

Why Are Food Prices Going Up?

Michael Roberts, *Assistant Professor*

In just the last few years, prices of corn, soybeans, wheat, rice and other basic food commodities have doubled or tripled. At their peak earlier this year, corn and wheat prices were nearly four times their all time lows in 2000 (Figure 1), and rice and soybean prices exhibited similar trends. The ongoing financial crisis and global economic slowdown are bringing commodity prices back down somewhat, but prices remain high by historical standards. In the poorest nations, where families typically live on \$2 a day and spend half their income on food, continued high prices could cause widespread malnutrition. Retail prices at U.S. grocery stores are following the same trend as basic food commodities, albeit at a much slower pace. That's because retail prices are comprised mainly of costs associated with turning raw commodities into food we like to eat, plus transportation and marketing. Except for the fuel component of transportation costs, these added costs are comprised mostly of wages for labor and haven't changed much. Meat, milk, and cheese, for example, are mainly reprocessed corn and soybeans, the principal sources of animal feed. Fuel costs depend on oil prices, which have increased along with prices of food commodities. Here in the U.S., modestly higher retail food prices probably have more to do with the price of oil than with the price of corn. In poorer nations, however, where people live mainly on basic grains, price increases have been significantly larger, and people are much less able to afford them.

What has caused the sudden rise in food prices? This issue of the *NC State Economist* discusses four key reasons for the sudden rise in food prices over the past few years – demand growth, rising energy prices, slowing technological progress in food production, and diversion of certain food crops

(especially corn) to biofuel production. While there is some uncertainty about their relative importance, there is little debate that these are the main factors at play.

Demand Growth

One reason for rising food prices has been accelerating demand growth in India and China. India and China are the most populous countries in the world, and their economies are growing rapidly. China is particularly important because the Chinese, like Americans, enjoy eating meat, and are using their rising incomes to buy a lot more of it.

Since 1961 China's population has doubled while their meat consumption has grown more than 33 fold. Since it takes 5 to 10 calories of feed grains to make one calorie of meat, a billion new meat eaters adds a lot to world demand for basic grains. While China is growing more corn and soybeans to feed their livestock, their imports of soybeans, particularly from South America, have soared over the last decade. And just this year China imported rather than exported corn for the first time.

Energy Prices

A second factor affecting food prices has been rising energy prices that make it more costly to transport grains and retail foods from one place to another. Agricultural production and processing are also energy intensive. For example, methane (natural gas) is used to produce nitrogen fertilizer, so when natural gas prices rise, fertilizer prices rise. Farms in developed nations also use a lot of energy-consuming machinery, as do processing facilities.

Rising energy prices are partly due to economic growth in Asia noted above: both the Chinese and the Indians appear to share our taste for automobiles, just as the Chinese share our taste for meat. It has also become more difficult to find new, easily extractable deposits of oil.

Slowing Technological Progress

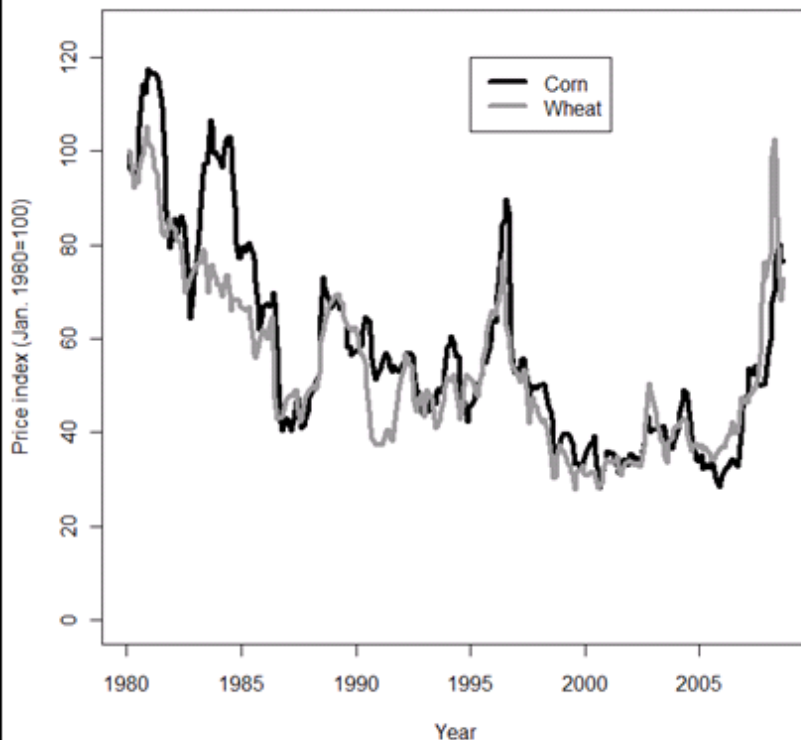
A third factor boosting food prices has been an apparent slowing of the development of yield-enhancing production technologies for food commodities. For many decades food prices declined mainly because technological advances allowed farmers to grow ever more food per acre of land cultivated. For example, between 1961 and 1998, U.S. corn yields increased from 62 to 134 bushels an acre. Wheat, rice and soybeans experienced similar yield growth over this time span as well. Steadily increasing productivity was

