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WPS4740

POLICY RESEARCH WORKING PAPER 4740

Assessing the Potential Impact on Poverty of Rising Cereals Prices:

The Case of Ghana

Quentin Wodon
Clarence Tsimpo
Harold Coulombe

The World Bank
Human Development Network
Development Dialogue on Values and Ethics
October 2008



Policy Research Working Paper 4740

Abstract

Concerns have been raised about the impact of rising food prices worldwide on the poor. To assess the (short term) impact of rising food prices in any particular country it is necessary to look at both the impact on food producers (who benefit from an increase in prices) and food consumers (who loose out when the price increases), with a focus on poor producers and consumers. In Ghana, the impact of a change in the price of rice is not ambiguous because a large share of the rice consumed is imported, so that the negative impact for consumers is much larger than the positive impact for producers. For maize by contrast, the impact is ambiguous since much of the consumption is locally produced. Using a recent and comprehensive household survey, this paper provides an assessment of the potential impact of higher food prices on the poor in Ghana using both simple statistical analysis and non-parametric methods. The paper finds that rising food prices for rice, maize, and other cereals would together lead to an increase in poverty, but that by contrast to a number of other countries, this increase, while not negligible, may not be as large as feared.

This paper—a product of the Development Dialogue on Values and Ethics, Human Development Network—is part of a larger study by the Africa Chief Economist Office and the Development Dialogue on Values and Ethics on the impact of the food price crisis in Africa and the policy responses available to governments. This research was started in the Africa PREM department and benefits from funding from the Africa Region Regional Studies Program as well as the Belgium and Luxemburg Poverty Reduction Partnerships. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at qwodon@worldbank.org.

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Produced by the Research Support Team

Assessing the Potential Impact on Poverty of Rising Cereals Prices: The Case of Ghana[1]

Quentin Wodon, Clarence Tsimpo and Harold Coulombe

JEL codes: I32, D1, Q12

Key words: Food prices, poverty, Ghana

[1] This paper and the broader research project it is part of have benefitted from discussions with and/or comments from among others Douglas Addison, Harold Alderman, Antonella Bassani, Shanta Devarajan, Hinh Dinh, Wilfried Engelke, Louise Fox, Delfin Go, Ana Revenga, Sudhir Shetty, Kenneth Simler, Linda Van Gelder, Jan Walliser, Vera Wilhelm, and Hassan Zaman. All potential mistakes or omissions remain obviously ours.

1. Introduction

The issue of the increase in food prices has received renewed attention in recent months as the increase in prices worldwide has had large negative impacts on households (e.g., Ivanic and Martin, 2007; World Bank, 2008a and 2008b; IMF, 2008; Wodon and Zaman, 2008; Wodon et al, 2008). In Ghana, prices for rice, maize and other cereals increased by 20 to 30 percent between the last few months of 2007 and the spring of 2008. This has led the authorities as well as development partners to consider a range of compensatory measures that could help offset part of the negative impact on the poor of this increase in prices. However, at least from a conceptual point of view, the net impact of an increase in food prices on the poor is not obvious. Indeed, when discussing the link between rice and other cereal prices and poverty, a key issue is to assess the double and opposite impact that a change in prices can have through producers (who benefit from an increase in prices) and consumers (who lose out when the price increases).

The techniques for the analysis of the short term producer and consumer impacts of food commodity price changes are well developed in the literature. Early work in this area was conducted by Deaton (1989) using data from Thailand (see also Singh et al., 1986). Similar methods have been used in sub-Saharan Africa among others by Barrett and Dorosh (1996) for Madagascar, Budd (1993) for Cote d'Ivoire, and Loening and Oseni (2007) for Ethiopia. These are also the methods that we use in this paper. Most of these studies have found that food price increases tend to lead to an increase in poverty because the consumption effects dominate the production effects as many countries are net importers of food, at least in sub-Saharan Africa.

There has also been a literature on assessing whether in the medium to long term, the increase in prices is compensated by an increase in wages, among others for those workers who contribute to the production of food crops (see for example Ravallion, 1990; Boyce and Ravallion, 1991, Rashid, 2002; Christaensen and Demery 2007; and Ivanic and Martin, 2007). The findings from these studies suggest that wage offset compensate only in a limited way for the initial increase in food prices. Finally, there has also been a substantial amount of work looking at the impact of various policies to deal with food production and prices. This can be illustrated with the case of rice. Indonesia is a country that used to import substantial amounts of rice, but where restrictions were progressively placed on imports in order to help local producers, with imports of rice actually banned after 2004. Using a general equilibrium model, Warr (2005) find that the ban on rice imports raised the price of domestically produced rice, and that this led to an increase in poverty by almost one percentage point (on the Indonesia story as well as for a more general discussion on the experience of governments in Asia to stabilize the price of rice, see Timmer and Dawe, 2007; see also Ravallion and van de Walle, 1991). Another paper on Indonesia by (Sumarto et al., 2005) using panel data suggests that the practice of subsidizing rice as part of a social safety net led to a reduction in the risk for household to be poor. Papers on Vietnam by Niimi et al. (2004) and Minot and Goletti (2000) suggest that the liberalization of rice exports probably led to a reduction in poverty despite an increase in the price of rice in the country, thanks essentially to increased rice production of rice.

In this paper, our objective is thus to assess what could be the short-term impact on poverty of the increase in the price of cereals in Ghana. The impact of a change in the

price of rice and bread is not ambiguous because most of the rice and bread that is consumed is imported or produced from imported goods in the case of bread. For these goods, an increase in price will tend to result in higher poverty in the country as a whole (even if some local producers will gain from this increase). For maize by contrast, the impact on poverty is less obvious as this is a commodity that is produced in the country for local consumption. Overall, when considering several key cereals together, the impact of the price increase is likely to be an increase in poverty, but whether this increase will be severe depends on a number of parameters, including who consumes and produces what, and in what amounts. It is thus an empirical question to assess what might be the impact on poverty of higher cereals price in a country such as Ghana.

For the sake of simplicity, we will use a number of assumptions to provide estimates of the impact on poverty of higher food prices. First, we will assume that the cost of an increase in food prices for a household translates into an equivalent reduction of its consumption in real terms. This means that we do not take into account the price elasticity of demand which may lead to substitution effects and thereby help offset part of the negative effect of higher prices for certain food items. Similarly, an increase for producers in the value of their net sales of food translates into an increase of their consumption of equivalent size, and we again do not take into account the role that the price elasticity of supply may play here. As for food auto-consumed by producers (which represents a large share of total consumption), it is not taken into account in the simulations since changes in prices do not affect households when food is auto-consumed. Poverty measures obtained after the increase in prices are then compared to baseline poverty measures to assess impacts. This implicitly means that we do not take

into account the potential spill-over effects of the increase in food prices for the food items included in the analysis on the prices for items not included.

A difficult question is whether increases in consumer prices do translate into increases in producer prices. At least two factors may dilute the impact of rising food prices on the incomes of farmers. First, production costs for farmers as well as transport costs are likely to be rising due to higher costs for oil-related products. Second, market intermediaries may be able in some cases to keep a large share of the increase in consumer prices for themselves without paying farmers much more for their crops. Because it is difficult to assess whether producers will benefit substantially from higher food prices, especially in the short term, we could consider our estimates obtained when considering only the impact on consumers as an upper bound of the impact of the rise in prices on poverty, and interpret the results obtained when factoring in a proportional increase in incomes for net sellers or producers as a lower bound of the impact.

The rest of the paper is structured as follows. Section 2 presents basic data on cereals production and consumption in Ghana based on an analysis of food consumption and production using the 2005-06 GLSS survey for a number of food categories. In section 3, we provide estimates of the overall impact of higher food prices on poverty. A brief conclusion follows.

2. Patterns of food consumption and production

2.1. Food consumption

Cereals prices are the focus of this paper, and within cereals, we focus further on rice, maize, bread and flour as these goods have experienced sharp increases in prices in

recent months and are also less likely to be auto-consumed than other staple foods. Table 1 provides summary data on rice consumption and production, with data provided for both imported and locally produced rice. Table 2 provides similar data on the consumption of the other cereals considered here, namely bread, flour, and maize as well as maize flour.

We see important differences in the weight of the various cereals in the overall consumption basket of the population, as well as differences between various types of households in their consumption patterns. Consider first rice. For those households who consume rice, total consumption is at about 785,000 cedis, but only three fourths of the population consumes rice. Thus the average household consumption of rice in the population as whole is estimated at about 585,000 cedis (about $59 at the current exchange rate). Knowing that the poverty line for one equivalent adult is at about 0.9 million cedis, per equivalent adult and that the average size of a poor household in Ghana is about four adults and three equivalent adults, the value of rice consumption among the poor on average is roughly equivalent to almost one sixth of what is needed for a typical household to not be poor, which is large.

Most of the consumption of rice is from imported goods. Local production represents less than one fifth of total consumption, and somewhat surprisingly, most of the local production seems to be sold on the market rather than used for auto-consumption (the reverse is observed for example in Sierra Leone, where locally produced rice is in good part auto-consumed). As expected, locally produced rice is more frequently consumed in rural areas, while the reverse is observed in urban areas. But in both urban and rural areas, approximately three fourths of the population consumes rice.

Rice consumption is somewhat less frequent in the rural savannah (the poorest area of the country) and in the Greater Accra metropolitan area. However, in terms of the amounts consumed on average in the whole population, the Greater Accra comes in second position after the urban coastal area. The lowest average amounts consumed are observed in rural areas where households are poorer.

Clearly, rice is also a good that is consumed in significantly higher amounts by the better off population as represented by the top two quintiles of consumption. In the top quintile, rice consumption is more than three times higher than in the bottom quintile. But there is a clear difference between imported and locally produced rice. Imported rice is mostly consumed by the non-poor (about 28.5 percent of the population is considered poor in Ghana according to Coulombe and Wodon, 2007), while the consumption of locally produced rice is higher among the poor than among richer households.

Table 2 provides data for bread, flour and maize (and maize flour) consumption. The average consumption of bread in the population as a whole is 358,000 cedis, while it is much lower for flour (only 7,200 cedis). For maize, consumption is higher, at about 520,000 cedis per year, which is slightly below the amount for rice. About two thirds of the population consume maize, while the proportion is at 85 percent fort bread (flour is consumed by only a small fraction of the population). There are differences in terms of consumption patterns between bread and maize. While maize is heavily consumed by the poor, bread is more like rice and tends to be consumed more by better off households.

Together, the consumption of rice, bread, flour, and maize represents an outlay of about 1.5 million cedis. Using the same comparison as above, this represents about 40 percent of what is needed for a typical poor household not to be poor. An increase of 25

percent of cereals price would then represent about eight percent of what a poor family needs in order not to be poor. Yet this would take into account only the impact of higher prices on the cost of food, and not the extra revenues that some households would get as producers of food.

