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Debunking the 'new normal': Why world food prices are expected to resume their long run downward trend

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ABSTRACT

Contrary to the opinions expressed by many commentators, the recent episode of higher prices for agricultural commodities is likely a transitory phenomenon. When compared to the last half-century, population growth is expected to be much slower in the coming decades, with nearly all of the growth occurring in lower income countries, where added population places less pressure on global markets. The impact of the recent surge in growth rates in the developing world, and the associated dietary upgrading, will be insufficient to overcome the population effect. Further, earlier projections of biofuels growth are proving overly enthusiastic in the wake of lower oil prices and environmental concerns. Consequently, our projections using the SIMPLE model of global agriculture suggest that, in the long run, food prices are expected to be slightly lower at mid-century than they were prior to the food price crisis (2006). However, this outcome is shown to depend critically on the rate of productivity growth in agriculture. Our projections involve expected global productivity growth over the 2006–2050 period which is only 60% as fast as over the historical period: 1961–2006. If total factor productivity growth slows more than this, perhaps due to adverse climate impacts or reduced investment in R&D, then prices could rise in the coming decades. Also, we cannot rule out the possibility of a steeper price decline in the wake of recent signs of robust productivity growth in the developing world.

1. Introduction

As recently as 2013, there appeared to be widespread agreement that international agricultural commodity prices had ceased their secular decline and were now on a new trajectory, owing to the emergence of large scale biofuel production, rapid growth in many developing economies, and slowing productivity growth. The World Bank (2013) stressed that "…high and volatile food prices have become the "new normal"…". The Food and Agriculture Organization of the United Nations (FAO Media Centre, 2013) noted that "In the past century … real food prices declined steadily…. In the beginning of this century that long-term trend has been reversed…" The OECD/FAO (2013) stated that "prolonged periods of low agricultural prices driven by ever increasing productivity improvements… seem now a feature of a bygone era". However, strong supply response in the 2014 crop year has subsequently altered this view of the world and the most recent OECD/FAO Outlook (2015) for the 2015–2024 period envisions modest price declines over the coming decade.

Nonetheless, there remains a strong belief that the future holds higher crop prices in store – particularly once climate change impacts and policies are factored into the analysis. Oxfam (2012) reported that "…the average price of staple foods… could more than double in the next 20 years compared with 2010 trend prices" in the wake of climate change. The International Food Policy Research Institute projected that the rise in the price of food grains such as rice, maize and wheat from 2010 to 2050 might be has high as 92% to 64% under current agricultural technologies (Rosegrant et al., 2014). A recent MIT study (Paltsev, 2012) suggests that global agricultural prices from 2010 to 2050 may increase by more than 20–30% if GHG mitigation policies are implemented. The idea that future commodity prices will rise continues to be pervasive in the public discourse.

We believe that the high price 'consensus' has been misguided. Observers were overly influenced by the 2007/08 and 2010/11 spikes in commodity prices, which, we believe, were largely driven by transitory phenomena, including record low stocks, an exceptional build-up in the U.S. and European Union biofuels programs, reactionary market interventions, and a succession of adverse weather events (Abbott et al., 2011; Piesse and Thirtle, 2009; Headey, 2010; Headey and Fan, 2010, 2008). Meanwhile, these studies have not paid sufficient attention to long run structural changes in the coming decades, including slowing population growth, the changing composition of global income growth and

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recent growth rates in agricultural productivity. When these underlying drivers of change are taken into account, we find that long run crop commodity prices will most likely resume a modest downward trend between now and 2050.

This is not the first time agricultural commodity prices have spiked over the past century. Fig. 1 reports CPI-deflated corn (grey squares), and aggregated grains (red) prices in the United States, which are broadly indicative of real agricultural commodity prices as a whole. In the early 1970s, food supply and trade shocks drove real food prices to levels not seen since the 1940s. However, over time, an expansion of supplies, coupled with the rebuilding of commodity stocks, led to prices resuming their long run downward trend. Indeed, Timmer (2010) has argued that regular food crises are to be expected every three decades as governments and private investors cycle through periods of low prices/disinterest in farming into periods of high prices and strong supply response. Is the recent experience with high prices just a repeat of the 1970s? Will prices resume their decline over the coming decades? In order to systematically explore this question, we report on a series of experiments designed to assess the long run changes in global food prices using the Simplified International Model of agricultural Prices, Land use and the Environment (SIMPLE) (Baldos et al., 2013).

