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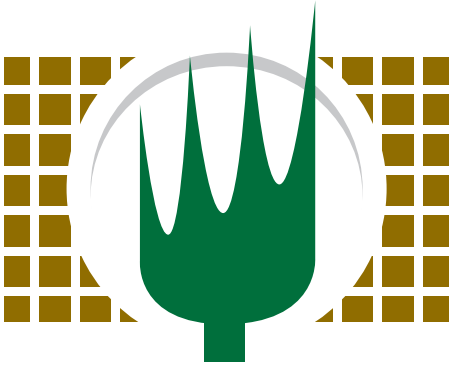
Issue Report



What's Driving Food Prices?

July 2008

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Preface

The temperature of the rhetoric in the food-versus-fuel debate has been rising right along with the prices of corn and oil. Farm Foundation is not about heat or fueling fires. Our mission is to be a catalyst for sound public policy by providing objective information to foster deeper understanding of the complex issues before the food system today. We commissioned this paper to provide a comprehensive, objective assessment of the forces driving food prices.

In recent months, much has been written in the academic and popular press about commodity prices, biofuels and food prices—often with varying perspectives and conclusions. Farm Foundation asked Wallace Tyner, Philip Abbot and Christopher Hurt, all of Purdue University, to review the literature and provide a comprehensive assessment of the forces driving food prices today. The three economists reviewed more than two dozen reports and studies, summarizing them in light of their own examination of the facts.

As is true of many issues in the food system, the full story behind rapid increases in food prices is not a simple one. Today's food price levels are the result of complex interactions among multiple factors—including crude oil prices, exchange rates, growing demand for food and slowing growth in agricultural productivity—as well as the agricultural, energy and trade policy choices made by nations of the world. But one simple fact stands out: economic growth and rising human aspirations are putting ever greater pressure on the global resource base. The difficult challenge for public and private leaders is to identify policy choices that help the world deal with the very real problems created by today's rising food prices without jeopardizing aspirations for the future.

It is the intent of Farm Foundation that the objective information provided in this report will help all stakeholders meet the challenge to address one of the most critical public policy issues facing the world today.

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President
Farm Foundation

What's Driving Food Prices?

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July 2008

The three authors are agricultural economists on the faculty at Purdue University. Abbott works in international trade and macro factors. Hurt works in analysis of commodity markets. Tyner is an energy and policy economist most recently specializing in biofuels policies. Tyner also coordinated the project. The final product reflects the insights gained through working in a multi-specialist team.

This paper was prepared by the authors for Farm Foundation. The authors are solely responsible for its content.

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Executive Summary

Prices of virtually all food commodities have increased substantially over the past year. For many commodities, prices are at or near records. Why have commodity prices gone up so much? In the debate surrounding this question some have singled out one or two factors as the primary drivers of food price increases. The real and much more complex answer involves economic growth, international trade, currency markets, oil prices, government policies and bad weather. In preparing this report, we reviewed 25 recent studies and reports, a rich but sometimes controversial literature.

Through this review and our own analysis, we identified three broad sets of forces driving food price increases:

- global changes in production and consumption of key commodities,
- the depreciation of the dollar, and
- growth in the production of biofuels.

The factors driving current food price increases are complex. We make no attempt to calculate what percentage of price changes are attributable to the many disparate causes, and, indeed, think it impossible to do so. However, in looking at the interplay of the forces driving food prices, a clearer picture emerges of what has been happening.

Rapid economic growth in developing countries has led to growing food demand and a dietary transition from cereals toward more animal protein. As a result global consumption of agricultural commodities has been growing rapidly. This growth in demand for agricultural commodities has been broad based. While China and India have received much attention, we differ with other studies on their impact. World prices are formed by those who trade. China and India have both followed policies aimed at agricultural self-sufficiency, and neither are major traders of most agricultural commodities. However, China's rapidly growing oil imports have had an indirect effect on food prices by impacting world prices for crude oil.

While demand for agricultural commodities has increased, the growth in agricultural productivity has slowed. Investments in agricultural research lagged in response to agricultural surpluses in the 1980s and 1990s. Over the past four to eight years, depending on the commodity, growing demand and sluggish productivity growth led to the change from a surplus to a shortage era and set the stage for commodity price increases. When weather and crop disease shocks hit commodity markets in 2006 and 2007, stocks of many agricultural commodities were already low, thus exacerbating the price impacts. The policy actions of some countries to isolate their domestic markets through export restraints made the situation even worse, particularly for rice. Increased investment in agricultural research is important, but it will not provide a short-term solution.