Beyond statistical tables, it is useful to visualize the data so as to better understand differences in consumption patterns between various households groups as defined by their level of consumption, since this is ultimately what affects the impact on poverty of price changes. We focus here on maize and rice because these are the two cereals for which average consumption is highest, and these are also the two cereals for which we observe both consumption and production in the country (as discussed below in the case of production). For the graphical analysis we use simple on-parametric techniques to present kernel estimates for various variables (this follows previous similar work by a number of authors, as noted in the introduction). All figures presented in this section as well as in following ones share a common variable for the horizontal axis, namely the level of well-being of households according to the logarithm of their consumption per equivalent adult.

Figure 1 first provides the distribution density for the logarithm of consumption in urban and rural areas as well as at the national level. As urban households are richer, the urban density is to the right of the rural density. In rural areas, the mode of the density is about a value of 14, while in urban areas, the mode is around 15. As the distributions appear to have a normal shape, the modes are similar to the mean values. We present these figures to highlight the fact that for low values of log consumption (below 12.5) and for high values (above 16), the shares of the population in these areas are very low, so

that in future graphs, the impact of what takes place at these extremes should be discounted by the fact that those impacts affect a very small share of the population. Said differently, what matters the most is what is taking place between values of 12.5 and 16 on the graphs, as this will drive the overall average effects.

In Figures 2a and 2b, we provide data on the consumption shares for rice and maize among the population as a whole. For rice we have an inverted U shape, suggesting that rice consumption represent a higher share of total consumption for the population with intermediate levels of consumption near the middle of the distribution. This is because the poor tend to consume on average much less rice than better off households, while for those at the top of distribution, even if rice consumption is high, total consumption is even higher so that rice consumption as a share of total consumption is low. For maize, the consumption share is much higher for the very poor and the poor than for other households. This echoes our earlier findings in terms of the consumption levels of households (albeit this was then not discussed in terms of consumption shares) in tables 1 and 2. Thus, if one were to not include the producer side impact of higher prices on poverty into account, clearly, on the consumption side an increase in the price of maize would likely hurt the poor more than an increase in the price of rice, both because the poor are comparatively larger users of maize than the better off while this is not the case for rice, and because for the poor at least the share of their consumption allocated to maize is substantially higher than that allocated to rice.

2.2. Food production

We now turn to the production side, where the data enables us to assess whom produces rice and maize as well as maize flour (we don't have data on production of bread and flour, but these are likely to be goods that are imported or produced from imports for the most part).

As shown in table 3, only a small minority (3.9 percent) of the population produces rice for auto-consumption, for sales or for both. Rice production is concentrated in rural areas, and especially in the rural Savannah (especially the Upper East region), which as mentioned before is the poorest part of the country. As a result, the share of households with rice income is much larger in the poorest quintile where more than one household in ten produces rice, than in the upper deciles. The average income from rice in the population as a whole is low, at less than 42,000 cedis, but among producers, the figure is much higher at about 1.1 million cedis. While poorer households are more likely to be rice producers, the amount produced among producers is as expected higher among richer households, with producers in the top two quintiles sell two to three times more rice than producers in the bottom quintile.

Table 4 provides the same data for maize. The share of producers in the population is much higher, at more than 28 percent, with again a higher probability of production in poorer quintiles. While rice production is concentrated in the rural Savannah area according to the survey, maize production is more evenly spread among all rural areas, since the share of producers in the population is similar in the rural Coastal, rural Forest, and rural Savannah areas. However, incomes from maize production are higher in the rural Savannah area. In the urban Forest and urban Coastal

areas, while the proportion of producers in the population is lower, the revenues from maize are not negligible. On average, maize sales among producers are similar to rice sales among rice producers, at about 1.0 million cedis per household. But because the proportion of maize producers is much larger, average income from maize in the population (including auto-consumption) as a whole is seven times larger than average incomes from rice.

3. Combining consumption and production data to assess poverty impacts

The impact on poverty of the change in food prices is the result of the combined impacts on the consumption and production sides. We first provide in this section estimates of the impact of changes in the price of rice, bread and maize, as well as cereals as a whole. For rice, we consider together imported and locally produced varieties assuming that prices move in tandem, which is apparently indeed the case when one looks at time series data on rice prices. We measure likely impacts of food price increases on three poverty measures. The headcount index of poverty is the share of the population with a level of consumption per equivalent adult below the poverty line. The poverty gap takes in addition into account the distance separating the poor from the poverty line (while giving a zero distance to the non-poor). The squared poverty gap takes in addition into account the square of that distance (and thus inequality among the poor; for an introduction to the concepts of poverty measurement, see Coudouel et al., 2002).

We carry the simulations in a very simple way. First, for rice and maize producers, we measure the additional income or the loss in income obtained from the sale

of rice or maize by households due to an increase or reduction in the price of rice or maize. We assume that this difference in income translates into an equivalent difference in the consumption per equivalent adult of households used to measure poverty. We then compute again the poverty measures keeping the poverty line intact. For consumers, we do essentially the same thing, but considering also bread and cereals as a whole. That is, we estimate the increase or decrease in the cost of rice, maize or other food items following a change in price, taking into account the actual spending of the household. In the case of a reduction in price, we then add to the consumption aggregate the reduction in the total cost of food for the household, since this reduction in cost means that the household can actually consume other goods (this is thus as if the household consumption had increased.) In the case of an increase in the price of food, we subtract from the consumption aggregate the value of this increase, since the household will have to give up other consumption goods in order to be able to purchase the food it needs. For either an increase or a decrease in the price of food we then compute again poverty with the adjusted consumption level. What determines if a household is considered as a net producer or consumer is the level of the net sales of the consumer (negative for consumers, positive for producers; auto-consumption is not taken into account on either the producer or the consumer side)

This procedure is admittedly a rough approach, but it has the merit of being simple. The approach may slightly overestimate the impact on poverty of changes in prices because we do not take into account the price elasticity of rice, maize and other food consumption, but this price elasticity is likely to be low in any case, due to the fact that rice and maize are important in the diet of the population and that the prices of the

various food items seem to increase jointly (so that it is not clear that households can offset the loss in purchasing power associated with the price increase by shifting to other foods). Also, the approach does not take into account any ripple effects of changes in the price of rice, maize and other cereals on other parts of the economy. More sophisticated methods could be used to measure the "general equilibrium" effect of a change in the price of rice (such as using a Social Accounting Matrix, as done for Ghana by Parra Osorio and Wodon, 2008), but such simulations require a much larger number of assumptions, some of which are the subject of debate (especially when more complex computable general equilibrium models are used). The estimations given here thus provide "first round" likely poverty effects from lower or higher food prices paid to producing households or paid by consuming households, assuming that households don't change their consumption and production patterns for rice as well as for the other commodities after the change in their price.

Before providing the results, one more word of caution is required. As mentioned in the introduction, it remains an open question as to the higher prices paid by consumers translate into higher prices paid to producers. If one has doubts as to producers will really benefit in the short run from higher prices, one could consider estimates based on consumption impacts only as an upper bound for the impact on poverty, and estimates taking into account both consumer and producer impacts as a lower bound.

Key results from the simulations are provided in tables 5, 6 and 7. Consider first table 5, which is based only on data on the consumption of food. At the time of the survey, the share of the population in poverty was 28.5 percent. If the price of rice increases by 25 percent, and if we look only at the impact on the consumer side, the

headcount index would increase by half a percentage point to 29.0 percent. The increase for bread is slightly smaller at 0.4 percentage point. For maize and maize flour, the increase is at 0.3 percentage point. For all cereals combined, including flour, the increase is 1.1 percentage points. While this is not negligible (it would mean that more than 200,000 persons would fall into poverty), the impact is not huge. The other poverty measures (poverty gap and squared poverty gap) follow a similar pattern, but with smaller increases in absolute terms since these measures are also smaller to start with. For information, we provide also the impacts for those households who consume the various foods.

If we now look at the impact of changes in producer prices in table 6, the impacts are reversed. The beneficial impact of the increase in rice prices is small since local production of rice is limited. With a 25 percent increase in prices, and if we look only at the impact on the producer side, national poverty measures would remain essentially unchanged (but there would be a small reduction in poverty among rice producers). In the case of maize, if the price for producers were to increase by 25 percent, the headcount index of poverty would decrease nationally to 28.1 percent. The combined impact of higher producer prices for rice and maize is similar to that for maize since the impact for rice is small.

The total impact of changes in the price of rice, maize and other cereals on poverty is obtained by taking both consumers and producers into account, and the results are given in table 7. If the price of rice increases by 20 percent, the headcount index of poverty increases in the population as a whole to 29.0 percent, while if the price of maize increases by the same percentage, poverty actually decreases slightly at the national level,

to 28.3 percent. For cereals as a whole though, taking into account both consumer and producer impacts, the headcount index increases by 0.7 points to 29.2 percent with a 25 percent increase in prices. Data on the poverty impacts separately for urban and rural areas are provided in appendix. The increase in the headcount index is similar in urban and rural areas, at 0.7 percentage points, as for the whole country. However, when one considers the poverty gap or squared poverty gap, the increase in poverty is higher in rural areas than in urban areas (this is clear especially for the poverty gap).

As before, to understand the differences in results for rice and maize, it is useful to visualize the data. Figures 3a and 3b provide the shares of households who are net producers, net consumers, or neither for both commodities (the last group of households does not consume nor does it produce rice or maize). The sum of the three proportions sums to one. The pattern is as expected very different for rice and for maize. For rice (which combines imported and domestically produced rice), we have an inverted-U pattern for net consumers who also represent a large majority of households (remember that most households are located in the middle of the graphs while the share of households located at the two extremes are low). Net producers are located among the poor, but even among the poor, there is a larger number of net consumers than net producers. This means that an increase in the price of rice is unambiguously going to increase poverty, with the impact on standards of living more generally being larger towards the middle of the distribution. For maize, the picture is different. The very poor at the left of the horizontal axis are net consumers, and thereby will be hurt by an increase in prices. But this is a small group of households. Many among the poor, who are located a bit further to the right, gain as they are net producers. Better off households are

net consumers, but the more one moves to the upper levels of consumption, the smaller is the share of households that are affected by the maize price shock. Thus, overall while the impact on poverty of an increase in rice prices is clear, the impact of an increase in maize prices is not, and it is indeed the fact that a larger share of poor households are net producers than net consumers of maize that leads to higher maize prices reducing poverty.

In Figures 4a and 4b, we provide data on the net income from sales of rice and maize, with net income defined as the difference between sales and purchases of the good. As expected, for rice, net income is negative for almost all households except the very poor, and more so in urban than in rural areas. For maize in rural areas net income is negative for the very poor, then positive for a large share of the distribution, before becoming negative again for the better off. In urban areas, net income is negative for maize through most of the distribution. These patterns explain why the net impact on poverty of the price increase for rise is an increase in poverty, while the net impact for maize is a decrease in poverty.

Finally, Figures 5a and 5b provide data on the net benefit ratio for rice and for maize, where this ratio is defined as the net income from the commodity divided by the consumption level of the household. The figures are very similar in shape to those for the net income, and they clearly show a negative impact again for rice on all but the poorest households, and a small benefit for much of the distribution in the case as maize, as well as a large percentage loss in consumption for the very poor.

