

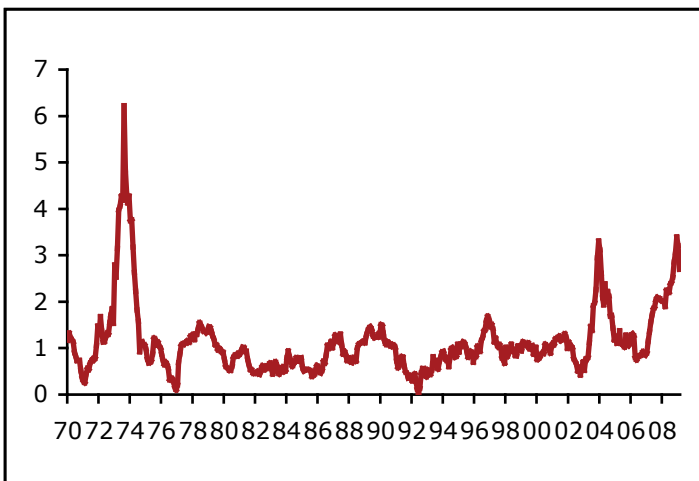
# Food and Energy: An Inflationary Duet

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After last year's spike, current oil prices of around \$50 a barrel appear to be a bargain. The reality, however, is that even at this recessionary level, real oil prices are \$15 higher than their long-term average. And with the eventual global economic revival, oil prices will rise alongside the global economy, albeit not materially until 2011.

The longer-term climb in energy prices that we've already seen threatens to alter agriculture and food systems. The foundation of the modern agri-food system has rested on cheap energy, given the need to maximize yields in the face of constraints on arable land supply. But a recovery in oil prices, and the potential impact of environmental policies to restrain its use, will turn this model on its head. The agri-food system is highly energy intensive, and as energy prices rise, so does the cost of growing and delivering the food. That will lead to a significant shift towards less energy-intensive methods—read organic. Ditto for the globalization of food that was largely fuelled by cheap energy. But with the cost of transport potentially exceeding the actual cost of many products, we will witness a significant cut in food miles—internationally via reduced imports, and locally via re-localization of farming. The environmental movement is also promoting such a shift in consumer attitudes. That will also mean smaller farms, as the recent concentration of supply (large farms) led to a rising distance between the point of production and the point of consumption.

Chart 1  
Ratio of US Food Inflation to Core Inflation



## No Deflation in Food Prices

We are already seeing fundamental change in the way food prices behave in the midst of a deep global recession. While US CPI inflation is already at zero, food inflation is still running at a red hot 5%. With the exception of 2004, the gap between food inflation and core inflation is the largest seen since the food crisis of the 1970s (Chart 1). And this isn't just a US story, as large, if not larger gaps between food and inflation are sprouting up all throughout the world (Chart 2). So it's not about local factors, like a poor harvest in particular regions, but rather about global conditions.

The gap between food and inflation is particularly puzzling given where we are in the cycle. Over the past 40 years, food inflation tended to lead the inflation cycle by roughly 4-5 months (see circles in Chart 3), but this time around the pattern has not only been broken, but effectively reversed with food inflation lagging the decline in overall core inflation.

Clearly there are some fundamental structural shifts going on that are overwhelming the cyclical forces that would normally prevail over food inflation in the midst of one of the deepest post-war recessions on record.

