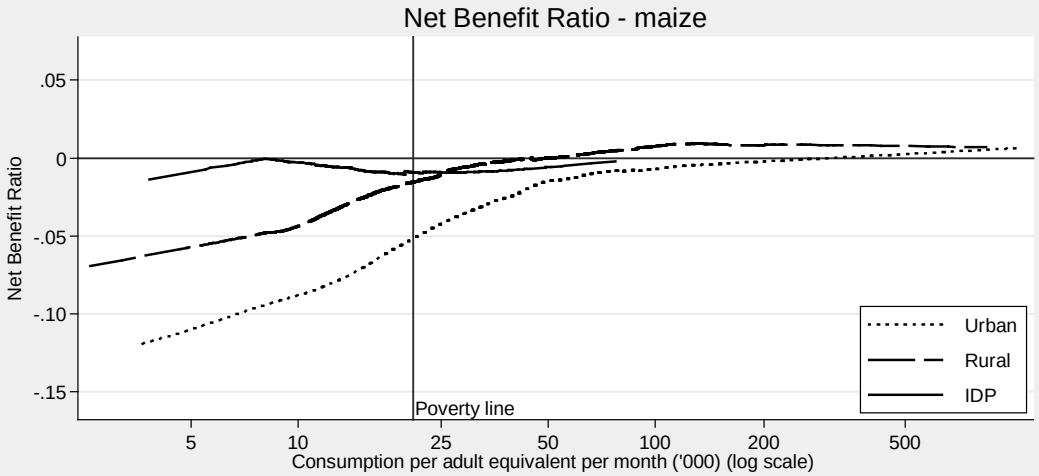
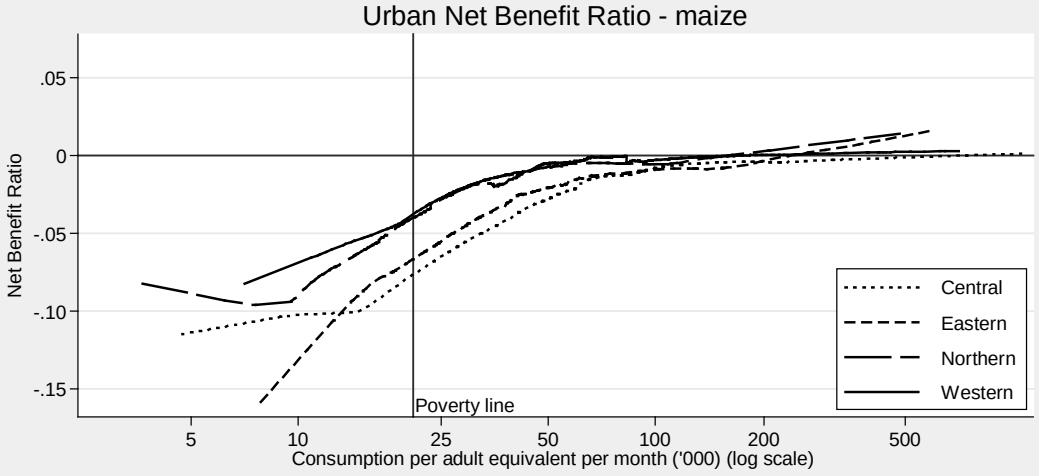


Figure 3: Net Benefit Ratios for Maize


Net Benefit Ratio - maize
Net Benefit Ratio
.05
0
-.05
-.10
-.15
Poverty line
Urban
Rural
IDP
5
10
25
50
100
200
500
Consumption per adult equivalent per month ('000) (log scale)


Urban Net Benefit Ratio - maize
Net Benefit Ratio
.05
0
-.05
-.10
-.15
Poverty line
Central
Eastern
Northern
Western
5
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100
200
500
Consumption per adult equivalent per month ('000) (log scale)

