HIGH FOOD PRICES: A CYCLICAL OR STRUCTURAL PHENOMENON?

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Food prices, and particularly the prices for basic food commodities, have risen sharply during the past two years. Food prices are known to be highly cyclical, but in recent years it became obvious some structural forces are causing food price hikes in response to supply and demand imbalances. In many countries, especially low-income, food-insecure or highly import-dependent countries, some serious concerns have been expressed about the socio-economic implications of long-term high food prices.

It was more than 200 years ago, at the start of the industrial revolution, when economist Thomas Malthus theorized that "the power of population is indefinitely greater than the power in the earth to produce subsistence for man." Luckily, his predictions of famine and disaster turned out to be deeply flawed, but his catastrophic predictions are coming to the fore once again as food shortages grip the world.

Certain long-term, structural trends led to slower growth in production while rapid growth in demand contributed to a sharp downward trend in world aggregate stocks of grains and oilseeds. Recent factors that have further tightened world markets include increased global demand for biofuels, feedstocks and adverse weather conditions in 2006 and 2007 in some major grain- and oilseed-producing areas of the world.

The devaluation of the U.S. dollar, rising energy prices, increases in agricultural costs of production, growth in foreign exchange holdings by major food-importing countries, and protective policies adopted by some exporting and importing countries have led to upward pressures on prices and led to a tightening of supplies or increased demand.

Subsequently, stocks of grains and oilseeds have fallen to levels that make the global aggregate stock-to-use ratio for grains and oilseeds the lowest since 1970.

1. The Disparity Effect of High Food Prices

Rising food commodity prices tend to negatively affect lower income consumers more than higher income consumers. First, lower income consumers spend a larger share of their income on food. Second, staple food commodities such as corn, wheat, rice, and soybeans account for a larger share of food expenditures in low-income families. Third, consumers in low-income, food-deficit countries are vulnerable because they must rely on imported supplies, usually purchased at higher world prices. Fourth, countries receiving food aid donations based on fixed budgets receive smaller quantities of food aid.

A number of factors affect how much of an increase in world food commodity prices passes through to consumers' budgets: the percentage of income spent on food, the percentage of retail food expenditures spent on staple foods, government trade and domestic food policies. Figure 1 illustrates a simplified comparison of the impact of higher food commodity prices on consumers in high-income countries and on consumers in low-income, food-deficit countries illustrates these differences.

Impact of Higher Food Commodity Prices On Consumers' Food Budgets*

	High-income countries	Low-income food-deficit countries
I. Base scenario		
Income	$40,000	$800
Food expenditure	$4,000	$400
Food costs as % of income	**10.0%**	**50%**
Disaggregate retail food spending (staples vs. non-staples)		
Staples as % of total food spending	20%	70%
Expenditures on staples	$800	$280
Expenditures on non-staples	$3,200	$120
II. Scenario: 50% price increase in staples, partial pass through on staples		
Assumed % pass through	60%	60%
Increase in cost of staples	$240	$84
New cost of staples	$1040	$364
New total food costs	$4,240	$484
Food costs as % of income	**10.6%**	**60.5%**

*These are illustrative food budgets that characterize the situations for consumers in high- and low-income countries.

Source: Trostle, 2008

Figure 1:

Thus, for highly import-dependent or highly food-insecure countries, any decline in import capacity stemming from rising food prices can have challenging food security implications, besides adversely affecting economic and price stability.

2. The Surge in Food Prices

World market prices for major food commodities such as grains and vegetable oils have risen sharply to historic highs in the past couple of years. Many factors have contributed to the run-up in food commodity prices. Some factors reflect trends of slower growth in production and more rapid growth in demand that have contributed to a tightening of world balances of grains and oilseeds over the last decade.

Recent factors that have further tightened world markets include increased global demand for biofuels feedstock and adverse weather conditions in 2006 and 2007 in some major grain- and oilseed-producing areas. Other factors that have added to global food commodity price inflation include the declining value of the U.S. dollar, rising energy prices, increasing agricultural costs of production, growing foreign exchange holdings by major food-importing countries, and policies adopted recently by some exporting and importing countries to mitigate their own food price inflation.

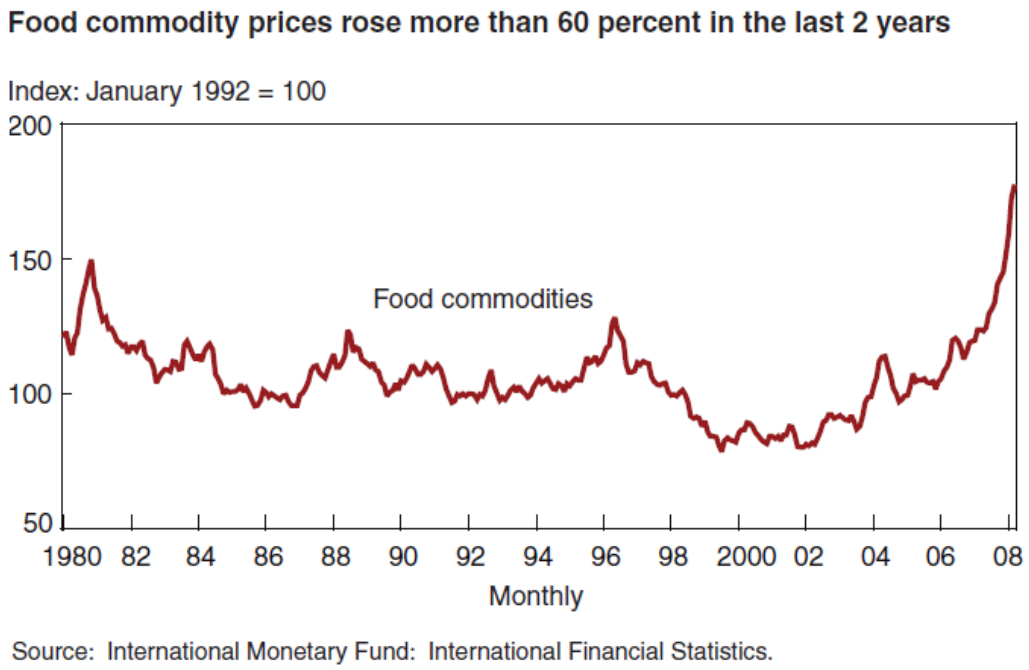


Figure 2:

Figure 3 puts the evolution of the food commodity price index into broader perspective. Monthly price indices for wheat, rice, corn, and soybeans back to 1970 have been added to the index for food commodity prices. Wheat and rice account for the bulk of the world's food consumption of grains. Corn is used for both food and animal feed. Soybeans provide vegetable oil for human consumption and protein feed for animals. Combined, the four crops account for a large share of the staple foods that are consumed globally.

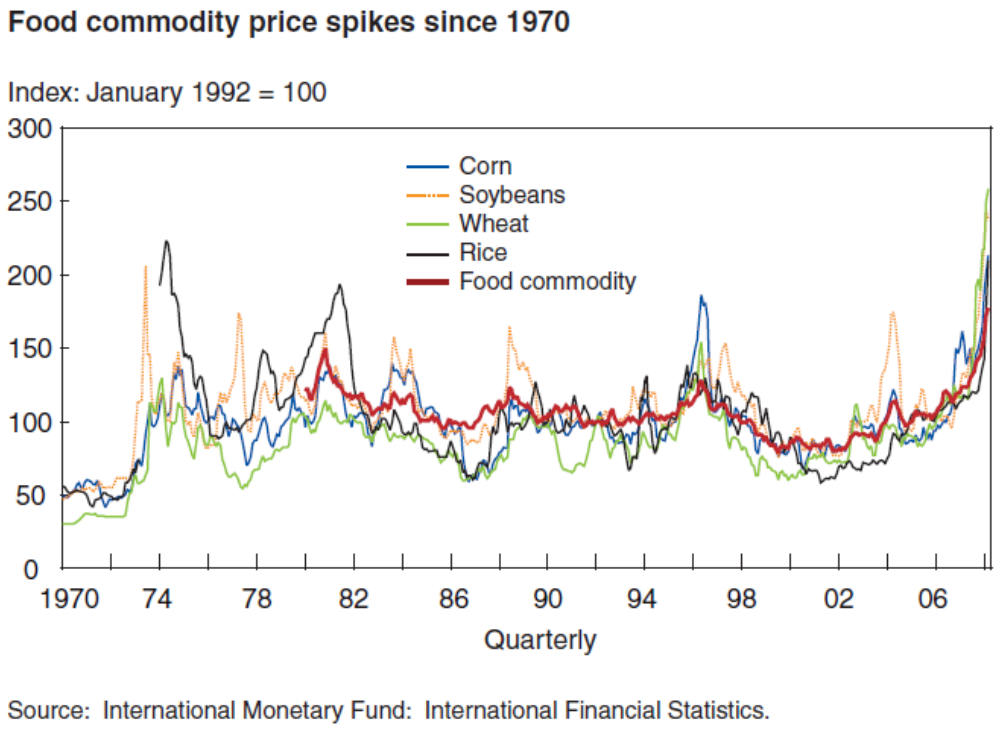


Figure 3:

Two general patterns are especially significant in figure 3. First, the index of average food commodity prices closely tracks the prices of the four major crops (wheat, rice, corn, and soybeans). Second, there have been periodic spikes in the prices of the four crops during the last 38 years. Although some of the price spikes focused on only one of the crops, in general the prices of all four crops rise and recede in a similar pattern. This occurs because buyers can substitute among these or other commodities, whether for food use or animal feed use, and purchase whichever is cheaper. With the exception of the early 1970s, each period of rapidly rising prices was followed by a retreat back to their pre-spike level.

Figure 4 charts the price index for food commodities along with an index for the average of all commodities and an index for crude oil. Although the food commodity index has risen more than 60 percent in the last 2 years, the index for all commodities has also risen 60 percent and the index for crude oil has risen even more.