Chart 2  
Huge Gap Between US Food and Inflation Also Found Worldwide

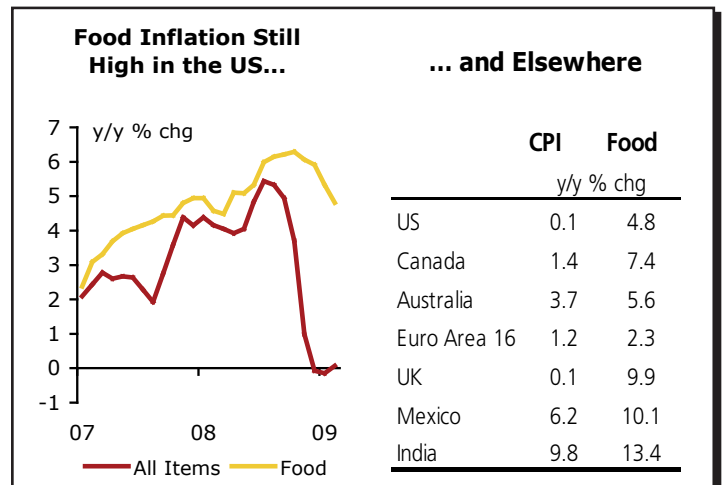


Chart 3

**Food Prices No Longer Leading the US Inflation Cycle**

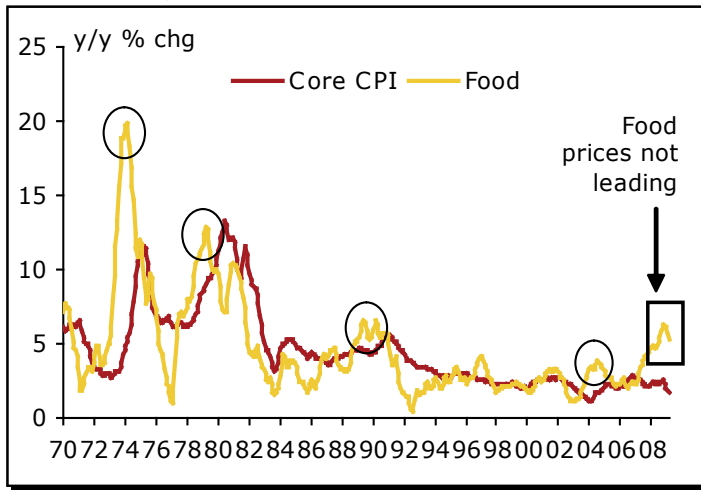
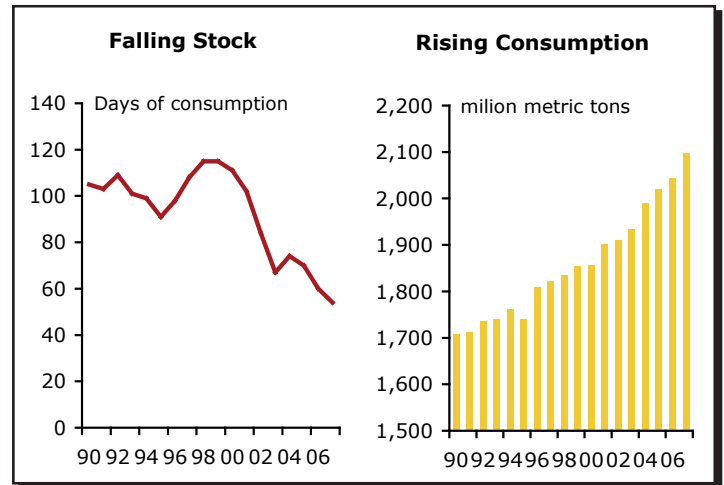


Chart 5

**The Global Grain Market**



Source: USDA, CIBC

**Disequilibrium in the Global Food Market**

One of those shifts is the growing global demand for meat, which has been advancing at twice the speed of population growth. Currently, we consume close to 90 pounds of meat per person a year globally—up from 60 pounds in the 1970s. And despite the recession, meat consumption in the US did not fall in the past year and, in fact, it is still almost 5% higher than it was during the past decade. Recession or no recession, Americans still consume their meat (Chart 4). Nor has meat consumption fallen notably in China during this recession. More importantly, at more than 120 pounds per capita a year, it is now more than double the consumption seen a decade ago.

More meat means more grain—a lot more. It takes close to seven pounds of feed to produce a pound of beef or pork, and about two-and-a-half pounds of feed to produce a pound of chicken. So when world meat consumption soars, we have to grow a lot more grain just to accommodate for the additional feed demand. That is why demand for oilseeds and grains grew faster than supply in eight of the last nine years. During that period of time, world grain inventories have fallen by 50% and are at the lowest levels on record (Chart 5).

