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# Food Security: The Tanzanian Case

Sheila Kiratu, Lutz Märker and Adam Mwakolobo

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# Abstract

This paper investigates the impact of the 2007–08 international food crisis on Tanzania and assesses the extent to which both the country's long-term and short-term policies helped mitigate the effects of the crisis on its society and economy. Using household-level data from a budget survey, we estimate that 0.5–1 per cent of the population, mostly clustered in urban regions, was driven into poverty by the crisis, as measured by the national poverty line, rendering the crisis less severe than in many other countries. There is no clear evidence that short-term policies helped alleviate these effects, whereas some success can be attributed to Tanzania's economic reforms since the early 2000s, which enabled it to export some of its food to its neighbouring countries. A major challenge, however, remains that of increasing productivity and stabilizing output growth.

Series on Trade and the Food Security

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This study is part of a larger TKN project that seeks to better environmental impacts of trade and investment policy in ASEAN, and specifically the Mekong subregion. It was made possible through the generous support of the Swedish Environment Secretariat for Asia (SENSA) which is part of the Swedish International Development Cooperation Agency (SIDA). The project outputs are available on the TKN website.

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# About the authors

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# Dedication

The authors would like to dedicate this paper to the memory of the late Dr Hadi Soesastro (1945–2010), a truly ASEAN oriented thinker, a mentor and a friend.

# Abbreviations and acronyms

| | |
|---|---|
| FAO | United Nations Food and Agriculture Organization |
| FPI | Food Production Index |
| GDP | gross domestic product |
| SAP | Structural Adjustment Program |
| TZS | Tanzanian shilling |
| USD | United States dollar |

# Executive summary

The international food crisis in 2007 and 2008 showed that poor countries are the most affected by such crises, since poor people tend to spend a higher proportion of their incomes on agricultural products. Tanzania is one of the poorest countries in the world, ranking 151st in the Human Development Report, with 90 per cent of the population living on less than a dollar a day. This paper investigates the impact of the international food crisis on Tanzania and assesses the extent to which the country's long-term and short-term policies contributed to mitigating the effects of the crisis on its society and economy. We begin with a brief look at the state of Tanzania's agricultural sector and the government's reform efforts since the late 1980s. Next, we estimate the impact of the crisis on poverty levels in Tanzania by using disaggregated household data from the 2007 household budget survey. Finally, we examine the Tanzanian government's short-term policy responses and try to evaluate their effectiveness, with a particular focus on their effects on the trade balance.

**Key findings**

- Despite many liberalization reforms in the past, Tanzania's agricultural markets are not well integrated with international markets; nonetheless, the sector was still vulnerable to international shocks.

- Domestically, the country managed to increase output, but at the cost of higher volatility of production.

- The government first introduced trade-related measures (export bans and lower tariffs for crops) to deal with the crisis. These were followed by incentives to stimulate domestic production (micro-credits) and subsidies on food consumption (lower excises and a value-added tax).

- Despite an export ban, Tanzania managed to increase its crop exports.

- Domestic prices dropped slightly after tariffs were lowered but soon picked up again.

**Key recommendations**

- Tanzania should seek more integration with global markets as an insurance against domestic shocks to production.

- The country should continue its agricultural reforms based on incentives to raise production and productivity, but it should also seek to stabilize output growth, rendering domestic production less volatile.

- However, its broad development agenda should appreciate the decreasing role of the agricultural sector in the economy in general and in the structure of exports in particular, because other income sources will help to maintain cash flows of foreign currency in times of domestic agricultural shocks.

# 1. Introduction

Tanzania is one of the poorest countries in the world, ranking 151st in the Human Development Report, with a Human Development Index score of 0.53, a per capita income of USD$1,300[1] and 90 per cent of the population living on less than a dollar a day. However, stable economic growth at around 4 per cent during the last decade has fuelled hopes that Tanzania has finally found itself back on the path of sustainable economic growth and poverty reduction. Skyrocketing international food prices in 2007 and 2008, though, caused a devastating blow to many economies. For instance, it is estimated that up to 26 million people, especially those in poor countries, were driven into extreme poverty (IMF, 2008). Hence, as a poor country, one would expect Tanzania to be among those most affected by the crisis.

However, a cautious analysis of the impacts of the food crisis raises serious doubts about such conclusions, for the following reasons: (1) domestic prices are not perfectly coupled to international prices; (2) poor countries are likely to have their competitive advantage in agriculture and thus would benefit from rising prices; and (3) above all, aggregated country data say little about how the effects are dispersed within a country. Specifically, according to the United Nations Food and Agriculture Organization (FAO), Tanzania experienced "severe localized food insecurity" until May 2007, but then did not appear again on its list of countries in crisis requiring external assistance for food.[2] According to the reports, improved exogenous conditions (such as rainfall) helped the country to overcome its own food crisis and alleviated the impacts of soaring international food prices in 2007 and 2008.

It is therefore evident that to ask whether Tanzania (as a whole) benefitted or suffered from the international food crisis without considering the above may result in distorted conclusions, since such a mercantilist perspective would hide the variety of consequences borne by different parts of Tanzanian society. This paper attempts to reveal the effects for different income classes and regions in the country, using disaggregated data to describe thoroughly the impact of the increase in international food prices on the Tanzanian people. A second main objective of the paper is to analyze to what extent public policy contributed to keeping these effects modest (compared to Tanzania's neighbours), with a stronger focus on the country's long-term structural policies.[3]

Given this scope, the paper will be organized as follows: section 2 provides a brief description of the state of Tanzania's agricultural sector and the state's development policies; section 3 presents some stylized facts about international and domestic price movements, which provide the groundwork for the empirical methodology and the data for the calibration of our model; and section 4 deals with the measures introduced by the Tanzanian government to alleviate the impact of the crisis, with a special emphasis on its effects on trade and regional integration, offering some preliminary evaluations. It concludes with discussion of our findings with regard to our two objectives in section 5, along with an assessment of their implications for Tanzania's overall development agenda.

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1    Purchasing power parity adjusted, in current U.S. dollars. Data is from World Bank (2000).
2    FAO publishes a list of 'Countries in crisis requiring external assistance for food' in its Crop prospects and food situation reports, which appear every two to three months. We found that Tanzania appeared on this list only until the May 2007 publication. The reports are available at <http://www.fao.org/giews/english/cpfs/index.htm>.
3    As will become clear later, an assessment of its short-run reactive policies is very difficult, given limited data availability. See the cross-regional paper in this series for a cross-sectional evaluation of these policies.
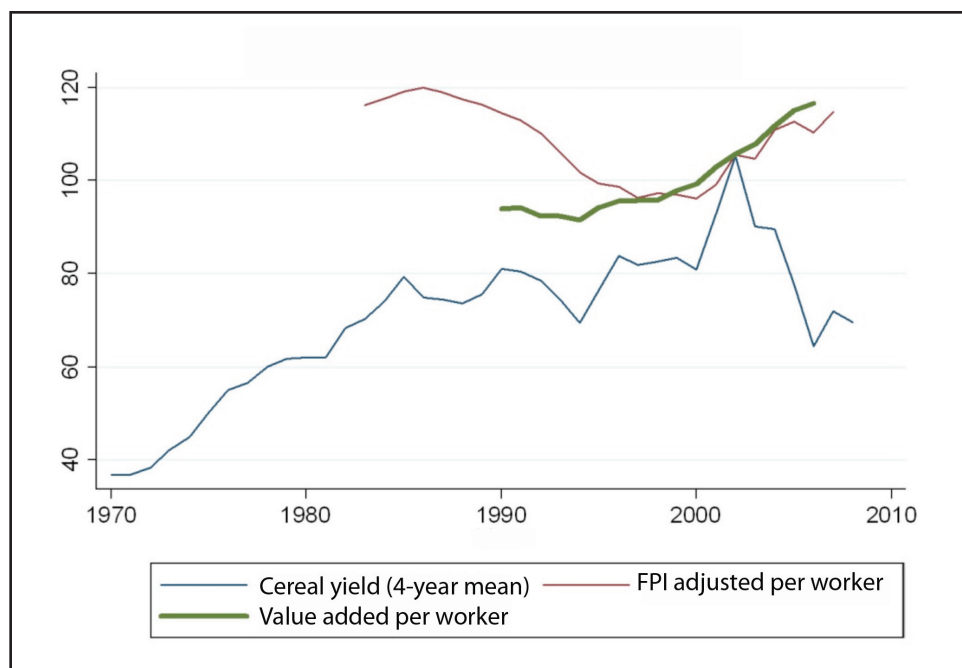
# 2. The agricultural sector in Tanzania

The Tanzanian economy is heavily dependent on agriculture. It accounted for over 33 per cent of GDP between 1970 and 2005, and it employed 82 per cent of the labour force in 2001. In recent years, however, the contribution of the sector to GDP has dropped to less than 25 per cent and the fraction of employees fell to 75 per cent in 2006. A number of reasons account for this trend, but the recent growth of mining, tourism and other services seems to the most apparent one.

