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Recent Agricultural Price Volatility and the Role of Grain Stocks

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This Policy Brief serves as a background paper for the May 2010 seminar, "Agricultural Price Volatility: Prospects, Challenges and Possible Solutions," organized by the International Food & Agricultural Trade Policy Council, the University of Barcelona, and the International Centre for Trade and Sustainable Development. Brian D. Wright is Professor in the Department of Agricultural and Resource Economics at the University of California, Berkeley. All views expressed in this note are those of the author, not necessarily those of the IPC.

Recent history of prices in the global markets for major food and feed grains

In the past three years, an increase in the volatility of prices of agricultural products has attracted global attention. It is widely discussed as a novel phenomenon requiring new policy responses. However, several similar episodes of high volatility have been witnessed in the past half century, most recently in 1996. Each has consisted of a steep price increase, generally followed by an even more precipitous fall. They are separated by longer, more stable periods in which prices have followed steady downward trends. When compared with other, less-noticed episodes, the real grain price volatility of the last few years is not unusually high.

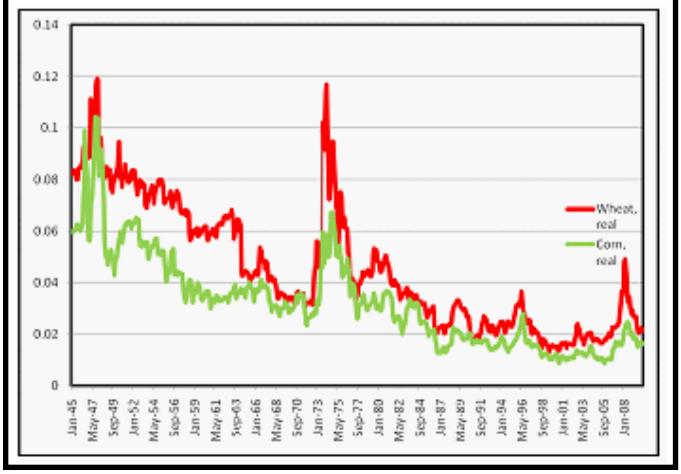
What led to the recent price spikes?

Important, persistent changes in global grain markets set the stage for the grain price spikes of 2007-08. These included remarkably sustained and rapid increases in income in many countries, including China and India, which increased worldwide grain demand, especially for animal feeds. Public support for biofuels production was another new, large and persistent shifter of demand for maize and oilseeds, whereas funding of production-oriented crop research continued to be neglected. The net effect of these factors was a gradual tightening of the aggregate supply-demand balance for major grains.

However, by 2007 these global trends could hardly have been surprises, and only surprises can cause grain price spikes. To explain price jumps, we must look to less predictable shocks in grain markets. In 2006-2008, these included the unprecedented extension of the multi-year Australian drought, a low Indian wheat harvest, regional problems with rice harvests, transport cost increases and exchange rate movements. An important new factor was the boost in biofuels production beyond previously planned levels, induced by increased biofuels mandates in the United States, the European Union, and other nations. These new mandates were driven by farmers and by citizens concerned with global warming and energy independence and alarmed by petroleum price increases. The latter led to a further biofuels demand spike in the United States, beyond the mandated levels.

As in previous spikes, government policies implemented in the autumn of 2007 exacerbated the food access crisis in the international market. A sequence of export controls, taxes and bans adopted by key exporters turned market anxiety into panic by effectively withdrawing international access to their stocks. This cascade began in the thin

Figure 1. Indices of Real Wheat and Corn Prices



global rice market, sparked by Indian concerns generated by a low wheat harvest, and proliferated globally, spreading to the wheat and maize markets via inter-grain substitution by food consumers and animal feeders.

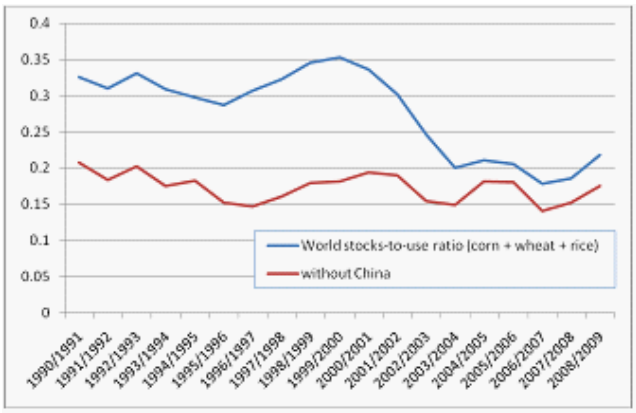
Stocks and Price Shocks

If there is private storage in the global market, anticipated international shortages never cause the price expected next year to rise by more than the costs of financing and storing stocks. Accumulation now, available for release later, raises current price and lowers next year's expected price until the expected rise is no greater than the interest rate and the cost of storage, smoothing the effects of foreseen events.

Even unanticipated shocks do not cause spikes when sufficient stocks are available; low stocks are a necessary condition for price spikes. But when internationally available stocks are close to the minimal levels essential for operation of the supply chain, shocks must be absorbed by reduction in the amounts fed to animals or consumed by humans. In free markets, this is achieved through cutbacks by livestock producers and by those consumers who are too poor to maintain consumption. To achieve a given percentage cut in consumption, the percentage price increase must be much higher. Thus the response of price to supply cutbacks is highly nonlinear. The response also reflects the availability of substitute grains. Figure 2 illustrates the recent history of aggregate calories available from wheat, maize and rice in the world market.