4. Conclusion

When assessing the potential impact of a change in the price of cereals on poverty, it is important to consider both the impact on producers (who tend to benefit from an increase in prices) and consumers (who tend to loose out when the price increases). If producers tend to be poor and if consumers live in urban areas and are better off, an increase in the price of cereals, despite its impact on the cost of food, may well be poverty reducing. In Ghana, the main cereals that are sold for consumption (as opposed to auto-consumed) are rice, bread, and maize. In the case of rice, the impact of an increase in price is not ambiguous at all as a majority of the rice consumed is imported. Any increase in the price of rice clearly result in an increase in poverty. For bread as well, given limited production in the country, price increases are likely to be poverty increasing. But for maize however, price increases are poverty reducing, at least if we assume that the higher price paid by consumers translates into a higher price received by producers.

Overall, we find that an increase in the price of the various cereals of 25 percent would lead to an increase in poverty, but this increase is not very large, as it is likely to be below one percentage point (which still could represents close to 200,000 persons falling into poverty). The fact that the increase in poverty may not be as large as one might have feared does not mean however that some households are not likely to be affected significantly. In addition, other food prices have increased in Ghana, and these increases have not been factored in the analysis since we have focused only on key cereals.

Even if the national impact on poverty may not be dramatic, the food crisis could justify the implementation of compensatory measures to protect the most vulnerable households. These measures should probably not be in the form of broad import tax or value added tax cuts or food subsidies, as much of the proceeds from such measures would probably not reach the poor better than other household groups. Targeted interventions to reach poor households who are less likely to have the means to cope with price shocks would probably be more effective.

References

Boyce, J. K., and M. Ravallion, 1991, A Dynamic Econometric Model of Agricultural Wage Determination in Bangladesh, Oxford Bulletin of Economics and Statistics, 53(4): 361-76

Budd, J. W., 1993, Changing Food Prices and Rural Welfare: A Non-Parametric Examination of the Cote d'Ivoire, Economic Development and Cultural Change, 41(3): 587-603.

Coudouel, A., J. Hentschel, and Q. Wodon, 2002, Poverty Measurement and Analysis, in J. Klugman, editor, A Sourcebook for Poverty Reduction Strategies, Volume 1: Core Techniques and Cross-Cutting Issues, World Bank, Washington, DC.

Barrett, C. D. and P. A. Dorosh, 1996, Farmers' Welfare and Changing Food Prices: Nonparametric Evidence from Rice in Madagascar, American Journal of Agricultural Economics, 78(3): 656-69.

Christiaensen, L. and L. Demery, 2007, Down to Earth: Agriculture and Poverty Reduction in Africa, Directions in Development, World Bank, Washington, D.C.

Coulombe, H., and Q. Wodon, 2007, Poverty, Livelihoods and Access to Basic Services in Ghana, in World Bank, Ghana: Meeting the Challenge of Accelerated and Shared Growth (Country Economic Memorandum), Report No. 40934-GH, Volume III: Background Papers, Washington, DC.

Deaton, A., 1989, Rice Prices and Income Distribution in Thailand: A Non-Parametric Analysis, The Economic Journal, 99(395):1-37.

International Monetary Fund (2008) Food and Fuel Prices: Recent Developments, Macroeconomic Impact, and Policy Responses, mimeo, Washington, DC: IMF.

Ivanic, M., and W. Martin, 2007, Implications of Higher Global food Prices for Poverty in Low-Income Countries, Policy Research Working paper 4594, World Bank, Washington, DC.

Loening, J., and G. Oseni, 2007, Approximating Urban and Rural Welfare Effects of Food Price Inflation in Ethiopia, mimeo, World Bank, Washington, DC.

Minot, N, and F. Goletti, 1998, Export Liberalization and Household Welfare: The Case of Rice in Vietnam, American Journal of Agricultural Economics, 80(4): 738-49.

Niimi, Y., P. Vasudeva-Dutta, and A. L. Winters, 2004, Storm in a Rice Bowl: Rice Reform and Poverty in Vietnam in the 1990s, Journal of the Asia Pacific Economy, 9(2):170-190.

Ravallion, M. 1990, Welfare changes of food price changes under induced wage responses: Theory and evidence for Bangladesh, Oxford Economic Papers, 42: 574–85.

Ravallion, M. and D. van de Walle, 1991. The impact on poverty of food pricing reforms: a welfare analysis for Indonesia, Journal of Policy Modeling, 13(2):281-99.

Rashid, S. 2002, Dynamics of Agricultural Wage and Rice Price in Bangladesh: a Reexamination, MSSD Discussion Paper No. 44, International Food Policy Research Institute, Washington DC.

Singh, I., L. Squire, and J. Strauss, 1986, Agricultural Household Models: Extensions and Applications, Johns Hopkins University Press, Baltimore.

Sumarto, S., A. Suryahadi, and W. Widyanti, 2005, Assessing the Impact of Indonesian Social Safety Net Programmes on Household Welfare and Poverty Dynamics, European Journal of Development Research, 17(1): 155-77.

Timmer, C. P., and D. Dawe, 2007, Managing Food Price Instability in Asia: A Macro Food Security Perspective, Asian Economic Journal, 21(1): 1-18.

Warr, P., 2005, Food Policy and Poverty in Indonesia: A General Equilibrium Analysis, Australian Journal of Agricultural and Resource Economics, 49(4): 429-51.

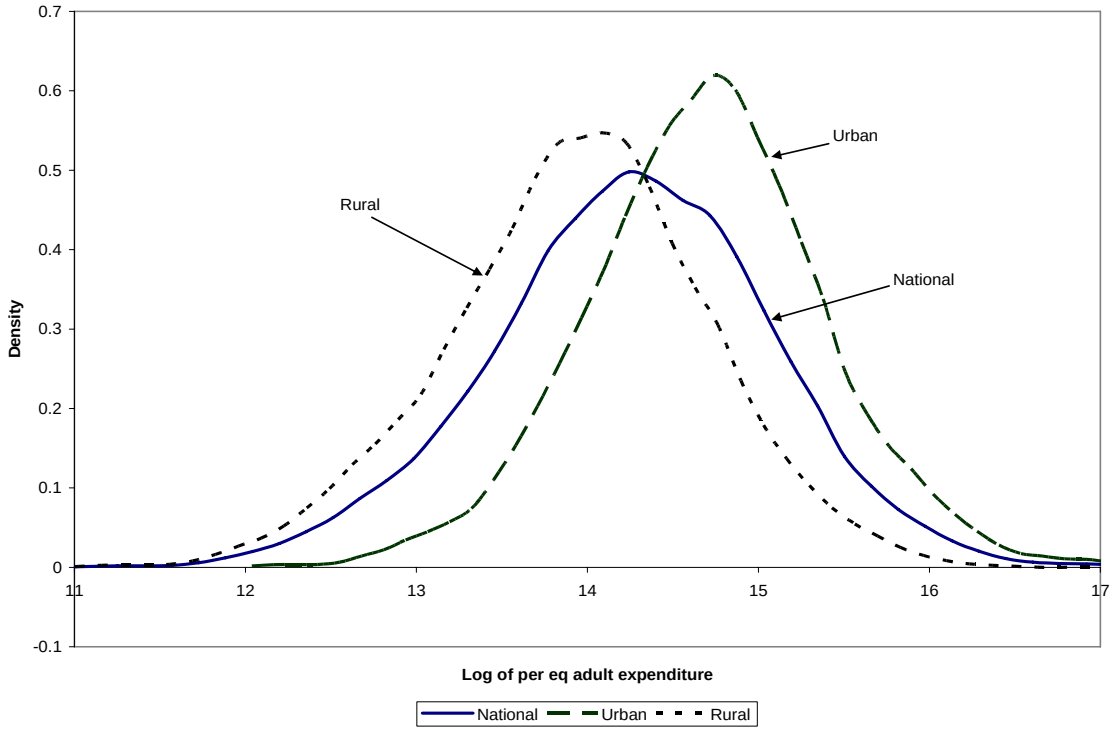
Wodon, Q., and H. Zaman, 2008, Rising Higher Food Prices in Sub-Saharan Africa: Poverty Impact and Policy Responses, mimeo, World Bank, Washington, DC.

Wodon, Q., C. Tsimpo, P. Backiny-Yetna, G. Joseph, F. Adoho, and H. Coulombe, 2008a, Impact of Higher Food Prices on Poverty in West and Central Africa, mimeo, World Bank, Washington, DC.

World Bank, 2008a, Addressing the Food Crisis: The Need for Rapid and Coordinated Action, Background paper for the Finance Ministers Meetings of the Group of Eight, Poverty Reduction and Economic Management Network, Washington, DC

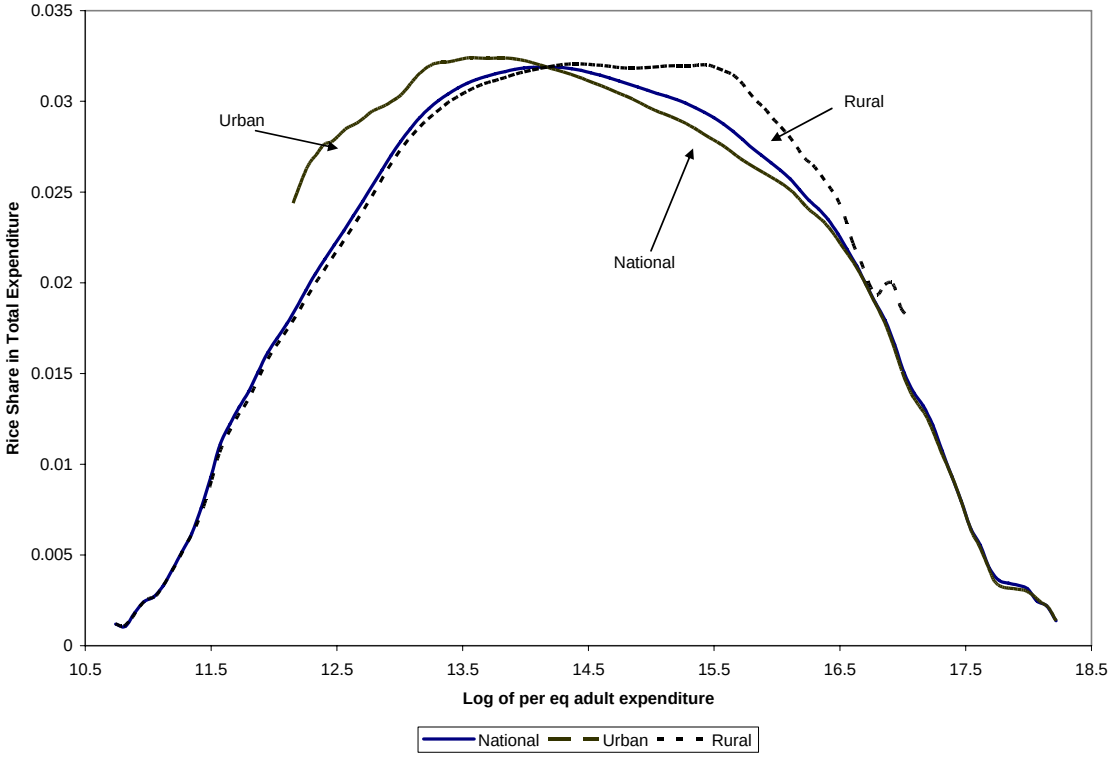
World Bank, 2008b, Guidance for Responses from the Human Development Sectors to Rising Food and Fuel prices, Human Development Network, Washington, DC.