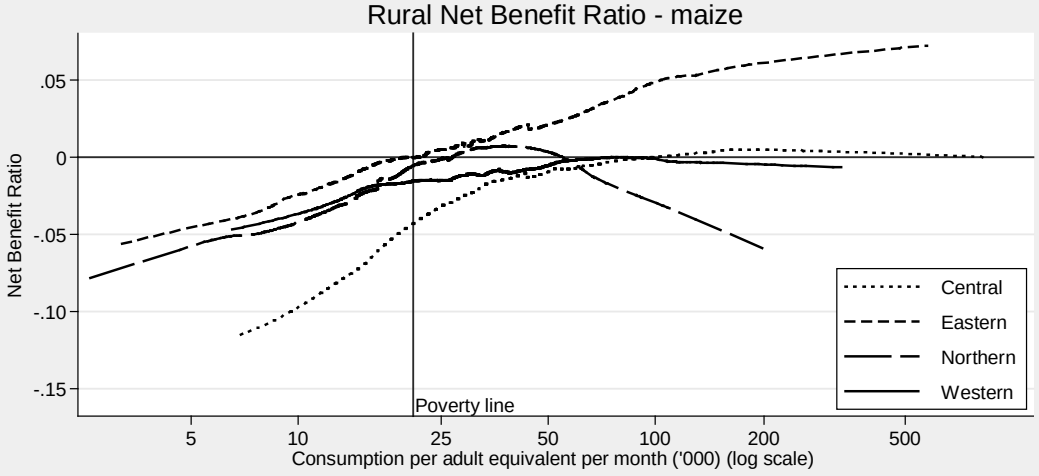

Rural Net Benefit Ratio - maize
Net Benefit Ratio
.05
0
-.05
-.10
-.15
Poverty line
Central
Eastern
Northern
Western
5
10
25
50
100
200
500
Consumption per adult equivalent per month ('000) (log scale)