While the effects of supply and demand on commodity prices are clear, the effects of changes in the structure of commodity markets, in particular increased speculative activity, are not. There is no doubt that the amount of hedge fund and other new

monies in the commodity markets has mushroomed. Price volatility has increased, partly due to increased trading volumes. Based on existing research, it is impossible to say whether price levels have been influenced by speculative activity.

Most commodities, including crude oil and grains are priced in U.S. dollars, but are purchased in the local currency. When the dollar falls, as it has over the past six years, there is a link with rising commodity prices. The link between the U.S. dollar exchange rate and commodity prices is stronger and more important than many other studies imply. The decline of the dollar is linked not only to higher demand for U.S. agricultural commodity exports, but also to higher oil prices.

Some studies conclude that oil prices and rising production and transportation costs have helped drive current commodity price increases. But many of these impacts occur with a significant lag. Higher crude oil prices have pushed up the cost of producing agricultural commodities through increases in the price of inputs, such as fertilizer and diesel, but the long-term impact of these increases has yet to be felt.

Crude oil's strongest and most direct impact on food prices has been through its effect on the demand for biofuels. Policies, including subsidies and mandates, in the United States and European Union led to the development of the biofuels industry and its growing demand for corn and vegetable oils. In the last four years, most of the growing global demand for corn has come from its increased use for ethanol production. The ethanol blender credit, tariff and Renewable Fuel Standard are factors causing increased corn price, but quantitatively most of the increase has been driven by higher oil prices.

While the factors are complex and some of the interactions of economic forces and policy are subtle, the global effects of rising commodity and food prices are real. Agricultural commodity price increases have a much greater impact on low-income consumers, especially in developing countries, because food is a much larger fraction of total expenditures and commodities are a larger share of their food consumption. Another side of the higher commodity price story that has gotten relatively little attention is the potentially large supply response that could result as farmers in developing countries increase production and productivity. Higher prices could induce these farmers to purchase and use inputs such as improved seeds and fertilizer, which would lead to substantial increases in productivity and economic gains. For this to happen, governments would have to permit higher prices to be transmitted to farmers.

Historically, commodity prices rise and fall. Consumers and farmers respond and markets adjust. While the current turn in the cycle may look somewhat different than those of the past, we can be reasonably sure that supply will increase in response to higher prices while demand will diminish reducing the pressure on prices. The challenge facing policy makers is to find policy options that deal with the short-term effects created by rising food prices without creating a new set of long-term problems.

Introduction

Prices of virtually all agricultural commodities have seen spectacular increases over the past year. For many commodities, prices are at or near records. So why have commodity prices gone up so much? Is there some major driving force that is behind all the price increases or is it a perfect storm of individual commodity supply and demand circumstances that just happened to come together at the same time, or is it a combination of several factors?

Another issue that complicates the story is that over the past three years, biofuels production has grown sharply in the United States and the European Union and, to a much smaller degree in other countries, and many would like to blame the food price increases on the hungry energy appetites of the rich countries (e.g., IFPRI). So what role has biofuels played, and is that role driven by the policies of rich countries?

Our objective is to provide as complete an assessment as possible of the major forces behind the dramatic increases in commodity prices. In so doing, we do not, in general, provide quantitative estimates of the magnitude of food price increases due to the commodity price changes. Food price increases vary with the level of development, with richer countries having more services included in food prices than poor countries. People in developing countries consume more commodities directly, so commodity price impacts have a much greater impact on food prices.

We have attempted to conduct an impartial evaluation based on the data available. In conducting this assessment we have read many reports, articles, and studies plus numerous other press releases, op-ed articles, and other similar short pieces. Appendix A contains an annotated bibliography of the major sources consulted. Some of the reports were done by established national or international institutions such as the International Food Policy Research Institute (IFPRI), World Bank, International Monetary Fund (IMF), United Nation's (UN) Food and Agricultural Organization (FAO), Organization for Economic Cooperation and Development (OECD), International Rice Research Institute (IRRI), U.S. Department of Agriculture (USDA), Congressional Research Service (CRS), Federal Reserve Bank of Kansas City, the Center for Agricultural Research and Development (CARD), and Texas A&M University.

Some of the documents were prepared by organizations with a particular position to support such as the American Coalition for Ethanol, Grocery Manufacturer's Association, Renewable Fuel Association, 25 x 25–America's Energy Future, and National Corn Growers Association. Most of these position statements and reports are done to tell the story or position of their organization in the most favorable light possible. That is the job of lobby groups. Many of the studies are not data driven. Some draw conclusions that do not follow from whatever analysis is contained in the study. In our work, we have attempted a data-driven approach to try to learn what story can be gleaned from the best information available.