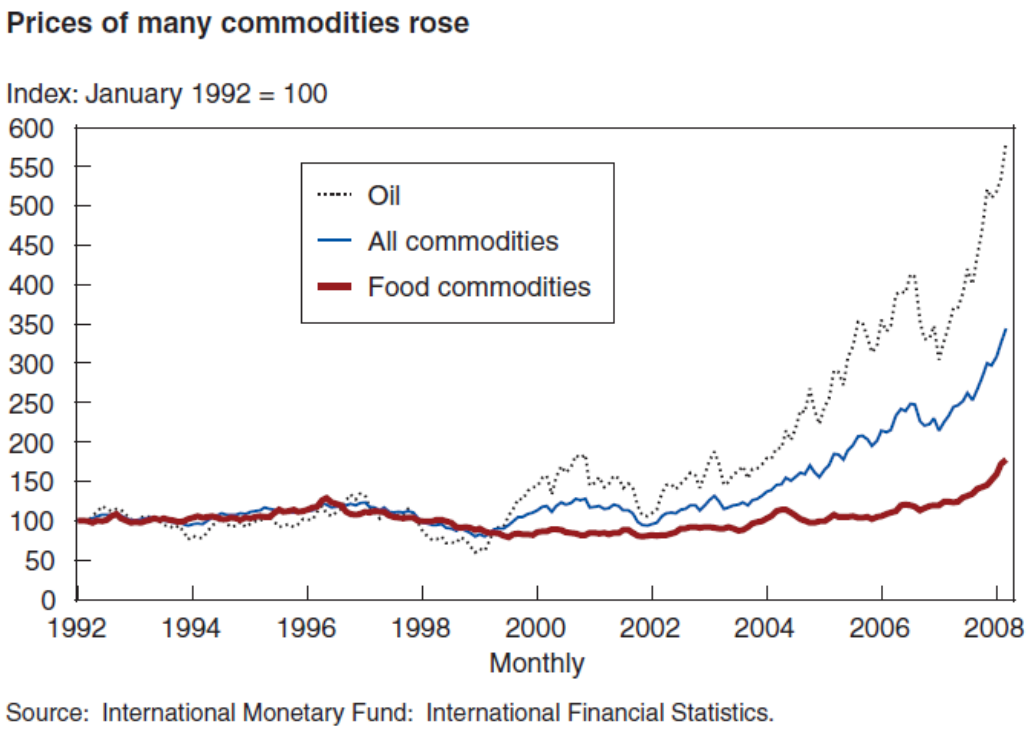


Figure 4:

Since mid-1999, when all three indices were at about the same level (and were about where they had been 10 years earlier), food commodity prices have risen 98 percent (as of March 2008); the index for all commodities has risen 286 percent; and the index for crude oil has risen 547 percent. In this perspective, the recent rise in food commodity prices might not seem so severe after all. However, because an increase in the price of food–a basic necessity–causes hardships for many lower income consumers around the world, food-price inflation is socially and politically sensitive. That is why much of the world's attention is now focused on the increase in food prices more so than on the more rapid increase in prices of other commodities.

3. Behind The Surge

3.1 Long-Term Trends Affecting Supply

A number of long-term, slowly evolving trends have affected the global supply and demand for food commodities. The impact of these trends has been to slow growth in production and to strengthen demand. The resulting tightening of the global supply and demand balance has gradually put upward pressure on agricultural prices.

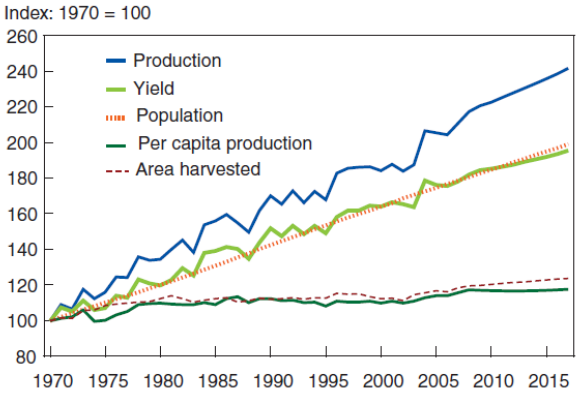
Production Economics

The growth rate in the production of grains and oilseeds has been slowing during the past decades. Yield growth is projected to continue declining over the next 10 years to less than 1.0 percent per year. The growth rate for area harvested has averaged only about 0.15 percent per year during the last 38 years, but it is expected to increase in the coming decade as the result of higher commodity prices, conversion of forest and pastures to cropland, and more intensive use of existing cropland.

Total world grain & oilseeds[1]
Production, yield, area harvested, population & per capita production

Exponential trend growth rates:

	1970-90	90-07	2009-17
Production	2.2	1.3	1.2
Yields	2.0	1.1	0.8
Area	0.15	0.14	0.39
Population	1.7	1.4	1.1
Per capita production	0.56	0.11	0.02



[1]Total oilseeds = soybeans + rapeseed + sunflowers.
Source: USDA Agricultural Projections to 2017.

Figure 5:

Research & Investment

Reduced agricultural research and development by governmental and international institutions may have contributed to the slowing growth in crop yields. Stable food prices during the last two decades have led to some complacency about global food concerns and to a reduction in R&D funding levels. Although private sector funding of research has grown, private sector research has generally focused on innovations that private companies could sell to producers. These have often been cost-reducing rather than yield enhancing technological developments. Publicly-funded research might be more likely to focus on innovations that would increase yields and production.

Industrialization & Environmental Degradation

Other trends have contributed towards the slowdown in yield growth: *One*, over the past decades a small percentage of the world's agricultural land has been converted to non-agricultural (industrial and residential) uses. *Second*, the ability to obtain water for agricultural use has become more challenging, either because gravity-flow irrigation systems are more difficult or expensive to develop, or because irrigation wells have to be dug deeper as water tables decline. *Third*, climate change has increasingly become a concern for agriculture production, although its impact on crop production is not undoubtedly quantifiable.

Water is often an overlooked but valuable commodity. For example, a horrific drought in Australia's rice growing areas has caused chaos in Asia while booming industrial development and a water shortage have harmed Chinese crop output. Water depletion is a serious problem in China with an estimated annual water shortfall of 40 billion cubic metres. The problems are being compounded by the erosion of top soil. China expects to import the equivalent of 40% of US corn exports by 2010. Elsewhere, in countries such as Saudi Arabia acute water shortages will force them to become 100% dependent on food imports in the near future.

3.2 Long-Term Trends Affecting Demand

Buoyant Growth in Developing Economies

Over the past decade, strong global growth in average income combined with rising population increased the demand for food, particularly in developing countries. As per capita incomes rose, consumers in developing countries not only increased per capita consumption of staple foods, they also diversified their diets to include more meat, dairy products, and vegetable oils, which in turn, amplified the demand for grains and oilseeds. Rising wealth is a better explanation for soaring food prices than population growth alone.

Global economic growth has been strong since the late 1990s. For developing countries, growth has been quite strong since the early 1990s while growth in Asia has been exceptionally strong for more than a decade. Unusually rapid economic growth in China and India, with nearly 40 percent of the world's population, has provided a powerful and sustained stimulus to the demand for agricultural products.

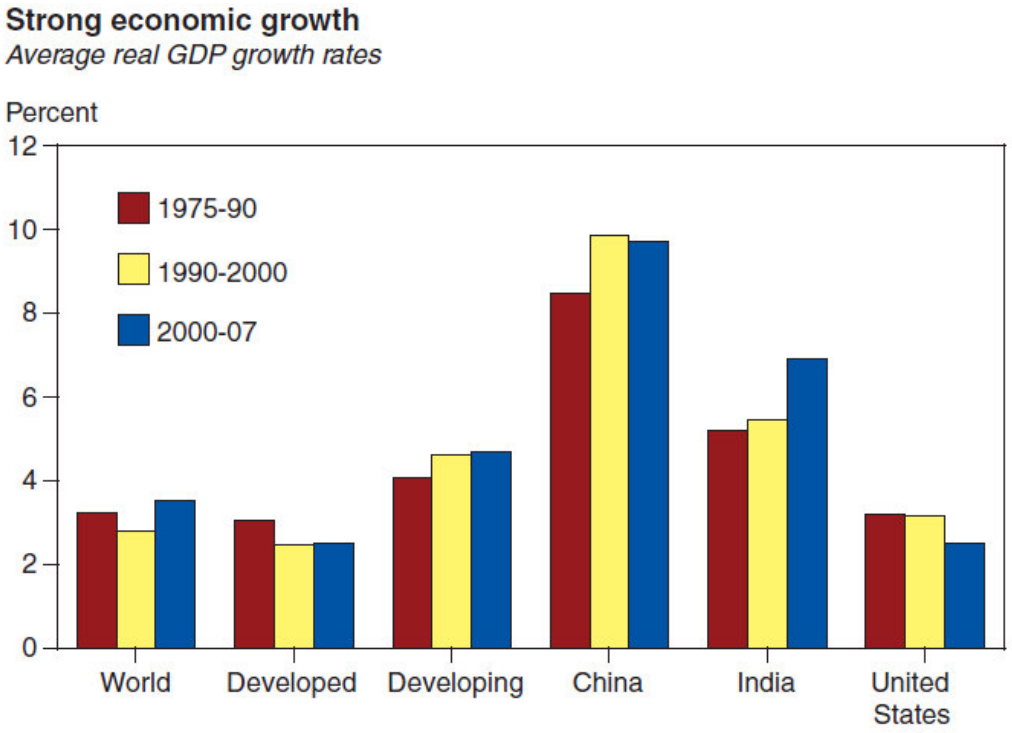


Figure 6:

Rapid economic growth in developing countries has also resulted in very rapid growth in the demand for energy for electricity and industrial uses, as well as for transportation fuel. The associated increase in petroleum use in developing countries has contributed to rapidly rising oil prices since 1999. The oil imports of China alone grew 20 percent per year from 166 million barrels in 1996 to 1.06 billion barrels in 2006.

Demographics

The world's population growth rate has been trending down since the 1970s. The declining trend applies to nearly all countries and regions of the world. However, the number of people on earth is still rising by about 75 million (1.1 percent) per year. This rising population adds to the global demand for agricultural products and energy. The impact on demand is amplified because the most rapid population growth rates tend to be in developing countries. Many of these have rapidly rising incomes, again particularly important for agricultural demand due to diet-diversification.

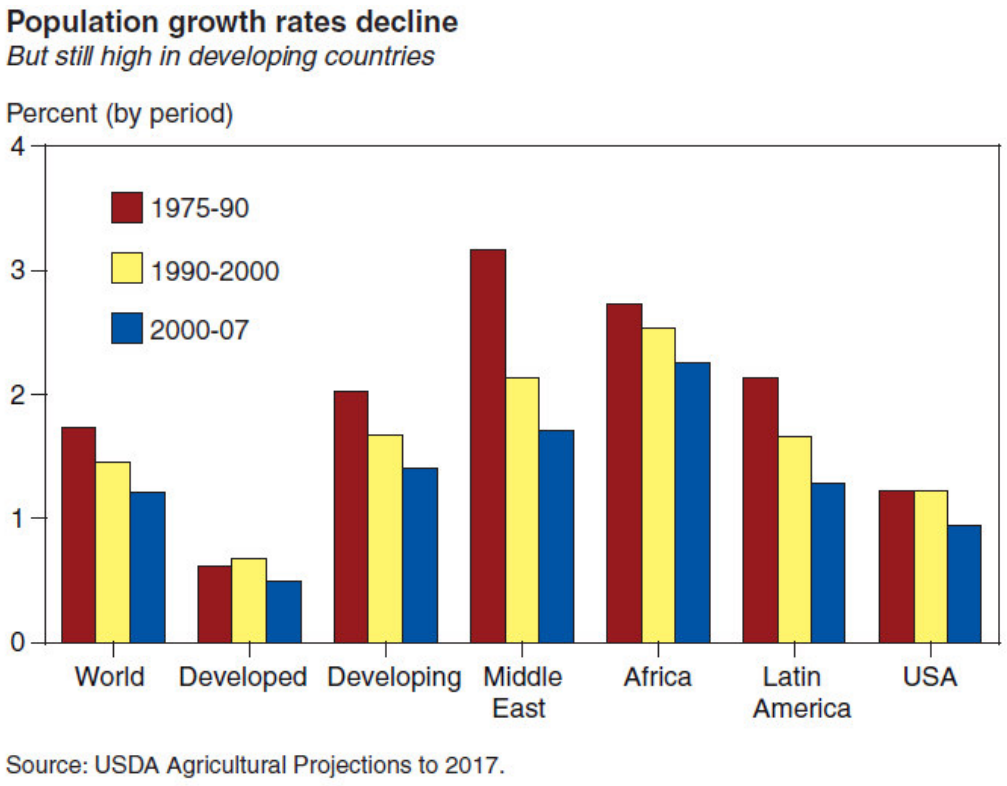


Figure 7:

High-Protein Diets

Global consumption of meat has been growing much more rapidly than consumption of grains and oilseeds. Between 1985 and 1990, production of meat (beef, pork, chicken, and turkey) rose more than 3 percent per year. Since this was well above the world's population growth rate of 1.7 percent per year, per capita consumption was able to climb by 1.4 percent per year.