The country is well endowed with a high potential base for agriculture development, yet productivity remains very low. Agriculture is predominantly characterized as a smallholder business, with farm sizes ranging in size from 0.9 to 3 hectares, dedicated to subsistence with limited marketable surpluses. On the other hand, the few bigger enterprises have been responsible for more than 80 per cent of Tanzania's exports (especially cash crops such as coffee, tea, cashew nuts, tobacco and sisal), albeit with a declining share since the late 1990s due to the increasing importance of minerals and ores.

Further, the agricultural sector is characterized by traditional farming methods with low levels of technology, low utilization of modern inputs and inefficient resource allocation (Mashindano & Kaino, 2009; Runyoro, 2006). It has poor linkages to other domestic sectors, with a poorly developed marketing system in general and under-developed infrastructure that affects access to both domestic and international markets. Figure 1 depicts several productivity indices over time. Both the Food Production Index (FPI, adjusted for employment in the agricultural sector) as well as the cereal yield (crop in kilograms per hectare) suggest that the current degree of productivity in terms of output has fallen back to the level of the 1980s. However, the value of that output increased steadily since 1990, as is shown by value added (in constant 2000 U.S. dollars) per employee in the agricultural sector.

**Figure 1: Tanzanian production indices, 1970–2007 (1999–2001 = 100)**



Source: Authors' calculations based on World Bank (n.d.)

The agricultural sector's weakness resonates with an unsatisfactory level of food security and consequent widespread poverty and poor quality of life (URT, 2005; Mashindano & Kaino, 2009). Food production has remained low, failing to meet household and national requirements (Runyoro, 2006). Furthermore, the dependency on agriculture as the mainstay of the economy has made the Tanzanian economy more vulnerable to both external and internal shocks, given the lack of other important productive sectors such as manufacturing.

As a result, the food security situation in Tanzania varies from one region to another and from one season to another. There are some perennial pockets of food shortages, particularly the coastal regions of Pwani, Lindi, Mtwara and Tanga, together with the semi-arid central regions of Dodoma and Singida and some parts of Shinyanga, Morogoro, Kigoma and Mara (Ashimogo, 1995). Although food production has been increasing marginally and in some years exceeded the theoretical overall food requirements, the nation's nutritional energy requirements are far from being met on a sustainable basis.[4]

However, this would not be a major problem if Tanzania could meet its food requirements by resorting to more imports. Unfortunately, as highlighted above, other sectors produce little for international markets, providing an insufficient source of foreign currency to finance these requirements.[5] Still, as can be seen in Figure 2, the overall situation has improved significantly in recent years, although it can be misleading if one looks only at aggregated data.

**Figure 2: Tanzanian food production indices, 1961–2007 (1999–2001 = 1.0)**
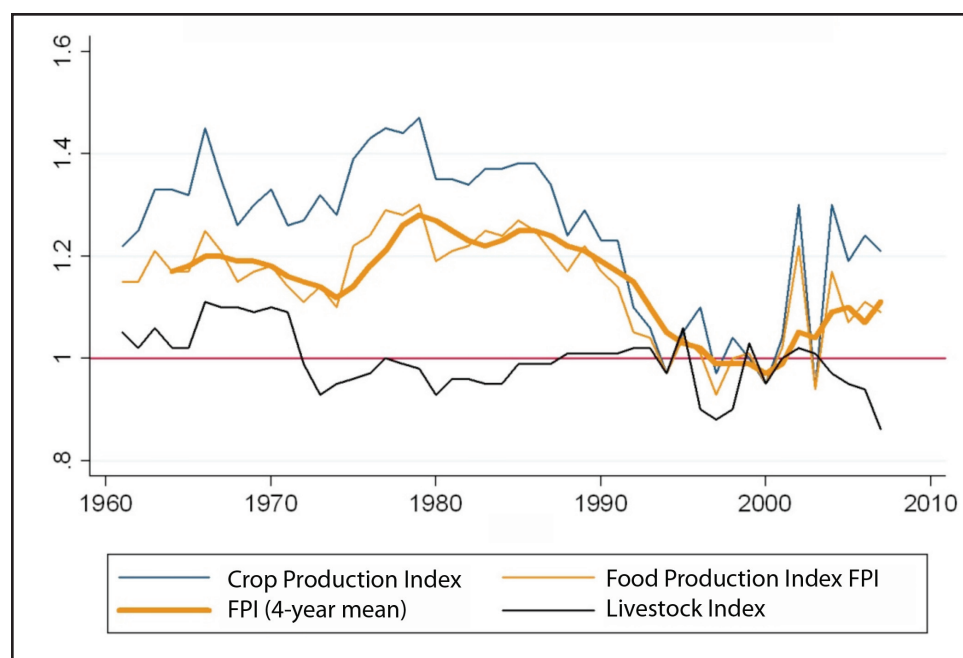


Source: World Bank (n.d.)

Figure 2 depicts several indices of per capita agricultural production, normalized to 1.0 for the average in the period 1999–2001. Special attention should be paid to the thick orange line, which maps the four-year moving average of the total FPI and is a good indicator of long-term trends. The picture shows a

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4    FAO; see footnote 2.

5    Note that we do not argue here that the state should necessarily engage in these transactions, e.g. by trading manufactured goods against food imports. This is also to be achieved in a decentralized market economy; the broad story behind international trade, however, remains unaffected by the complexity of individual international transactions.

remarkable decrease in production since the start of economic reforms (in 1986) to the year 2000, but a modest, yet significant increase since this date, probably attributable to the new focus of policies on infrastructure and research and development investments. Unfortunately, the data series stops at 2007, thus failing to capture the subsequent international food crisis.

However, there is a second interpretation to this story when we keep in mind that the data shows per capita indices. Figure 3 maps the same data from a Malthusian perspective,[6] showing the population growth rate (red line), the food production growth rate (blue line) and the absolute change in the FPI (dotted line) over the period 1960–2000, and its linear trend (green line). During this period, food production increased on average only linearly, as is indicated by the almost horizontal trend line, whereas population increased exponentially at a stable rate between 2.5 and 3.5 per cent. From this point of view, the crucial policy challenge has been to overcome this Malthusian dynamic by introducing structural reforms that increase productivity, and the recent spike in the agricultural growth rate seems promising in this regard.

**Figure 3: Population and production growth, 1961–2007 (%)**
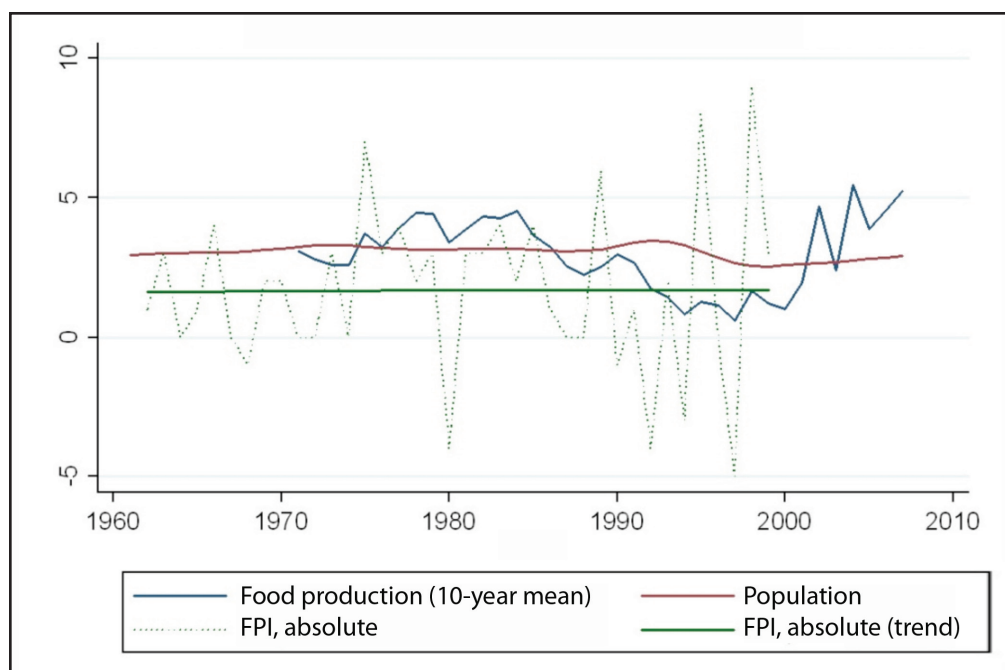


Source: Authors' calculations based on World Bank (n.d.)

Given the huge challenges faced by the agricultural sector, it is no surprise that it has been subject to a number of reform initiatives. Since the initiation of economic reform in 1986, considerable changes have been made in the agricultural sector and the economy as a whole, mostly under the umbrella of the World Bank and the International Monetary Fund's Structural Adjustment Programs (SAPs). The main objective was to transform the inefficient, socialist-based system into a functioning sector based on the principles of the market economy. In particular, restrictions on private traders' involvement in the marketing of major agricultural grains were abolished, bottlenecks in transport removed and the monopoly of the state-controlled marketing system broken.