What are the common themes among the studies we reviewed? Many point to the following causes of food price increases:

- Growing food demand and dietary transition to more animal protein in developing countries resulting in global consumption increasing faster than production. Many studies focus on China and India.
- Lower level of investment in agricultural research leading to lower growth in productivity in commodity production. Some of the studies that include this factor fail to distinguish between short and long run impacts.
- Weather and crop disease issues in 2006-07 that made an already difficult situation worse.
- Biofuels programs in the United States and European Union, which provide subsidies and mandates for biofuels leading to greater use of corn and vegetable oil for biofuels, thereby increasing the prices of these commodities.
- Depreciation of the U.S. dollar relative to the Euro and other world currencies.
- Increases in the price of crude oil.
- Production cost increases, especially those driven by higher crude oil prices such as fertilizer and diesel.
- Speculation in the commodity markets.

A few of the studies attempt to apportion the share of the price increases that can be attributed to biofuels, but most do not, rather indicating that the total impacts come from the combination of all these factors, and it is impossible to separate out the share of any one cause. The adverse impacts on the poor have been highlighted by the international organizations working with developing countries such as the World Bank, IMF, and IFPRI. Higher agricultural commodity prices have greater adverse impacts on the poor.

The position papers and brief reports from the associations take the positions one would expect. The ethanol organizations and corn growers all voice strong support for ethanol and claim it is not the villain in the food price increases. The livestock organizations and grocery associations claim ethanol is a major contributor and urge that the subsidies and mandates be terminated. Some UN organization leaders have also voiced strong opinions, favoring ending government support of biofuels because of its potential role in increasing food prices and global poverty.

We have considered all of these documents as inputs into our analysis, but do not rely on any of them for our conclusions. Some of the studies leap to conclusions with little or no data to support the conclusions. The clearest examples are the roles of China in food price increases and the exaggerated importance of drought in Australia, especially rice. One common missing element was the fact that prices of commodities are set in international markets through interactions among countries that buy and sell. If a country does not import or export appreciable volumes, it is not a significant determinant of international price (e.g., China, except for soybeans and India, except for rice). We also found that most of the reports did not distinguish between short run and long run. There often was not a good correspondence between conclusions and policy

recommendations. Many reports focused on increased agricultural research as a solution. Indeed it is an important step to take, but not a solution for the near term. Other reports (*The Economist*, World Bank) did make a clear distinction between appropriate and needed short-term and long-term measures. None of the reports focused on the transition from surpluses to shortages in agricultural commodities—a change that has occurred in the last decade. This transition, as we will argue below, is quite important in understanding where we are today.

The paper is organized into sections that we consider to be the most important factors related to food price increases. The first major section is an analysis of what has been happening in the supply and utilization accounts for each major food commodity. Most of the prior studies focused on this area, although perhaps not with as much attention to details of the data as will be evidenced here. For example, for some commodities, especially those that are thinly traded like rice, global stocks and changes in global stocks may not be nearly as important as stocks of those countries that actually export rice. One of the themes we develop in this section is that the 2007-08 food price increase is not an instantaneous development. It has been building for many of the commodities for years. We have moved from a surplus era (and mentality) to a shortage situation in a relatively short time. The same applies to biofuels in that the biofuels induced corn price increases did not occur until stocks had fallen significantly.

Another theme developed here is that stocks-to-use ratios play a crucial role in determining commodity prices. When stocks are relatively high, shocks can be easily absorbed with little price change, but when stocks are low, even modest supply or demand shocks can have major impacts on price. In other words, the price response is non-linear with respect to changes in stocks-to-use ratios. We provide a commodity-by-commodity assessment of the supply and demand factors influencing price.

The second section is on exchange rates and international trade. Exchange rates, particularly the US$ depreciation, have been mentioned as a factor that might be important in several studies, but none of the food price studies has reported a data-based analysis. We use several measures based on exchange rate data to show similarities and differences between the current and past commodity price cycles. We provide a background on the economic forces that determine exchange rates, and we broaden the base beyond food prices to show the extent to which commodity prices in general have moved together historically and in the recent period. We show how commodity prices have historically moved with exchange rate changes, but to differing degrees and with different time lags, depending on what else was happening. We discuss the relationships between exchange rates, commodity prices, inflation and recession in the economy. Finally, we provide some indication on what forces may determine how long high commodity prices may continue based on this macroeconomic analysis.