Figure 1: Rural and urban welfare distributions (in logarithm)



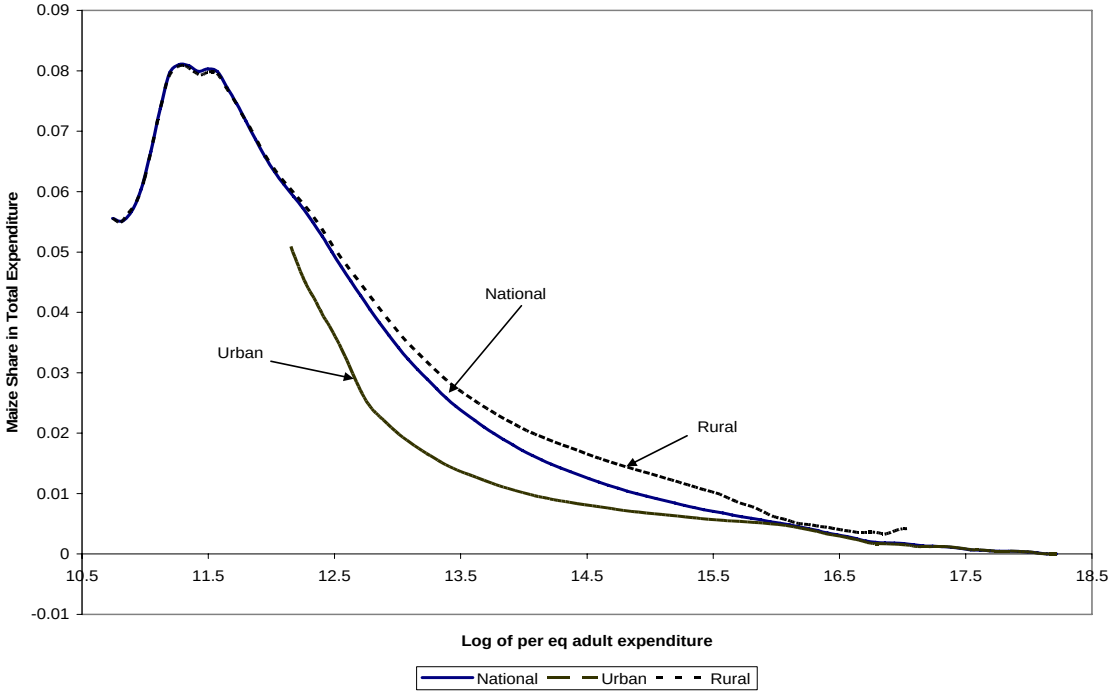
Source: Authors' estimation using 2005-06 GLSS.

Figure 2a: Budget share of rice expenditure



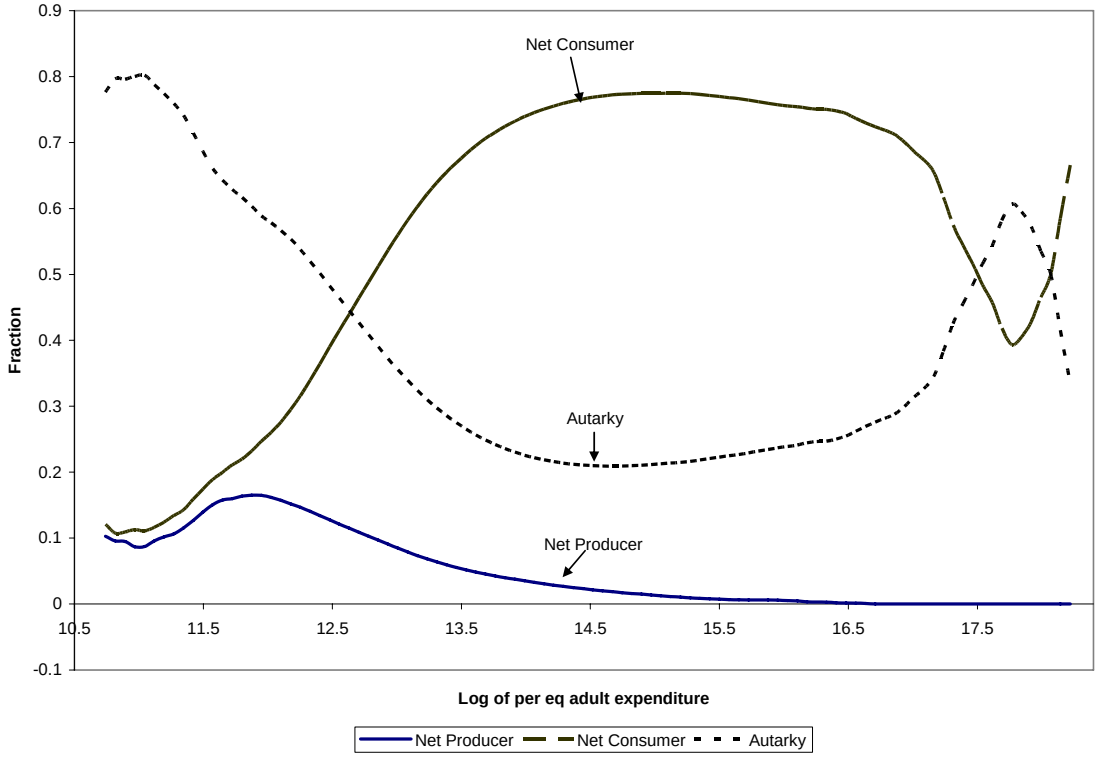
Source: Authors' estimation using 2005-06 GLSS.

Figure 2b: Budget share of maize expenditure



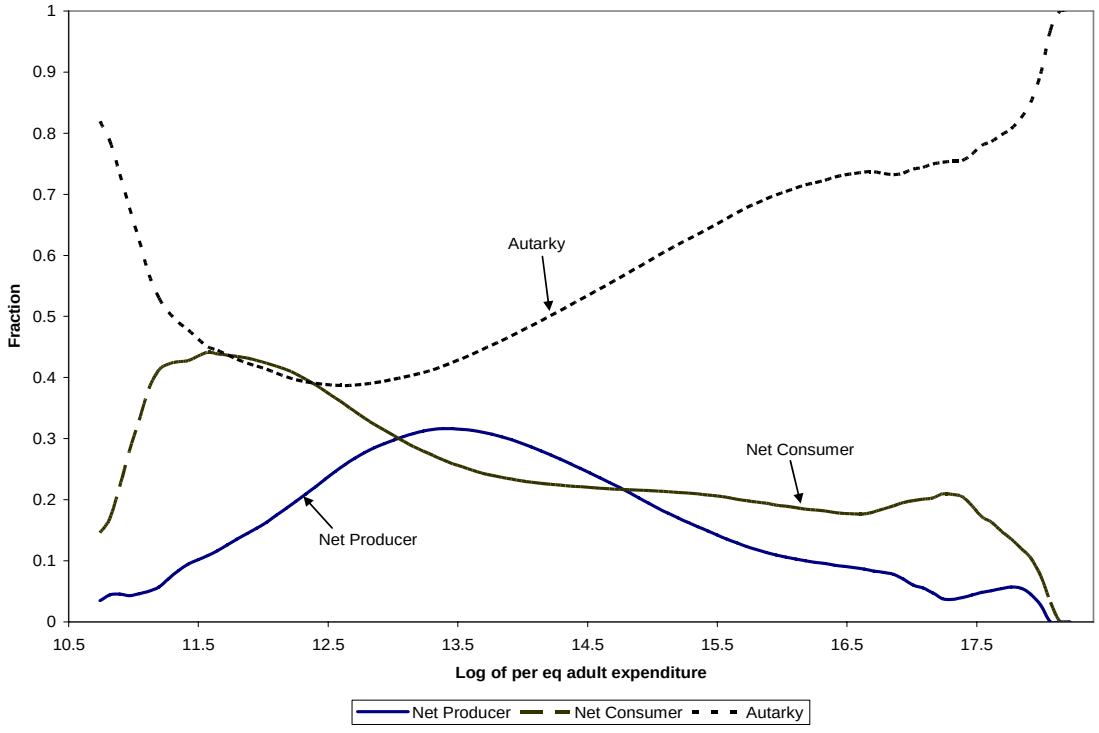
Source: Authors' estimation using 2005-06 GLSS.

Figure 3a: Net producers, net consumers, and autarky households for rice



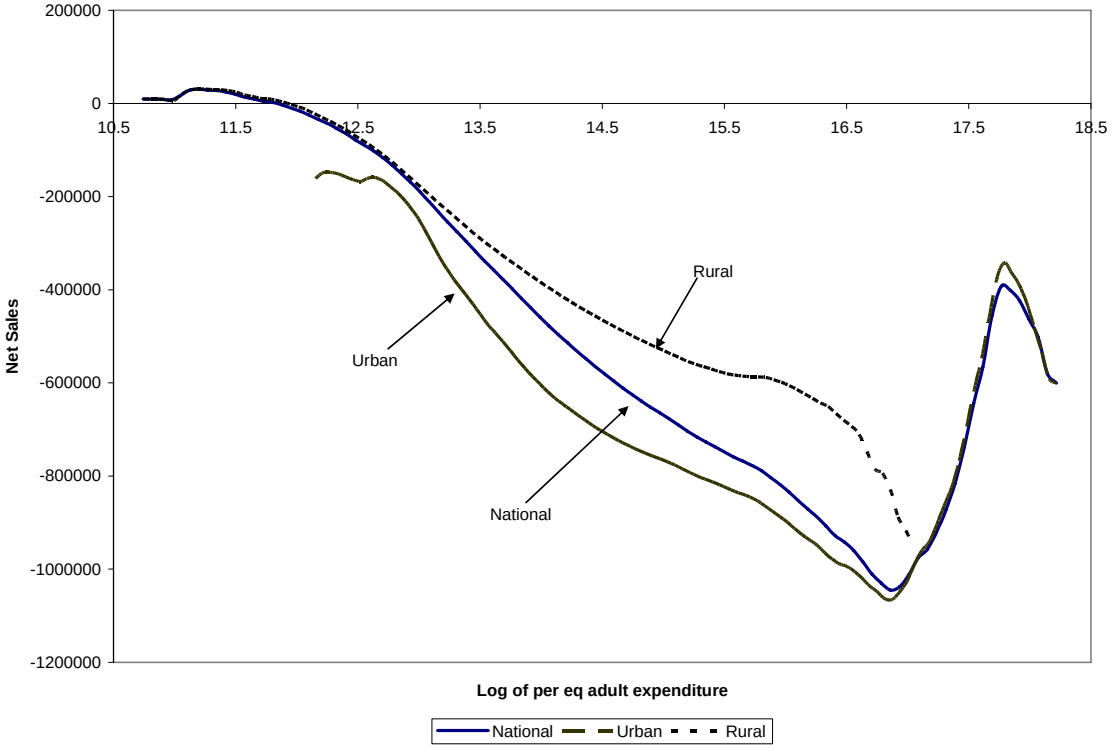
Source: Authors' estimation using 2005-06 GLSS.