Figure 4: Net Benefit Ratios for Rice

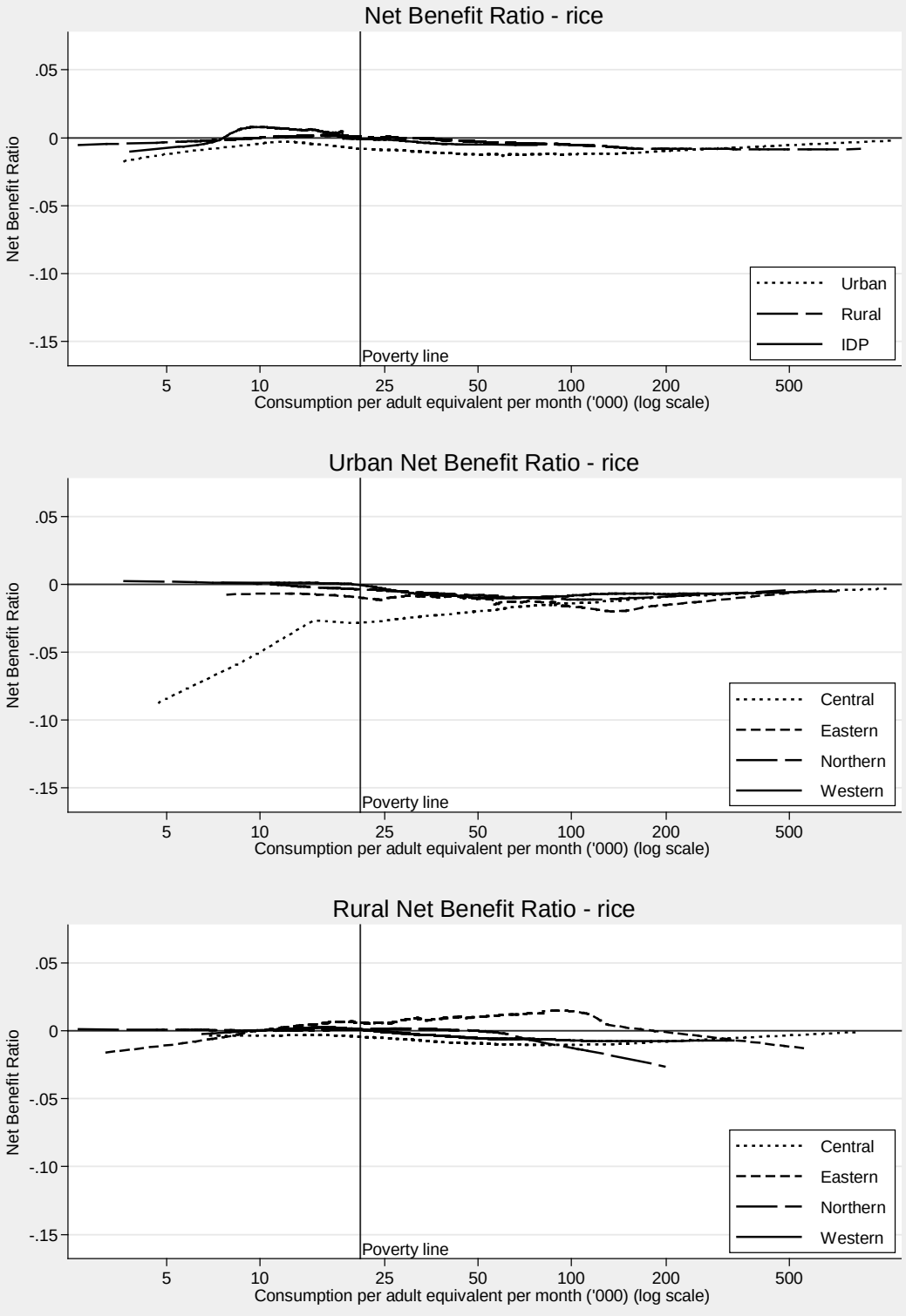
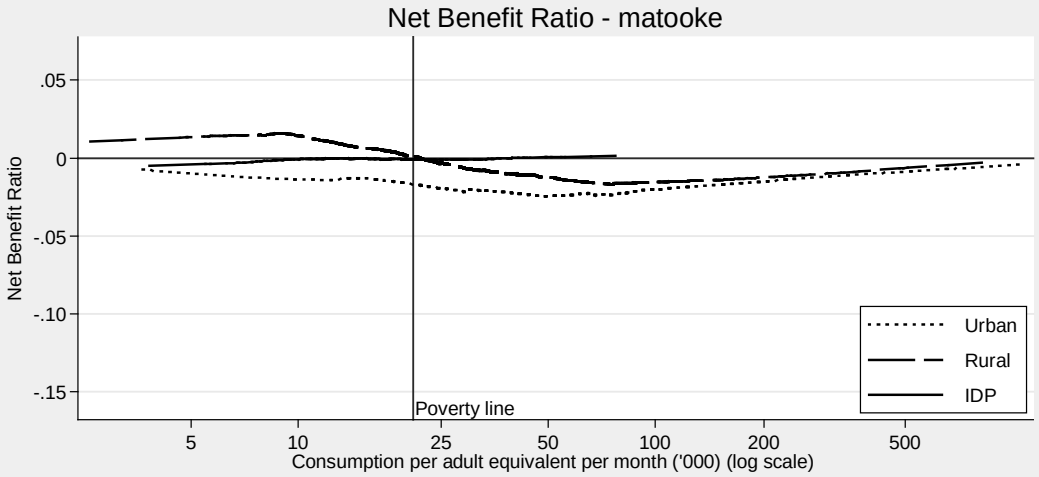
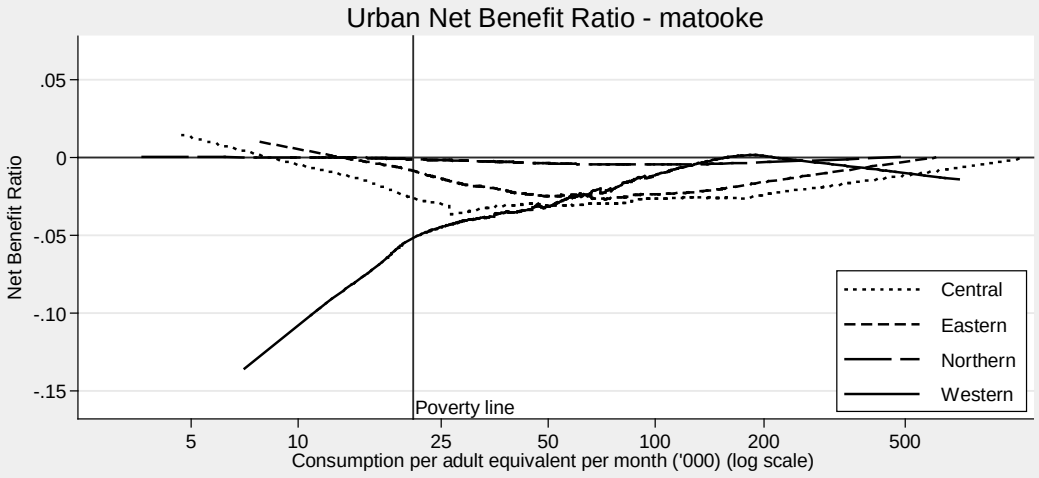