Chart 4

**America's Meat Consumption Is Not Falling Despite Recession**

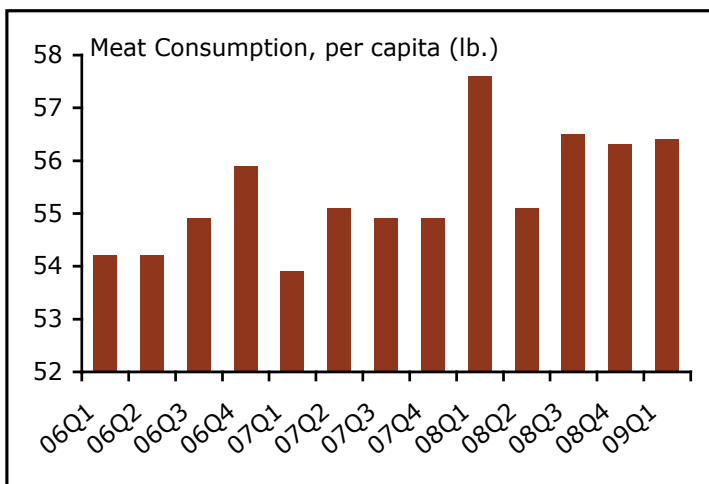
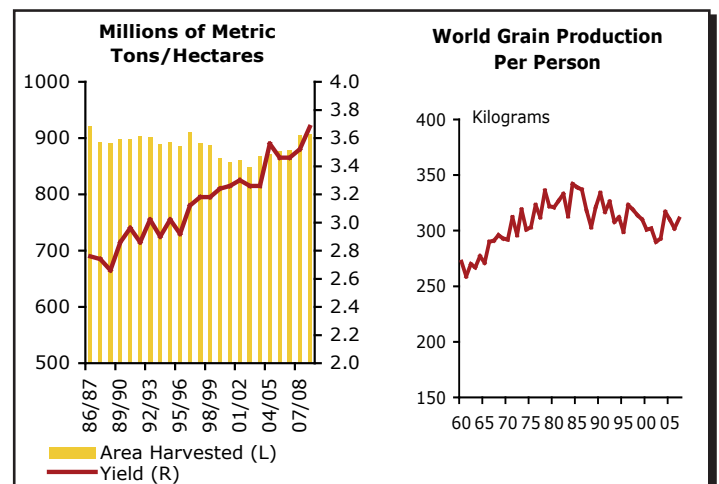


Chart 6

**Rising Yield, Not More Harvested Land, Keeps Per Capita Grain Production Stable**



Source: Foreign Agricultural Service/USDA, CIBC

Source: USDA, CIBC

Growth in world food production over the past several decades came entirely from productivity gains or rising yield per hectare. Harvested land usage was relatively constant over the past two decades while yield per hectare is currently at 3.7 million metric tons—a 35% improvement over the past 20 years (Chart 6, left). And that is why per capita global food production has not fallen despite the urbanization demands of huge increases in world population (Chart 6, right).

**Farming is Energy Intensive**

But productivity gains in agriculture are extremely dependent on ever greater energy inputs and hence, hugely vulnerable to higher energy prices. Vast amounts of oil and gas are used as raw material and energy in the manufacture of fertilizers and pesticides, and as energy for all stages of food production: from planting, irrigation, feeding and harvesting, through the processing, distribution and packaging, not to mention the energy needs of the infrastructure needed to facilitate this industry. Industrial food supply accounts for no less than one-fifth of total energy use in the US.

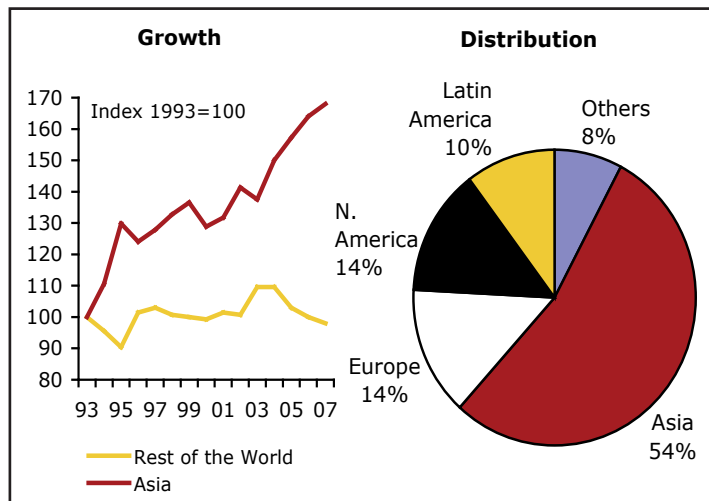
But by far the single most important factor in the growing use of energy in farming is the ever greater dependency of today’s farmers on fertilizers. Just like in the oil market, fertilizer demand is coming predominantly from developing countries. Over the past decade, China and India have increased fertilizer usage by 40% and 55% respectively. In fact, fertilizer consumption in the US and