The third major section focuses on the linkage between biofuels and commodity prices. It describes the new relationship between prices of energy and agricultural commodities. In the past, energy and agricultural commodity markets have been largely

distinct and have marched to different drummers. Today, because of biofuels, the price of crude oil and the price of corn are much more closely linked. Crude oil determines the gasoline price, which is linked to the ethanol price, which in turn determines the incentive to add ethanol capacity, and ethanol capacity drives corn demand for ethanol. With ethanol use approaching one-third of the U.S. corn crop, this link is becoming quite strong. This section examines the relative importance of oil price, subsidies, mandates, and import tariffs in determining the corn price.

The final section summarizes conclusions for this analysis. We indicate the points where our analysis yields similar conclusions to many of the reviewed studies, and areas where our conclusions are different or at least have different emphasis.

Supply and Utilization Impacts

Ending stocks for a number of major agricultural commodities are currently reduced to exceptionally low levels. Reviewing how tight these ending stocks are helps to explain the current high prices. However, tight stocks alone generally fail to explain the record high level of prices seen in a number of agricultural commodities, at least compared to historic stocks and price relationships. This means tight stocks are a foundation for higher prices, but that other factors seemingly are having large contributions, as well.

The use of supply and utilization balances give us an opportunity to explore issues of how area harvested and weather (yields) may have influenced production; how growth in world consumption was impacting ending stocks; and, of course, how the growth of biofuels production may have affected ending stocks. Data for this analysis is from the May 2008 update of the USDA data base, maintained by the Foreign Agricultural Service, known as “Production, Supply, and Distribution” or PSD.

The question of the level of ending stocks needed when the new crop is nearly ready to be harvested is interesting to ponder. In recent years, the general attitude has been that smaller ending stocks are needed than in previous decades because world yield variability has been lowered due to improved seed technology and to increased global sourcing of food where faltering yields in one part of the globe might be offset by higher yields in another major growing area. The enormous growth of soybean production in the Southern Hemisphere in recent decades is one example. Increased levels of world trade may also have contributed to an increased comfort level with low stock levels as more countries have been willing to cover internal crop shortfalls by buying on world markets.

Regardless, there is a point at which ending stocks are so small that they reach minimum or “pipeline” levels. This means total stocks will be used up at the time the new crop is ready to harvest. When market participants perceive that consumption will exceed available supplies such that stocks will drop below pipeline levels, prices rise to ration out the short supply. Prices continue to rise until a sufficient number of end users reduce use, and/or producers have time to respond by increasing production. The line

between surplus stocks and shortages can be very thin. It has likely become narrower in the last decade as governments got out of the storage business and private end users developed the philosophy of just-in-time-delivery and thus held minimum stocks in inventory.

The transition from surplus stocks or “too much” to “too little” came quickly for most agricultural commodities from 2006 to 2008. Once that thin line was crossed, prices were “unbolted” as everyone asked what the value of food should be in a world of “too little.” Ending stocks for many commodities now are near record lows as shown in Table 1.

Table 1. Last Time the Stocks-to-Use Ratio Was as Tight or Tighter than Current Period

Total Grains	1972/73
Corn	1973/74
Wheat**	Record
Rice	1976/77
Soy Oil	1976/77
Palm Oil	1972/73
Rapeseed Oil	1975/76
Soybean Meal	1984/85
Rapeseed Meal	1966/67

**PSD data back to 1960/61

Source: PSD, FAS, USDA

Comparing stock levels today with the 1970s is probably easier than comparing current price relationships with those of the 1970s. A host of changes have occurred in exchange rates, inflation levels, crop genetics plus production technology that has sharply increased yields, different costs structures, and a different world trade and policy environment. In the 1970s, agricultural policy for key exporters like the United States resulted in large accumulation of government-owned stocks; today, such policies no longer exist.

While comparing the specific level of prices with the 1970s may be difficult, there have been strong similarities in general price patterns. The non linear relationship of changes in stocks levels and changes in price is well documented in commodity price analysis. When ending stocks are large or burdensome, a large change in stocks levels may be required to change prices a small amount. However, when stocks become depleted, very small changes in anticipated stocks can be associated with major price impacts.

Today, the twin food/energy demands have likely heightened the inelasticity of the stocks-price relationship. Regardless, both in the 1970s and recently, short-run observations of price behavior appear very inelastic, changing up or down quickly.

However in either period, when average prices over a series of months, quarters or an entire year are observed, these average prices are likely to appear much more rational.

