Food Policy 46 (2014) 50–55

Contents lists available at ScienceDirect

Food Policy

journal homepage: www.elsevier.com/locate/foodpol

Marketing margins and the welfare analysis of food price shocks

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ARTICLE INFO

Article history:
Received 18 December 2012
Received in revised form 14 December 2013
Accepted 30 December 2013

Keywords:
Food prices
Welfare analysis
Marketing

ABSTRACT

Following the surge in world food prices of 2007–2008, there has been a revival of short-run household welfare analysis that seeks to understand whether food price increases are beneficial or detrimental for households. For a number of reasons, including lack of data in some instances, the short-run analytical approach has embedded an assumption of equal percentage price changes for consumers and producers. This assumption implies that food marketing costs change by the same percentage, because an *x* percent change in both farm prices and consumer prices implies that there must also be an *x* percent change in their difference. But this paper shows that most marketing costs are fixed, not proportional, and further that assuming proportional marketing costs leads to a bias towards finding negative impacts of higher food prices. The magnitude of the bias is shown to be greater than that from failing to incorporate supply and demand responses to price changes, and can be substantial relative to the effect estimated without incorporating the bias. In addition, the bias is not necessarily uniform across income classes; thus, failure to explicitly consider marketing margins has the potential to reverse the relative magnitudes of the impact on rich and poor.

Introduction

With the world food crisis of 2007–08, subsequent price increases for some foods in 2010–11, and many episodes of associated social unrest, there has been tremendous interest in understanding the welfare impact of food price shocks. Because some households are primarily producers of food, while others are primarily consumers, the impact of a food price shock is not immediately obvious: there will be both winners and losers. Thus, a substantial new wave of literature has analyzed the impact of such shocks disaggregated by location (rural vs. urban), by income quantile, or by gender of the household head.

By exploiting the substantial increase in the number of household surveys conducted over the past years, these analytical studies have been used to construct global estimates of recent changes in poverty and have provided many insights surrounding the distributional implications of food price shocks. Ivanic and Martin (2008) estimated an increase in extreme poverty of 105 million people due to the 2008 price shock (they did not consider income growth in their analysis, so their estimates are estimates of the price shock, not estimates of what happened in 2008). For the second half of 2010, when world maize and wheat prices surged, Ivanic et al. (2011) estimated an increase in extreme poverty of 44 million people due to the price spike. This estimate again did not take into account income growth, and utilized data on actual retail price increases in a number of countries for which household income and expenditure survey data were available.

While the impacts of food price increases vary from country to country, there are some general patterns that have emerged from the studies. First, higher food prices lead to higher poverty incidence in most countries (Barrett and Bellemare, 2011). Ivanic and Martin (2008) found that higher food prices increased poverty in seven of the nine countries studied, while Robles and Torero (2010) found that higher food prices increased poverty in four Latin American countries. Wood et al. (2012) found that higher prices harmed the poor in Mexico. Warr (2005, 2013) found that higher rice prices increase poverty in Indonesia, as did McCulloch (2008), and similar results were found for Bangladesh and Nepal by Zezza et al. (2008). Balisacan (2000) found that the poorest deciles of the income distribution in the Philippines were net rice consumers, and would thus be harmed by higher rice prices. Wodon et al. (2008) found that higher food prices hurt the poor in most countries in western Africa, while Barrett and Dorosh (1996), in their study of Madagascar, find that "the roughly one-third of rice farmers who fall below the

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http://dx.doi.org/10.1016/j.foodpol.2013.12.010
0306-9192/

poverty line have substantial net purchases of rice, suggesting important negative effects of increases in rice prices on household welfare." Bellemare (2012) also found that, over the past couple of decades, high food prices have led to social unrest.

Second, increases in poverty are likely to be less severe in net food exporting countries, holding other factors such as inequality in land ownership constant. Thus, high food prices have been estimated to *reduce* poverty in countries such as Brazil (de Souza Ferreira Filho, 2008), Pakistan (Ivanic and Martin, 2008), Thailand (Deaton, 1989; Warr, 2001), Uruguay (Estrades and Inés Terra, 2012), and Viet Nam (Ivanic and Martin, 2008; Minot and Goletti, 1998), although other studies for Thailand (Warr, 2008) and Viet Nam (Zezza et al., 2008) found different results.

Third, controlling for net trade status (i.e. whether a country is a net exporter or net importer), inequality in the distribution of land (both quantity and quality) makes a difference to the poverty effects of high prices. Thus, in Thailand, Poapongsakorn (2010) shows that the bottom quintile of rice farmers ranked according to income received only about 4.5% of the benefits of a government program to raise farm prices. One reason for this is that the poorest farmers do not have irrigated land, and thus produce less.

