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Analyzing nutritional impacts of price and income related shocks in Malawi: Simulating household entitlements to food

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ABSTRACT

The 2007/2008 food price crisis and the following global economic recession has (temporarily) increased the number of people to suffer from hunger. While the impacts can be measured with precision only ex post, for policy makers it is critical to get a sense of likely impacts ex ante in order to plan approaches to mitigate these impacts. In this paper we adopt a very simple micro-based simulation approach to analyze how changes in prices of specific food groups, such as maize prices or prices for staple foods, as well as how negative short-term household level income shocks affect the entitlements to calorie consumption of individuals and how these changes affect overall food poverty. We illustrate our approach using household survey data from Malawi. We find that food poverty is of serious concern with large within-country variations. We find that price shocks for staple foods have a considerable impact on food security with particularly strong effects on poor net food buyers in rural and urban areas. This paper demonstrates that it is possible to estimate food security impacts of price and income shocks ex ante in a relatively straightforward fashion that can be done relatively quickly and that is suitable for cross-country assessments of the likely impacts of shocks on food security and the design of appropriate response measures.

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Introduction

The 2007/2008 food price crisis and the following global economic recession have (presumably) led to large increases in the number of people to suffer from hunger (FAO, 2008, 2009, 2011a). The major concern related to recent increases in food prices as well as of negative income shocks, which affects many households in Sub-Saharan Africa, is the possible increase in food poverty and food insecurity as it reduces the entitlements households have to food. Indeed such entitlement failures are the key to explaining famines in the framework of Sen's entitlement approach (Sen, 1981). However, although there is a general agreement in the literature on the definition of food security, i.e. referring to effective access to food by individuals and households rather than just the availability of food in a country, it is exceedingly difficult to come up with reliable estimates of the impact of the food price and related crises on food insecurity and hunger. Although data availability has been improved within the last years, data limitations are still the main constraint when analyzing impacts of income and price shocks on food security and food poverty. Due to their infrequent collection, analyzing household survey data for this purpose implies a time lag of several years between a majority of events and estimates of their effects. This further increases uncertainty in identification and overall makes the information much less useful for policy-makers.

As argued by de Haen et al. (2011), to be useful for a comprehensive assessment of food insecurity, indicators of food insecurity should provide answers to at least three questions, namely: Who are the food-insecure? How many are they? And where do they live? If the purpose of the measurement goes beyond assessment and includes the design of policy responses, the indicators should also help answering the more ambitious question: Why are people food insecure? While that paper dealt with chronic food insecurity, it is at least as important to identify those affected by short-term crises who might be threatened with acute hunger.

The most commonly used indicator in public debates of food insecurity is the Food and Agriculture Organization of the United Nations' (FAO) indicator of undernourishment which calculates

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the number of people with insufficient caloric access and which is also used to monitor MDG 1. The FAO indicator is based on food supply at the national level and not on data directly measuring individual's access to food. Rather, it attempts to measure the access individuals have to calories in a country[3]: It first estimates a three year moving average of per capita calorie availability from food balance sheets, trade statistics, and assumptions about waste, then applies a distributional assumption to account for inequality in caloric availability, and then identifies the share of the population that has fewer calories than recommended by a norm. At best, it is a rough proxy for the long-term availability of calories in a country, and it is only available with a time lag of 2–3 years.[4] Therefore, this indicator is unsuitable to assess the impact of food price crises and economic recessions on hunger, and the only driver of changes in hunger over time in a country using this FAO approach is the mean caloric availability which is largely driven by agricultural production and exports, and little affected by changes in people's entitlements to food (see de Haen et al., 2011; Sen, 1981). Although food availability at the national level is a necessary condition for households to have access to food, it is not a sufficient condition. Households must also have enough resources to meet their basis needs and to acquire enough amount of food.[5]

The most direct alternative to measuring caloric shortfall is to analyze information from household surveys as to measure food availability and food insecurity on a per-day and per capita basis. Based on an analysis of household surveys, the International Food Policy Research Institute (IFPRI) has published an estimate of hunger in 12 sub-Saharan African countries (Smith et al., 2006). The authors found that in the late 1990s, 59% of the population was food energy deficient. This result was in stark contrast to estimates by the FAO, based on food balance sheets for the same countries, the same period and using the same criterion of energy deficiency as an indicator of undernourishment. The FAO prevalence estimate was 36%, hence significantly lower. Not only did the two methods differ with respect to the mean level of undernourishment, the ranking of the 12 countries differed as well. In other words, there is not even a close correlation between the two estimates. This example of divergent estimates of hunger, measured with the same criterion, namely food energy deficiency, suffices to raise interest in a thorough comparative assessment of the various methods used to estimate hunger.