Figures 1 and 2 are the stocks-to-use ratio for total world grains and the amount of harvested acres from 1960/61 to projections for 2008/09. The stocks-to-use ratio measures the amount of ending stocks as a percentage of a full year's use. Total grains include corn, sorghum, wheat, rice, barley, oats, rye, millet and mixed grains. As such, it is a broad measure of feed grains, wheat and rice. There are several helpful general observations over this long data set:

1. The world cycles through periods of high ending stocks and low ending stocks. The periods of high stocks and low prices have tended to be much longer than the periods of low stocks and corresponding high prices.

2. The current period of extremely low stocks is explained by a much longer cycle of events that date to the 1980s and 1990s when, in general, stocks were high and world prices were very low.

3. Harvested acres for total grains generally dropped from 1981 until 2002/03, reflecting relatively low financial returns to producers and a shift of planted area to more lucrative oilseed crops. During this time period, harvested acres for total grains dropped by 11 percent.

4. China's role in reduction of world stocks of corn, wheat and rice is important during this period. In 1998/99, China's stocks-to-use ratio for these three grains was 105 percent, 90 percent and 70 percent, respectively. By 2004/05 China's stocks-to-use had dropped sharply to only 26 percent for corn, 38 percent for wheat and 30 percent for rice. However, China still did not become an important trader on world markets. The stocks changes were internal decisions.

5. The recent movement toward extremely tight stocks is noted since the 2002/03 marketing year when world ending stocks slipped below 25 percent for the first time since the early 1980s. This means the declining stocks situation has been incurred by tightening stocks in five of the last six years starting in 2002/03. In fact in an even longer perspective, world grain stocks to use have declined in eight of the last nine years dating from 1998/99 to 2007/08.

Figure 1. Stocks-to-Use Ratio for Total Grains in the World (1960-2009)

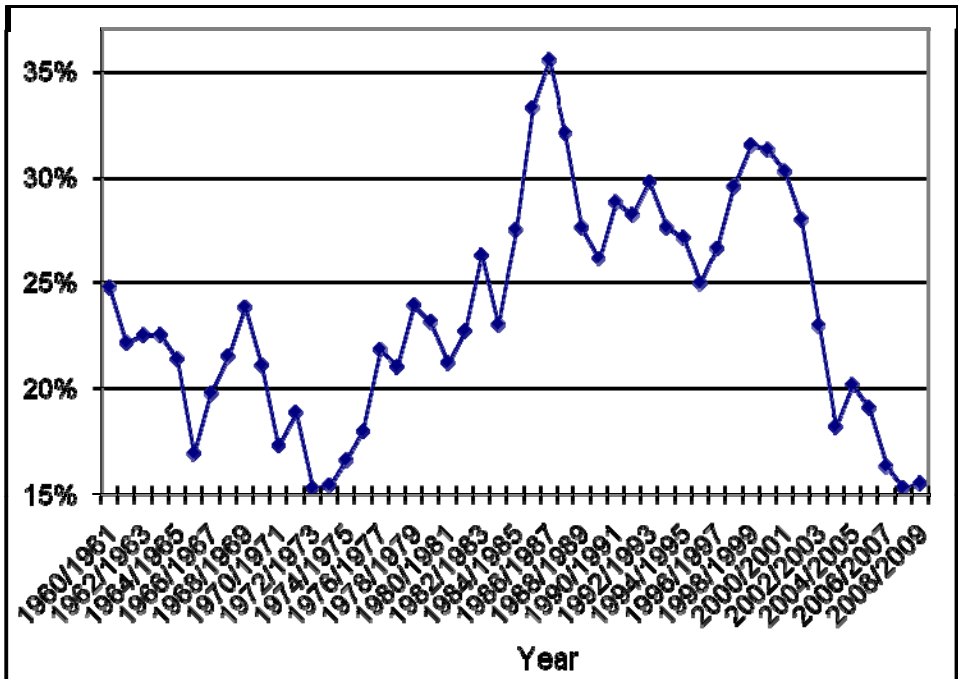
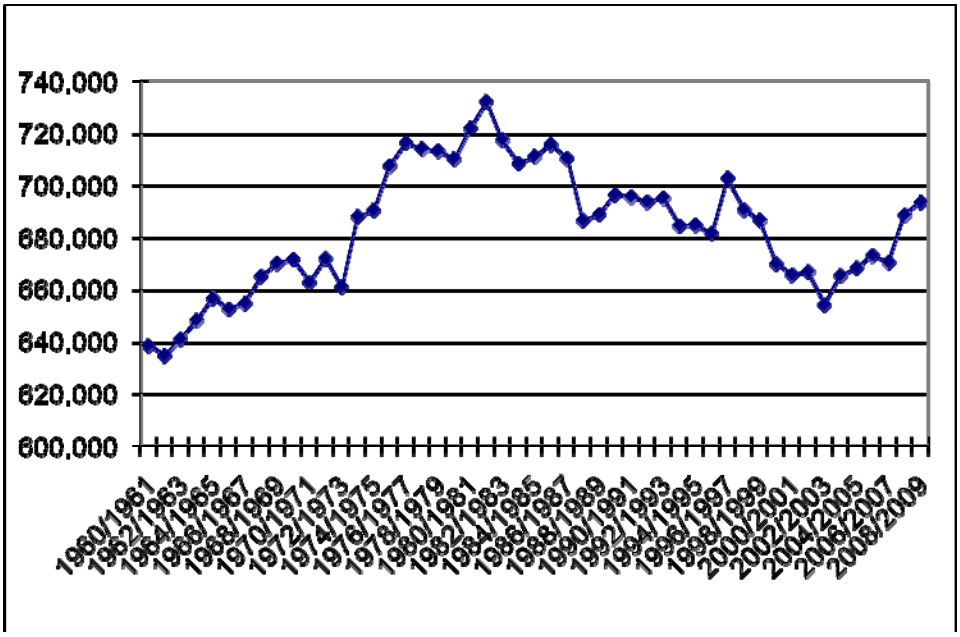