Figure 3b: Net producers, net consumers, and autarky households for maize



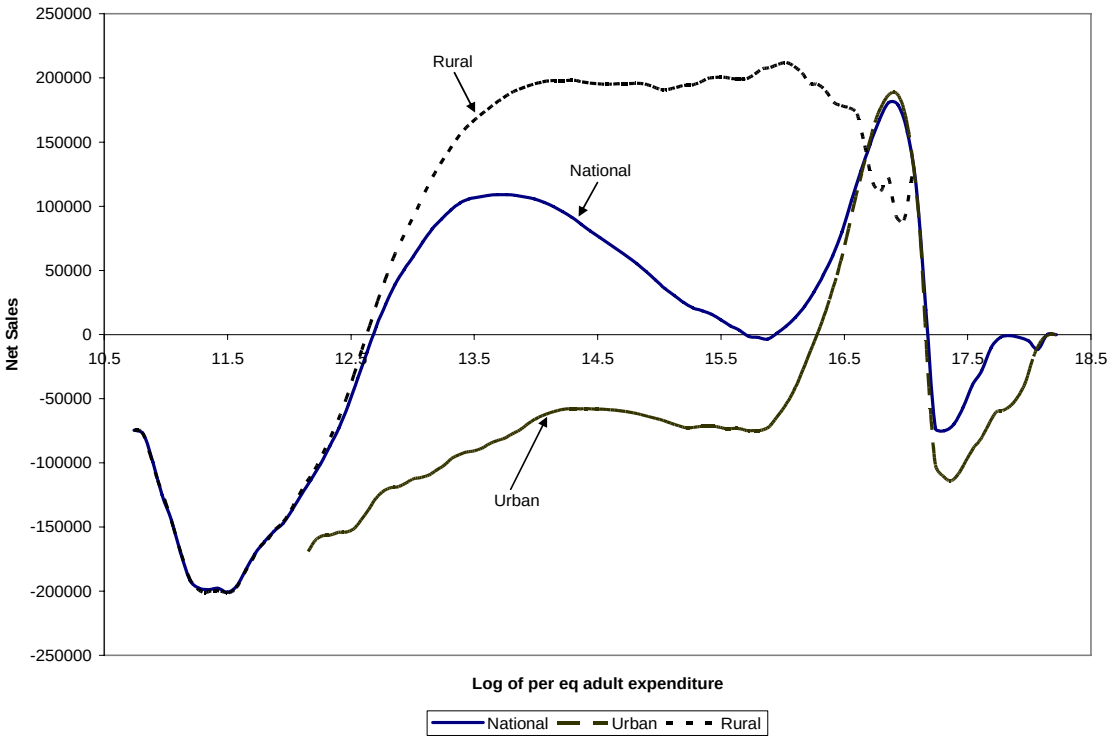
Source: Authors' estimation using 2005-06 GLSS.

Figure 4a: Income (net sales) from rice production per equivalent adult



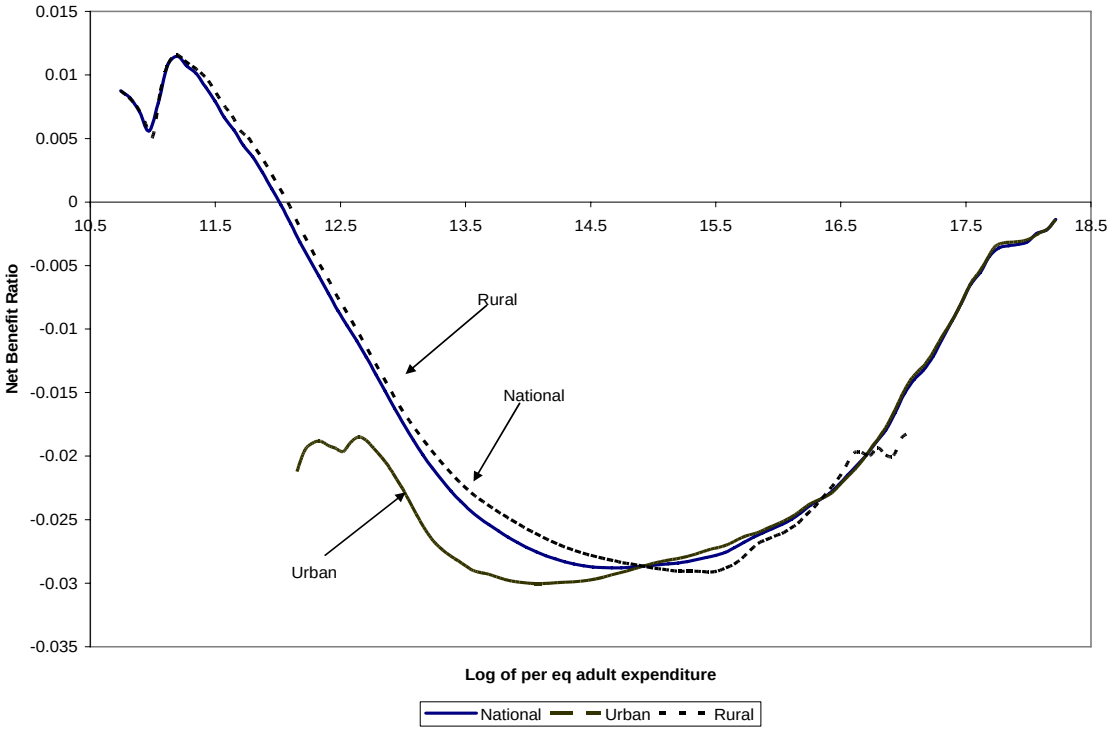
Source: Authors' estimation using 2005-06 GLSS.

Figure 4b: Income (net sales) from maize production per equivalent adult



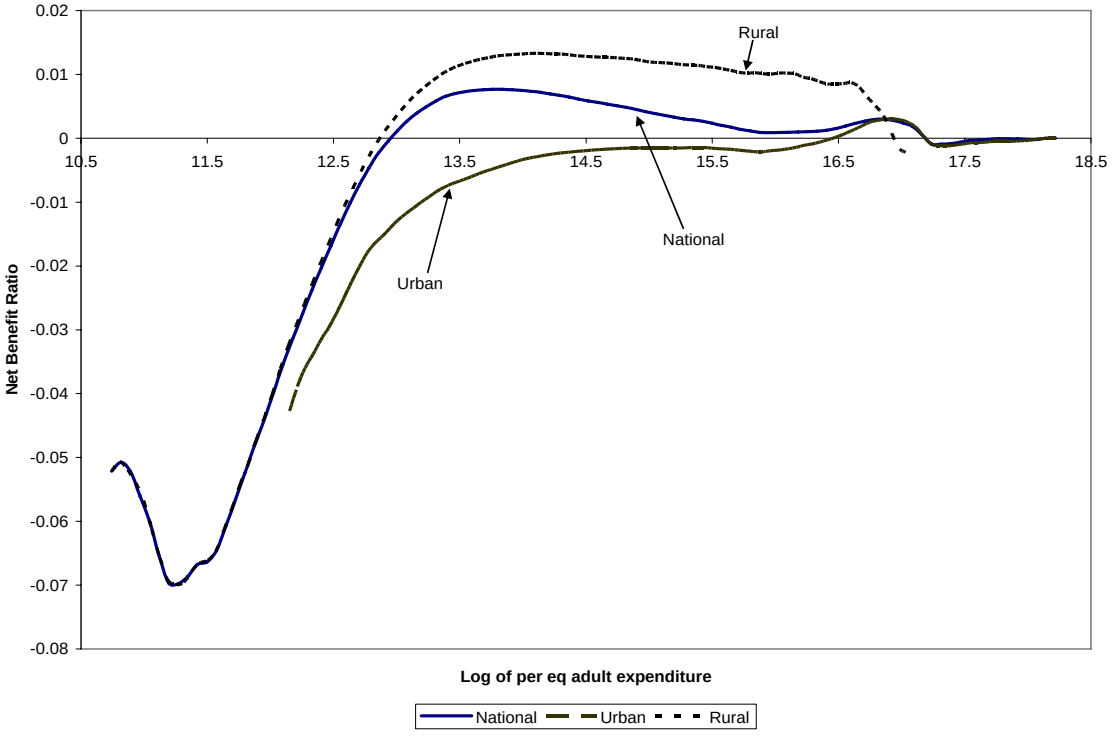
Source: Authors' estimation using 2005-06 GLSS.

Figure 5a: Net benefit ratio for rice



Source: Authors' estimation using 2005-06 GLSS.

Figure 5b: Net benefit ratio for maize



Source: Authors' estimation using 2005-06 GLSS.