Europe was hardly changed. Asia accounts for 54% of the market (Chart 7) and, in fact, the US is now the largest importer of fertilizer given that since 1999, 40% of its fertilizer industry has been shut down. As with oil, one of the reasons for the strong demand from Asia is fertilizer subsidies, roughly 10-20% of cost.

A gradual rebound in energy costs is bound to be reflected in food prices, unless energy intensity in the sector falls dramatically. But despite the high cost of energy of the past five years, agriculture has not been able to materially reduce its energy intensity. In the last decade, the rate of improvement in energy intensity has become marginal (0.5% per year), compared to as much as 4.5% per year improvements during the 1980s (Chart 8). A key reason preventing further reductions in energy intensity is the fact that for crops like wheat or corn, fertilizer represents anywhere from 50-70% of the total energy used.

With so much of the energy used derived from fertilizers, organic farming is the only way to materially reduce agriculture’s energy intensity in the short term. Since organic farming does not use fertilizers, it is significantly more energy efficient. For example, it takes 30% less energy to produce a pound of organic corn than it takes to produce a pound of conventional corn. Ditto for soybeans where the energy savings is close to 20% (Chart 9, right). While organic farming has skyrocketed lately and has doubled in volume over just the last five years, it still only accounts for only 2-3% of the market in the United States.

Chart 7  
**Global Fertilizer Demand**



Source: Bloomberg, IFA and CIBC

Chart 8  
**Improvement in Agriculture Energy Intensity (Per Year)**

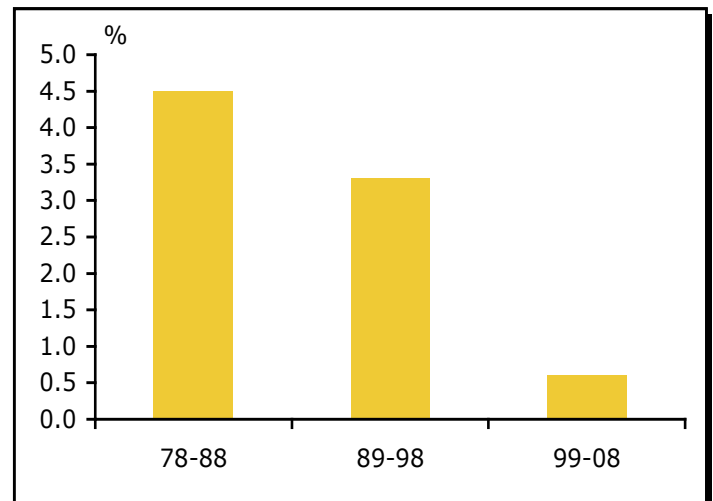
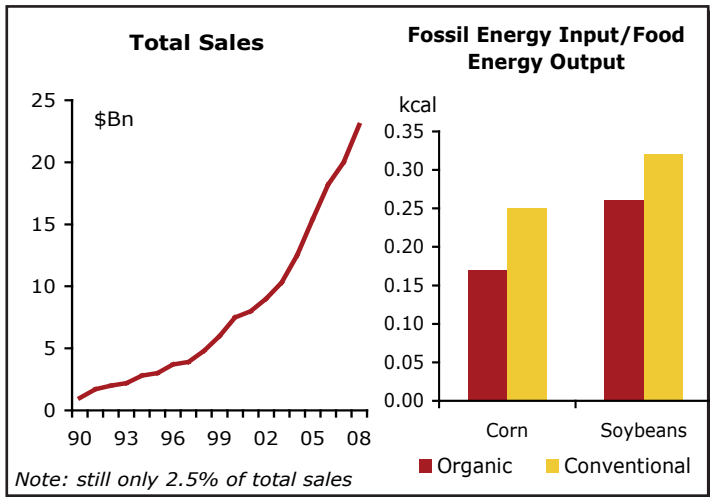
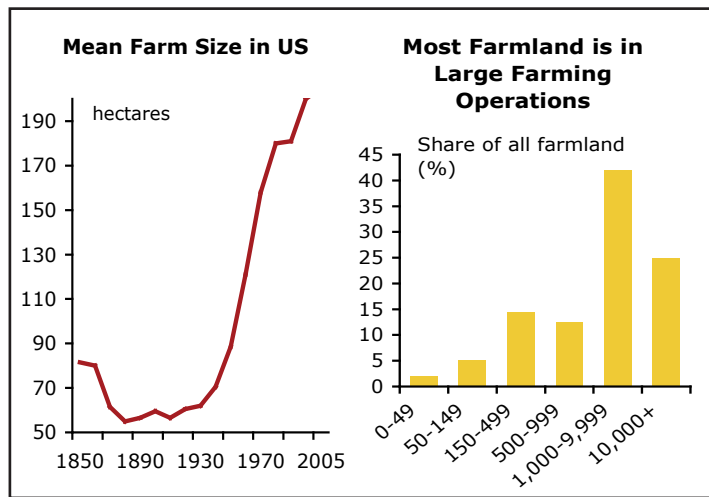