Notably, Asia's fast growing middle class is switching to meat-based diets. For example, Japanese today are consuming 10 times more protein than they did 50 years ago. Thus, if the rest of Asia will follow Japan's example protein consumption will surge in the next decades.

Furthermore, as the demand for meat rises, the demand for grain and protein feeds used to produce the meat grows proportionally more quickly as explained by the typical feed-to-meat conversion rates illustrated below.

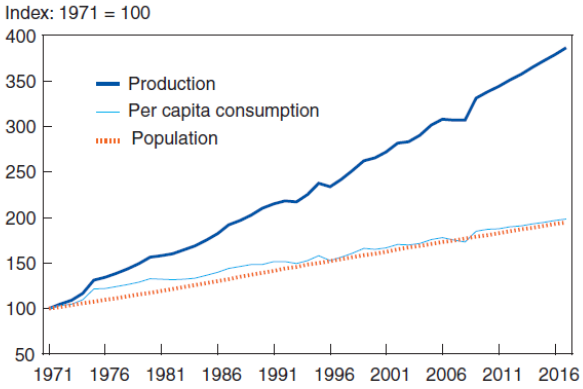
Feed-to-meat conversion rates

Class of animal	Pounds of feed needed to produce 1 pound of meat
Chicken	2.6
Pork	6.5
Beef	7.0

Global meat[1]
Production, per capita consumption, and population

Exponential trend growth rates:

	1975-90	90-07	2009-17
Production	2.2	2.5	2.1
Population	1.7	1.4	1.1
Percapita use	1.4	1.1	1.0



[1]Total meat = beef + pork + chickens & turkeys.
Source: USDA Agricultural Projections to 2017.

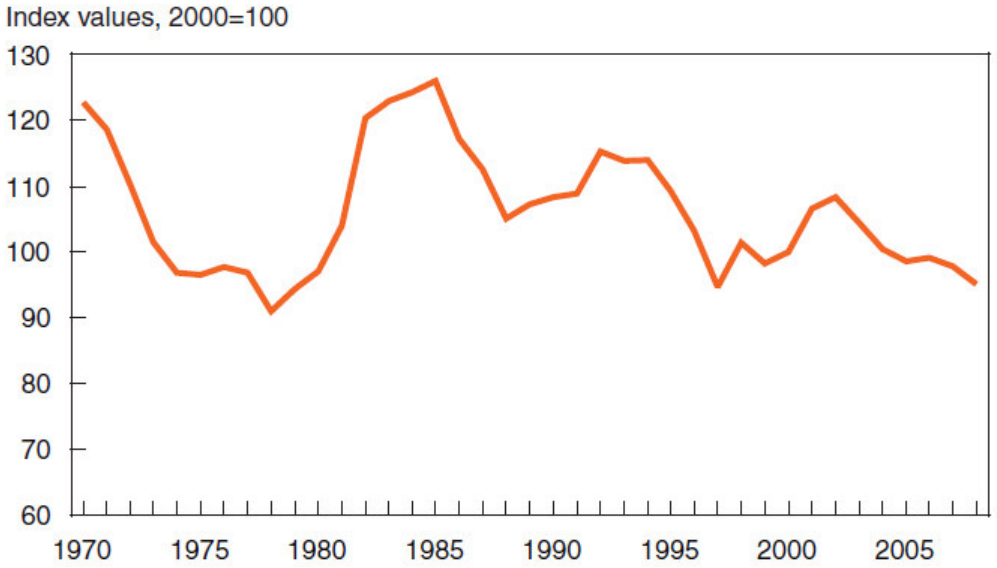
Figure 8:

Depleting Stock Piling

During the past decades there were incentives for governments and private sector to reduce stocks. Government-held buffer stocks were deemed to be less important after nearly two decades of low and stable food prices. For the private sector, the cost of holding stocks, use of "just-in-time" inventory management, and years of readily available global supplies provided incentives to reduce stock holding. Over the past decade, the shift toward more liberalized trade reduced trade barriers which in turn reduced the need for individual countries to hold and build stocks.

Beginning in 2002, the U.S. dollar began to depreciate, both against OECD country currencies and many developing countries' currencies. As the dollar lost value relative to the currency of an importing country, it reduced that country's cost of importing. Since the United States is a major source of many agricultural commodities, foreign countries' imports of commodities from the United States began to rise. This put upward pressure on U.S. prices for those commodities. Further, since the world price of major crops are typically denominated in U.S. dollars, the depreciation of the dollar also raises prices (measured in dollars).

Value of U.S. dollar declines after 2002[1]

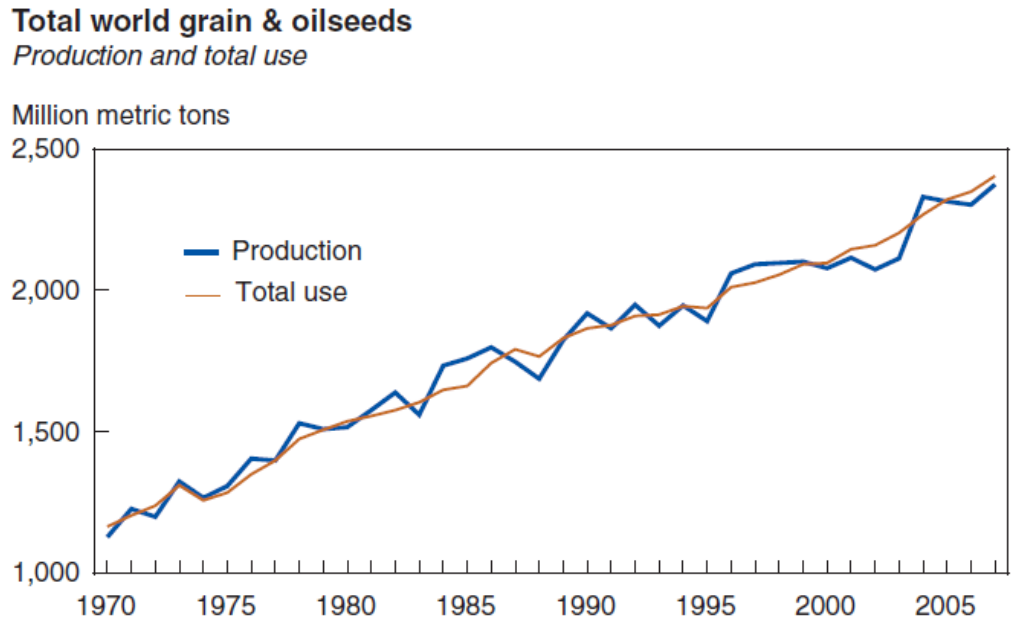


[1]Real U.S. agricultural trade-weighted dollar exchange rate, using U.S. agricultural export weights, based on 192 countries.

Source: ERS International Macroeconomics Dataset.

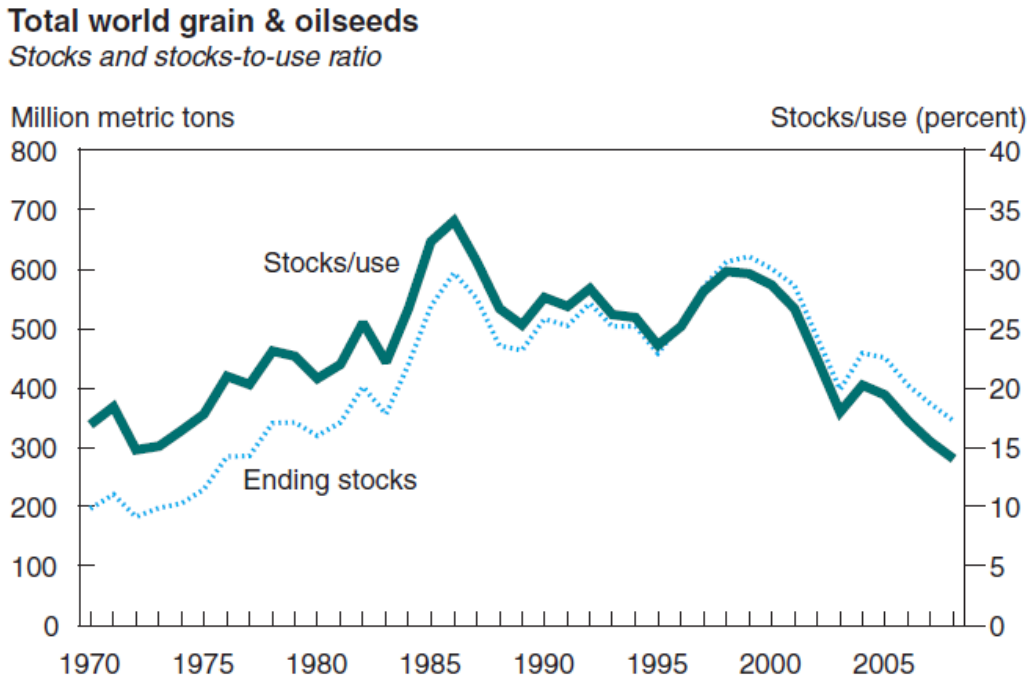
Figure 9:

Global consumption of aggregate grains and oilseeds exceeded production in 7 of the 8 years since 2000. And since 1999, the global stocks-to-use ratio for the aggregate of grains and oilseeds declined from about 30 percent to less than 15 percent currently—the lowest level on record since 1970. The resulting low level of world stocks in 2007 has caused importing countries to become anxious about being able to obtain their future food needs.