Figure 5: Net Benefit Ratios for Matooke





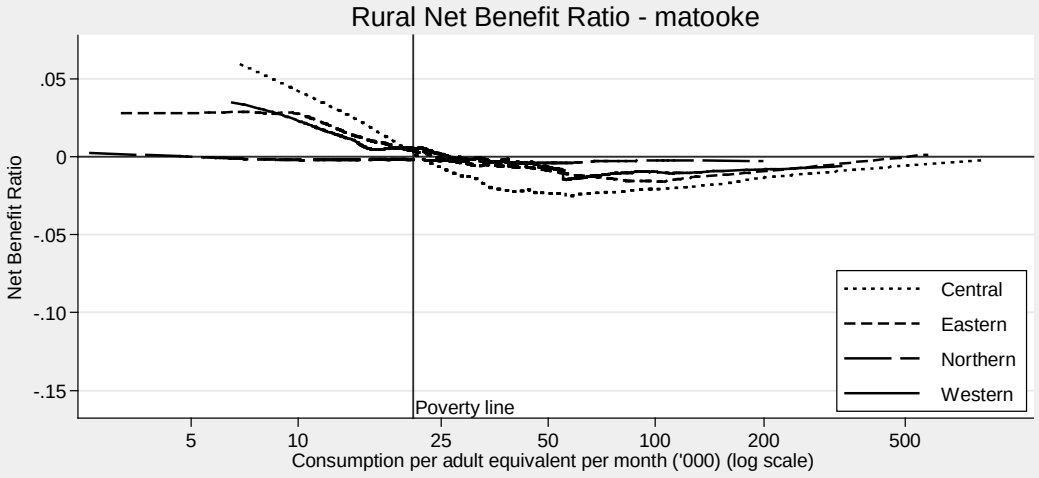
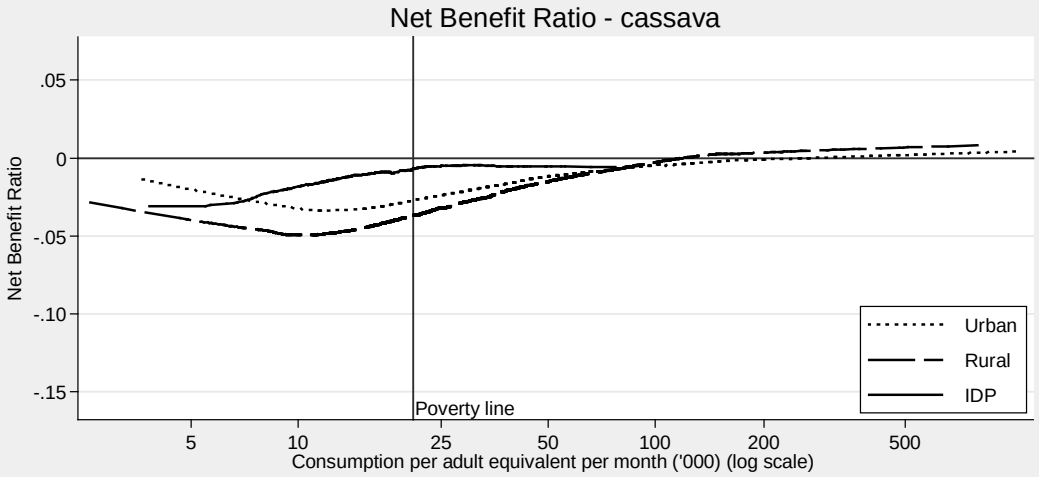
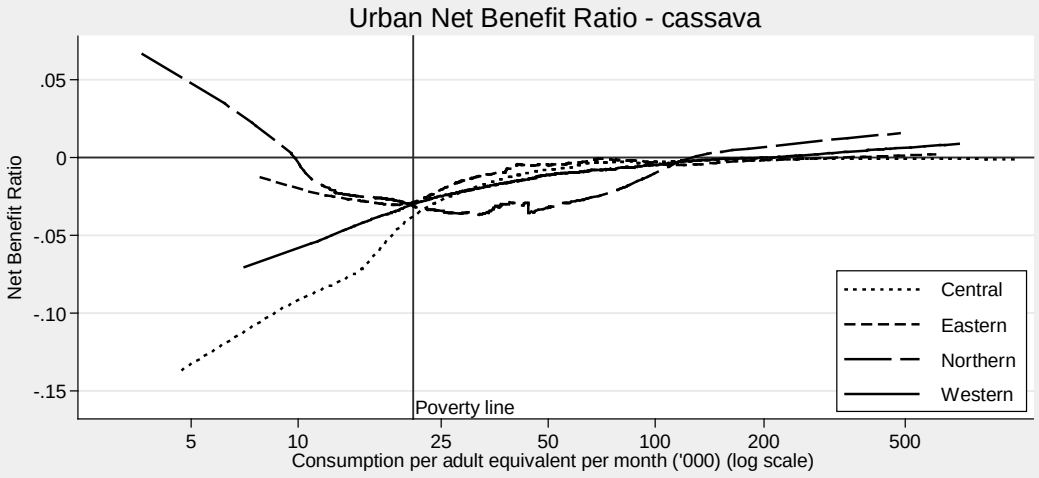