Chart 9  
The Organic Market



Source: D. Pimentel, Cornell University, CIBC World Markets Inc.

Chart 11  
US Farms



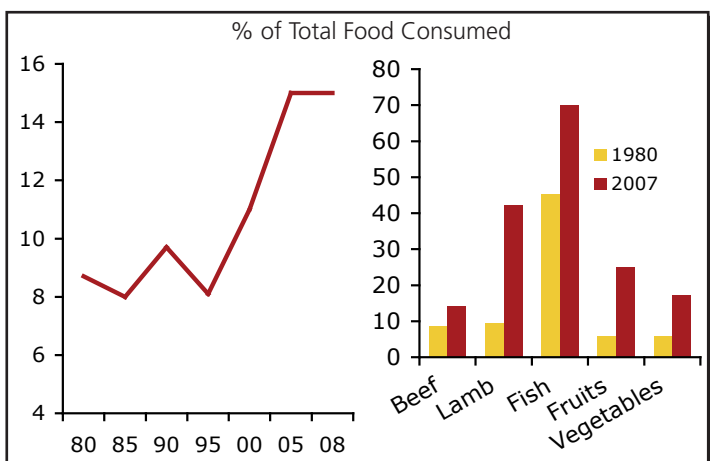
Source: US Department of Commerce, USDA, CIBC World Markets Inc.

**Energy Also Used to Move Food**

Energy is not just being used more to grow food, it is also being used to move food all around the world like never before. A food mile is the distance food travels from where it is grown to where it is ultimately purchased. And food appears to be traveling further and further these days to dinner plates all over the world. Agricultural imports more than doubled in the US over the past decade. For some foods like seafood, the increases have been nothing less than striking. Whereas in 1980 Americans imported 40% of their seafood, today they import 70%. And likewise, in 1980 America imported only 10% of its lamb from abroad, today it imports 40% (Chart 10).

But it's not only about international trade; even more important was the trend towards a larger and more concentrated farming system. The average size of a farm is now more than twice the size of farms seen in the 1950s (Chart 11, left). Farms with fewer than 50 acres comprise less than 2% of all farmland in the US, while farms with more than 1,000 acres represent two-thirds of all farmland (Chart 11, right).

Chart 10  
US Food Imports



Source: Economic Research Service/USDA, CIBC

This concentration led to a situation in which close to 50% of domestic US food is coming from only four states. So even domestically, the concentration led to a significant rise in the food odometer.

In fact, if you sum up the distance travelled by the food items consumed daily by the average American for breakfast, lunch and dinner, you get roughly 37,000 miles. That's almost 50% larger than the circumference of the earth.

The current disconnect between food inflation and overall inflation is an early sign of the upcoming changes in the economics of food. While fuel prices will remain subdued through 2010, a global recovery will have them rising more materially again beyond then, particularly if carbon taxes or emissions permits are imposed. In an effort to reduce energy intensity, farmers will increase organic food production whereas the food system as a whole will reduce its dependency on imports, and will become much more localized.