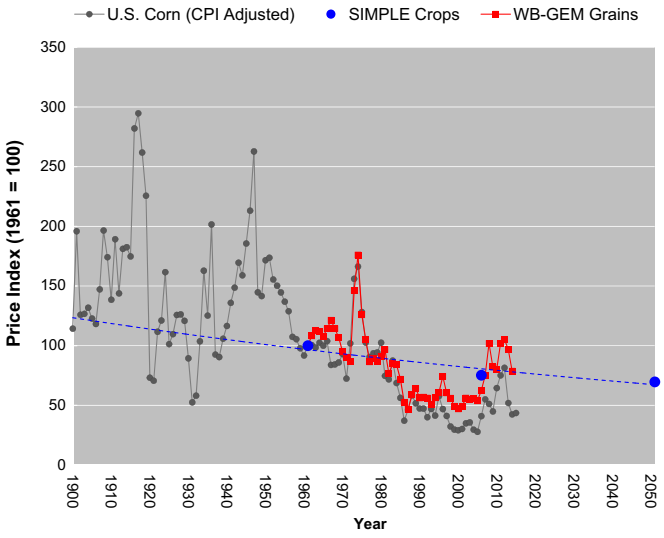

Fig. 1. Real crop prices: 1900–2051. Grey circles correspond to the historical evolution of annual U.S. corn prices from USDA-ERS Feed Grains: Yearbook Tables (US Department of Agriculture Economic Research Service, 2014), adjusted using estimated U.S. consumer price indices (CPI) from the Federal Reserve Bank of Minneapolis (2014). Red squares represent the global grain price indices from the World Bank – Global Economic Monitor (World Bank, 2015). Blue points report the historical and projected 45-year global crop prices based on simulations of the SIMPLE model for years 1961, 2006 and 2050. Blue dashed line connecting these points is a simple exponential trend line of these simulations based on the SIMPLE model.

The key elements of SIMPLE are laid out in Fig. 2. As its name suggests, this has been designed around the principle that a model should be no more complex than is absolutely necessary to understand the basic forces governing the global supply and demand for crops. Each regional crops sector is conceptualized as one in which land is combined with non-land inputs in order to produce crop output to satisfy domestic and global demands, including direct consumption, feedstuff demand, raw inputs to processed foods, and biofuel feedstock use. Food demands are price sensitive, and, over time, growth in food consumption is driven by population and per capita incomes. Rising incomes cause consumers to diversify their diets, which, at lower income levels, means adding relatively more livestock and processed foods. Production of both these commodities requires crop inputs – the demand for which can be altered by technological progress in those sectors (e.g., more feed efficient livestock). Income also has an implicit effect on food demand response, as high income households typically spend less on food relative to non-food commodities; therefore, their demands are less responsive to changes in both income and food prices (Muhammad et al., 2011). In contrast, households in regions with low per capita incomes are more responsive to high food prices (i.e. larger absolute value for the price elasticity of demand), since food makes up a relatively large share of their budget. Additional crop demands in SIMPLE come from the exogenously specified feedstock use by the global biofuels industry.

On the supply side, substitution of non-land inputs (e.g., fertilizers, farm labor and machinery) for land in crop production offers scope for endogenous intensification of production, even in the absence of technological change. In addition, we allow for exogenous growth in agricultural productivity, driven by investments in

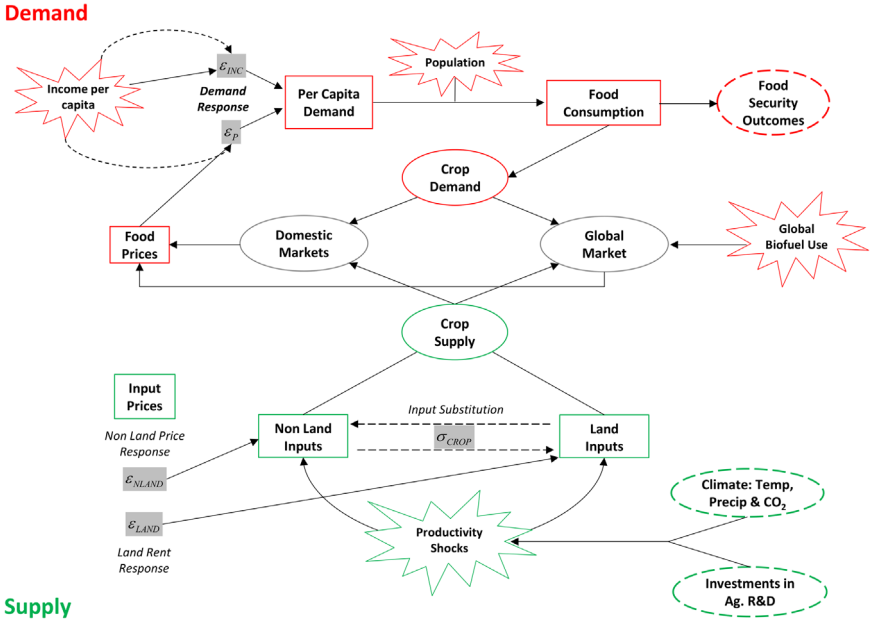

Fig. 2. Overview of the Simplified International Model of agricultural Prices, Land use and the Environment (SIMPLE).