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6    In his famous essay published at the end of the eighteenth century, Thomas Malthus argued that population grows at an exponential rate, but agricultural production only in a linear way. This ultimately leads to the point where population growth, in absolute numbers, exceeds food production, entailing a declining per capita agricultural production.

The SAPs were followed by a series of reforms that included the Economic Recovery Program (I & II) and the Economic and Social Action Plan. These programs continued the gradual withdrawal of interventionist instruments from the economy and in the agricultural sector in particular. Encouraging private sector participation in the marketing of agricultural products, eliminating price fixing and privatizing state enterprises were just a few of these reforms (Mashindano & Kaino, 2009; World Bank, 2000; Erikisson, 1993).

However, since the 1990s, the government has placed a greater emphasis on its poverty reduction strategies (URT & FAO, 2008; Mashindano & Kaino, 2009; World Bank, 2000), while also continuing its market economy reforms. For example, an important step regarding trade policies was that private traders were allowed to process and export traditional crops like coffee, cotton, tobacco and cashew nuts.

A key effort in coordinating all agricultural policies was undertaken with the Agricultural Sector Development Strategy in 2001 (URT, 2001) and its eventual implementation within the Agricultural Sector Development Program adopted in 2006 (URT 2006). The main components of this program are:

- the strengthening of the institutional framework;

- reforms in agricultural research and extension services;

- the facilitation of investment;

- the development of markets, irrigation and water management; and

- rural infrastructure development and fiscal reforms.

Thus, agricultural development has no longer been understood as merely a matter of a sound institutional framework. Its agenda was broadened significantly by prioritizing incentives for investment and infrastructural reforms. For example, the government has been trying to introduce a number of tax incentives aimed at creating a favourable environment for investment in this sector, thus enhancing productivity among smallholder farmers. However, the consistency of agricultural policy is still threatened by contradictory measures put forward by some district councils (URT & FAO, 2008).

# 3. The impact of the international food crisis

As has already been argued in the introduction, a cursory glance at the debate about the impacts of the international surge in food prices in 2007–08 leads to the tempting hypothesis that Tanzania, as one of the world's poorest countries, might be among those states that suffered most from the crisis. However, scrutinizing the issue more carefully raises some questions about this hypothesis:

- It seems puzzling that, on the one hand, more agricultural liberalization is sought in order to raise food prices to their presumed fundamental level, thereby enabling developing countries to exploit their competitive advantage in agriculture by increasing exports (Ivanic & Martin, 2008). On the other hand, these price surges are often blamed for the impoverishment of millions of people.

- This issue, obviously, cannot be assessed at this broad level of aggregation. As Duflo (2008) notes, the basic mechanism is fairly straightforward. Net producers of agricultural goods win, while net consumers lose. Secondly, the higher the share of food consumption in total consumption, the more significant the impact on households' wealth (IMF, 2008). Thirdly, poor countries have more people with a high share of food consumption.

- Consequently, the extent to which a country is hit by rising food prices depends on the number of net consumers of food and their fraction of food expenditures as part of total consumption.

- Moreover, domestic prices can vary significantly from international prices. The rule of one price only applies to a framework of perfect competition. Lack of infrastructure and a high degree of informality, however, can lead to huge distortions in domestic prices. Hence, those markets that are only barely integrated regionally are subject to local demand and supply shocks, possibly to the same extent as they are influenced by international price movements.

It follows that a straightforward way to estimate the impact of international food prices is to first calculate the extent to which international prices have been transmitted to domestic prices, disaggregated by region. The second step is to aggregate the price changes per good according to a region-specific food index that measures the overall increase in (theoretical) consumption expenditures. Finally, we use this data to calculate the new income and consumption streams for each household according to the amount of food that it produces, consumes and purchases, in order to reveal the final net effects.

Before doing this, the existing literature on the food crisis and Tanzania is reviewed. The second part of this section looks at international and domestic prices, distils some stylized facts and estimates a price index for each region. Sub-section 3.3 completes this section by discussing the results of the household-level estimates.

## 3.1 Reviewing the evidence

Not surprisingly, the literature related to the surge in international food prices and its impact in Tanzania is fairly limited due to its very specific nature. Two of the studies in this area include Hella et al. (2009) and Dessus (2008). Hella et al. (2009) basically conduct qualitative case studies and observe that the impact of high food prices was very diverse due to the subsistence nature of the Tanzanian economy, traditional food consumption and production behaviour. These authors also find that the high food prices between 2006 and 2008 were likely to raise poverty levels in food-deficit regions. They distinguish between winners and losers, although they do not show the magnitude of how much the winners gained and the losers lost. According to them, the winners are those who reside and farm close to feed roads and markets, have diversified their income sources and produce less-perishable foods. The losers are defined as those who have difficulty producing sufficient food throughout the year, limited access to (and control over) productive resources, and in particular are female- and orphan-headed households, and/or people residing in remote areas with poor market access.

Dessus (2008) uses a computable general equilibrium model to assess the welfare impact of rising commodity prices. His results show that high food commodity prices in 2006–08 may have had a negative impact on all Tanzanian households in the short run, with expected potential welfare improvement in the medium and long term. Additionally, he finds that poor households are likely to be shielded from soaring prices because they are more likely to derive their income from agricultural activities and, as he also includes rising energy prices in his considerations, consume fewer oil-intensive products.

Mwakalobo et al. (2009) studied two Tanzanian regions: the semi-arid areas of Dodoma and Kilosa Districts. They argue that during food shortages and high food prices, households tend to reduce food consumption, indicated by a declining number of meals per day, with severe consequences for the household's nutritional and health status.

The works cited in this part provide interesting and relevant insights about the problems faced by many Tanzanian families in their everyday lives. Yet these insights remain rather qualitative and as such are only a suboptimal guide for policy design. We attempt to fill this gap in the remainder of this section.

## 3.2 International and domestic prices

Figure 4 shows the international prices for selected commodities. It becomes immediately clear that the surge in 2007 and 2008 was unprecedented and included almost all agricultural products, as indicated by the Food Index (an international consumer price index limited to agricultural products). Only beef prices remained more or less unaffected.

**Figure 4: International prices for selected agricultural products, 2000–10 (current U.S. dollars per tonne)**
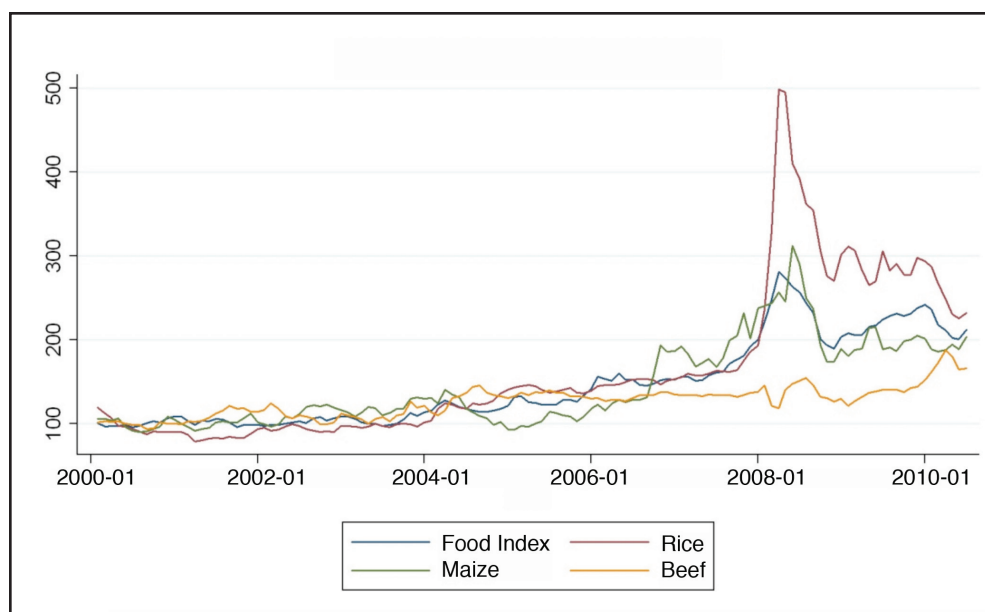


Source: UNCTAD (n.d.)

This high correlation can be used to estimate the Food Index for each Tanzanian region. Resorting to only a few of the commodity prices, we can explain almost 90 per cent of the variation in the international Food Index with rice and maize prices. The estimated elasticities vary between 40–50 per cent and 20–30 per cent, respectively, meaning that a 1 per cent increase in the price of rice (or maize) implies an increase of 0.4–0.5 per cent (0.2–0.3 per cent) in the Food Index. These values were robust during different time periods.[7] Moreover, to use rice and maize makes sense not only for statistical reasons, but also because data for almost all regions is readily available from the FAO.[8] In addition, rice and maize account for half of Tanzania's food consumption.

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[7] The elasticities were highly significant, with robust standard errors. However, serial correlation in the errors is a severe problem. Notwithstanding, this does not affect the consistency of the estimates, and t-values were very high anyway (14 and 21).

[8] See the FAO price tool: <http://www.fao.org/giews/pricetool/>.