Table 1: Rice consumption in Ghana for different household groups, 2006

	% HH consuming rice					Average consumption For all households					Average consumption for households with positive consumption				
	Locally produced rice					Locally produced rice					Locally produced rice				
	Purchase	Auto Cons.	Total Local	Imported rice	Total	Purchase	Auto Cons.	Total Local	Imported Rice	Total	Purchase	Auto Cons.	Total Local	Imported Rice	Total
Residence area															
Urban	13.9	0.2	14.0	66.3	74.7	78885.1	1076.9	79962.0	643519.8	723481.8	568279.3	540481.5	571932.4	970337.3	968201.1
Rural	27.4	1.7	28.8	53.2	74.4	129804.6	7786.8	137591.4	342202.4	479793.8	473790.3	459037.9	478150.8	642787.9	644536.4
Locality															
Accra (GAMA)	4.8	0.0	4.8	62.8	65.3	26051.5	0.0	26051.5	703650.0	729701.5	547407.1	-	547407.1	1120967.0	1116862.0
Urban Coastal	11.5	0.0	11.5	73.5	82.4	96339.3	0.0	96339.3	730814.3	827153.6	837742.3	-	837742.3	994945.4	1003843.0
Urban Forest	15.4	0.0	15.4	73.8	80.5	59723.0	0.0	59723.0	657083.4	716806.4	388281.1	-	388281.1	890284.4	890214.9
Urban Savannah	38.2	1.7	39.1	41.6	71.6	269694.2	9243.8	278938.0	305430.3	584368.3	705290.1	540481.5	713507.6	734862.3	816610.6
Rural Coastal	12.4	0.2	12.6	66.5	75.4	44595.7	281.1	44876.8	440640.2	485517.0	359469.1	119161.3	354984.9	662879.7	643939.3
Rural Forest	26.9	2.0	28.5	63.7	84.5	139777.4	9170.1	148947.5	428160.2	577107.6	518762.4	451611.9	522112.4	672098.1	683136.4
Rural Savannah	38.8	2.2	40.6	27.1	57.7	174299.9	10899.7	185199.6	135074.9	320274.4	449791.1	495863.5	456007.8	497917.2	554843.1
Region															
Western	17.0	0.0	17.0	76.6	87.6	114905.2	0.0	114905.2	706091.3	820996.5	674343.8	-	674343.8	921274.4	937397.4
Central	15.4	0.0	15.4	72.0	84.7	90458.0	0.0	90458.0	532907.4	623365.4	587039.2	-	587039.2	739836.3	736131.6
Greater accra	4.6	0.0	4.6	63.7	66.2	23685.2	0.0	23685.2	674849.5	698534.7	512291.2	-	512291.2	1059782.0	1055189.0
Volta	20.4	13.5	30.9	61.6	77.1	78265.4	64072.9	142338.2	329992.4	472330.6	384341.9	475470.3	460798.7	535713.3	612931.3
Eastern	18.6	0.2	18.8	66.4	78.1	80101.0	236.4	80337.4	493734.9	574072.3	431596.4	119161.3	428292.2	744011.8	734665.4
Ashanti	26.4	0.0	26.4	61.8	81.2	124392.9	0.0	124392.9	509161.1	633554.0	471629.9	-	471629.9	824471.9	780625.0
Brong ahafo	19.2	0.0	19.2	63.3	74.3	76035.5	0.0	76035.5	365185.3	441220.8	396669.5	-	396669.5	576533.1	593852.5
Northern	49.1	0.0	49.1	21.6	58.5	275284.8	0.0	275284.8	142863.6	418148.4	560820.4	-	560820.4	661745.9	714680.6
Upper east	57.4	0.0	57.4	7.6	60.8	277643.2	0.0	277643.2	49111.7	326755.0	483890.3	-	483890.3	642099.3	537581.3
Upper west	26.4	0.0	26.4	11.3	33.2	128811.0	0.0	128811.0	55183.5	183994.5	487060.4	-	487060.4	489380.4	554921.8
Quintile															
Q1 (poorest)	31.4	1.9	32.8	25.9	54.5	121994.8	7842.2	129837.0	109793.3	239630.3	388014.5	408131.7	395475.3	423859.2	440026.6
Q2	27.5	2.4	29.6	52.2	73.7	126357.0	13020.3	139377.3	282192.3	421569.6	458797.9	553866.5	470472.5	540716.6	571948.6
Q3	25.8	1.1	26.8	59.3	77.5	130848.5	5656.4	136504.9	397218.9	533723.8	507272.0	493062.5	509216.0	670378.3	688696.1
Q4	20.0	0.7	20.4	65.6	78.9	109376.3	2282.9	111659.1	551676.9	663336.0	547661.2	343556.4	547893.7	841523.7	840796.0
Q5 (richest)	13.4	0.3	13.6	70.5	78.3	78979.5	1090.8	80070.3	697283.9	777354.1	589263.7	393240.3	589994.7	989677.9	992588.6
Total	21.6	1.0	22.4	58.9	74.6	107811.9	4888.7	112700.6	472344.7	585045.4	500067.0	465714.8	503448.4	802114.1	784633.4

Source: Authors' estimation using 2005-06 GLSS.

Table 2: Bread, flour and maize consumption in Ghana for different household groups, 2006

	Bread			Flour			Maize and maize flour		
	% HH consuming	Average consumption For all HH	Average consumption for HH with positive consumption	% HH consuming	Average consumption For all HH	Average consumption for HH with positive consumption	% HH consuming	Average consumption For all HH	Average consumption for HH with positive consumption
Residence area									
Urban	91.4	495251.6	541700.2	2.6	4463.7	174877.7	59.5	389314.2	654619.6
Rural	79.4	253455.7	319177.4	2.9	9285.0	315249.5	72.6	619856.9	854035.8
Locality									
Accra (GAMA)	91.6	580010.9	633433.1	2.0	5008.8	256357.8	52.5	231820.1	441646.9
Urban Coastal	94.2	532890.5	565668.6	3.6	4264.7	117100.2	58.8	420659.6	715516.1
Urban Forest	93.0	417853.5	449141.2	2.6	2370.8	92947.5	60.9	327520.8	537674.8
Urban Savannah	81.8	459440.5	561677.7	2.8	10172.9	368638.6	75.5	1002372.0	1326798.0
Rural Coastal	89.1	339137.3	380694.8	1.6	1034.9	63611.5	75.1	654328.2	870710.3
Rural Forest	87.5	270348.4	308847.2	3.6	11482.9	322568.8	67.2	396242.5	589411.7
Rural Savannah	59.6	165707.2	278185.3	2.9	11624.5	401054.6	79.3	952639.5	1201170.0
Region									
Western	92.5	404392.7	437220.4	1.6	3757.7	241005.2	58.7	268881.9	458198.9
Central	90.5	368872.5	407717.6	2.9	2684.8	91150.5	58.6	431537.3	736084.3
Greater accra	91.9	564171.0	613832.9	2.0	4716.7	230780.2	56.5	290732.3	514219.5
Volta	83.3	277941.7	333717.7	14.3	64670.1	450771.5	89.6	1052452.0	1175066.0
Eastern	90.8	350093.5	385767.2	2.1	2729.4	128046.6	76.4	585744.4	766580.9
Ashanti	91.5	340273.4	371987.5	2.1	1485.1	70725.1	61.6	259131.9	420705.5
Brong ahafo	75.9	204767.5	269765.6	0.9	979.5	112632.9	60.0	403705.7	672564.3
Northern	70.8	337121.8	475968.5	1.1	494.2	46412.8	83.3	1278083.0	1534827.0
Upper east	42.6	124164.9	291521.2	1.2	1682.7	139345.9	73.6	714062.8	970703.5
Upper west	34.0	87685.2	258029.4	0.2	633.0	261984.6	76.0	805720.8	1060325.0
Quintile									
Q1 (poorest)	56.6	120749.1	213223.3	2.5	8109.5	327481.8	70.5	533034.6	755772.5
Q2	80.7	229621.2	284475.1	3.8	14276.6	373747.3	71.6	570378.5	796397.1
Q3	84.8	300059.3	353718.6	2.0	6065.2	297557.9	72.1	601736.9	834509.1
Q4	89.6	401082.9	447432.5	1.9	3280.2	169645.3	68.2	551180.4	807781.4
Q5 (richest)	94.0	517758.0	550846.8	3.4	6705.8	198609.6	59.4	423479.3	713487.6
Total	84.6	357890.0	423042.6	2.8	7202.6	259496.0	66.9	520282.9	777490.1

Source: Authors' estimation using 2005-06 GLSS.

Table 3: Rice Incomes in Ghana for different household groups, 2006

	% HH with rice incomes			Average income For all HH			Average income for households with positive income		
	Auto consumption	Sales	Total	Auto consumption	Sales	Total	Auto consumption	Sales	Total
Residence area									
Urban	0.2	0.6	0.8	1076.9	18842.1	19919.0	540481.5	3230942.0	2545804.0
Rural	1.7	4.7	6.3	7786.8	50122.1	57908.9	459037.9	1055494.0	920875.4
Locality									
Accra (GAMA)	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
Urban Coastal	0.0	0.3	0.3	0.0	24577.6	24577.6	-	8414861.0	8414861.0
Urban Forest	0.0	0.3	0.3	0.0	11259.5	11259.5	-	3631658.0	3631658.0
Urban Savannah	1.7	3.6	5.3	9243.8	90069.5	99313.3	540481.5	2526173.0	1882451.0
Rural Coastal	0.2	0.0	0.2	281.1	0.0	281.1	119161.3	-	119161.3
Rural Forest	2.0	1.2	3.2	9170.1	20545.4	29715.5	451611.9	1701584.0	939429.9
Rural Savannah	2.2	13.8	15.6	10899.7	132916.2	143815.9	495863.5	965013.6	923467.0
Region									
Western	0.0	0.8	0.8	0.0	25409.6	25409.6	-	3027230.0	3027230.0
Central	0.0	0.2	0.2	0.0	5610.0	5610.0	-	2597180.0	2597180.0
Greater accra	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
Volta	13.5	2.2	14.5	64072.9	18635.7	82708.5	475470.3	835150.1	569097.9
Eastern	0.2	0.5	0.7	236.4	16799.4	17035.8	119161.3	3212409.0	2361734.0
Ashanti	0.0	0.7	0.7	0.0	13916.7	13916.7	-	2092629.0	2092629.0
Brong ahafo	0.0	3.6	3.6	0.0	87277.9	87277.9	-	2446868.0	2446868.0
Northern	0.0	11.0	11.0	0.0	154821.5	154821.5	-	1406595.0	1406595.0
Upper east	0.0	26.5	26.5	0.0	129894.2	129894.2	-	490565.2	490565.2
Upper west	0.0	11.1	11.1	0.0	47534.0	47534.0	-	429796.2	429796.2
Quintile									
Q1 (poorest)	1.9	9.4	10.9	7842.2	65855.1	73697.3	408131.7	703248.9	673709.9
Q2	2.4	4.5	6.7	13020.3	59855.9	72876.2	553866.5	1316987.0	1092366.0
Q3	1.1	2.6	3.7	5656.4	41443.7	47100.1	493062.5	1584093.0	1270510.0
Q4	0.7	1.7	2.4	2282.9	30970.7	33253.5	343556.4	1805158.0	1397116.0
Q5 (richest)	0.3	0.7	0.9	1090.8	14811.1	15901.9	393240.3	2229225.0	1688466.0
Total	1.0	2.9	3.9	4888.7	36611.9	41500.6	465714.8	1241269.0	1061304.0

Source: Authors' estimation using 2005-06 GLSS.

