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Long-term impacts of an unanticipated spike in food prices on child growth in Indonesia

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ABSTRACT

Unanticipated spikes in food prices can increase malnutrition among the poor, with lasting consequences; however, livelihood strategies that include producing food for home consumption are expected to offer a measure of protection. To test this, we use anthropometric and consumption data from Indonesia collected before and after the 2007/08 food price crisis. Based on standardized height and weight measures, our results indicate that soaring food prices had a significant and negative impact on child growth among households that did not produce food for home consumption. A corresponding effect was undetectable for the households that did. The results remain robust when income effects from increased commercial sales, and possible attritions through migration and fostering are considered. Further, local food price changes were uncorrelated with the share of producing-households in the village and village's initial average child nutrition status, suggesting that observed outcomes are directly attributable to market events and livelihood strategies. Gender differences were not detected. Our findings imply that the food price crises can have negative impacts on children, potentially leading to lifelong disadvantages. Livelihood choices that include food production provide protection against price hikes but may trap households on low income paths.

1. Introduction

Poor households build livelihood strategies that include mechanisms to mitigate and manage the many risks they face. Included are informal forms of insurance based on a willingness to help extended family members and neighbors in time of need with the expectation of receiving assistance when needed. In the absence of formal insurance and risk markets, informal mechanisms are crucial and can work well when risk events are idiosyncratic. However, informal insurance systems can fail when needed most in the face of a systemic risk event affecting all members of the informal insurance network. Governments can and do help prop-up informal systems by responding to crises and by building all-purpose safetynets.

In rural areas, households often choose to produce much of their own food. This livelihood choice provides a measure of protection against a loss of other sources of income and can be especially effective in the face of rising food prices. However, the protection comes at a cost, since the strategy can obligate families to devote limited land and labor resources to activities and production technologies that are less profitable under normal circumstances. In turn, this makes it harder for families to generate higher incomes, accumulate wealth and human capital, and escape reinforcing poverty traps.

In this paper, we focus on surging food prices, a cardinal risk that can undermine the capacity of poor households to meet minimal nutritional needs. We distinguish between two types of households: households that produced some food for home consumption (food-producers) and households that did not (non-producers), and examine the potentially permanent effects of the food price crisis of 2007–08 on child nutrition intakes. We calculate local food price indices to take into account spatial differences in the transmission of global price shocks and the effects of differing diet compositions; we construct standardized child anthropometric nutrition-status measures, height-for-age and weight-for-age z scores, to detect health outcomes. The analysis uses Indonesian household panel data collected in 2007 and 2010. The villages in our sample are rural, but include farming and non-farming households. The first round of 2007 was fielded from the second to third quarter, immediately before the initial food price run-up

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late in 2007. The follow-up survey was conducted in 2010 after the crisis had subsided. The timings offer us an ideal setting to assess the impact of food price spikes on child growth.[1] The geographic coverage of the survey over seven provinces in five macro regional islands lets us take advantage of significant variations in village-level food price changes.

Our findings suggest that the livelihood strategies available to food-producers and non-producers are qualitatively different, which led to asymmetry in the impact of the price crises on child growth. Specifically, we find strong evidence that soaring prices had a significant and negative impact on child growth among non-producer households, despite government-backed support programs meant to help the most vulnerable. At the same time, a corresponding effect on child growth was not detected for food-producing households, suggesting that minimal levels of self-sufficiency in food mitigated the harshest consequences of the crises.[2] The result remains robust when income effects from increased commercial sales and possible attritions through migration and fostering arrangements are considered. Further, local food price changes were uncorrelated with the share of non-producer village households and the initial average child nutrition status in the village, suggesting that observed outcomes are directly attributable to market events and livelihood strategies. Interestingly, gender differences were not detected. Our findings imply that the food price crises can have long-term impacts on child human capital formation, potentially fostering lifelong income inequality among those affected at an early and vulnerable stage of life. This gives incentive for households with access to land to produce their own food, thereby achieving a measure of protection against food price shocks. However, the strategy comes at a cost, since it may trap poor households on low income paths. Policy implications are discussed in the concluding section.