Simple bivariate correlations show that international maize prices are only 25 per cent correlated to regional prices. For rice, this figure is 65 per cent. Correlations across regions, however, are much higher (usually higher than 70 per cent and most of them well above 80 per cent), both for rice and maize. Graphically, this can be seen in Figure 5: national and regional prices follow very similar paths and are not perfectly in line with the international price. In particular, Tanzania's 2006 food shortage can be shown by peak prices during this time, whereas international prices remained largely stable. Another remarkable finding is that domestic prices are significantly higher for most of the non-crisis period, often double or three times the international price. Thirdly, domestic prices plummeted temporarily in the second quarter of 2008, despite rising international prices. This could mimic the effect of trade-related policy measures implemented by the Tanzanian government to fight the crisis (see section 4).

**Figure 5: Maize and rice prices, 2004–08 (U.S. dollars per tonne)**
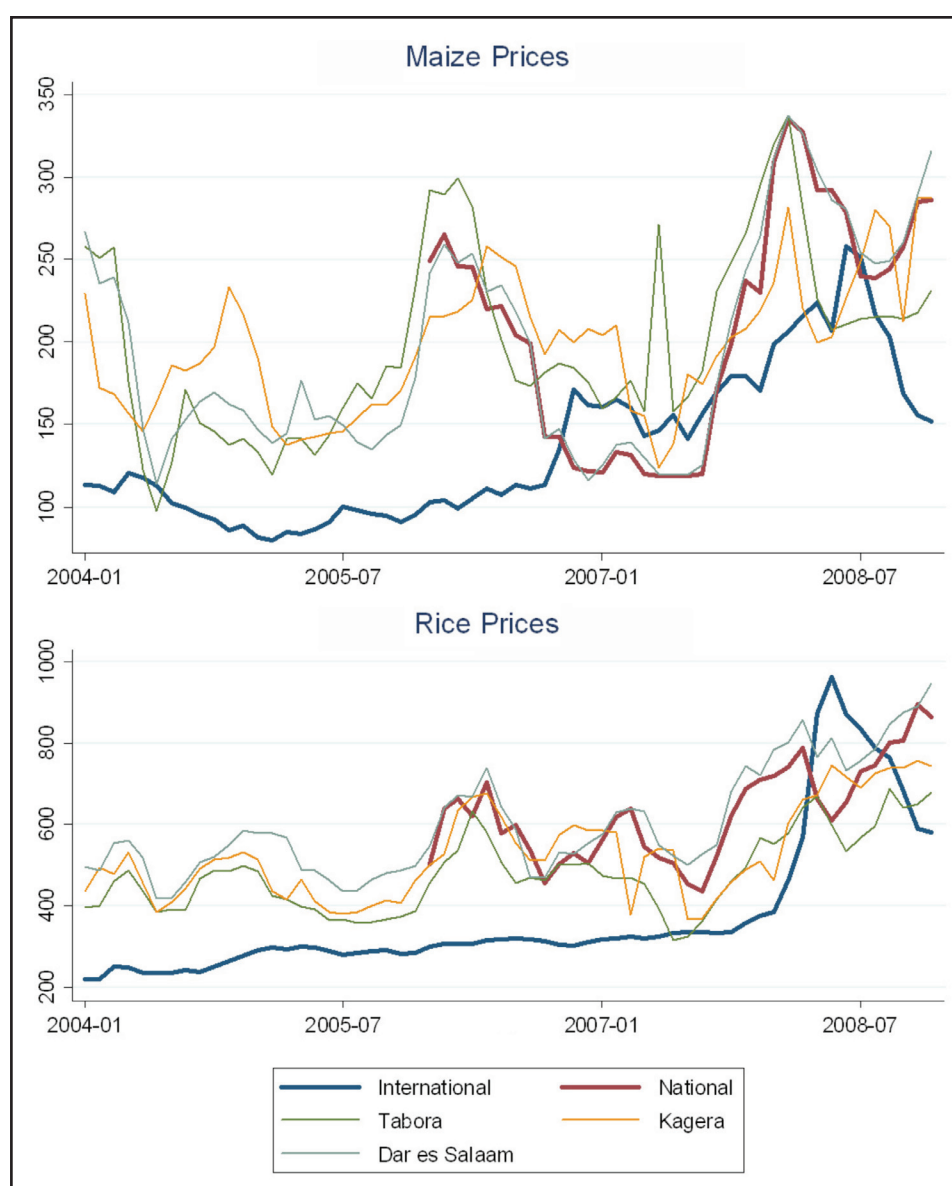


Source: FAO (n.d.); data provided by the Economic and Social Research Foundation; Tanzania Reserve Bank for foreign exchange rates

Finally, we used the data on regional prices to estimate regional food indices, which measure how much overall food prices have picked up since the last Household Budget Survey was conducted in 2007, and constructed two different scenarios that account for a variety of factors:

- We do not know whether the domestic Food Index exhibits a similar correlation to maize and rice prices as that of the FAO international Food Index. However, since correlations between international and domestic prices in times of crisis were high, it is unlikely that there were major differences.

- We do not want to rely on point estimates for the elasticities, but wish to allow for some variation, hence we use the upper and the lower end of our estimates.

The results are given in Table 1.[9]

**Table 1: Estimated Tanzanian regional food price indices**

| Region | Upper | Lower | Region | Upper | Lower |
|---|---|---|---|---|---|
| Arusha | 1.39 | 1.27 | Morogo | 1.40 | 1.28 |
| Dar es Salaam | 1.39 | 1.27 | Mtwara | 1.33 | 1.24 |
| Dodoma | 1.48 | 1.33 | Mwanza | 1.35 | 1.26 |
| Iringa | 1.44 | 1.30 | Pwani | 1.38 | 1.26 |
| Kagera | 1.31 | 1.23 | Rukwa | 1.35 | 1.25 |
| Kigoma | 1.27 | 1.20 | Ruvuma | 1.54 | 1.37 |
| Kilimanjaro | 1.52 | 1.37 | Shinyanga | 1.29 | 1.21 |
| Lindi | 1.38 | 1.26 | Singida | 1.38 | 1.27 |
| Manyara | 1.38 | 1.26 | Tabora | 1.25 | 1.19 |
| Mara | 1.38 | 1.26 | Tanga | 1.37 | 1.26 |
| Mbeya | 1.35 | 1.25 | | | |

Note: "upper" refers to elasticities of 0.5 and 0.3; "lower" to elasticities of 0.4 and 0.2; the base = 1.00 is the average FPI in 2007.

Source: Authors' estimates

## 3.3 Impact on poverty

Using these regional food indices and household level data from the 2007 Household Budget Survey, we estimated new income streams for each household according to its dependence on agricultural production and consumption. A brief description of our methodology is given in Annex 1.[10]

Figure 6 plots the empirical income distribution functions before (black line) and after the crisis (red line), for both scenarios ("upper" and "lower" for the upper and lower end of our estimated food price indices) and for the whole country, urban areas and rural areas. As such, the graphs show the fraction of the population (y-axis) below a certain income level (x-axis). The vertical black line at 10.219 presents the national food poverty line and its intersection with the distributions, and, consequently, the head count ratio (fraction of people living below the food poverty line).

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9     In particular, we used the price ratio between the average price in 2008 and the average in 2007 for rice and maize, respectively, and applied our elasticities: 0.5 and 0.3 for the "upper" scenario, and 0.4 and 0.2 for the "lower" scenario. We did not have data for four regions (Lindi, Mara, Mbeya and Pwani), so we used national prices.