When stocks are already tight, an otherwise minor shock can have major consequences for world stocks-to-use ratios for aggregate calories from corn, wheat, and rice. By 2007/08, the ratios of stocks of calories reported for the global market to calorie consumption in that market were at the same minimal levels seen in previous price spikes. The grain price spikes were, in real terms, within the range observed when stocks were similarly low and consumers were being forced by high prices to reduce their grain purchases.

Figure 2. Stocks-to-Use Ratio for Calories from Corn, Wheat, and Rice



However, it is important to note that the stocks data referenced are imprecise and exclude the large public and private stocks held in China, because China has usually shielded its own consumers from price spikes by controlling grain exports. Other important producers have tended to shut off access to grain just when it is most needed by importers by banning or taxing exports in order to favor domestic consumers.

How should public policy interact with stocks at both the global and national levels?

Given the potential negative effects of price volatility, especially on the most vulnerable consumers, most governments intervene in commodity markets to reduce these effects on consumers or other favored groups. As reserves play a crucial role in absorbing market shocks, they are targets for both global and national policies, which at times may be at odds with one another. Before considering policy options at each of these levels, however, we will first examine government interventions that only lead to further destabilization of consumption and price.

Destabilizing Policies

Interventions in futures markets and private stockholding. In every episode of food price spikes, speculators have been blamed for exacerbating price fluctuations. However, speculation cannot raise prices for consumers unless it reduces the quantity consumed, presumably by increasing stocks. In recent years, there is no evidence that speculators' actions increased total grain stocks during spikes. Hence it is unclear how they might have caused increases in the price spikes faced by consumers. Nor is it clear that modest private holdings of stocks would have been socially undesirable, given there was some probability that aggregate supplies could have been lower one year later. Indeed futures markets encourage competitive private market-stabilizing behavior; banning them removes protection of importers from potentially huge "counterparty risks" associated with forward trading, analogous to those recently revealed by the failure of AIG to honor contracts hedging collateralized debt obligations. Inadequate hedging facilities discourage the establishment of marketing cooperatives and other independent trading enterprises and encourage the domination of global trading by multinational oligopolies, each integrated across many steps of

the international value chain.

There is no evidence that markets without futures are more stable. Indeed, the great famines of the past century (in Russia, India, and China) all occurred in countries with massive government interventions that discouraged or eliminated private storage.

Global Stabilization Policies

International Commodity Agreements

There is a long history of agreements, supported by economists from Keynes to Hayek, to stabilize prices of globally traded commodities around levels agreed upon as "reasonable" by persons designated as experts with superior knowledge of true equilibrium values. Four decades ago, the "new international economic order" (NIEO) proposed by UNCTAD included price band buffer stocks to stabilize commodity prices at levels designed to favor producers rather than consumers. Such agreements frequently adopt price band rules that establish floor prices at which stocks are purchased and ceiling prices at which they are sold. Price bands appear simple and transparent, but their effects are neither. Unfortunately, simulations and experience with actual policies show that price tends to hover at or near the upper or lower bound of the band (the "ceiling" or the "floor" price) and to be less stable around the middle. The overall effect on volatility, relative to competitive storage, is ambiguous. Release of stocks at the ceiling price smoothes price peaks, but the ceiling discourages private storage and suppresses the production response to anticipated shortages. The financial balance fluctuates wildly. Commodity models indicate that these agreements will not succeed, even if there is no underlying trend in price. Experience has demonstrated repeatedly that these programs tend to fail quickly and cause great destabilization when they do. Empirical research of international commodity agreements since the NIEO highlights the extreme difficulty--if not impossibility--of consistently out-guessing the market, setting judicious price bands or other trading rules, and adjusting them to prevent financial failure.

A recent variant of the price band scheme is a proposed "virtual buffer stock," designed to operate with unhedged positions in futures markets to smooth price spikes by convincing speculators that their expectations of profit are misguided. Such intervention, if large enough to move markets, would be financially risky and subject to manipulation by traders. Essentially, it would amount to another attempt to rely on a group of experts, even though this has not worked in the past.

Global collaborative storage policy

It would be globally desirable for nations to guarantee free access to grain by relying on an open trading system. This would economize on stocks and storage costs in providing a globally adequate amount of storage and increase food security worldwide. Yet, the trading system is not open, as witnessed by the breakdown in access to grain markets in 2007/08.

National policies for consumption stabilization

Domestic strategic stocks

Given the infeasibility of a global grain reserve, importers with good access to global grain trade routes in normal times might be forced to consider national strategic reserves as part of a policy for domestic food security. Land-locked nations have even greater need to consider local stockholding as a food security measure. To protect minimal consumption levels, there is no need to stabilize price. Only the poor adjust calorie consumption significantly when prices spike. If reserves are designed to meet quantitative targets for distribution of food on the basis of need, such as "food for work" at a value below the prevailing wage and targeted feeding, total costs will be lower, leakage will be reduced, and disincentive effects on private traders and storage operators will be less severe. Such programs require prior planning and infrastructure. Choice of the size of the reserve is a challenge that involves a compromise between food security and the cost of storage, including interest on the capital invested in the stock.

Instruments to minimize disruption from biofuel demands

The emergence of domestic biofuel demand and the global surge in animal feeding have reduced availability of major grains for consumers and stock levels, and so have raised prices and made markets more susceptible to spikes. Although their net effect on consumption security is negative, they also offer new opportunities for national consumption stabilization. For the growing number of nations with biofuels mandates, it is important to ensure that such mandates will be modified in food crises. Further, option agreements with domestic biofuel producers and animal feeders could guarantee voluntary diversion of grain from biofuel production and feed use to targeted human consumption, in specified severe food crises. If such crises are infrequent, such options might be more cost effective than increased domestic storage.