Figure 2. Area Harvested (1000 ha) for Total Grains in the World 1990-2009



This general pattern of consumption exceeding production since early this decade emerges in a general way from crop to crop for total grains, oilseeds and vegetable oils. The foundation for this period of declining stocks was growing world usage with little incentive for producers to expand. The eight-year period of low grain prices immediately following the 1997 Asian Financial Crisis is illustrative. Average prices received by U.S. farmers from 1998/99 through the 2005/06 crop year were $2.05 per bushel for corn, $5.33 per bushel for soybeans, and $3.04 per bushel for wheat. Over this eight-year period, U.S. crop producers generally had costs of production that exceeded prices received, and substantial federal government direct payments helped to make up the difference. It was indeed a surplus era.

Since the early part of this decade, rising world incomes have continued the trend of rising consumption of basic food products, including animal protein consumption. Grains and vegetable oils use for biofuels is a major additional consumption component since the 2004/05 marketing year. Later we will evaluate just how large the biofuels component of consumption has been relative to food and feed growth. However, while biofuels have been major new uses, it is important to recognize that the tightening of ending stocks was already well underway since at least 2002/03.

This is the general pattern seen for individual commodities, but there are differences among corn, soybeans, wheat, rice, soybean oil, rapeseed oil and palm oil that we will examine in detail.

Corn Situation

At the end of the 2008/09 marketing year world corn stocks-to-use will reach the lowest level since the 1973/74 marketing year, even with normal yields, according to USDA projections made in May 2008 and shown in Figure 3. World corn harvested area declined three percent from 1996/97 to 2002/03. Since 2002/03, corn harvested area has increased sharply by 14 percent primarily in response to expansion of corn use for ethanol. Figure 4 shows growth rate trends for corn use—the straight line is a linear trend from 1960/61 to 2008/09. Usage for feed and residual have increased slightly above the long-term trend rate, but Food, Seed and Industrial (FSI) use can clearly be seen as the larger source of consumption increases since 2004/05, driven by corn use for ethanol.

The role of increased world meat consumption has also been listed by some as a major reason for surging corn prices. Growing demand for animal products is occurring and is an important ongoing demand growth factor. However, as shown in Figure 4 there was no surge in use of corn for feeding in the past few years as corn prices rose.

The role of China's growing meat consumption specifically has also been linked by some as a major factor in the growth of demand for corn. China had growing meat consumption through 2005, but total meat consumption in 2006, 2007 and 2008 is below 2005 levels. This decline of recent years is related to the decline in internal pork production due to blue ear disease. While imports of meat did increase some in 2006, 2007 and 2008, the level of imports are still small compared to total world imports and

were not large enough to offset the declines in internal meat production. Imports of pork in 2007 and 2008 will average about four percent of total world imports. Chinese poultry imports in these two years will be about seven percent of total world imports, and Chinese beef imports as a percent of world imports are negligible.

