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Implications of domestic price insulation for global food price behavior

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A B S T R A C T

Rapid changes in global food prices in recent years are widely viewed as a serious threat to global development. While various sources of price instability in agriculture have been identified, little attention appears to have been given to the importance of changes in trade policies that insulate domestic prices from world markets as a source of volatility in world prices. A contribution of this paper is to show that these interventions are dynamically more complex than simple proportional insulation. Insulation against an initial price increase in world prices increases the magnitude of that increase, while subsequent adjustments to the level of protection change the fundamental nature of price volatility. We find such policies are widespread and increase the volatility of world prices while not reducing the volatility of domestic prices because of the collective action problem involved in this form of policy intervention.

Sudden and major changes in global prices of key food commodities in the recent years have raised serious concerns among global policy makers. Food price spikes represent a direct threat to global development by adversely affecting poor households with large food expenditure shares. The International Monetary Fund and the World Bank (World Bank, 2011) argue that sharp increases in food prices raise poverty, lower the level and quality of nutrition, and reduce the consumption other essential non-food services such as healthcare and education, all of which negatively affect future growth. Because of the important developmental consequences of food price volatility, it is important

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to understand its sources and, even more importantly, identify feasible policy options for dealing with its adverse consequences.

Much of the attention on global price volatility in recent years has focussed on the effects of weather shocks on output, and the interaction between these shocks and commodity stock levels (Cafiero et al., 2011). While there is evidence that the frequency of many weather shocks, such as extreme temperatures and intense precipitation events, has increased over time, these changes have been very gradual (Easterling et al., 2000) making them an unlikely cause of the recent increase in volatility. Further, there is evidence that, despite the apparent increase in the volatility of climate outcomes, the volatility of yields for key staples has been decreasing (Gollin, 2006). Other sources of volatility that have been emphasized include government programs such as biofuel mandates, which link the price of grains to those of volatile fuel prices; however the evidence regarding the impact of such mandates on global price volatility remain inconclusive (Zhang et al., 2010). Another frequently-cited potential source of volatility is the financialization of commodity markets and the potential for instability resulting from this linkage, but careful analysis raises serious doubts about whether this factor is an important source of increased price volatility Irwin et al. (2009).

Another important feature of commodity price behavior is strong positive autocorrelation. This was highlighted in the original formulation of the storage model in Deaton and Laroque (1992), and the apparent inability of this model to generate the observed level of autocorrelation was a major cause of its rejection in Deaton and Laroque (1996, 1995). However, Cafiero, et al. (2011) resuscitated this model after finding that it could generate both price volatility and strong patterns of positive autocorrelation for seven key commodities—coffee, copper, jute, maize, palm oil, sugar, and tin—but not for wheat or rice.

Whatever the fundamental sources of shocks to global food prices, there is considerable evidence that insulating trade policy can play a major role in increasing the volatility of these prices. Martin and Anderson (2012) conclude that almost half of the increase in world rice prices between 2005 and 2008 could be attributed to the effects of the policies that countries used to insulate themselves from increases in world prices. When there is an adverse shock that raises world prices, the use of insulating trade policies raises world prices by restricting export supplies from exporting countries, and by increasing import demand from importing countries. If all countries respond in the same way, this policy response is completely ineffective—the reductions in domestic prices resulting from insulation are exactly offset by increases in the world price. While countries do not, in fact, respond in exactly the same way to price rises, Anderson, Ivanic and Martin (2013) found that this behavior was collectively ineffective if its goal was to protect poor people from the adverse impacts of higher food prices. If changes in trade policies involve intertemporal dynamics, rather than simply attempting to reduce the volatility of domestic prices relative to world prices, they may also influence the intertemporal correlations of commodity prices, as well as changing their volatility.

Anderson and Nelgen (2011) show that protection changes reduce the extent to which changes in world prices result in changes in domestic prices. They also show that the relationship between domestic and international prices is not a consistent one, with insulation being greater when prices first increase, and diminishing when price increases are sustained. This pattern of insulating behavior has potentially important implications not just for the volatility of world prices but also for their intertemporal dynamics of these prices.

In this paper, we examine the role of trade protection policies in destabilizing global food markets in more detail. Taking advantage of a large dataset of historical agricultural protection (Anderson, 2009) in a number of regional markets and for a number of important food commodities, we estimate the price insulation parameters that represent the policies countries use to shield their markets from changes in global prices. Then, in the second part of the analysis, we use a global general equilibrium model to calculate the impact of the observed insulation policies on the volatility of global prices driven by the observed volatility of regional supply and draw conclusions.

1. Methodology

To address the questions raised in this work, we use two distinct methodologies. We first use an econometric approach to uncover key parameters describing the relationship between agricultural