Some of the literature cited above deals only with instantaneous, short-term effects, while some of the studies estimate long-term effects, e.g. through the use of computable general equilibrium models that take account of adjustments in output and factor markets. If food prices increase, consumers eat less (and lower quality) of the foods for which prices increased the most, and farmers will produce more; these responses will reduce the magnitude of the welfare loss. Labour markets may also adjust over time, with higher food prices leading to higher wages (Ravallion, 1990; Rashid, 2002; Lasco et al., 2008). In general, at least for staple foods, the conclusions seem not to change substantially once long-term adjustments are considered. For example, Ivanic and Martin (2008) allow unskilled wages to rise after the increase in food prices, but the estimated effects were not substantially different when compared to the results without labour market effects. Zezza et al. (2008) allowed for adjustments in production and consumption of staple foods, but found only small differences compared to their initial results without such adjustments. On the other hand, Wood et al. (2012) found large substitution effects when the prices of meat and dairy products increased compared to a situation when only tortilla prices increased.

While the literature over the past few years is rich in insights, domestic marketing costs and margins have not generally figured in the analyses. In nearly all studies, the standard assumption has been to use an equal percentage change for both farmers and consumers without providing any justification or even discussion of the issue (Deaton, 1989; Budd, 1993; Barrett and Dorosh, 1996; Ivanic and Martin, 2008). It is a convenient assumption when data on farmgate prices are missing, as is often the case, and it seems an innocuous assumption as well. But this assumption implies that marketing costs are proportional to prices. For example, if before the shock, farm and consumer prices were 10 and 20 (all in local currency units per kg), and it is assumed that both prices increase 20%, then farm and consumer prices will increase to 12 and 24 respectively. Thus, marketing costs also increased by 20%, from 10 to 12. This assumption of a proportional increase in marketing costs will be questioned in the next section, but it is important to note that some papers, notably Minot and Goletti (1998), have explicitly allowed for a different magnitude of price changes at farm and retail levels, and thus a more sophisticated treatment of marketing. But most papers overlook this point.

The objective of this paper is to analyze the implications of relaxing the assumption that marketing costs are proportional to food prices. For simplicity, our analysis is conducted within an explicitly short-run framework without behavioural adjustments to the food price shock. After this introduction, the next section of this paper shows that marketing margins are unlikely to be proportional through a discussion of the cost structures that underlie the determinants of marketing margins, as well as citing some evidence on price changes over time at different levels of the marketing system. The third section works through the basic mechanics of relaxing the assumption of proportional marketing margins, and the implications for the measurement of welfare effects. The fourth section utilizes some empirical household data to illustrate the practical importance of explicitly considering marketing margins, and the final section briefly states the implications for future research.

Marketing costs: Fixed or proportional?

The studies cited in the introduction universally assume that food price shocks lead to increases in both retail and farm prices. This assumption will not be perfectly satisfied under all conditions, as typically some time is required for transmission to occur from one level to another. Nevertheless, it does seem to be a broadly reasonable assumption, especially since mobile telephone coverage has expanded so tremendously, even in developing countries. And it is not clear what assumption could replace it. For example, an assumption that only retail prices increase, but farm prices do not, is hard to defend.

This paper does *not* take issue with the assumption of instantaneous transmission between retail and farmgate levels; rather it questions what happens to marketing margins while retail and farmgate prices are increasing. As shown above, an assumption that farmgate and retail prices increase by the same percentage, as is nearly universally assumed, implies that marketing costs also increase by the same percentage. This section of the paper argues that marketing costs are unlikely to increase proportionately, and that a more reasonable assumption should be made in its place.

Traders incur a wide variety of costs in transporting, storing and processing farm products so that they can be consumed in a convenient form. These costs include, but are not limited to: labour, management (including search costs), working capital, depreciation on machinery and vehicles, risk premia, fuel, electricity, land, materials such as sacks, spoilage and theft. For the current analysis, it is important to assess which of these costs are likely to increase when farmgate and retail prices increase. For example, working capital costs are likely to increase proportionately to farmgate prices, as the amount of working capital required to procure farm products is directly proportional to the value of those products. Risk premia and the costs of spoilage and theft are also likely to increase as food prices increase. On the other hand, it is not clear that other marketing costs will increase when farm prices increase. To quote Timmer (1974): "Only one or possibly two items in the marketing process are of necessity charged as percentages: interest charges during storage and possibly any insurance charges as well."

As far as the other major costs items listed above, transport and milling costs are most likely incurred on a per ton basis (Timmer, 1974). It might be argued that fuel costs increased during the food price crisis, but this is of limited relevance for the current analysis on two grounds. First, it is hard to argue that food price increases lead to fuel price increases, rather than the other way around. Thus, it is not clear why a *ceterus paribus* analysis of the impact of food price hikes should necessarily assume that fuel prices also increased. Second, fuel prices in developing countries are often administered prices – thus, the correlation between domestic food prices and domestic fuel prices is likely to be weak.

More generally, there are a variety of transactions costs, for both sellers and buyers, that separate farmgate prices from retail prices (Key et al., 2000; Bellemare and Barrett, 2006). It is highly unlikely that these costs will all change by the same percentage as food prices in the wake of a food price shock, or even that their