Source: Trostle, 2008

Figure 10:



Source: Trostle, 2008

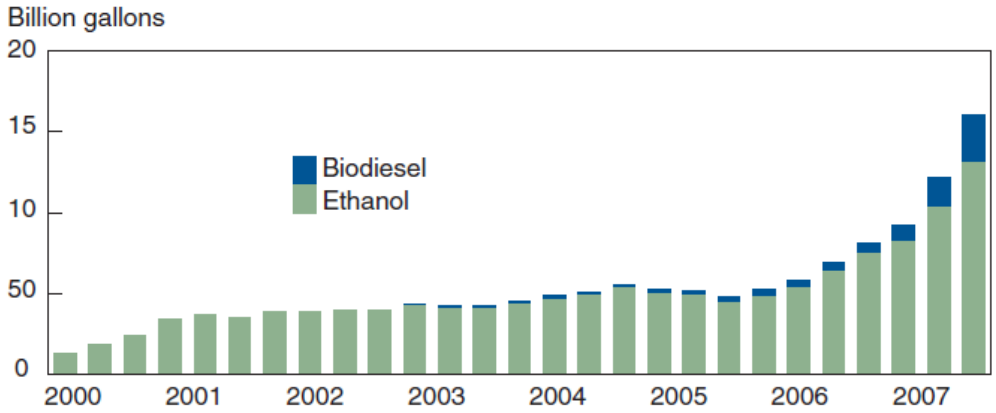
Figure 11:

4. Megatrends Affecting Agricultural Prices

4.1 The Biofuels Industry

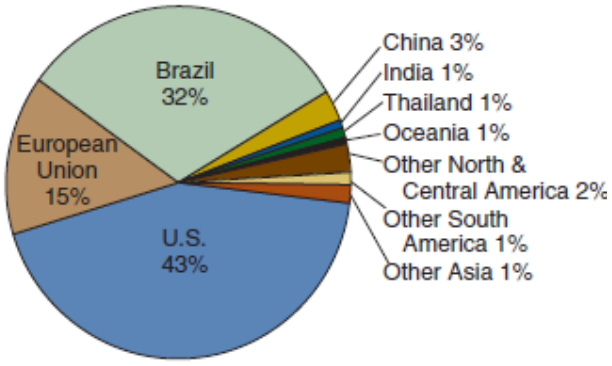
With record oil prices, the future of biofuels—made from plant material—is of keen interest worldwide. Global biofuels production has tripled from 4.8 billion gallons in 2000 to about 16.0 billion in 2007, but still accounts for less than 3 percent of the global transportation fuel supply. About 90 percent of production is concentrated in the United States, Brazil, and the European Union (EU).

Global biofuel production tripled between 2000 and 2007



Source: International Energy Agency; FO Licht.

About 90 percent of global biofuel production is concentrated in U.S., Brazil, and Europe, 2007

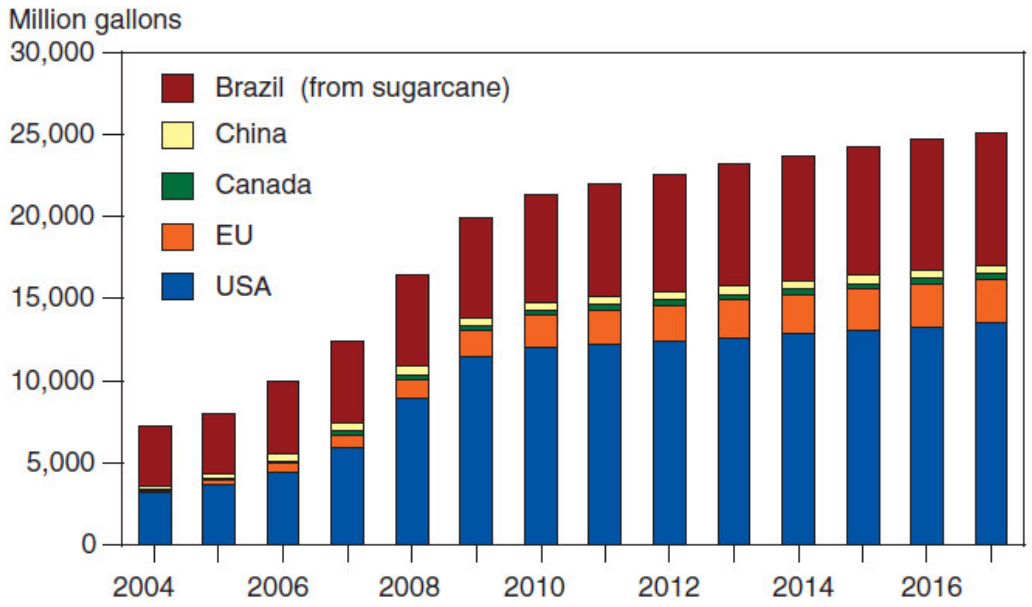


Source: FO Licht, includes only ethanol for fuel.

Figure 12:

Brazil and the United States account for most of the world's ethanol production. Brazil uses sugarcane as a feedstock, while the United States uses nearly all corn. A number of other countries have policy initiatives designed to increase ethanol production, but so far the total augmentation in production capacity has been small relative to the combined capacity of Brazil and the United States.

Ethanol production
Mostly from grain feedstocks except for Brazil



Source: USDA Agricultural Projections to 2017.

Figure 13:

The European Union is the largest biodiesel producer, and rapeseed oil is its main feedstock. The EU has mandated that biofuels account for 10 percent of transportation fuel use by 2020. The EU cannot produce sufficient rapeseed to fill the mandate and will have to import either some feedstocks for producing biodiesel, or some biodiesel.

Russia and the Ukraine are increasing rapeseed production destined for export to the EU as rapeseed, rapeseed oil, and perhaps as biodiesel. Brazil and Argentina are using soybean oil as a feedstock to expand biodiesel production. Canada is expanding biodiesel production in the Prairie Provinces using rapeseed as the feedstock.

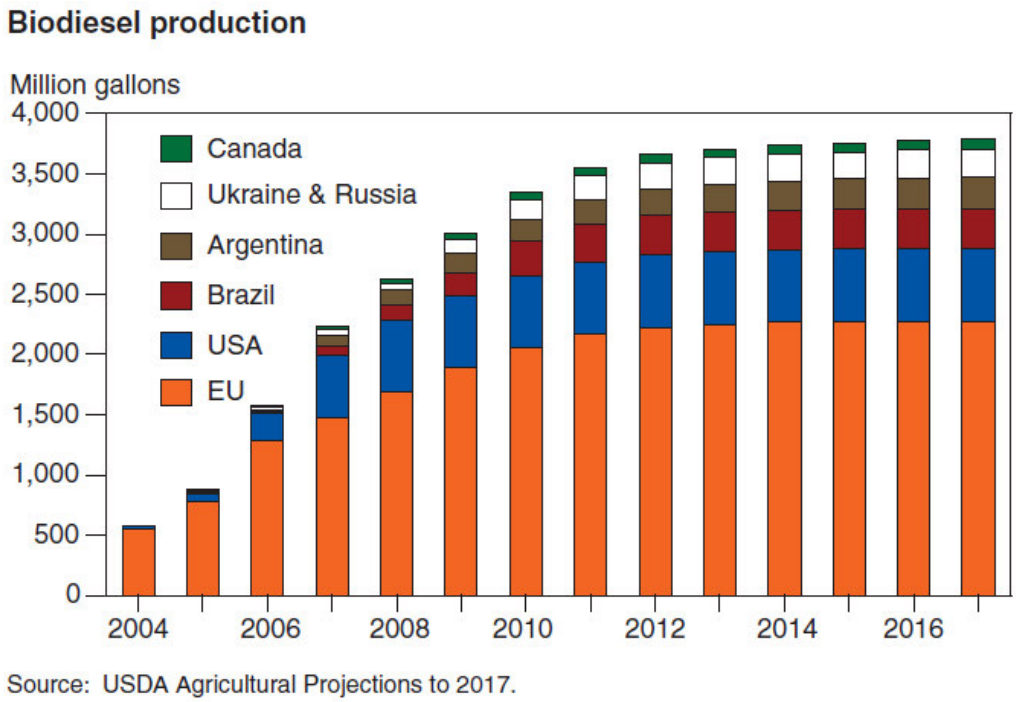


Figure 14:

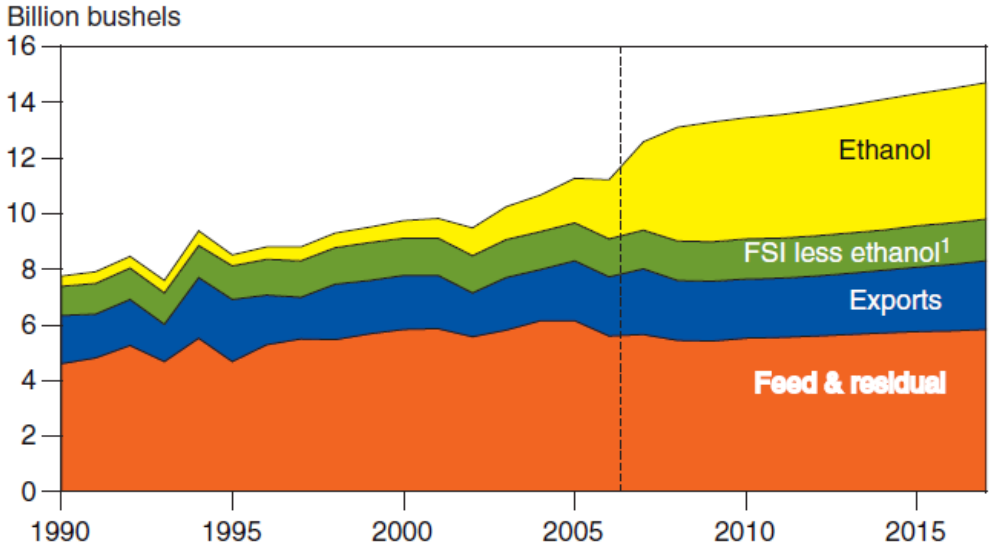
U.S. ethanol production began to expand rapidly in 2002. There were several incentives for expanding ethanol production: the increasing price of petroleum; concerns about the reliability of some traditional exporters (geopolitical tensions) and an environmental objective to increase the use of cleaner burning fuels. Without the concerns about petroleum, the increase in U.S. and world biofuels production would not have been nearly as great.

Corn used for ethanol rose from about 25 million tonnes in 2002/03 to a projected 75 million tonnes in the current (2007/08) crop year. With this increase, corn used for ethanol production now accounts for about 24 percent of total U.S. corn disappearance, up from 10 percent in 2002/03. This increase was facilitated because U.S. corn production rose in response to increased demand and prices, and, in general, other uses of U.S. corn (food, feed, non-ethanol industrial uses, and exports) did not decline.

Corn however, is not the most efficient source of energy – it is low in carbon hydrates – and about 230 kg of corn is necessary to fill an average 50 litre fuel tank with ethanol, which incidentally is enough corn to feed a child for a year. Nonetheless it is expected that up to 45% of the total US corn production will go towards ethanol production by 2015.

The data suggest that while U.S. corn used for ethanol production had only a small effect on global markets in the 1980s and 1990s, the increase in U.S. ethanol production over the past 5 years and the related significant changes in the structure of the U.S. corn market have had a more pronounced impact on the world's supply and demand balance for total coarse grains recently. Importantly, since the United States is the world's largest corn exporter, some of the higher prices resulting from increased U.S. demand have spilled over onto world markets.

U.S. corn use



[1]Food, seed, and industrial less ethanol.

Source: USDA Agricultural Projections to 2017.