10    A detailed explanation and data documentation are available upon request.

**Figure 6: Estimated income distribution before and after the crisis (expenditure per capita, TZS)**
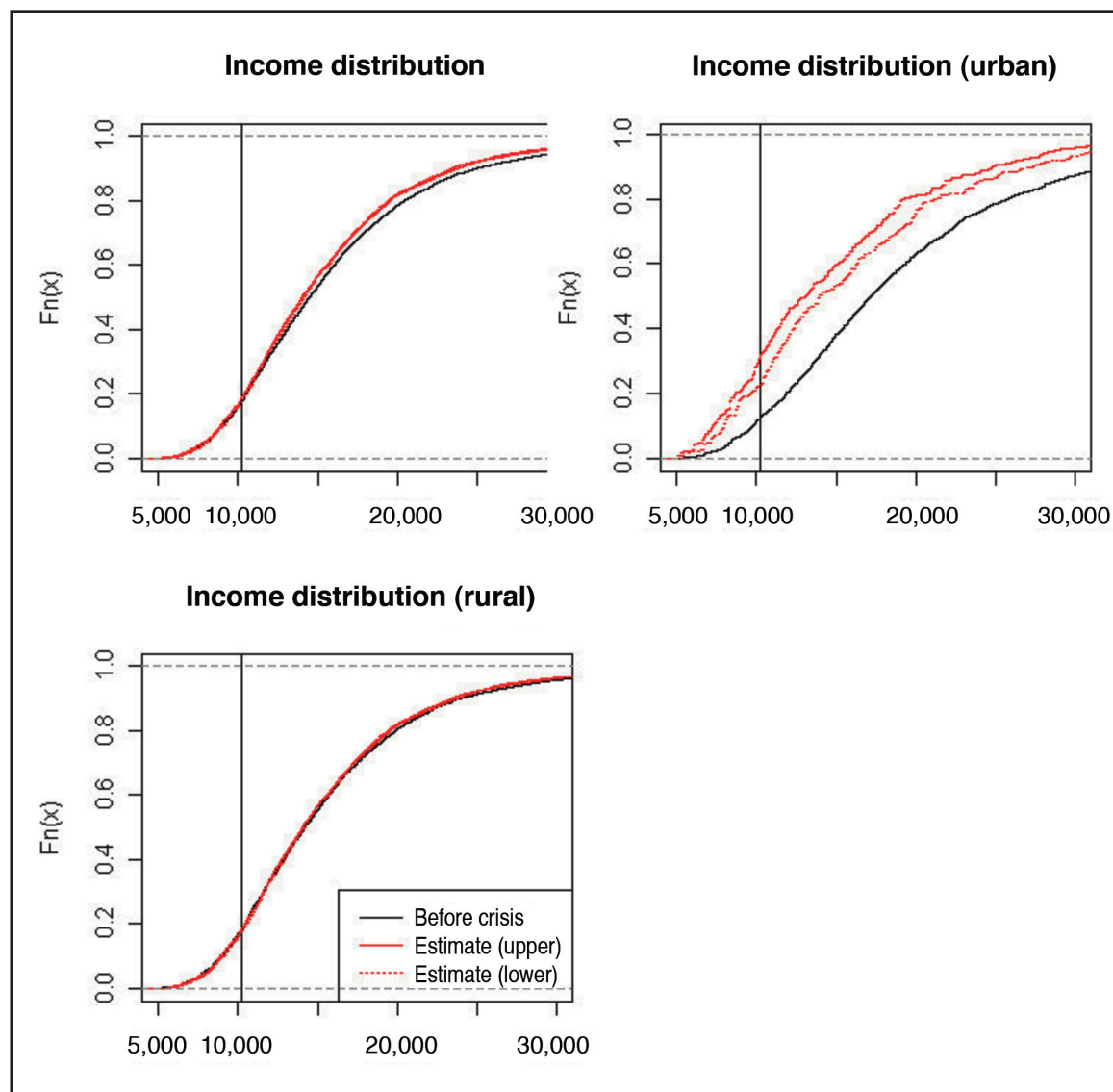


Fn(x) = cumulative distribution.

Source: Authors' estimates

In Figure 6 the national and rural estimates are hardly distinguishable from their base scenarios, clearly indicating that Tanzania as a whole was not extremely affected by rising international food prices. Still, our calculations suggest an increase of the head count ratio by 0.5–1.0 per cent, which translates into 200,000–400,000 people. Those are most likely to be located in urban areas, as the second plot of Figure 6 shows. The differences in the head count ratios are between 10 and 19 per cent, a very significant amount.

An even clearer picture is revealed in Table 2, which presents some summary statistics per income decile. Surprisingly, the lower-income classes are also the ones who are most likely to have benefitted from increasing food prices, probably due to their higher likelihood of depending on income from agriculture.

Secondly, the income effects are significant, but on average within a limit of 10 per cent of total household income; this is not a very dramatic picture compared to the huge surge in food prices. This suggests that many of those who dropped below the food poverty line might not face very severe consequences – although there are certainly many others who do. However, the huge jump in the urban head count ratio might overstate the problem, because income in these percentiles tends to be clustered, so even marginal shifts can yield significant changes in this statistic.

**Table 2: Estimated income effects per income decile in Tanzania**

| Decile | Better off | Mean income effect (upper) | Mean income effect (lower) | Mean positive income effect (upper) | Mean positive income effect (lower) | Mean negative income effect (upper) | Mean negative income effect (lower) | Mean income effect (urban, upper) | Mean income effect (urban, lower) |
|---|---|---|---|---|---|---|---|---|---|
| 0–10% | 50.00% | -9 | -5 | 797 | 569 | -815 | -580 | -1,656 | -1,184 |
| 10–20% | 49.67% | 43 | 31 | 1,263 | 900 | -1,162 | -827 | -2,132 | -1,511 |
| 20–30% | 47.91% | 136 | 96 | 1,676 | 1,186 | -1,280 | -907 | -2,747 | -1,945 |
| 30–40% | 47.43% | 56 | 40 | 1,851 | 1,310 | -1,564 | -1,106 | -2,811 | -1,989 |
| 40–50% | 45.71% | -3 | 0 | 2,236 | 1,580 | -1,889 | -1,330 | -3,344 | -2,357 |
| 50–60% | 39.50% | -161 | -113 | 2,829 | 1,989 | -2,113 | -1,486 | -3,581 | -2,517 |
| 60–70% | 38.75% | -462 | -321 | 2,847 | 2,003 | -2,557 | -1,792 | -4,410 | -3,109 |
| 70–80% | 34.61% | -769 | -547 | 3,644 | 2,544 | -3,105 | -2,184 | -4,598 | -3,249 |
| 80–90% | 30.05% | -1,354 | -949 | 4,701 | 3,293 | -3,955 | -2,772 | -5,756 | -4,039 |
| 90–100% | 21.38% | -4,015 | -2,807 | 7,491 | 5,226 | -7,143 | -4,991 | -10,135 | -7,081 |

Note: The second column gives the share of people who were better off after the crisis: the next two columns the average income shift in Tanzanian shillings. The following four columns report the average income effect, given that the household is better off (positive income effect) and worse off (negative income effect), respectively. The last two columns present the average income effect in urban regions (since no household was better off, these values are also the negative income effects).

Source: Authors' estimates

Table 3 provides similar estimates, but now disaggregated by region. The differences are huge, from drops in the head count ratio by 4 per cent in Manyara to an increase of 8 per cent in Morogoro. The largest income effects are likely to be found in Dar es Salaam, although the change in the head count ratio is surprisingly low for an urban region. This puzzle can be explained by a relatively high standard of living and its low head count ratio in 2007.

**Table 3: Estimated income effects per Tanzanian region**

| Region | Head count (upper) | Head count (lower) | Better off | Mean income effect (upper) | Mean income effect (lower) | Mean positive income effect (upper) | Mean positive income effect (lower) | Mean negative income effect (upper) | Mean negative income effect (lower) | Mobility | N |
|---|---|---|---|---|---|---|---|---|---|---|---|
| National | 1.00% | 0.48% | 37.33% | -1,052 | -736 | 3,056 | 2,145 | -3,498 | -2,452 | 19.95% | 4,372 |
| Arusha | -0.11% | -0.11% | 52.10% | 878 | 612 | 4,692 | 3,272 | -3,270 | -2,281 | | 119 |
| Dar es Salaam | 3.78% | -0.53% | 2.08% | -7,453 | -5,178 | 5,353 | 3,719 | -7,725 | -5,367 | | 240 |
| Dodoma | 9.09% | 4.73% | 35.29% | -333 | -230 | 5,234 | 3,615 | -3,369 | -2,327 | 6.67% | 204 |
| Iringa | 1.74% | 1.71% | 45.83% | -722 | -493 | 3,311 | 2,260 | -4,134 | -2,821 | 26.67% | 288 |
| Kagera | 2.18% | 0.81% | 34.04% | -1,194 | -870 | 1,955 | 1,425 | -2,820 | -2,055 | 11.76% | 188 |
| Kigoma | 7.50% | 2.43% | 27.03% | -1,180 | -870 | 974 | 719 | -1,978 | -1,459 | 6.06% | 148 |
| Kilimanjaro | -1.43% | -2.60% | 41.33% | -1,772 | -1,245 | 4,806 | 3,377 | -6,406 | -4,501 | | 196 |
| Lindi | -3.32% | 1.77% | 31.65% | -1,259 | -869 | 1,457 | 1,006 | -2,517 | -1,737 | 20.00% | 139 |
| Manyara | -4.36% | -3.66% | 69.29% | 3,028 | 2,091 | 6,120 | 4,225 | -3,948 | -2,726 | 36.36% | 127 |
| Mara | -0.67% | -1.77% | 32.78% | -966 | -667 | 3,967 | 2,739 | -3,372 | -2,328 | | 180 |
| Mbeya | -1.12% | -2.70% | 44.38% | -247 | -172 | 3,484 | 2,431 | -3,223 | -2,249 | 30.00% | 338 |
| Morogo | 9.00% | 7.99% | 15.87% | -2,546 | -1,773 | 1,300 | 905 | -3,271 | -2,279 | 6.67% | 334 |
| Mtwara | -1.42% | -1.78% | 26.56% | -981 | -692 | 1,890 | 1,333 | -2,020 | -1,424 | 13.04% | 241 |
| Mwanza | -1.44% | -1.77% | 33.20% | -1137 | -827 | 2,167 | 1,575 | -2,779 | -2,020 | 21.28% | 241 |
| Pwani | 4.52% | 4.15% | 22.35% | -2,380 | -1,643 | 1,895 | 1,309 | -3,611 | -2,493 | 0.00% | 170 |
| Rukwa | -2.36% | -0.75% | 54.35% | 332 | 236 | 2,324 | 1,655 | -2,039 | -1,453 | 27.59% | 184 |
| Ruvuma | -0.91% | -0.12% | 52.00% | -95 | -66 | 3,257 | 2,253 | -3,726 | -2,578 | | 175 |
| Shinyanga | -1.03% | 0.66% | 50.37% | 244 | 179 | 2,513 | 1,845 | -2,059 | -1,512 | 28.30% | 270 |
| Singida | -2.58% | -2.19% | 46.71% | -196 | -140 | 2,663 | 1,906 | -2,702 | -1,934 | 25.64% | 167 |
| Tabora | -1.83% | -2.44% | 45.88% | -158 | -119 | 1,927 | 1,450 | -1,925 | -1,448 | 18.18% | 170 |
| Tanga | -1.94% | -3.42% | 46.25% | -511 | -353 | 2,382 | 1,647 | -2,999 | -2,074 | 28.57% | 253 |

Note: The first two columns report the change in the head count ratios; the last one the number of observations. The 'mobility' column measures how many people who were below the poverty line before the crisis are estimated to be above it afterwards (where the number of observations was unsatisfactory, this statistic has not been reported). The first row presents the overall national estimate.