Table 4: Maize Incomes in Ghana for different household groups, 2006

	% HH with rice incomes			Average income For all HH			Average income for households with positive income		
	Auto consumption	Sales	Total	Auto consumption	Sales	Total	Auto consumption	Sales	Total
Residence area									
Urban	2.1	8.2	9.0	2364.3	108818.5	111182.8	112499.5	1334985.0	1230460.0
Rural	14.7	37.1	43.1	45332.3	383778.2	429110.5	307506.1	1035036.0	996235.4
Locality									
Accra (GAMA)	0.2	0.2	0.4	342.8	3322.4	3665.3	142568.0	2073585.0	914724.1
Urban Coastal	0.3	6.6	6.6	16.3	44476.2	44492.5	6383.6	669458.6	669704.3
Urban Forest	4.6	13.9	15.6	5506.4	194684.0	200190.3	120415.1	1396153.0	1286604.0
Urban Savannah	1.7	13.7	15.2	898.0	212599.5	213497.5	52127.2	1549103.0	1401455.0
Rural Coastal	11.5	37.3	40.2	48460.5	337410.8	385871.4	422164.6	903601.7	960492.1
Rural Forest	16.7	37.8	44.6	15596.2	368898.5	384494.7	93299.9	975824.8	862460.3
Rural Savannah	13.9	35.7	42.7	90617.9	440430.7	531048.6	651841.7	1232501.0	1243092.0
Region									
Western	7.9	20.1	24.1	6567.8	167804.5	174372.2	83103.7	836808.8	724423.3
Central	7.4	32.1	34.5	52746.1	201448.2	254194.4	716352.5	628485.3	737196.3
Greater accra	1.2	2.7	2.9	1700.2	33641.4	35341.7	141516.1	1256549.0	1199368.0
Volta	10.2	29.6	33.8	5571.6	256820.5	262392.2	54846.9	867716.4	775461.4
Eastern	12.6	28.3	32.5	22853.1	276028.3	298881.4	181286.1	974136.4	919276.9
Ashanti	13.7	28.8	33.4	15843.0	355727.8	371570.8	115639.1	1236382.0	1112093.0
Brong ahafo	9.0	34.9	38.9	44996.2	531767.6	576763.8	499799.3	1524323.0	1483772.0
Northern	11.6	40.5	45.8	92202.6	497368.7	589571.3	794147.6	1229190.0	1287806.0
Upper east	9.8	13.5	20.7	28539.7	96957.1	125496.7	291294.6	720657.0	604987.9
Upper west	16.8	15.9	27.8	43443.9	257485.4	300929.3	258174.2	1621896.0	1081782.0
Quintile									
Q1 (poorest)	12.8	30.1	36.8	37752.2	273361.4	311113.6	295412.8	909683.9	844948.1
Q2	14.2	32.4	38.2	42954.5	335003.2	377957.7	301747.2	1034394.0	989554.8
Q3	11.8	31.7	35.5	24802.5	332414.8	357217.2	210110.6	1049808.0	1004902.0
Q4	8.5	23.1	26.7	42989.7	236973.6	279963.3	503300.6	1023997.0	1046908.0
Q5 (richest)	4.6	15.6	17.3	4724.2	208178.8	212903.0	103756.8	1337500.0	1233276.0
Total	9.3	24.6	28.4	26774.0	265020.0	291794.0	288436.8	1077990.0	1028454.0

Source: Authors' estimation using 2005-06 GLSS.

Table 5: Impact of a change in cereals consumer prices on poverty, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
	Rice												
Poverty, population as a whole													
Headcount index of poverty	28.1	28.2	28.3	28.4	28.4	28.5	**28.5**	28.7	28.8	28.9	29.0	29.0	29.1
Poverty gap	9.4	9.5	9.5	9.5	9.5	9.6	**9.6**	9.6	9.6	9.7	9.7	9.7	9.8
Squared poverty gap	4.5	4.5	4.5	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.7	4.7	4.7
Poverty, rice consumers													
Headcount index of poverty	22.1	22.1	22.2	22.4	22.4	22.5	**22.6**	22.9	22.9	23.1	23.2	23.3	23.4
Poverty gap	6.3	6.3	6.3	6.4	6.4	6.4	**6.5**	6.5	6.6	6.6	6.6	6.7	6.7
Squared poverty gap	2.6	2.6	2.7	2.7	2.7	2.7	**2.7**	2.7	2.8	2.8	2.8	2.8	2.8
	Bread												
Poverty, population as a whole													
Headcount index of poverty	28.3	28.4	28.4	28.4	28.5	28.5	**28.5**	28.7	28.7	28.8	28.9	28.9	29.0
Poverty gap	9.5	9.5	9.5	9.5	9.6	9.6	**9.6**	9.6	9.6	9.6	9.6	9.7	9.7
Squared poverty gap	4.6	4.6	4.6	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.6	4.6	4.6
Poverty, bread consumers													
Headcount index of poverty	21.8	21.8	21.8	21.8	21.9	21.9	**22.0**	22.2	22.2	22.3	22.4	22.5	22.6
Poverty gap	6.0	6.0	6.1	6.1	6.1	6.1	**6.1**	6.1	6.2	6.2	6.2	6.2	6.2
Squared poverty gap	2.4	2.4	2.5	2.5	2.5	2.5	**2.5**	2.5	2.5	2.5	2.5	2.5	2.5
	Maize and maize flour												
Poverty, population as a whole													
Headcount index of poverty	28.2	28.3	28.4	28.4	28.4	28.5	**28.5**	28.6	28.6	28.7	28.8	28.8	28.8
Poverty gap	9.5	9.5	9.5	9.5	9.5	9.6	**9.6**	9.6	9.6	9.7	9.7	9.7	9.7
Squared poverty gap	4.5	4.5	4.5	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.7	4.7	4.7
Poverty, maize and maize floor consumers													
Headcount index of poverty	21.4	21.6	21.7	21.8	21.8	21.9	**22.0**	22.1	22.2	22.4	22.5	22.5	22.6
Poverty gap	7.0	7.1	7.1	7.1	7.2	7.2	**7.3**	7.3	7.4	7.4	7.5	7.5	7.6
Squared poverty gap	3.3	3.3	3.4	3.4	3.4	3.5	**3.5**	3.5	3.5	3.6	3.6	3.6	3.7
	All identified cereals												
Poverty, population as a whole													
Headcount index of poverty	27.4	27.7	27.9	28.1	28.2	28.4	**28.5**	28.8	29.0	29.2	29.3	29.6	29.7
Poverty gap	9.2	9.3	9.3	9.4	9.5	9.5	**9.6**	9.7	9.7	9.8	9.9	9.9	10.0
Squared poverty gap	4.4	4.4	4.5	4.5	4.5	4.6	**4.6**	4.6	4.7	4.7	4.7	4.8	4.8
Poverty, food consumers													
Headcount index of poverty	24.7	25.0	25.3	25.5	25.6	25.8	**26.0**	26.2	26.5	26.7	26.8	27.0	27.2
Poverty gap	7.8	7.9	7.9	8.0	8.1	8.1	**8.2**	8.3	8.3	8.4	8.5	8.6	8.6
Squared poverty gap	3.5	3.6	3.6	3.6	3.7	3.7	**3.7**	3.8	3.8	3.9	3.9	3.9	4.0

Source: Authors' estimation using 2005-06 GLSS.

Table 6: Impact of a change in cereals producer prices on poverty, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
							Rice						
Poverty, population as a whole													
Headcount index of poverty	28.7	28.7	28.6	28.6	28.6	28.6	**28.5**	28.5	28.5	28.5	28.5	28.5	28.5
Poverty gap	9.6	9.6	9.6	9.6	9.6	9.6	**9.6**	9.6	9.6	9.6	9.6	9.6	9.5
Squared poverty gap	4.6	4.6	4.6	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.6	4.6	4.6
Poverty, rice producers (positive sales)													
Headcount index of poverty	61.8	61.7	61.0	60.5	60.3	59.9	**58.9**	58.8	58.8	58.8	58.8	57.1	56.9
Poverty gap	25.9	25.7	25.5	25.3	25.2	25.0	**24.8**	24.7	24.5	24.3	24.2	24.0	23.9
Squared poverty gap	14.0	13.9	13.7	13.6	13.5	13.4	**13.3**	13.2	13.1	13.0	12.9	12.8	12.7
							Maize and maize flour						
Poverty, population as a whole													
Headcount index of poverty	28.9	28.9	28.8	28.7	28.6	28.6	**28.5**	28.5	28.4	28.3	28.2	28.1	28.0
Poverty gap	9.8	9.8	9.7	9.7	9.7	9.6	**9.6**	9.6	9.5	9.5	9.5	9.4	9.4
Squared poverty gap	4.7	4.7	4.7	4.7	4.6	4.6	**4.6**	4.6	4.6	4.5	4.5	4.5	4.5
Poverty, maize producers (positive sales)													
Headcount index of poverty	35.4	35.4	35.1	34.7	34.3	34.3	**34.2**	34.1	33.7	33.5	33.0	32.7	32.4
Poverty gap	11.2	11.0	10.9	10.8	10.7	10.6	**10.4**	10.3	10.2	10.1	10.0	9.9	9.8
Squared poverty gap	5.1	5.0	4.9	4.8	4.8	4.7	**4.6**	4.6	4.5	4.5	4.4	4.4	4.3
							Rice, Maize and maize flour						
Poverty, population as a whole													
Headcount index of poverty	29.0	29.0	28.8	28.8	28.7	28.7	**28.5**	28.5	28.4	28.3	28.2	28.1	28.0
Poverty gap	9.8	9.8	9.8	9.7	9.7	9.6	**9.6**	9.5	9.5	9.5	9.4	9.4	9.4
Squared poverty gap	4.8	4.7	4.7	4.7	4.6	4.6	**4.6**	4.6	4.6	4.5	4.5	4.5	4.5
Poverty, Rice, maize and maize flour producers (positive sales)													
Headcount index of poverty	37.9	37.9	37.5	37.2	36.9	36.8	**36.5**	36.4	36.0	35.7	35.3	35.0	34.7
Poverty gap	12.7	12.6	12.4	12.3	12.1	12.0	**11.9**	11.7	11.6	11.5	11.4	11.3	11.2
Squared poverty gap	6.0	5.9	5.8	5.7	5.6	5.6	**5.5**	5.4	5.4	5.3	5.2	5.2	5.1

Source: Authors' estimation using 2005-06 GLSS.