Figure 15:

Outlook for the Biofuels Industry:

The leading raw materials, or feedstocks, for producing biofuels are corn, sugar, and vegetable oils. While rapid expansion in biofuels production has raised expectations about potential substitutes for oil-based fuels, there have been growing concerns about the impact of rising commodity prices on the global food system.

The Chinese Government put a moratorium on expanded use of corn for ethanol because of rising prices and is promoting other feedstocks that do not compete directly with food crops, such as cassava and sweet sorghum. Mexico capped tortilla prices in early 2007 to contain food price inflation from higher priced corn imports. Real sugar prices hit a 10-year high in 2006, stressing budgets of low-income people in Brazil and elsewhere. The Indonesian

Government increased the export duty on crude palm oil, also used in biodiesel production, in mid-2007 to slow the rising cost of domestic cooking oil.

U.S. livestock producers are facing increased costs for corn and other feed, which may translate into higher retail meat prices. And in Japan, historical concerns have been revived about the country's almost complete dependence on imports of feed grain and oilseeds to support its large livestock sector.

The outlook for global biofuels will depend on a number of interrelated factors, including the future price of oil, availability of low-cost feedstocks, sustained commitment to supportive policies by governments, technological breakthroughs that could reduce the cost of second-generation biofuels, and competition from unconventional fossil fuel alternatives.

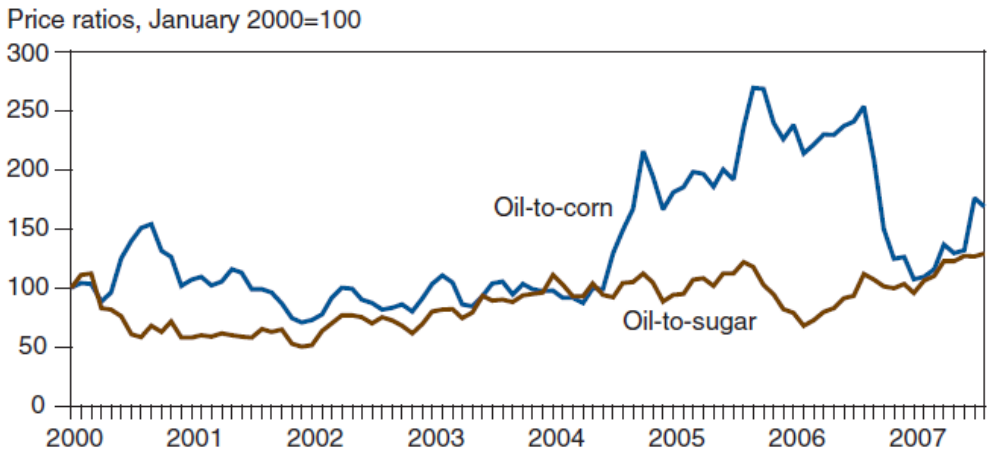
The rise in oil prices is the most important factor boosting the competitiveness of alternative fuels, including biofuels. The unprecedented 6-year rise in oil prices has prolonged opportunities for efficiency gains, stimulated energy conservation, and generated increased supply from traditional and alternative energy sources. While these adjustments may eventually lower oil prices, most forecasts do not show real prices falling below $50 per barrel.

Unlike previous high-price periods, the current oil market is driven by strong demand-side factors. These factors include robust economic growth and rising oil demand from rapidly growing middle-income economies, where consumers are demanding a higher standard of living and exhibiting big appetites for energy. Almost two-thirds of recent global growth in oil demand has come from China and other middle-income economies.

Feedstock costs are the most significant cost of biofuels production, ranging from 37 percent for sugarcane-based ethanol in Brazil to 40-50 percent for corn-based ethanol in the United States. Sugar beets represented 34 percent of the cost of sugar-based ethanol production in the EU. With rising commodity prices, these cost shares are even higher now. Another major cost component is energy, which may account for as much as 20 percent of biofuels operating costs in some countries.

The ratio of crude oil prices to feedstock prices offers a simple indicator of the competitiveness of biofuels made from various feedstocks. The ratio of crude oil to corn prices, for example, rose sharply after 2004 as oil and ethanol prices increased and corn prices were stable. But the ratio dropped sharply after September 2006, making biofuels less cost competitive.

Currently, it is estimated that the cost of producing ethanol from corn is about $80 per barrel, while it is much less for sugar cane ($35 per barrel), but much more for wheat and soybeans.



Source: USDA, Economic Research Service and Federal Reserve Bank of St. Louis.

Figure 16:

Technological advances and efficiency gains—higher biomass yields per acre and more gallons of biofuels per ton of biomass—could steadily reduce the economic cost and environmental impacts of biofuels production. Biofuels production will likely be most profitable and environmentally benign in tropical areas where growing seasons are longer, biofuels yields are higher, and fuel and other input costs are lower.

For this commodity-dependent industry, government support to reduce profit uncertainty has been a common theme in the U.S., Brazil, and the EU, where biofuels production has been most significant. Biofuels will most likely be part of a portfolio of solutions to high oil prices, including conservation and the use of other alternative fuels.

The role of biofuels in global fuel supplies is likely to remain modest because of its land intensity. In the U.S. replacing all current gasoline consumption with ethanol would require more land in corn production than is presently in all agricultural production. Technology will be central to boosting the role of biofuels. If the energy of widely available, cellulose materials could be economically harnessed around the world, biofuels yields per acre could more than double, reducing land requirements significantly.

Lessons From Brazil

Brazil has the world's second largest ethanol program and is capitalizing on plentiful soybean supplies to expand into biodiesel. More than half of the nation's sugarcane crop is processed into ethanol, which now accounts for about 20 percent of the country's fuel supply.

Initiated in the 1970s after the OPEC oil embargo, Brazil's policy program was designed to promote the nation's energy independence and to create an alternative and value-added market for sugar producers. The government has spent billions to support sugarcane producers, develop distilleries, build up a distribution infrastructure, and promote production of pure-ethanol-burning and, later, flex-fuel vehicles (able to run on gasoline, ethanol-gasoline blends, or pure hydrous ethanol). Advocates contend that, while the costs were high, the program saved far more in foreign exchange from reduced petroleum imports.

In the mid- to late 1990s, Brazil eliminated direct subsidies and price setting for ethanol. It pursued a less intrusive approach with two main elements—a blending requirement (now about 25 percent) and tax incentives favoring ethanol use and the purchase of ethanol-using or flex-fuel vehicles. Today, more than 80 percent of Brazil's newly produced automobiles have flexible fuel capability, up from 30 percent in 2004. With ethanol widely available at almost all of Brazil's 32,000 gas stations, Brazilian consumers currently choose primarily between 100-percent hydrous ethanol and a 25-percent ethanol-gasoline blend on the basis of relative prices.

Approximately 20 percent of current fuel use (alcohol, gasoline, and diesel) in Brazil is ethanol, but it may be difficult to raise the share as Brazil's fuel demand grows. Brazil is a middle-income economy with per capita energy consumption only 15 percent that of the United States and Canada. Current ethanol production levels in Brazil are not much higher than they were in the late 1990s. Production of domestic off- and on-shore petroleum resources has grown more rapidly than ethanol and accounts for a larger share of expanding fuel use than does ethanol in the last decade.

Source: Coyle, 2007

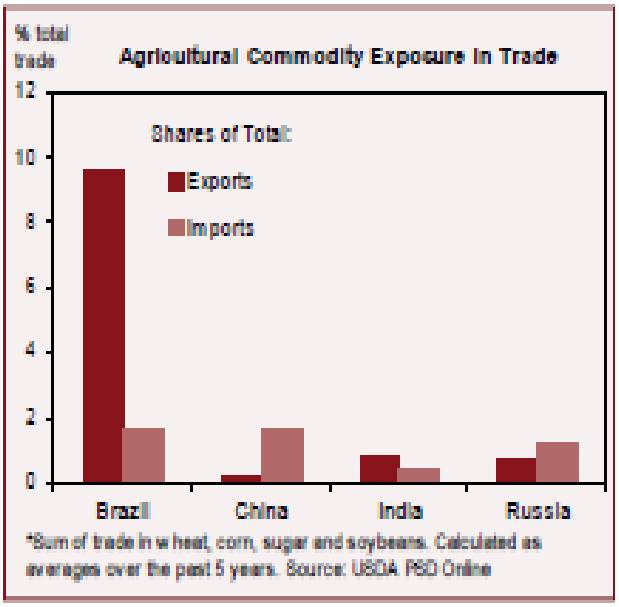
4.2 The BRIC Countries

Global agricultural prices have seen a structural change over the past two years, much as the energy and metals markets have since the early part of the decade. Heightened demand from the BRICs (Brazil, Russia, India and China) has put strains on food supplies around the world.

As the world's fourth largest exporter of agricultural commodities, Brazil stands to profit most from the expected rise in agricultural prices. With a significant comparative advantage conferred by advanced technology, Brazil has become a pioneer in the production of sugarcane-based ethanol. Brazil is expected to increase production by 145% from 2006 to 2016, which could allow it to become the world's top exporter of ethanol.

Russia is the world's third largest importer of agricultural commodities, particularly poultry, dairy, and fruits and vegetables. With just 2% of the world's population, Russia consumes close to 20% of the world's poultry.

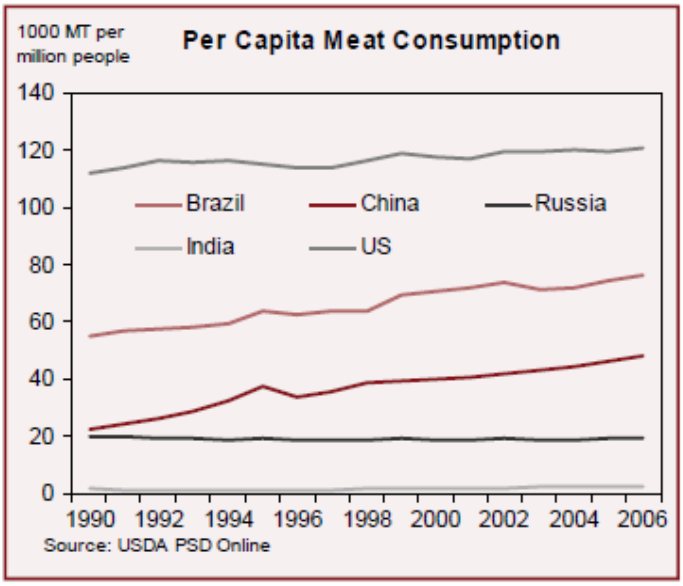
China also ranks among the top ten importers of agricultural commodities. It remains the largest importer of cotton, the critical raw material for its textile exports, but these imports should fall over time as China's export industry continues to climb the value chain. It is estimated that China will become the largest importer of oilseeds and consolidate its position in imports of oils and oilseed as biofuels production expands.