Source: Authors' estimates

Which parts of Tanzanian society are the most affected? A number of socioeconomic variables are indicated within the Household Budget Survey, so the most obvious step is to include them in a regression on the net income effect (the difference between new income and old income). The results are provided in Table 4.

**Table 4: Socioeconomic drivers of income changes in Tanzania**

| | OLS upper (1) | OLS lower (2) | OLS upper (3) | OLS lower (4) |
|---|---|---|---|---|
| urb | -2,539.890 | -1,802.523 | -2,579.568 | -1,830.812 |
| | (168.217)*** | ( 116.768)*** | (167.845)*** | (116.490)*** |
| rpc | .086 | .059 | .077 | .053 |
| | (.023)*** | (.016)*** | (.020)*** | (.014)*** |
| rpc | -2,59e-06 | -1.81e-06 | -2.53e-06 | -1.76e-06 |
| | (2.81e-07)*** | (2.95e-07)*** | (2.68e-07)*** | (2.86e-07)*** |
| sourceagric | 4,933.692 | 3,463.127 | 4,938.992 | 3,466.610 |
| | (129.159)*** | (89.716)*** | (125.138)*** | (86.986)*** |
| foodsec | -133.888 | -94.749 | -141.708 | -100.457 |
| | (50.778)*** | (35.222)*** | (47.881)*** | (33.233)*** |
| anyedu | -653.827 | -462.000 | -645.307 | -456.089 |
| | (120.886)*** | (84.220)*** | (123.330)- | (85.884)*** |
| adultedusec | -450.145 | -320.802 | | |
| | (268.544)* | (186,132)* | | |
| adulteduter | -2,465.974 | -1,685.281 | -2,469.183 | -1,686.47'2 |
| | (741.177) *** | (513.455)*** | (730.484)*** | (505.819)*** |
| landl | -1.08e-07 | 4.55e.08 | | |
| | (1.74e-07) | (1.17e-07) | | |
| tot | -6.31e-06 | -4.4-4e-06 | -6.18e-06 | -4.34e-06 |
| | (1.64e-06)*** | (1.13e-06)*** | (1.58e-06)*** | (1.09e-06)*** |
| size | 25.769 | 18.698 | | |
| | (19.904) | (13.811) | | |
| hhsex | 447.066 | 313.223 | | |
| | (303.106) | (210.329) | | |
| hhage | 27.231 | 19.041 | 25.816 | 18.014 |
| | (5.837)*** | (4.063)*** | (5.413)*** | (3.722)*** |
| Const. | -4,494.271 | -3,142.756 | -3,990.938 | -2,782.207 |
| | (562.238)*** | ((389.759)*** | ((378.169) *** | ((263.009)*** |
| Ohs. | 4,372 | 4,372 | 4,372 | 4,372 |
| R² | .564 | .564 | .563 | .565 |
| F statistic | 429.088 | 439.746 | 615.746 | 630.757 |

Robust standard errors in parentheses

Significance levels: * 10%; ** 5%; *** 1%.

Four different specifications were run, two for each scenario ("upper" and "lower"), and within each scenario a full model as well as a second where the insignificant variables were omitted.

The dependent variable is the net income effect; urb is a dummy variable taking the value of 1 if the household is situated in an urban area; rpc is real per capita expenditure; rpc2 is the square of it; sourceagric takes the value 1 if the household claimed that its main income source stems from agriculture; foodsec is a measure of how often a household could not satisfy its food needs, ranging from 1 (never) to 5 (always); anyedu takes the value 1 if any member in the household attended at least primary school; adultedusec is the fraction of adults in the household with secondary education; adulteduter is the fraction of adults in the household with tertiary education; land1 is the value of land owned by the household; tot is the total value of assets owned by the household; size is the number of household members; hhsex is the fraction of male people in the household; hhage is the average age of all household members.

Source: Authors' estimations

As expected, living in a city is associated with a huge negative effect, leading to a TZS 1,800–2,500 loss due to higher food prices. Initial income firstly has a positive influence, peaking at TZS 15,000–16,000, and then exerts a negative impact on the average net income effect. Thus, lower-income classes were more likely to benefit from the food crisis, whereas higher income classes were more likely to lose. Agricultural activity is clearly positively associated with benefits from higher food prices. With regard to gender, the effects of the fraction of male household members are neither statistically significant nor economically substantial, not exceeding TZS 500 if we compare a purely male to a purely female household. Small, albeit significant, effects can be observed from average household age, suggesting that a 20-years and older household (i.e. a household with fewer children) can expect benefits of TZS 500. The educational variables are negative and statistically highly significant, indicating that a family with two university degrees is exposed to a decrease of TZS 1,700–2,500 in its monthly income. This effect probably accounts for the fact that better-educated individuals are unlikely to engage in agricultural production[11] and more likely to spend more money on food (in absolute terms).

## 4. Consequences for policy and trade

Obtaining detailed information about the policy measures implemented to alleviate the effects of rising food costs was difficult. Hence we relied on the information provided in the FAO's crop reports, which give an overview of the policies adopted in various countries, to make our inferences.

According to these reports, the first measures were adopted at the end of the first quarter of 2008, when temporary export bans of agricultural products and temporary tariff reductions for the import of these products were imposed. The reason these trade-related measures were the first to be implemented might simply be a matter of administrative feasibility. They have, however, been criticised for their low targeting rate (they do not specifically help the poor), their distortion of international trade in general and their beggar-thy-neighbour character in particular (Cuesta, 2009). In light of these serious concerns, how did Tanzania's trade data reflect these policies?

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11    Although this fact should have been captured by the agriculture variables.