2. Background

Following decades of relative stability, global food prices spiked between the summer of 2007 and June 2008. On the heels of a six-month run-up in oil prices, wheat prices began to rise, surging 14 percent between May and June 2007. Maize prices increased 15 percent between December 2007 and January 2008. Rice prices, which had been climbing modestly during the summer, registered month-over-month increases of 21, 24 and 42 percent in February, March and April of 2008. Stocks relative to use had fallen for all three grains during the previous years, for a variety of reasons, including a strategic decision by China to drawn down government stockpiles (Headey & Fan, 2008; Piesse & Thirtle, 2009). With inventories low, markets were positioned to react sharply to negative news (Larson, 2007). In the case of wheat, poor harvests in Ukraine and Australia were seen as triggering events, while, in the case of maize, the large diversion of US maize to mandated biofuel quotas was blamed (Headey, 2011b; Mitchell, 2008; Timmer, 2010). In the case of rice, researchers suggest that the crisis was largely driven by a series of over-reactive policy decisions, and that interventions meant to insulate domestic markets sometimes led to rounds of counter-productive hoarding and speculation (Dawe, 2009; Slayton, 2009; Timmer, 2010). Regardless, a contagion of decisions by large producers to restrict exports clearly exacerbated the crisis (Headey, 2011a).[3] From April 2007 to April 2008, the World Bank's Food Price Index rose by 67 percent, the associated Grain Index nearly doubled, and rice prices nearly tripled.

The scale and suddenness of the price increases unleased widespread social and political unrest (Bellemare, 2015; Slayton, 2009). However, the sharp change in food prices played out differently among households, creating a continuum of outcomes, even among the poor (Swinnen & Squicciarini, 2012). In rural areas especially, households produce some or all of their own food, and this key aspect of rural livelihood strategies is thought to have been particularly important during the food price crises, since the cost of food produced and consumed at home is unaffected by changing market prices. In addition, households producing a surplus of food likely benefited from higher prices, as did households with livelihoods linked to agriculture. Consequently, poor rural smallholders are thought to be less vulnerable to food price spikes than the landless and urban poor (Ruel, Garrett, Hawkes, & Cohen, 2010). Even so, this strategy comes at a high cost, since smallholders must often pass up more-profitable opportunities in order to generate their own food. What's more, households often choose to produce their food using traditional low-risk-low-productivity farming methods. These choices can trap households on low-income paths that keep poor households poor (Binswanger & McIntire, 1987; Carter, Little, Mogues, & Negatu, 2007; Larson & Plessmann, 2009; Larson, Savastano, Murray, & Palacios-López, 2016; Rosenzweig & Binswanger, 1993).

Nevertheless, because the poor devote 50–80 percent of their expenditure to food and because many poor rural households are net buyers of food, the food crisis was thought to have increased poverty and malnutrition in both rural and urban areas (de Pee et al., 2010). Results from a series of simulation models suggest these impacts were large. For example, de Hoyos and Medvedev (2011) estimate that the food crisis increased global poverty by more than 155 million people, and analysis by USDA (2009) suggests that the number of food insecure people rose by 75–80 million because of the crisis. The simulation models distinguished between food producing and food consuming households, and the results suggest some portion of poor net-producer households benefited from higher prices. For example, Ivanic and Martin (2008) estimated that the crisis, on balance, decreased poverty rates in Pakistan and Vietnam. Still, most studies concluded that global net poverty rates increased as a result of the crisis, as did poverty rates in most developing countries, including Indonesia (McCulloch, 2008; Warr & Yusuf, 2014).

It is important to note that most staple crops are produced and consumed locally; for example, only 7–8 percent of the world's rice enters formal trading routes (Timmer, 2010). And while there is strong evidence that the prices recorded at a country's borders reflect global markets, transportation and transaction costs mute the impact of changes in international prices on local prices (Dawe & Maltsoglou, 2014; Mundlak & Larson, 1992; Yang, Bekkers, Brockmeier, & Francois, 2015). Long-standing trade and food policies affect pass-through rates, too. However, in the case of the food-price crisis, a weakening US dollar and new interventions were important as well (Anderson, Ivanic, & Martin, 2013).[4]

[1] First, early childhood nutrition status is a cumulative measure that records long-term impacts of an event that adversely affects their nutrition intakes. The 2007/08 food price crisis is a good example, which can be captured by nutrition status such as the height-for-age z score. Second, though the 2007/08 food price crisis that created international food price spikes ceased in the middle of 2008, price transmission to domestic markets depends on various factors (discussed in Section 2). The Laspeyres price index calculated from the 2007 and 2010 local food prices and consumptions captured in 98 villages is high, that is, local food prices have increased rather continuously during the period (see Section 3).

[2] The livelihood strategy focused in this paper, that is, the decision to produce food, is rigid at least in the short run. Our empirical evidence shows that the initial livelihood strategy and the subsequent price changes are uncorrelated. Our main conclusion remains robust even if non-producer households start food production after seeing an increase in food prices since such an action tends to narrow the average gap between producers and non-producers.

[3] Wheat exports Argentina, Kazakhstan, Russia and Ukraine were banned or otherwise restricted. China limited maize exports and levied new export taxes as did Argentina. Cambodia Egypt, India and Vietnam, restricted rice exports (Headey, 2011a, 2011b).

[4] When governments choose to intervene, the choice of instruments have distributional consequences (Miranda et al., 2013; Poapongsakorn, 2010).