key to the relative decline of food prices because corn, wheat, rice, and soybeans comprise 75 percent of the caloric energy in food crops produced and consumed worldwide.

In recent years, however, yield growth has slowed (Figure 2). Since 1998, corn yields worldwide have grown at an annualized rate of 1.4 percent, down from 2.2 percent per year between 1961 and 1998. Similarly, growth rates for rice and wheat fell by 50 percent and 80 percent in the past decade, while soybean yield growth has virtually stopped – falling from 1.9 percent per year to 0.1 percent per year.

Some of the recent slowdown in yield growth may be due to drought, particularly for wheat in Australia. While this phenomenon may be temporary, some believe it may stem from climate change. Others also see imminent advances in biotechnology that could accelerate yield growth in the near future. Only time will tell.

Figure 1. Inflation-Adjusted Prices of Corn and Wheat



After declining for many years, major food commodity prices are rising.

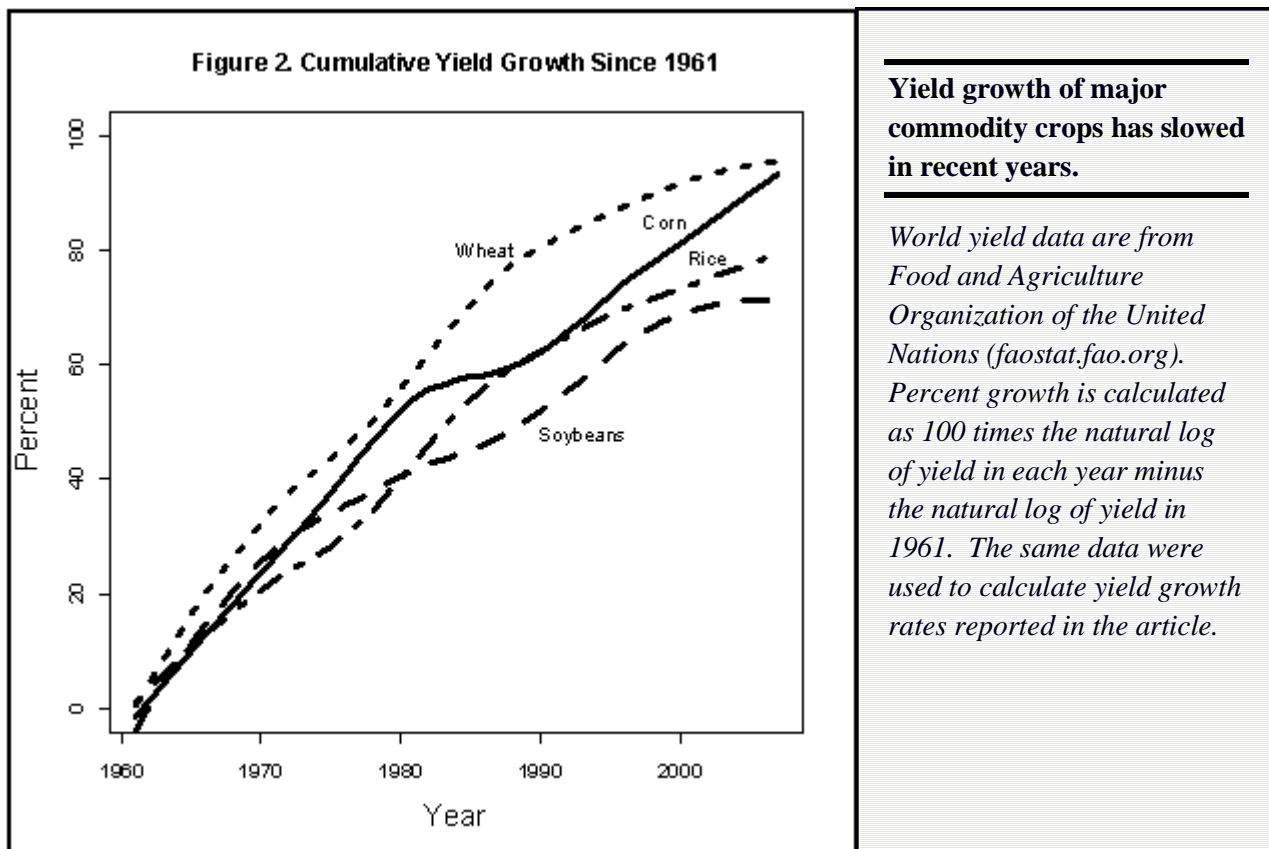
Price indices shown are monthly averages received by U.S. producers, adjusted for inflation, as reported by the USDA National Agricultural Statistical Service (www.nass.usda.gov). Prices received by farmers can differ from market prices. At their highest earlier this year, daily cash prices exceeded the highest shown here by over 35 percent.