**Figure 7: Trade by product category, 1995–2007/08**
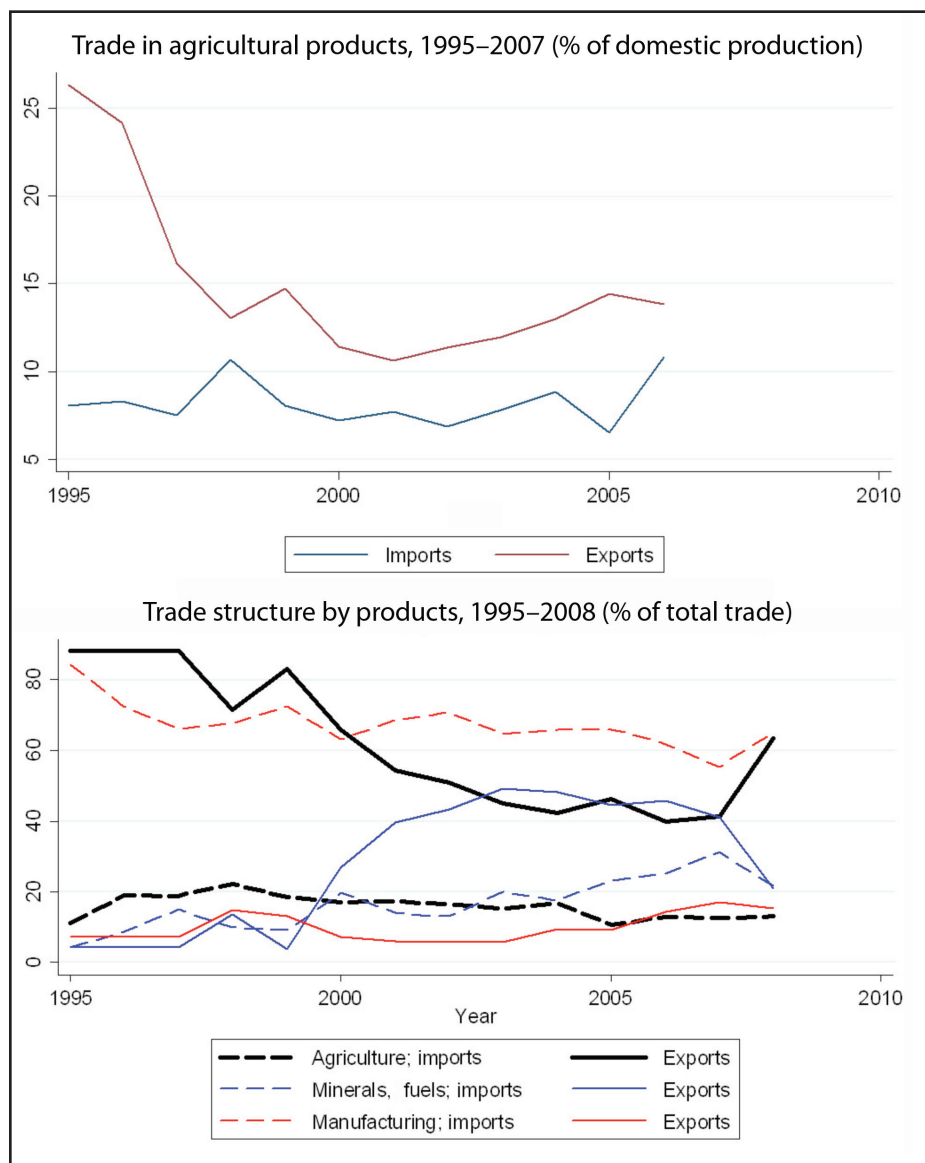


Source: UNCTAD (n.d.); authors' calculations

The upper graph in Figure 7 gives the broad context of the role of trade in total agricultural production, whereas the lower graph is the more interesting one for our purposes, since it dates until the year 2008.[12] The drop in agricultural production in the 1990s (see Figure 2) led to a collapse in exports, as the share plummeted from 25 per cent to 10 per cent of value added,[13] but recovered steadily to 15 per cent in subsequent years. Imports, though, remained fairly steady between 5 and 10 per cent, so that the net balance for Tanzania has always been positive, indicating the country's comparative advantage in agriculture.

---

12    The reason for the upper graph being dated only until 2007 is that we could not find more recent data on agricultural value-added products.

13    Note that this comparison is a little misleading in its absolute values, since value added – by definition – is a net value, whereas trade flows are always measured as gross values. Moreover, value-added data for domestic production does not cover all informal activity, i.e. production for own consumption, etc. However, this does not change the basic argument.

With respect to the composition of trade flows, the most striking fact is the sharp increase in agricultural exports in 2008 and the sideward trend in imports (see the thick black lines). This questions the efficacy of the imposed export ban and poses serious doubts as to whether these policy measures were enforced at all. All the other sectors, on the other hand, are pretty much in line with expectations (a high share of manufacturing imports, an increase in mineral exports, etc.).

A second interesting question emerges: where did those exports go? Unfortunately, there is no available data disaggregated by product and region, so we need to speculate a little with overall regional data, shown in Figure 8. The general picture is that only 20 per cent of Tanzania's trade is with African partners, the bulk of them situated in its own region, East Africa, yet with a strong upward trend. The recent spike also suggests that African countries – and East African countries in particular – benefitted proportionally more from Tanzania's 2008 export surge, which might be a hint that Tanzania could help its neighbours overcome their food shortages associated with the international food crisis.

**Figure 8: Regional export structure, 1980–2007 (% of total exports)**



Source: UNCTAD (n.d.)

Later that year, Tanzania implemented further measures that were more focused on domestic markets. These included tax exemptions for agricultural products, credits to producers to stimulate production, food subsidies and food assistance to the poor (by resorting to its strategic grain reserves).

As noted in section 3.2., the opposing movements of international and domestic prices in the second quarter of 2008 might show the consequences of the implemented trade policies. We tried to assess this question in an empirically more rigorous way.
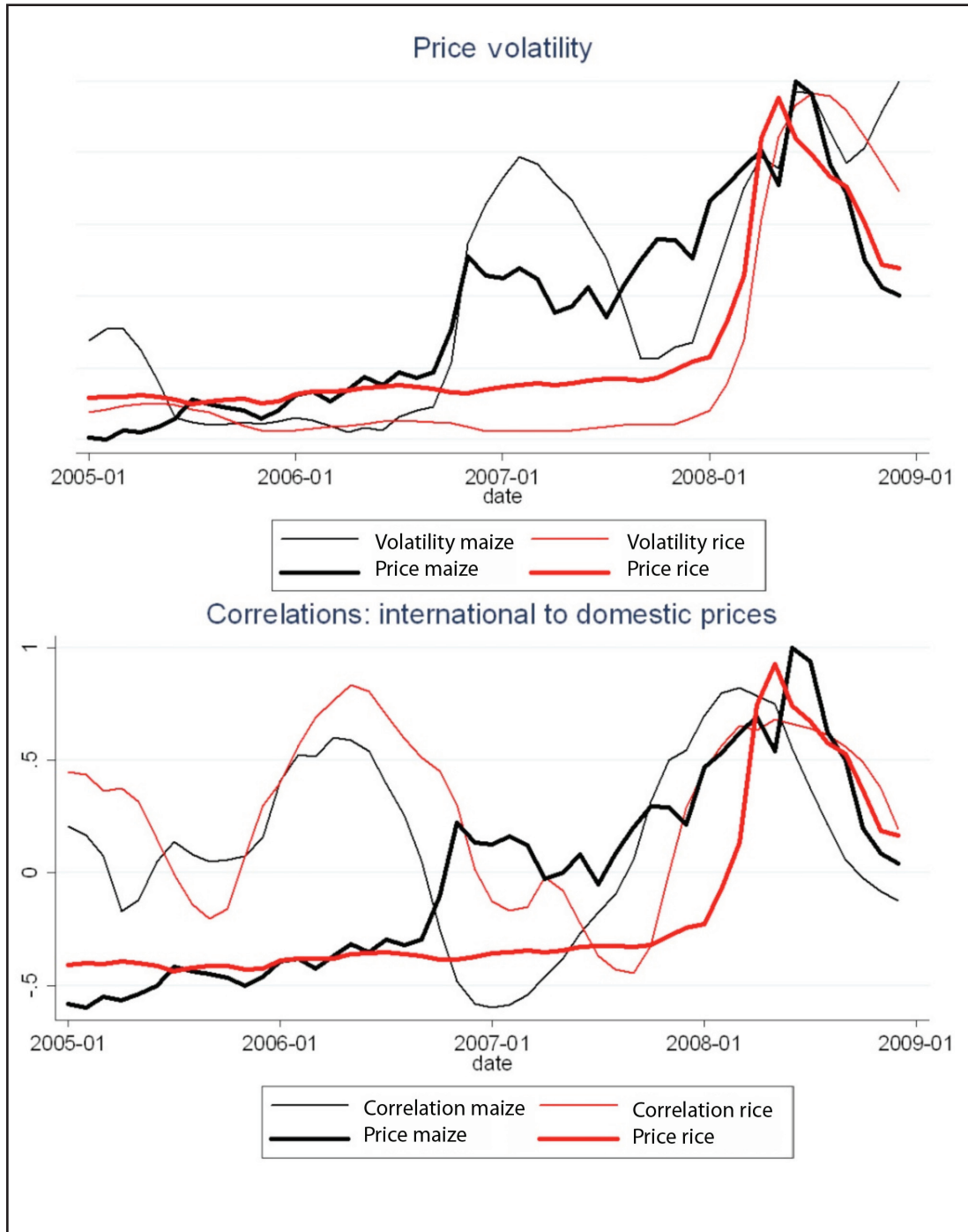
We assumed that domestic commodity prices are a function of the international price and domestic characteristics.[14] Unfortunately, the coefficients varied dramatically along different specifications and often exhibited implausible values and signs.[15]

We tried to trace the nature of this problem and believe Figure 9 provides useful insights. The upper graph plots volatility, measured as the standard deviation of (domestic) prices over the last 12 months, and these prices themselves (there is no y-axis, because every line has a different scale), showing some co-movement, especially for rice. The lower graph maps correlations between regional and international prices (measured over last 12 months) in time, exhibiting a very strong 'cyclical' pattern – in times of food crises correlations are elevated; in 'normal' times they are sometimes even negative. Again, a certain co-movement is evident, especially for maize. When correlations vary that strongly over time, and as a function of the price itself and its volatility,[16] we simply cannot rely on a stable relationship between international and domestic prices, as is assumed by our model. In a nutshell, we lack the necessary variables to explain the interaction between domestic and international prices, which prevents us from including policy variables in the specification.

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14    We exploited the panel character of our data by running several regression specifications where we used region-specific self-sufficiency ratios in 2008/09 as a proxy for domestic characteristics and then included a dummy variable that was set 1 if trade policies were implemented and 0 otherwise

15    We tried Pooled OLS, log-log specifications and first differences. For example, a log-log specification should give an intercept of around 1, because it implies that, on average, international and domestic prices are in line. However, it was 4. The first difference approach, in turn, estimated that a 1 per cent increase in the international price would only cause a 0.02 per cent increase in the domestic price. Even worse, the coefficient on the policy variable was positive and highly significant, obviously reflecting the fact that the prices increased a lot more in that time period and did not capture any specific policy effect at all. Another approach was to calculate for each region its correlation between domestic and international prices and regress them on self-sufficiency and the policy dummy, but this also failed to clarify the picture.