Source: Goldman Sachs, 2007

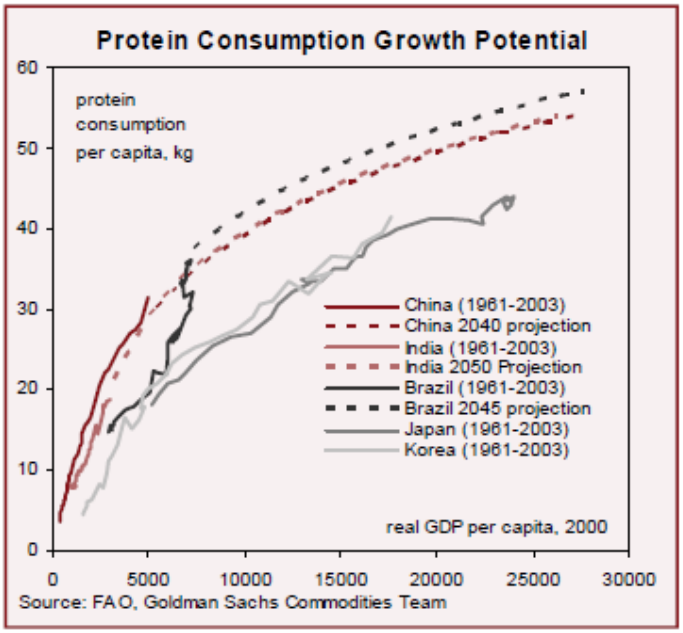
Figure: 17

Rising wealth levels of BRICs and other emerging markets, especially among the growing middle class, have led to improvement in diets, incorporating more meat, dairy and eggs. This increase in protein demand will continue to increase livestock prices and demand for feed. By 2017, Goldman Sachs expects per capita incomes to triple in China, double in India and Russia, and increase by 50% in Brazil.



Source: Goldman Sachs, 2007

Figure 18:



Source: Goldman Sachs, 2007

Figure 19:

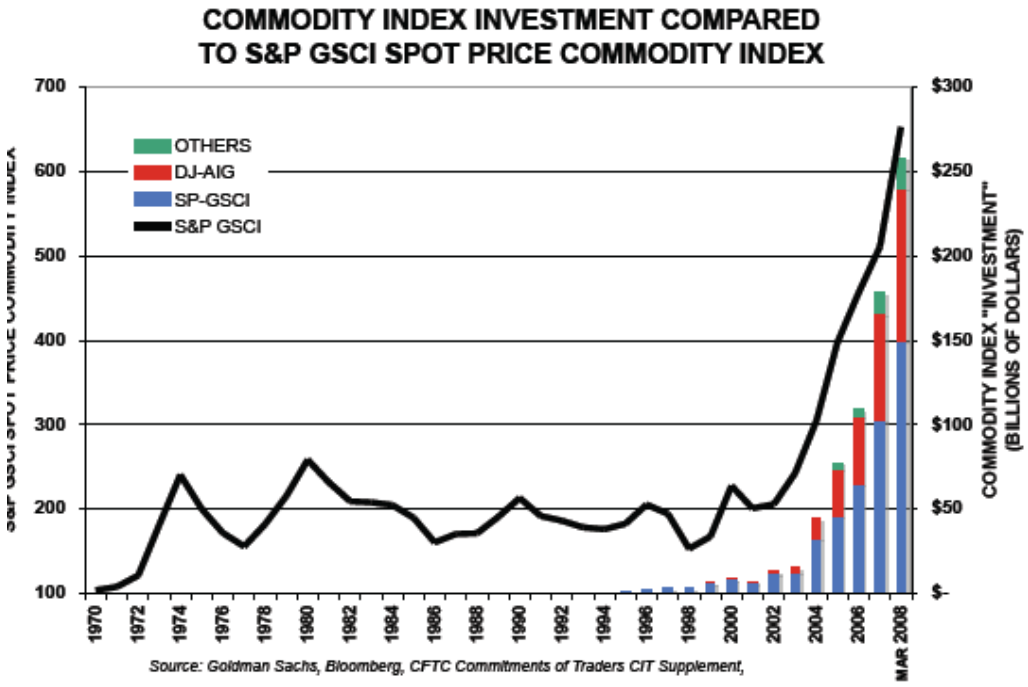
With 43% of the world's population, the BRIC countries together account for nearly 50% of global consumption of pork, beef, veal and poultry. China alone accounts for 30% of world meat consumption. Its share rose significantly over the 1990s and the early part of this decade, but has remained steady in recent years, even as China's relative consumption of other commodities has increased dramatically. In contrast, the shares consumed by India, Russia and Brazil have remained steady for the past 15 years, while the US share has declined.

Lower incomes per capita and cultural preferences mean that all of the BRICs lag US meat consumption on a per capita basis. Even Brazil consumes just two-thirds of the US on a per capita basis. At the other end of the spectrum, in India, per capita meat consumption is just 2% of the US level. Despite cultural preferences for a vegetarian diet, Indian meat consumption has risen by 40% since the early 1990s. Chinese per capita meat consumption has more than doubled over the past 15 years, while Brazil's has risen by more than one-third over the same period.

However, critical environmental challenges remain. Continued urbanisation and industrialisation will absorb agricultural land and labour, therefore productivity (yields) will need to rise. While this will be good for productivity growth, it may aggravate environmental degradation and strain water supplies.

4.3 INVESTORS' DEMAND

Over the past couple of years investors have "discovered" virtually a new asset class, namely commodity investing which typically are linked to a host of various broad-based commodity indices, for example the *Dow Jones AIG Commodity Index*, *Goldman Sachs Commodity Index*, *Rogers International Commodity Index* and *CRB Commodity Index*. After the equity bear market of 2000-2002 institutional investors have started to show some interest in commodities, especially given the uncorrelated characteristics of commodity prices with financial market returns. More importantly, the spectacular surge in commodity prices has fuelled investors' interest; assets invested in commodity index trading strategies have risen from $13bn in 2003 to more than $250 as of March 2008, as depicted by figure 20.



Source: Masters, 2008

Figure 20:

Figure 21 depicts the net purchases of investors in the commodities futures market since 2003. Notably, during this period investors have stockpiled corn futures equivalent to the entire demand for the US ethanol industry for a year. Similarly, enough wheat futures have been stockpiled to feed every US citizen for at least two years.

Commodity Purchases By Index Speculators The Last 5 Years

Sector	*Commodity*	*Units*	*Previous Futures Market Stockpile January 1, 2003*	*Net Purchases Last 5¼ Years*	*Current Futures Market Stockpile March 12, 2008*
Agricultural	Cocoa	Metric Tons	18,828	303,352	322,180
	Coffee	Pounds	195,716,944	2,238,858,056	2,434,575,000
	Corn	Bushels	242,561,708	2,138,383,292	2,380,945,000
	Cotton	Pounds	544,934,999	5,548,915,001	6,093,850,000
	Soybean Oil	Pounds	163,135,678	4,312,624,322	4,475,760,000
	Soybeans	Bushels	81,028,272	890,616,728	971,645,000
	Sugar	Pounds	2,291,358,746	46,094,097,254	48,385,456,000
	Wheat	Bushels	166,738,225	967,351,775	1,134,090,000
	Wheat KC	Bushels	54,746,014	102,618,986	157,365,000
Livestock	Feed Cattle	Pounds	104,446,612	365,453,388	469,900,000
	Lean Hogs	Pounds	517,414,747	3,827,425,253	4,344,840,000
	Live Cattle	Pounds	669,766,732	5,099,033,268	5,768,800,000
Energy	Brent Crude Oil	Barrels	47,075,357	144,524,265	191,599,621
	WTI Crude Oil	Barrels	99,880,741	538,499,579	638,380,320
	Gasoil	Metric Tons	1,682,662	6,027,680	7,710,342
	Heating Oil	Gallons	1,067,859,608	2,568,925,661	3,636,785,269
	Gasoline	Gallons	1,102,184,401	2,488,458,616	3,590,643,018
	Natural Gas	Million BTUs	330,652,415	1,932,356,225	2,263,008,640
Base Metals	Aluminum	Metric Tons	344,246	3,232,406	3,576,652
	Lead	Metric Tons	82,019	158,726	240,745
	Nickel	Metric Tons	20,147	101,988	122,135
	Zinc	Metric Tons	133,381	1,182,091	1,315,472
	Copper	Metric Tons	220,096	1,144,538	1,364,634
Precious Metals	Gold	Troy Ounces	979,863	8,742,401	9,722,264
	Silver	Troy Ounces	11,126,862	152,866,187	163,993,049

Sources: Goldman Sachs, Standard & Poors, Dow Jones, CFTC Commitments of Traders CIT Supplement, calculations

Source: Masters, 2008

Figure 21:

Recently, Exchange Traded Fund (ETF) providers issued a plethora of ETFs ranging from broad-based indices to specific commodity plays such as energy, metals and agriculture. Figure 22 shows an example of such ETFs currently on offer in the USA. Note that most of these funds were started in 2008, obviously on the back of strong commodity price performances.