Figure 3. World Corn Stocks-to-Use

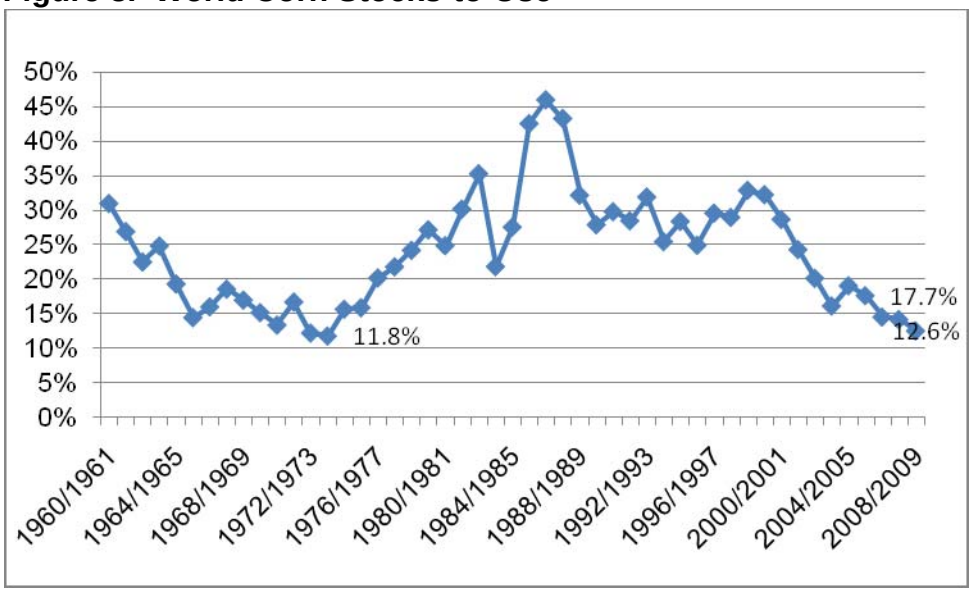
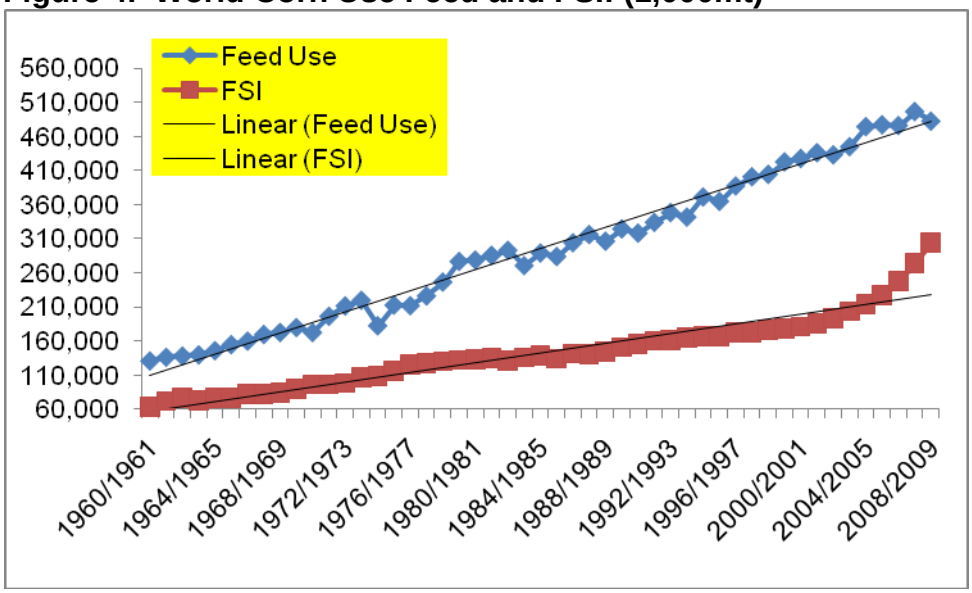


Figure 4. World Corn Use Feed and FSI: (1,000mt)



The large shift of area toward corn, particularly in 2007/08, came heavily at the expense of soybean and oilseed acres. World corn area increased by seven percent in 2007/08 alone and soybean area dropped by four percent, further tightening world oilseed stocks.

The overall argument that corn use for ethanol was/is tightening world stocks is stronger than for oils. For the three years from 2004/05 to 2007/08, USDA data suggests that the Food, Seed and Industrial (FSI) growth, of which corn use for ethanol is included, grew by 44 million metric tons, while world feed use grew by 39 million metric tons (Table 2). This means 53 percent was FSI and 47 percent was feed use.