Biofuels

A fourth key factor in rising food prices is related to rapid growth in biofuel production, particularly corn-based ethanol in the U.S. In just five years ethanol production has grown from a nascent industry into one that now diverts about a third of the U.S. corn crop toward fuel production and away from food production. The scale of this diversion is considerable because the U.S. is by far the world's largest producer and exporter of corn. We grow a full 40 percent of corn produced worldwide and ship nearly 80 percent of the world's exports. Diverting a third of the crop away from food production and into fuel production has surely influenced world commodity prices. Indeed, the annual amount of caloric energy diverted to U.S. corn-based ethanol production makes up about 4.4 percent of the worldwide caloric total of corn, soybeans, wheat and rice combined – enough to feed several hundred million for a year.

Growth in ethanol production has been precipitated by a federal subsidy of 51 cents per gallon and a simultaneous tariff on imports of Brazilian sugarcane-based ethanol, which is much more economical than domestic corn-based ethanol. These policies are further backed by a standing federal mandate to increase domestic biofuel production another 400 percent by 2022. Where corn-based ethanol production got its start from mandates, subsidies and tariffs, high oil prices have helped to accelerate it.

While many believe corn-based ethanol production will not be viable in the long run, some believe it is a useful bridge to large-scale production of cellulosic and other biofuels that may hold greater promise. Such fuels might be derived from waste biomass or as non-food crops grown on lower-quality land, like switchgrass and miscanthus.



Policy Responses

It is unclear which of these four factors has contributed most to recent price increases, but all four are important. From a policy perspective, some factors are easier to address than others. It is possible that corn-based ethanol production would persist even if current subsidies and tariffs were removed. Nevertheless, amid growing food crisis in poorer countries, it would seem prudent to remove tariffs and subsidies associated with ethanol production, at least as they pertain to food crops like corn. Another option in the short run would be to help developing nations promote the development of their own agricultural sectors and, in acute cases, provide greater food assistance.

In the long run, the food crisis may resolve itself. The current worldwide economic slowdown should help to lower food prices. If not, continued high prices may provide an incentive for farmers and biotechnology companies to develop (or increase the pace of developing) new, yield enhancing technologies, as well as providing incentive for farmers to

adopt those technologies. An additional long-run policy option could be to restore funding of research in basic plant sciences, which has fallen markedly in recent years and was a driving force of past yield gains.

N.C. State Economist

Published bi-monthly by the Department of Agricultural and Resource Economics and the Cooperative Extension Service.

Address Correspondence to: The Editor,
NC State Economist, Box 8109,
NC State University, Raleigh, NC 27695

The NC State Economist is on-line at:
<http://www.ag-econ.ncsu.edu/extension/economist.html>

**North Carolina Cooperative Extension Service
North Carolina State University
Agricultural and Resource Economics
Box 8109
Raleigh, North Carolina 27695-8109**

NON-PROFIT ORG.
U.S. POSTAGE
PAID
RALEIGH, NC
PERMIT #2353