As argued by de Haen et al. (2011), using food consumption surveys has a range of advantages vis-à-vis the FAO method. As one measures caloric availability directly at the household level, one does not need to rely on a problematic assumption about the distribution of calories within the country. Also, population groups affected can be directly identified and the indicator is thus particularly useful for policy purposes. The main problem, for the use as a measure of short-term assessments of food insecurity, is that these surveys take place rather infrequently, are costly, and often necessitate many months of fieldwork and data cleaning before they are available for analysis; they may be the best approach for an ex post assessment, but the time lags are substantial so that their use for policy makers, who need readily available information in a food crisis, is limited.

To use these household surveys for assessing current short-term food security fluctuations nevertheless, one could use a survey-based approach to then simulate the impact of price and income changes on caloric shortfall. Since these surveys also contain information on food prices and household incomes or total expenditures, calorie price and income elasticities can be estimated for the population as a whole as well as for population subgroups. Simulation results regarding household food security can then be used to predict changes in the prevalence of undernourishment due to price and income changes (see de Haen et al., 2011). There is an increasing body of literature that estimates price elasticities of food demand in Africa (Abdulai and Aubert (2004a,b), Bouis et al. (1992), von Braun et al. (1991), Strauss (1984), and Skoufias et al. (2009)). These studies are based on rather detailed simulation methods that address this issue for individual countries. For example, Ecker and Qaim (2010) extended such an approach by going beyond calories and the authors also capture micronutrient deficiencies and estimate related price and income elasticities. They show that food price changes have differentiated impacts on the consumption of micronutrients. For example, higher maize prices can lead to a shift in the micronutrient composition toward cheaper food, which can reduce the consumption of certain micronutrients. They also find that changes in income can have micronutrient neutral effects despite affecting calorie consumption. Alderman (1986) and Anríquez et al. (2010a,b) have also used household survey data to assess the possible effects of staple food price increases on household's food consumption and undernourishment. The authors find that food price increases reduce the mean calorie availability and increase inequality in its distribution, therefore, worsening the situation of those who were already most vulnerable to food insecurity.

While these are excellent ways of pursuing this issue in some detail, it may be useful to use slightly less involved methods suitable for comparisons over a larger range of countries to assess the likely impact of food and economic crises on hunger. This is what we plan to do here. The aim is therefore to provide an approach that allows for a timely, ex ante, and cross-country comparable assessment of the impact of price and income shocks on food security.

The advantage of this approach (vis-à-vis the FAO method) is that it links the issue of food insecurity directly to Sen's entitlement approach, which has proven to be the most robust way to understand famines. Sen (1981) identified changes in endowments (such as employment opportunities or assets) or changes in the 'exchange entitlement mapping' that turn endowments into food as the key drivers of famines. In other words, famines occur because people lose their asset base due a crisis or they starve because food prices have increased (relative to the price of labor or other products), exactly the issues we will analyze here.

Another advantage of this approach is its close linkage to empirical assessments of income poverty. As many poverty lines are actually based on a certain pre-defined food and non-food basket (e.g. Ravallion, 1994), income poverty increases if people lose income or if prices for their basket go up, again the issues we are interested in.

In particular, we adopt a very simple simulation approach to analyze how changes in prices of specific food groups such as maize or staple food as well as how negative short-term income shocks on household income affect the calorie consumption[6] of individuals and how these changes affect food poverty in the very short-term.

[3] As stated in the SOFI Report 2011, the FAO is currently revising the FAO measure of hunger to provide more frequent updates and to include more information (FAO, 2011).

[4] There have been attempts to use this general approach to provide more timely assessments of impacts, but the methods used have not been validated so far. See de Haen et al. (2011) for a discussion.

[5] For further discussions on the limitations of the FAO approach to measure hunger based on national estimates of food supply for policymaking and planning interventions see, e.g. Svedberg, 2000, 2003; Aduayom and Smith, 2003; Klasen, 2003, 2008; de Haen et al., 2011.

[6] Note that we use the terms food and calorie consumption and food and calorie availability interchangeably in this paper. For a discussion of conceptual differences, see Section 'Data limitations'.

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