Symbol	Index Based Funds	Launched	Holdings	Assets	Average Volume	YTD Gain (9/2/08)
PCRCX	Pimco Commodity Real Return Fund	Mar '03	DJ-AIG	$12.7B	N/A	1.9%
DBC	PowerShares Commodity Tracking ETF	Feb '06	DB-LCI	$2.4B	1.1M	16.5%
GSG	iShares GSCI Commodity-Indexed ETF	Jul '06	GSCI	$919M	314K	9.3%
GSP	iPath S&P GSCI Total Return Index ETN	Sep '06	GSCI	N/A	51K	10.3%
DJP	iPath DJ-AIG Commodity Index ETN	Oct '06	DJ-AIG	N/A	426K	0.1%
RJI	ELEMENTS Rogers Intl Commodity ETN	Oct '07	RICI	N/A	174K	4.3%
GSC	GS Connect S&P GSCI Enhanced ETN	Dec '07	GSCI	N/A	22K	9.9%
GCC	GreenHaven Continuous Comm. ETF	Jan '08	CRB	N/A	17K	N/A
RAW	Opta Lehman Brothers Pure Beta ETN	Feb '08	Various	N/A	1K	N/A
UCI	E-TRACS UBS Bloomberg CMCI Index ETN	Apr '08	CMCI	N/A	4K	N/A
DPU	PowerShares DB Commodity Long ETN	May '08	DB-LCI	N/A	1K	N/A
DEE	PowerShares DB Comm. Dbl Long ETN	May '08	DB-LCI	N/A	64K	N/A
DYY	PowerShares DB Comm. Dbl Short ETN	May '08	DB-LCI	N/A	15K	N/A
Symbol	Energy	Launched	Holdings	Assets	Average Volume	YTD Gain (9/2/08)
USO	United States Oil Fund, LP ETF	Apr '06	Crude Oil	$650M	14.4M	17.7%
OIL	iPath S&P GSCI Crude Oil ETN	Oct '06	Crude Oil	N/A	1.0M	16.9%
DBE	PowerShares DB Energy Fund ETF	Jan '07	Various	$171M	128K	21.6%
DBO	PowerShares DB Oil Fund ETF	Jan '07	Crude Oil	$56M	81K	23.6%
UNG	United States Natural Gas Fund, LP ETF	Apr '07	Natural Gas	$512M	5.9M	-7.7%
RJN	ELEMENTS Rogers Intl Comm. Energy ETN	Oct '07	Various	N/A	65K	14.8%
JJE	iPath DJ-AIG Energy Total Return ETN	Oct '07	Various	N/A	13K	7.6%
GAZ	iPath DJ-AIG Natural Gas ETN	Oct '07	Natural Gas	N/A	45K	-5.6%
USL	United States 12 Month Oil Fund, LP ETF	Dec '07	Crude Oil	$7M	3K	23.2%
UGA	United States Gasoline Fund, LP ETF	Apr '08	Gasoline	$27M	23K	N/A
UHN	United States Heating Oil Fund, LP ETF	Apr '08	Heating Oil	N/A	5K	N/A
UBN	E-TRACS UBS Bloomberg CMCI Energy ETN	Apr '08	Various	N/A	1K	N/A
DXO	PowerShares DB Crude Oil Dbl Long ETN	Jun '08	Crude Oil	N/A	111K	N/A
DTO	PowerShares DB Crude Oil Dbl Short ETN	Jun '08	Crude Oil	N/A	1.1M	N/A
OLO	PowerShares DB Crude Oil Long ETN	Jul '08	Crude Oil	N/A	4K	N/A
SZO	PowerShares DB Crude Oil Short ETN	Jul '08	Crude Oil	N/A	9K	N/A
UOY	MacroShares $100 Oil Up ETF	Jul '08	Crude Oil	N/A	27K	N/A
DOY	MacroShares $100 Oil Down ETF	Jul '08	Crude Oil	N/A	66K	N/A
Symbol	Metals	Launched	Holdings	Assets	Average Volume	YTD Gain (9/2/08)
GLD	streetTRACKS Gold Shares ETF	Nov 2004	Gold	$19.3B	13.3M	-4.0%
IAU	iShares COMEX Gold Trust ETF	Jan '05	Gold	$1.6B	327K	-4.1%
SLV	iShares Silver Trust ETF	Apr '06	Silver	$2.8B	7.1M	-12.0%
DBP	PowerShares DB Precious Metals ETF	Jan '07	Gold, Silver	$108M	50K	-7.0%
DGL	PowerShares DB Gold Fund ETF	Jan '07	Gold	$82M	32K	-5.3%
DBS	PowerShares DB Silver Fund ETF	Jan '07	Silver	$63M	49K	-14.0%
DBB	PowerShares DB Base Metals Fund ETF	Jan '07	Various	$105M	72K	-0.2%
RJZ	ELEMENTS Rogers Intl. Metal ETN	Oct '07	Various	N/A	41K	-3.8%
JJC	iPath DJ-AIG Copper Total Return ETN	Oct '07	Copper	N/A	11K	8.6%
JJM	iPath DJ-AIG Industrial Metals ETN	Oct '07	Various	N/A	5K	-1.1%
JJN	iPath DJ-AIG Nickel Total Return ETN	Oct '07	Nickel	N/A	12K	-26.1%
DGZ	Deutsche Bank Gold Short ETN	Feb '08	Gold	N/A	11K	N/A
DZZ	Deutsche Bank Gold Double Short ETN	Feb '08	Gold	N/A	410K	N/A
DGP	Deutsche Bank Gold Double Long ETN	Feb '08	Gold	N/A	971K	N/A
PMY	MLCX Precious Metals ELEMENTS ETN	Apr '08	Various	N/A	5K	N/A
GOE	MLCX Gold ELEMENTS ETN	Apr '08	Gold	N/A	<1K	N/A
UBG	E-TRACS UBS Bloomberg CMCI Gold ETN	Apr '08	Gold	N/A	<1K	N/A
USV	E-TRACS UBS Bloomberg CMCI Silver ETN	Apr '08	Silver	N/A	<1K	N/A
UBM	E-TRACS UBS Industrial Metals ETN	Apr '08	Various	N/A	1K	N/A
PTM	E-TRACS UBS Long Platinum ETN	May '08	Platinum	N/A	13K	N/A
PTD	E-TRACS UBS Short Platinum ETN	May '08	Platinum	N/A	1K	N/A
BDD	PowerShares Base Metals Dbl Long ETN	Jul '08	Various	N/A	4K	N/A
BOM	PowerShares Base Metals Dbl Short ETN	Jul '08	Various	N/A	7K	N/A
JJT	iPath DJ-AIG Tin Sub-Index ETN	Jul '08	Tin	N/A	2K	N/A
JJU	iPath DJ-AIG Aluminum Sub-Index ETN	Jul '08	Aluminum	N/A	6K	N/A
LD	iPath DJ-AIG Lead Sub-Index ETN	Jul '08	Lead	N/A	4K	N/A
PGM	iPath DJ-AIG Platinum Sub-Index ETN	Jul '08	Platinum	N/A	5K	N/A
Symbol	Agriculture	Launched	Holdings	Assets	Average Volume	YTD Gain (9/2/08)
DBA	PowerShares DB Agriculture Fund ETF	Jan '07	Various	$2.4B	1.8M	5.0%
RJA	ELEMENTS Rogers Intl Agriculture ETN	Oct '07	Various	N/A	280K	-5.2%
JJA	iPath Dow Jones AIG Agriculture ETN	Oct '07	Various	N/A	42K	-0.5%
JJG	iPath Dow Jones AIG Grains ETN	Oct '07	Various	N/A	64K	0.7%
COW	iPath Dow Jones AIG Livestock ETN	Oct '07	Various	N/A	188K	-11.6%
EOH	Opta Lehman Brothers Agriculture ETN	Feb '08	Various	N/A	1K	N/A
LSO	MLCX Livestock ELEMENTS ETN	Apr '08	Cattle, Hogs	N/A	3K	N/A
UAG	E-TRACS UBS Agriculture Index ETN	Apr '08	Various	N/A	2K	N/A
FUD	E-TRACS UBS Food Index ETN	Apr '08	Various	N/A	6K	N/A
UBC	E-TRACS UBS Livestock Index ETN	Apr '08	Cattle, Hogs	N/A	6K	N/A
FUE	MLCX Biofuels Index ELEMENTS ETN	Apr '08	Various	N/A	4K	N/A
GRU	MLCX Grains Index ELEMENTS ETN	Apr '08	Various	N/A	19K	N/A
DAG	PowerShares Agriculture Dbl Long ETN	Apr '08	Various	N/A	42K	N/A
AGA	PowerShares Agriculture Dbl Short ETN	Apr '08	Various	N/A	26K	N/A
JJS	iPath DJ-AIG Softs Sub-Index ETN	Jul '08	Various	N/A	3K	N/A
JO	iPath DJ-AIG Coffee Sub-Index ETN	Jul '08	Coffee	N/A	3K	N/A
SGG	iPath DJ-AIG Sugar Sub-Index ETN	Jul '08	Sugar	N/A	4K	N/A
BAL	iPath DJ-AIG Cotton Sub-Index ETN	Jul '08	Cotton	N/A	3K	N/A

Source: Iacono, 2008

Figure 22:

While investors in such commodity funds have no direct economic interest in commodity futures markets, i.e. they are not producers or consumers of commodities, some debate have been taking place in recent months about the effect of their investing activities on commodity prices.

On the one hand market exponents such as George Soros and Michael Masters claimed that the "new" investors have distorted market prices since they are in principle not sensitive to commodity price movements. In essence they are "buy and hold" (long only) investors whereas traditional speculators will take both long and short positions. One criticism is that investors, unlike traditional speculators only consume liquidity, but not providing it. Furthermore, the commodities future market relative to the equity market is small (about 200 times smaller), thus large scale investing into the commodities market would have a profound effect on market price movements and will lead to price bubbles.

Other groups have disputed the argument that the "tail is wagging the dog". Researchers such as Sanders, Irwin and Merrin found very little evidence of such a relationship. For example, if investment speculation led to higher future prices than inventories of grains and oil seeds would rise, yet for both groups inventories have fallen sharply.

The effect of investors' demand for commodity futures is not easily quantifiable. Nonetheless, the exponential rise in commodity ETFs and investments allocated to such funds is reminiscent of commodity price bubbles, which since July 2008 started to deflate significantly.

5. Future Trends and Concerns

Issues affecting Demand:

Global economic growth: If rapid growth continues, particularly in developing countries, it will continue to put upward pressure on food commodity prices through increases in food demand.

Energy prices and Biofuels production: If petroleum prices continue to rise, costs of agricultural production will rise, as will the cost of processing, and the cost of transporting products to markets both within a country and exporting to other countries. Continued high petroleum prices will also sustain the global incentives to produce more biofuels.

The USDA is projecting that world food commodity prices will not retreat to the past long-term levels. Moreover, the rapidly increasing global demand is expected to be the primary contributor to future upward pressure on food commodity prices.

Issues affecting Supply:

Cost of inputs: Continued increases in production costs, especially in energy-related costs, will restrain the world's production response. Higher costs for fertilizer, fuel, and seeds could cause farmers without access to credit to plant less than they otherwise would have, or to shift to crops requiring fewer inputs.

Additional cropland (quantity and quality): What will be the long run impact of higher world food commodity prices on the amount of land used to produce the crops? What is the productivity of the land that will be used to increase production?

Water shortages: How quickly will constraints on the amount of water available for agricultural production become more widespread?

New seed varieties and use of biotechnology: Will higher food prices encourage some countries to adopt the use of biotechnology, especially genetically modified seed for crops? Will future research focus more on yield-enhancing varieties rather than cost-reducing innovations?

Biophysical response to climate change: How will climate change affect agricultural production? How will it change temperatures, precipitation, the length of growing seasons, and variability of yields?

With low world stocks of food commodities, food prices are vulnerable at the moment to a production shortfall in one or more major production areas. If a significant shortfall occurs this year due to weather or disease, food prices might continue to rise sharply from the current high level. Although trade flows can mitigate some of these effects, new or existing trade restrictions or barriers can exacerbate price impacts. However, if good crop production conditions exist in the Northern Hemisphere, food commodity prices could retreat significantly from their current highs.