16    For maize, the $R^2$ is almost 0.4 for an OLS regression of correlation on price and standard deviation, with highly significant coefficients (0.0074 and -0.042; t-values between 4 and 6). For rice, the picture looks the other way, with a $R^2$ of .22 and highly significant coefficients of the average price and volatility (-0.021 and 0.0047 respectively, with t-values between 4 and 6 as well).

## Price volatility

Volatility maize — Volatility rice
Price maize — Price rice

## Correlations: international to domestic prices

Correlation maize — Correlation rice
Price maize — Price rice

Source: Authors' calculations

# 5. Conclusion

Figure 9 is not only of interest because it gives an explanation for a rather technical problem; it also reveals two key features of the Tanzanian economy. Firstly, despite many liberalization reforms in the past, Tanzanian agricultural markets remain poorly integrated into international markets, with correlations sometimes being negative. However, this did not shelter the economy from international price shocks, when correlations pick up rapidly. This provides considerable support to the position that avoiding future crises requires more international integration and less autarky. Integration should rather serve as an insurance against domestic shocks, as it could have been observed in the 2006 shortage, when international prices did not change as dramatically as domestic prices. Tanzania could have, given the resources, purchased its required needs on international markets.

This aspect is especially relevant since 2000, when domestic food production has been subject to higher volatility, rendering the population more vulnerable to domestic shocks, thus raising the need for international risk diversification.

Secondly, higher volatility is also a problem on the price side. It exposes both net producers and net consumers to a higher risk of becoming poor (depending on the direction of the change) (Duflo, 2008), redistributes a lot of wealth between these two groups for reasons beyond their personal control and is a disincentive for investment, since people cannot easily tell if price increases are temporary or indicate a more fundamental change (Conceição & Mendoza, 2009). This strongly makes the case for more international coordination in agricultural policy.

Most of the people negatively affected by the crisis were located in urban areas, which is not surprising, given the lack of agricultural production that could compensate for the rising (monetary) cost of food consumption. A second important factor is geography, with the effects on the poverty head count ratio varying remarkably by region, between -4 and +9 per cent compared to the status quo ante.

In total, however, Tanzania suffered comparably little from the crisis. At the same time, it appears to be on track with respect to its agricultural strategies, as the high average growth rate of production during the last decade proves. Still, we cannot rule out that this is a mere correlation instead of the result of sound agricultural policies. Furthermore, the dramatic increase in the volatility of production remains a puzzle, but it is clear that this resonates with a much higher vulnerability of the population to exogenous shocks, as happened in the 2006 crisis. In this regard, the modest effects of the international food crisis in 2007–08 can be attributed to a mixture of structural policies and good luck. Tanzania should be aware that a domestic shock, such as bad harvests, might have multiplied the negative consequences. As such, it remains a crucial task to stabilize agricultural output and keep the focus on infrastructure and local research and development investments that help to increase productivity.

Moreover, a broad development agenda should appreciate the decreasing role of the agricultural sector in the economy in general and in the structure of exports in particular. Other income sources certainly help to maintain flows of foreign currency in times of domestic agricultural shocks, which can be used to balance the shortage in local supplies for this limited period.

# Annex

This is a brief description of the methodology that leads to our estimates in section 3.3. A more detailed documentation is available upon request.

A major constraint was that data on household income were not accessible; thus we needed to predict such data with the help of the other variables. This was possible, since the 2002 dataset was complete and allowed us to test for the relationships between total household consumption expenditure; monetary food consumption (since the amount of non-monetary food consumption is, by definition, not subject to [direct] price changes); earnings from agricultural production; and our control variables.[17]

The specifications had a reasonable fit and followed similar distributions,[18] so we can be confident that our predicted income data for 2007 is viable, especially when bearing in mind that we are not interested in the individual, but in the aggregated distributional effects. After adjusting for inflation and spatial variation in the cost of living,[19] we were able to reproduce the income distribution in 2007 (data is per month per capita in Tanzanian shillings), shown as the black line in Figure 6. The new income for each household was calculated as its old expenditures,[20] less the increased costs (as measured by the regional FPI, calculated in section 3.2) for monetary food consumption, and with the increased income (measured in the same way) from agricultural production added. This approach relies on the following assumptions:

- Food production was assumed to be constant. This, however, allows us to clearly identify the effect stemming from increasing prices, decoupled from possible changes in quantities.

- There have been no adjustments in households' consumption pattern. In particular, they did not substitute expensive and cheap food more than is accounted for by the FPI, nor could they increase consumption from their own production.

- Finally, as already mentioned, our estimates for the regional food price indices are correct, and our estimated income distribution and income structure for 2007 is in line with reality (i.e. we rely on a stable relationship between these variables and the control variables across 2002–07).

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17    Asset values, education, household size, urban/rural and others. See Table 4 for details.
18    Specifications have been chosen to best mirror the distribution in the lower quantiles, at a cost to a worse fit in upper-income quantiles. We think this is appropriate, since the purpose of this exercise is to analyze the effect in the lower-income per centiles, i.e. on poor people.
19    We used our calculations of the regional food price indices for 2007 to account for differences in the provinces, and the difference between urban and rural areas has been chosen as the best map of the reported head count ratios in the 2007 Household Budget Survey.
20    We follow the methodology of the Household Budget Survey and use expenditure data as a more reliable measure for income.

# References

Ashimogo, G. C. (1995). *Peasant grain storage and marketing in Tanzania: A case study of maize in Sumbawanga District*. Berlin: Köster Verlag.

Conceição, P. & Mendoza, R. U. (2009). Is the global food crisis over? Retrieved from http://www.voxeu.org/index.php?q=node/3459

Cuesta, J. (2009). Are policymakers better equipped for the next food price crisis? Retrieved from http://www.voxeu.org/index.php?q=node/3848

Dessus, S. (2008). The short and longer term potential welfare impact of global commodity inflation in Tanzania. Policy research working paper no. WPS 4760. Washington, DC: World Bank.

Duflo, E. (2008). Food prices: The need for insurance. Retrieved from http://www.voxeu.org/index.php?q=node/1085

Erikisson, G. (1993). *Peasant response to price incentives in Tanzania: A theoretical and empirical investigation*. Research report no. 91. Uppsala: Nordiska Afrikainstitutet.

FAO (Food & Agriculture Organization). n.d. *National basic food prices: Data and analysis tool*. Retrieved from http://www.fao.org/giews/pricetool

Hella, J., Kamile, I.& Schulz, C. E. (2009). Food prices and world poor-winners and losers: A case study of two villages in Tanzania. In R. Haug et al. (eds), *High global food prices: Crisis or opportunity for smallholder farmers in Ethiopia, Malawi and Tanzania*. Noragric report no. 48. Department of International Environmental and Development Studies, Norwegian University of Life Sciences. Retrieved from

http://www.umb.no/noragric/article/noragric-reports-2009

IMF (International Monetary Fund). (2008). Elevated food prices and vulnerable households: Fiscal policy options. In 2008 Regional economic outlook: Western hemisphere. Washington, DC: IMF.

Ivanic, M. & Martin, W. (2008). *Food prices and food security*. Retrieved from VoxEU.org column. <http://www.voxeu.org/index.php?q=node/2596>.

Mashindano, O. & Kaino, D.. (2009). *Transformation of agricultural sector in Tanzania: Justifications for Kilimo Kwanza and conditions for its success*. Quarterly Economic Review, 9(2): 12–21.

Mwakalobo, A. B. S. et al. (2009). *Household food security coping mechanisms in semi-arid areas of Tanzania: Evidence from Dodoma Rural and Kilosa Districts*. Unpublished paper, Sokoine University of Agriculture.

Runyoro, G. T. (2006). *Globalization and food security in Tanzania*. In Msambichaka, L. A. et al. (eds), Globalization and development challenges in Tanzania. Dar es Salaam: Dar es Salaam University Press.

UNCTAD (UN Conference for Trade and Development). n.d. Commodities. UNCTAD database.

Retrieved August 2010. http://unctadstat.unctad.org/

URT (United Republic of Tanzania) (2001). *Agriculture sector development strategy.* Dar es Salaam: URT.

——. 2005. *Agricultural marketing policy.* Dar es Salaam: URT.

——. 2006. *Agricultural sector development programme.* Dar es Salaam: Ministry of Agriculture, Food Security and Cooperatives.

URT (United Republic of Tanzania) & FAO (Food and Agriculture Organization) (2008). *Agricultural sector reforms in Tanzania: Perspectives from within.* Unpublished report. Ministry of Agriculture Food Security and Cooperatives & FAO.

World Bank (2000). *Agriculture in Tanzania since 1986: Follower or leader of growth?* Washington, DC: World Bank.

——. n.d. World development indicators database. World Bank open data catalogue. Accessed August 2010. <http://data.worldbank.org/data-catalog>.

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