Figure 6: Net Benefit Ratios for Cassava





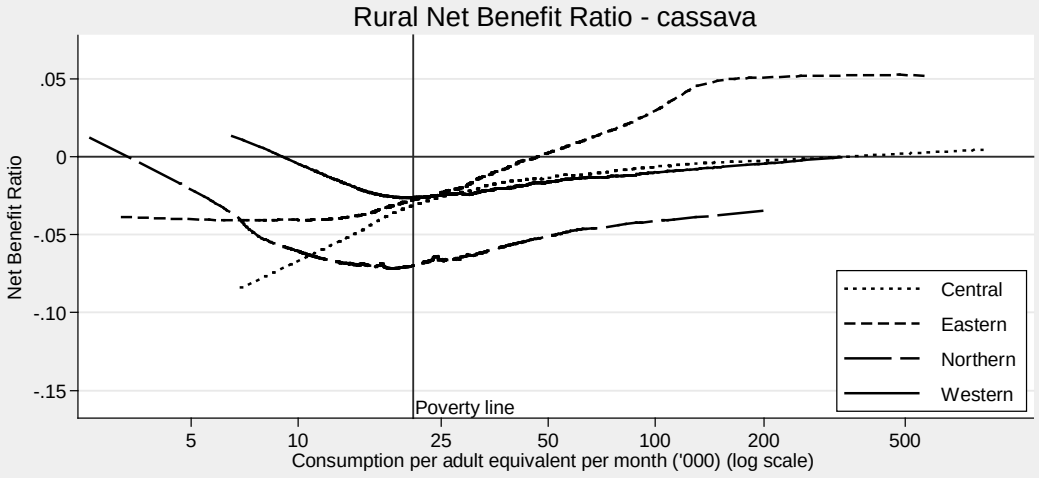


Figure 7: Net Benefit Ratios for Sweet Potato