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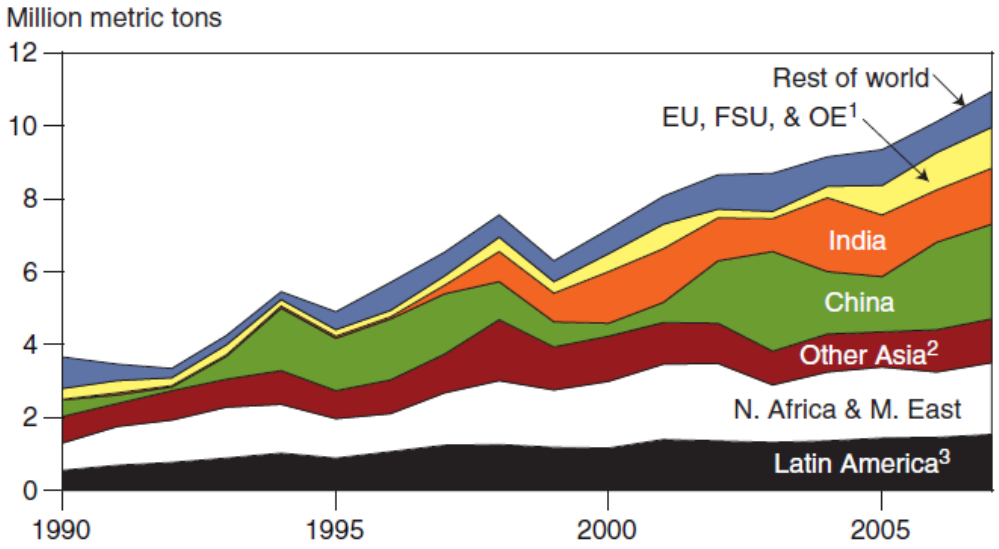
Appendix 1

Examples of major grain and oilseeds imports

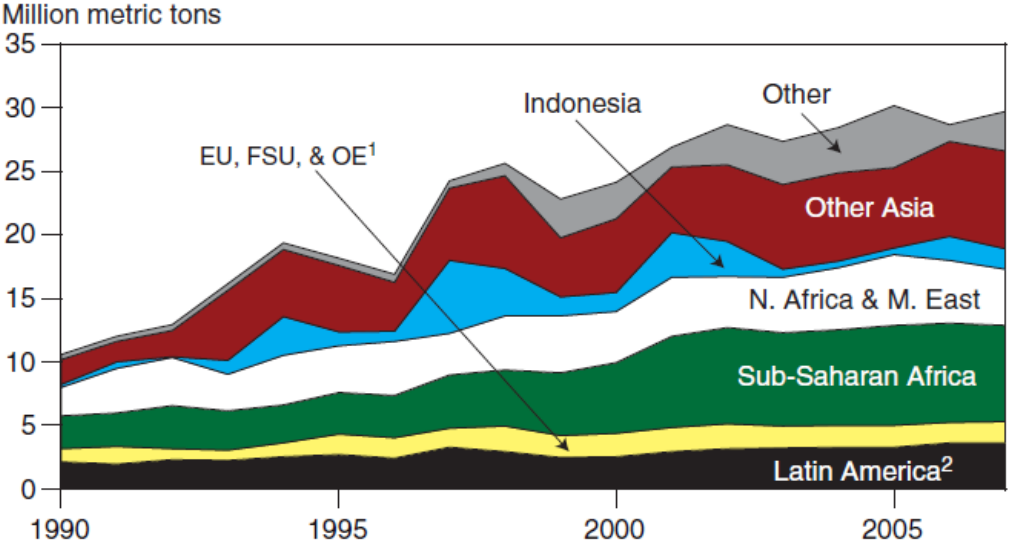
Global soybean oil imports



[1]European Union, former Soviet Union, and other Europe.
[2]Asia excluding India and China.
[3]Includes Mexico.

Source: USDA Agricultural Projections to 2017.

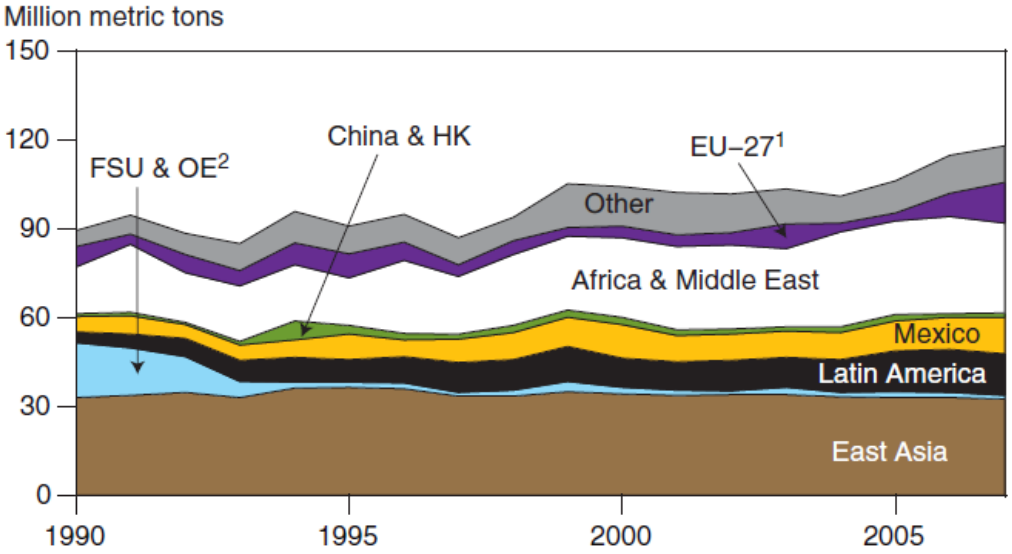
Global rice imports



[1]European Union, former Soviet Union, and other Europe.
[2]Includes Mexico.

Source: USDA Agricultural Projections to 2017.

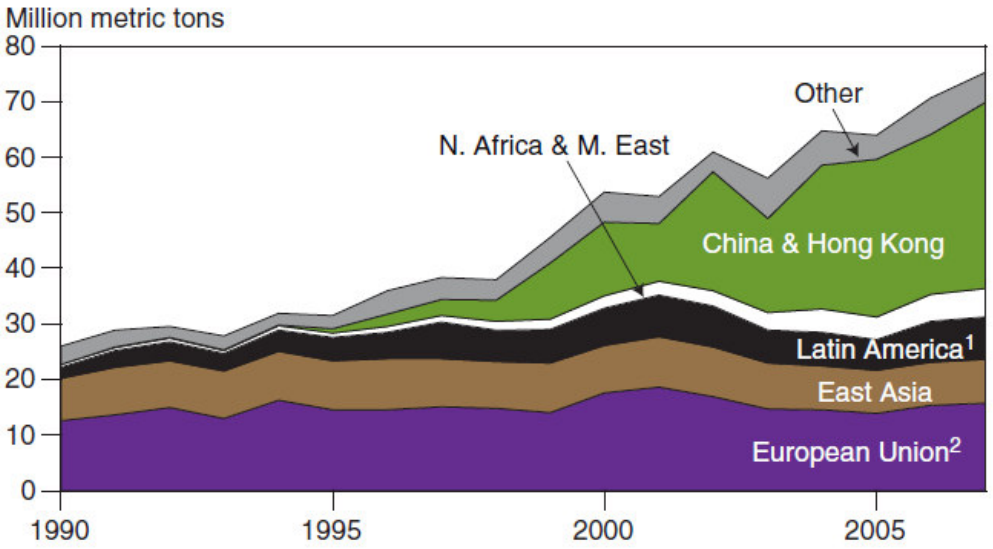
Global coarse grain imports



[1]EU-27 excludes intra-trade after 2002, EU-15 intra-trade before 2003, Slovenia before 1992.
[2]Former Soviet Union and other Europe; prior to 1999, includes Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

Source: USDA Agricultural Projections to 2017.

Global soybean imports

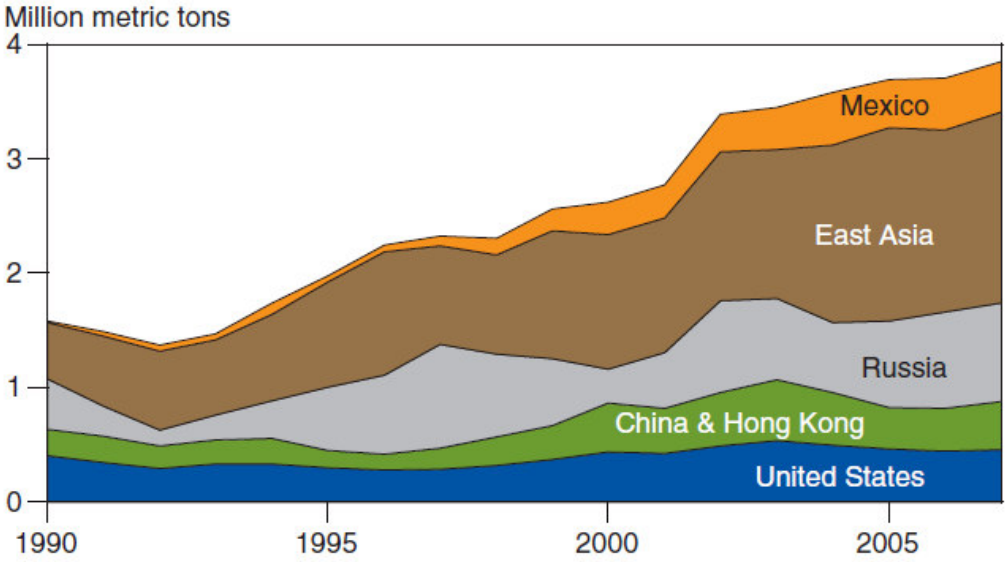


[1]Includes Mexico.
[2]EU-27 excludes intra-trade after 2002, EU-15 intra-trade before 2003, Slovenia before 1992.

Source: USDA Agricultural Projections to 2017.

APPENDIX 2

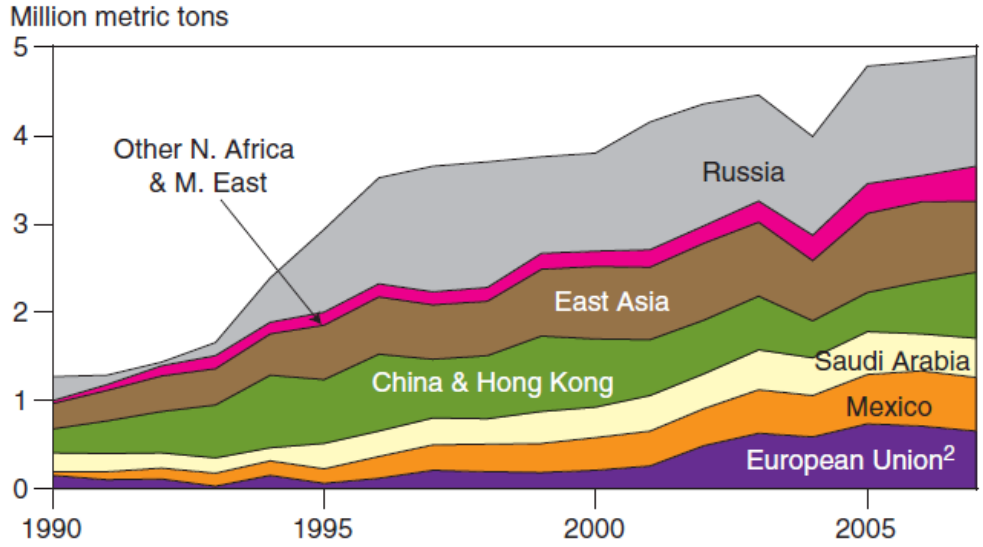
Pork imports[1]



[1]Selected importers.

Source: USDA Agricultural Projections to 2017.

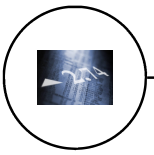
Poultry imports[1]



[1]Selected importers.

[2]EU-27 excludes intra-trade after 2002, EU-15 intra-trade before 2003, Slovenia before 1992.

Source: USDA Agricultural Projections to 2017.



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