Table 7: Combined impact of a change of both producer and consumer cereals prices on poverty, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
							Rice						
Poverty, population as a whole													
Headcount index of poverty	28.2	28.3	28.3	28.4	28.4	28.5	**28.5**	28.7	28.8	28.9	28.9	29.0	29.0
Poverty gap	9.5	9.5	9.5	9.5	9.5	9.6	**9.6**	9.6	9.6	9.7	9.7	9.7	9.7
Squared poverty gap	4.5	4.6	4.6	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.6	4.6	4.7
Poverty, rice consumers													
Headcount index of poverty	22.1	22.2	22.3	22.4	22.4	22.5	**22.6**	22.8	22.9	23.0	23.1	23.2	23.2
Poverty gap	6.3	6.3	6.4	6.4	6.4	6.5	**6.5**	6.5	6.6	6.6	6.6	6.7	6.7
Squared poverty gap	2.6	2.7	2.7	2.7	2.7	2.7	**2.7**	2.7	2.8	2.8	2.8	2.8	2.8
Poverty, rice producers													
Headcount index of poverty	61.6	61.5	60.9	60.4	59.3	58.8	**58.9**	58.9	58.9	58.9	58.9	58.1	57.0
Poverty gap	25.7	25.6	25.4	25.3	25.1	25.0	**24.8**	24.7	24.6	24.4	24.3	24.2	24.1
Squared poverty gap	13.9	13.8	13.7	13.6	13.5	13.4	**13.3**	13.2	13.1	13.0	13.0	12.9	12.8
							Maize						
Poverty, population as a whole													
Headcount index of poverty	28.7	28.7	28.6	28.6	28.5	28.5	**28.5**	28.5	28.4	28.4	28.4	28.3	28.3
Poverty gap	9.7	9.7	9.6	9.6	9.6	9.6	**9.6**	9.6	9.6	9.6	9.5	9.5	9.5
Squared poverty gap	4.6	4.6	4.6	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.6	4.6	4.6
Poverty, maize consumers													
Headcount index of poverty	28.9	29.2	29.1	29.1	29.1	29.4	**29.5**	29.5	29.6	29.7	29.9	29.9	30.2
Poverty gap	10.6	10.6	10.7	10.7	10.8	10.9	**10.9**	11.0	11.1	11.1	11.2	11.3	11.3
Squared poverty gap	5.4	5.4	5.4	5.5	5.5	5.6	**5.6**	5.6	5.7	5.7	5.8	5.8	5.9
Poverty, maize producers													
Headcount index of poverty	35.3	35.2	34.9	34.6	34.3	34.3	**34.2**	34.1	33.8	33.6	33.3	33.0	32.7
Poverty gap	11.1	11.0	10.9	10.7	10.6	10.5	**10.4**	10.3	10.2	10.1	10.1	10.0	9.9
Squared poverty gap	5.0	4.9	4.9	4.8	4.7	4.7	**4.6**	4.6	4.5	4.5	4.4	4.4	4.4
							All identified cereals						
Poverty, population as a whole													
Headcount index of poverty	27.9	28.0	28.2	28.3	28.4	28.5	**28.5**	28.8	28.9	29.0	29.1	29.2	29.3
Poverty gap	9.5	9.5	9.5	9.5	9.5	9.6	**9.6**	9.6	9.6	9.7	9.7	9.7	9.8
Squared poverty gap	4.5	4.5	4.6	4.6	4.6	4.6	**4.6**	4.6	4.6	4.6	4.7	4.7	4.7
Poverty, cereals consumers													
Headcount index of poverty	25.2	25.4	25.5	25.6	25.8	25.9	**26.0**	26.2	26.4	26.5	26.5	26.7	26.7
Poverty gap	8.0	8.0	8.1	8.1	8.1	8.2	**8.2**	8.2	8.3	8.3	8.3	8.4	8.4
Squared poverty gap	3.7	3.7	3.7	3.7	3.7	3.7	**3.7**	3.8	3.8	3.8	3.8	3.8	3.9
Poverty, cereals producers													
Headcount index of poverty	37.0	36.8	36.7	36.6	36.6	36.5	**36.5**	36.7	36.7	36.6	36.4	36.4	36.0
Poverty gap	12.3	12.2	12.1	12.1	12.0	11.9	**11.9**	11.8	11.7	11.7	11.7	11.6	11.6
Squared poverty gap	5.8	5.7	5.6	5.6	5.6	5.5	**5.5**	5.5	5.4	5.4	5.4	5.4	5.3

Source: Authors' estimation using 2005-06 GLSS.

Annex Table 1: Impact of a change in food consumer prices on poverty by urban/rural areas, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
	Rice												
Poverty, Urban													
Headcount index of poverty	10.5	10.5	10.6	10.6	10.7	10.7	**10.7**	10.9	10.9	11.0	11.1	11.2	11.2
Poverty gap	3.0	3.0	3.0	3.0	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.2
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	38.8	38.9	38.9	39.1	39.1	39.2	**39.3**	39.5	39.6	39.7	39.8	39.8	39.9
Poverty gap	13.3	13.3	13.4	13.4	13.5	13.5	**13.5**	13.6	13.6	13.6	13.7	13.7	13.7
Squared poverty gap	6.5	6.5	6.5	6.5	6.5	6.6	**6.6**	6.6	6.6	6.6	6.7	6.7	6.7
	Bread												
Poverty, Urban													
Headcount index of poverty	10.5	10.6	10.6	10.6	10.7	10.7	**10.7**	10.9	10.9	11.0	11.1	11.1	11.1
Poverty gap	3.0	3.0	3.0	3.0	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	39.1	39.1	39.2	39.2	39.2	39.3	**39.3**	39.5	39.5	39.5	39.6	39.7	39.8
Poverty gap	13.4	13.4	13.5	13.5	13.5	13.5	**13.5**	13.5	13.6	13.6	13.6	13.6	13.6
Squared poverty gap	6.5	6.5	6.6	6.6	6.6	6.6	**6.6**	6.6	6.6	6.6	6.6	6.6	6.6
	Maize and maize flour												
Poverty, Urban													
Headcount index of poverty	10.7	10.7	10.7	10.7	10.7	10.7	**10.7**	10.7	10.9	11.0	11.0	11.0	11.1
Poverty gap	3.0	3.0	3.0	3.0	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	38.8	39.0	39.1	39.1	39.2	39.2	**39.3**	39.3	39.3	39.4	39.5	39.5	39.6
Poverty gap	13.3	13.4	13.4	13.4	13.5	13.5	**13.5**	13.6	13.6	13.6	13.7	13.7	13.7
Squared poverty gap	6.5	6.5	6.5	6.5	6.5	6.6	**6.6**	6.6	6.6	6.6	6.7	6.7	6.7
	All identified cereals												
Poverty, Urban													
Headcount index of poverty	10.1	10.2	10.3	10.5	10.5	10.7	**10.7**	11.0	11.2	11.2	11.3	11.5	11.6
Poverty gap	2.9	2.9	2.9	3.0	3.0	3.0	**3.1**	3.1	3.1	3.2	3.2	3.3	3.3
Squared poverty gap	1.2	1.2	1.2	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.4	1.4	1.4
Poverty, Rural													
Headcount index of poverty	37.8	38.2	38.5	38.8	38.9	39.2	**39.3**	39.6	39.8	40.1	40.2	40.4	40.6
Poverty gap	13.0	13.1	13.2	13.3	13.4	13.4	**13.5**	13.6	13.7	13.8	13.9	14.0	14.1
Squared poverty gap	6.3	6.4	6.4	6.4	6.5	6.5	**6.6**	6.6	6.7	6.7	6.8	6.8	6.9

Source: Authors' estimation using 2005-06 GLSS.

Annex Table 2: Impact of a change in producer prices on poverty by urban/rural areas, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
	Rice												
Poverty, Urban													
Headcount index of poverty	10.8	10.8	10.8	10.8	10.8	10.8	**10.7**	10.7	10.7	10.7	10.7	10.6	10.6
Poverty gap	3.1	3.1	3.1	3.1	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	39.5	39.4	39.4	39.4	39.3	39.3	**39.3**	39.3	39.3	39.3	39.3	39.2	39.2
Poverty gap	13.6	13.6	13.6	13.6	13.5	13.5	**13.5**	13.5	13.5	13.5	13.5	13.5	13.5
Squared poverty gap	6.6	6.6	6.6	6.6	6.6	6.6	**6.6**	6.6	6.6	6.6	6.6	6.6	6.5
	Maize and maize flour												
Poverty, Urban													
Headcount index of poverty	10.8	10.8	10.7	10.7	10.7	10.7	**10.7**	10.7	10.7	10.7	10.7	10.7	10.7
Poverty gap	3.1	3.1	3.1	3.1	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	39.9	39.8	39.7	39.6	39.4	39.4	**39.3**	39.3	39.1	39.0	38.8	38.7	38.5
Poverty gap	13.8	13.8	13.7	13.7	13.6	13.6	**13.5**	13.5	13.4	13.4	13.3	13.3	13.3
Squared poverty gap	6.8	6.7	6.7	6.7	6.6	6.6	**6.6**	6.6	6.5	6.5	6.5	6.5	6.4
	Rice, Maize and maize flour												
Poverty, Urban													
Headcount index of poverty	10.9	10.9	10.8	10.8	10.8	10.8	**10.7**	10.7	10.7	10.7	10.7	10.6	10.6
Poverty gap	3.1	3.1	3.1	3.1	3.1	3.1	**3.1**	3.1	3.1	3.1	3.0	3.0	3.0
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	39.9	39.9	39.7	39.6	39.5	39.4	**39.3**	39.3	39.1	38.9	38.7	38.7	38.5
Poverty gap	13.9	13.8	13.8	13.7	13.6	13.6	**13.5**	13.5	13.4	13.4	13.3	13.3	13.2
Squared poverty gap	6.8	6.8	6.7	6.7	6.7	6.6	**6.6**	6.6	6.5	6.5	6.5	6.4	6.4

Source: Authors' estimation using 2005-06 GLSS.

Annex Table 3: Combined impact of a change of both producer and consumer prices on poverty by urban/rural areas, Ghana 2006

	-30%	-25%	-20%	-15%	-10%	-5%	No change	5%	10%	15%	20%	25%	30%
	Rice												
Poverty, Urban													
Headcount index of poverty	10.6	10.6	10.7	10.7	10.7	10.7	**10.7**	10.8	10.8	10.9	11.0	11.0	11.0
Poverty gap	3.0	3.0	3.0	3.1	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	38.9	39.0	39.0	39.1	39.1	39.2	**39.3**	39.5	39.6	39.7	39.8	39.8	39.9
Poverty gap	13.4	13.4	13.4	13.4	13.5	13.5	**13.5**	13.6	13.6	13.6	13.6	13.7	13.7
Squared poverty gap	6.5	6.5	6.5	6.6	6.6	6.6	**6.6**	6.6	6.6	6.6	6.6	6.6	6.7
	Maize												
Poverty, Urban													
Headcount index of poverty	10.7	10.7	10.7	10.7	10.7	10.7	**10.7**	10.7	10.8	10.8	10.8	10.8	10.8
Poverty gap	3.1	3.1	3.1	3.1	3.1	3.1	**3.1**	3.1	3.1	3.1	3.1	3.1	3.1
Squared poverty gap	1.3	1.3	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.3	1.3	1.3
Poverty, Rural													
Headcount index of poverty	39.5	39.6	39.5	39.4	39.2	39.3	**39.3**	39.3	39.1	39.1	39.0	38.9	38.8
Poverty gap	13.7	13.7	13.6	13.6	13.6	13.5	**13.5**	13.5	13.5	13.5	13.5	13.4	13.4
Squared poverty gap	6.7	6.6	6.6	6.6	6.6	6.6	**6.6**	6.6	6.6	6.6	6.6	6.6	6.6
	All identified cereals												
Poverty, Urban													
Headcount index of poverty	10.1	10.2	10.3	10.5	10.5	10.7	**10.7**	11.0	11.2	11.2	11.3	11.4	11.5
Poverty gap	2.9	3.0	3.0	3.0	3.0	3.1	**3.1**	3.1	3.1	3.2	3.2	3.2	3.2
Squared poverty gap	1.2	1.2	1.3	1.3	1.3	1.3	**1.3**	1.3	1.3	1.3	1.4	1.4	1.4
Poverty, Rural													
Headcount index of poverty	38.6	38.8	38.9	39.0	39.1	39.2	**39.3**	39.5	39.7	39.8	39.8	40.0	40.0
Poverty gap	13.4	13.4	13.4	13.5	13.5	13.5	**13.5**	13.6	13.6	13.6	13.7	13.7	13.7
Squared poverty gap	6.5	6.5	6.5	6.6	6.6	6.6	**6.6**	6.6	6.6	6.6	6.7	6.7	6.7

Source: Authors' estimation using 2005-06 GLSS.