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## Effects of food price shocks on child malnutrition: The Mozambican experience 2008/2009



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## ABSTRACT

A propitiously timed household survey carried out in Mozambique over the period 2008/2009 permits us to study the relationship between shifts in food prices and child nutrition status in a low income setting. We focus on weight-for-height and weight-for-age in different survey quarters characterized by very different food price inflation rates. Using propensity score matching techniques, we find that these nutrition measures, which are sensitive in the short run, improve significantly in the fourth quarter of the survey, when the inflation rate for basic food products is low, compared to the first semester or three quarters, when food price inflation was generally high. The prevalence of underweight, in particular, falls by about 40 percent. We conclude that the best available evidence points to food penury, driven by the food and fuel price crisis combined with a short agricultural production year, as substantially increasing malnutrition amongst under-five children in Mozambique.

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### 1. Introduction

In 2008, countries around the globe experienced a dramatic food and fuel price shock. From January 2007 to June 2008 world food real prices increased by more than 60 percent (cf. [FAO, 2012](#)) while the world price of oil increased by about 125 percent. The full implications of the 2008 food and fuel price crisis are yet to be fully understood and remain an important topic of research (e.g. [Ortiz et al., 2011](#); [Abbott and de Battisti, 2011](#); [Headey, 2011](#); [Headey et al., 2012](#); [Verpoorten et al., 2012](#)).

The nutritional consequences, in particular amongst children, are a primary concern (e.g. [Lock et al., 2009](#); [Keats and Wiggins, 2010](#); [Tiwari and Zaman, 2010](#); [Ruel et al., 2010](#); [Christian, 2010](#); [Brinkman et al., 2010](#)).

The unfolding nutritional consequences of price shocks remain under-investigated due, in significant measure, to lack of data ([Torlesse et al., 2003](#)). A number of papers have examined the impact of regional or national food price crises on child nutritional status in affected areas, for example, due to drought or general economic turndown (see the next section for further references). However, most of this work has relied on yearly observations of child nutritional status and other low-frequency data or has compared nutritional outcomes before and during (or after) some crisis.

This article studies the nutritional status of children in Mozambique by quarter over a full year beginning in September 2008. These periods of the year (quarters) are

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characterized by very different inflation rates for basic food products. We are able to conduct this analysis due to a large scale household budget survey that: (a) is representative quarterly, (b) contains an anthropometrics module, and (c) took place over the period September 2008 to August 2009. This period follows directly on the peak of the world price spike for food and fuel which occurred in June 2008. The principal harvest period also occurs around June. The 2008 harvest was short with yields per hectare for principal food crops down by about 20 percent relative to more favorable seasons (MPD/DNEAP, 2010). Accordingly, prices of basic food products in Mozambique actually peaked between September 2008 and February 2009 (a few months after the world food price index peak) before declining sharply between June and August 2009 (on the arrival of the next harvest). In the same period, nonfood prices were much less affected (Arndt et al., 2015). Real food consumption expenditure seems to have largely followed the price dynamics (Arndt et al., 2012), with the potential for affecting the nutritional status of under-five children.

Using individual-level matching analysis, we are able to compare under-five children surveyed in high-inflation months with children surveyed in low-inflation months. Our hypothesis is that the former group of children would present worse contemporary malnutrition indicators compared to children in the latter group. We also expect chronic (longer term) malnutrition measures, such as height-for-age, to follow different dynamics. If our hypothesis is correct, then weight-related malnutrition indicators such as weight-for-height, weight-for-age, wasting prevalence and underweight prevalence should be worse for children surveyed in high-inflation months. Conversely, height-related malnutrition may not differ greatly among the two groups due to the longer term dynamics associated with chronic malnutrition.

We find that, compared with the first semester or first three quarters, the prevalence of contemporary malnutrition among children aged 0–59 months was significantly lower in the final quarter of the survey, when inflation rates for basic food products were lower. The same comparisons with respect to chronic malnutrition measures do not differ significantly.

The remainder of this paper is structured as follows. Section 2 reviews literature. Section 3 describes the data employed for the analysis. Section 4 provides descriptive information. Section 5 presents the approach employed and the results. Section 6 concludes that strong price movements, driven by the combination of world price increases and a short production year, significantly impacted the nutritional status of children in Mozambique.

## 2. Literature

Studies examining the impact of a crisis on child nutritional outcomes are plentiful, although somewhat dispersed, in the literature. With respect to prices, Torlesse et al. (2003) use yearly data collected from 1992 to 2002 to examine how changes in rice prices affect child underweight in Bangladesh. Using aggregate data, they find that rice prices are strongly correlated with underweight (corr. coef. = 0.91,  $p = 0.001$ ). A number of other contributions

study the impact of a crisis using micro data. For example, Block et al. (2004) assess the nutritional impact of Indonesia's drought and financial crisis of 1997/1998, Yamano et al. (2005) examines the effect of a shock (drought) and food aid on child growth in Ethiopia for the period 1995–1996, and Hodinott and Kinsey (2001) investigate the impact of drought on child growth in Zimbabwe, using panel data for the period 1993–1997.

More recently, Stillman and Thomas (2008) examine the impact of the decline in economic activity in Russia between 1996 and 1998 on six dimensions of nutritional status using annual data. Miller and Urdinola (2010) investigate how child mortality in Colombia responds to fluctuations in world Arabica coffee prices and document starkly pro-cyclical child deaths, while a counter-cyclical relationship might be expected. Their analysis is also based on yearly data, hence focusing on medium to long run effects. Sweeney et al. (2013) detail the characteristics of populations that are more likely to be vulnerable to shocks in Guatemala. Finally, Hartwig and Grimm (2012) analyze the food crisis – a shortage of cereals due to adverse climatic conditions – in 2002 in Malawi relying on representative data collected before and after the crisis.

At the time of the global food and fuel price crisis, various efforts were made to simulate the effects of the crisis on the welfare of countries, sub-national regions, and households. For example, Ivanic and Martin (2008) examined the implications of the food price crisis for nine low-income African, Latin American, and South Asian countries. They found highly heterogeneous effects driven principally by the net buyer or net seller position of the household. Overall, they found that, across the nine countries considered, “the adverse welfare impact on net buyers outweighs the benefits to net sellers resulting in an increase in the number of poor and in the depth of poverty” (p. 1). Similarly, Arndt et al. (2008) focused on Mozambique and found negative implications for poverty using an economy-wide GE simulation model linked to a poverty module. This result was driven principally by fuel price increases although higher food prices also contributed to increases in poverty, particularly in urban areas.

With the passage of time, attention has shifted from simulating the impacts of the food and fuel price crisis on living standards in poor countries, to analyzing the implications of the crisis in retrospective. While in principle possible, the causal chain between substantial world price movements and welfare impacts on a population is long, complex, and highly specific to circumstance, including timing. Relatively few data sets are well suited to the task, and there are, correspondingly, relatively few ex post studies, despite the high profile of the shocks. For El Salvador, de Brauw (2011) finds a decrease in height-for-age of children under three, which he attributes to the rise in domestic food prices of 2008 that closely followed the rise in international prices. He also finds that children in families with access to remittances or with international migrants experienced lower declines in height-for-age.

Arndt et al. (2012) use a dynamic economy-wide model, linked to a poverty module, to track macroeconomic aggregates and world prices over the period 2003 to

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