Table 2. Relative Growth of Production and Consumption for Food and Biofuels Since 2004/05

	Usage Change Since 2004/05 (1,000 mt)			Production Change Since 2004/05	Usage Exceeds Production Since 2004/05	Usage Exceeds Production as % of 2004/05 Ending Stocks
07/08 vs. 04/05	Industrial	Food	Total			
	1,000 mt					% Change
Palm Oil	1,661	5,938	7,599	7,602	-3	0.0%
Soy Oil	2,202	4,042	6,244	5,794	450	29.7%
Rapeseed Oil	2,231	555	2,786	2,293	493	94.1%
Total 3 Oils	6,094	10,535	16,629	15,689	940	16.8%
	FSI	**Feed**	**Total**			
Corn**	43,584	39,374	82,958	64,440	18,518	14.1%
Soybeans			28,802	3,971	24,831	52.3%
Wheat	20,222	-7,591	12,631	-19,328	31,959	26.2%
Milled Rice			16,892	26,201	-9,309	-12.7%
Projected 08/09 vs. 04/05	**FSI**	**Feed**	**Total**			
Corn**	64,497	34,284	98,781	62,169	36,612	27.8%
Soybeans (na)						
Wheat	26,146	7,476	33,622	30,285	3,337	2.2%
Milled Rice			20,400	31,177	-10,777	-14.7%

**Assumes 1/3 of the growth in industrial above the 1960-2004 trend is used as feed (footnote 8)

(na) = not available

Table 2 also provides corn data for the projected 2008/09 marketing year compared to 2004/05. Of course, the impact of surging ethanol production in 2008/09 "crowds out" other users for the limited corn supply. Comparing these projected 2008/09 numbers with 2004/05 show that FSI growth represents a 64 million metric ton increase in usage over the now four-year period, compared to only a 34 million metric ton growth for world feed usage.[1] That means the FSI category would represent 65 percent of the growth compared to 35 percent for world feed for the four years. The fact that biofuels seemingly are such a high percentage of total growth lend support to the hypothesis that corn use for ethanol is having a much larger impact as compared to oils use for biodiesel to be covered later.

It is important to note that the higher corn prices have not yet been fully passed on to consumers. Egg prices have increased, and we would expect to see more increases in dairy, poultry, pork and beef prices down the road as production and marketing in these sectors adjusts to the higher feed costs.

Soybean Situation

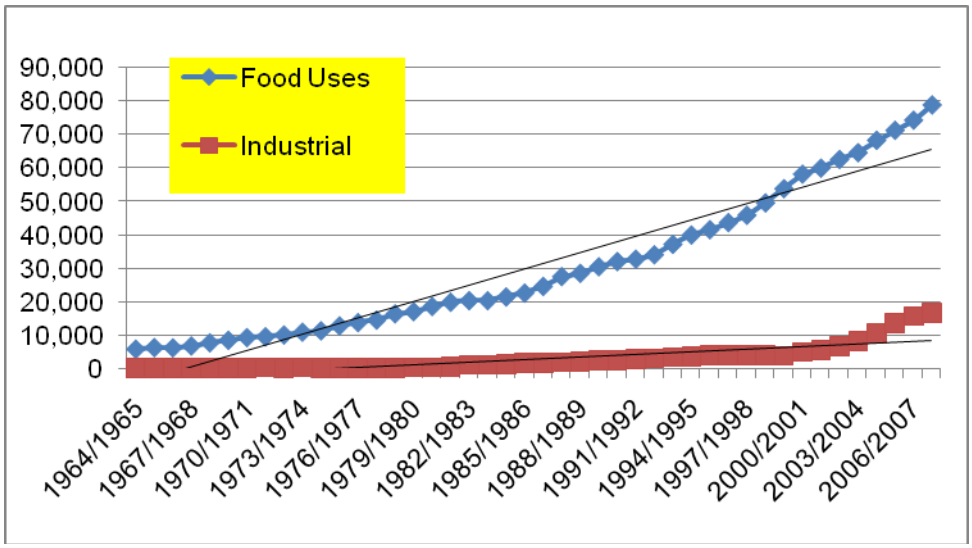
World soy oil consumption has been increasing rapidly as incomes increased, particularly in some developing countries, which led to growth in oil consumption. Meal consumption increased as animal feed rations shifted toward high protein meals. World soybean area was growing rapidly from 2002/03 to 2006/07 when it increased by 15 percent. Much of this growth was in South America with China the primary buyer of larger soybean and soy oil production. Other than 2003/04, world soybean yields have been at, or above long-term trends.

Soy Oil, Palm Oil, and Rapeseed Oil

Both food and industrial (primarily fuel) uses of soybean, palm and rapeseed oils have grown at rates exceeding long-term trends during the current decade (Figure 5). Strong world economic growth has led to rising uses of cooking oils for food use. The industrial use category, although much smaller than food uses, has surged in percentage terms during the decade with the growth of biofuels.

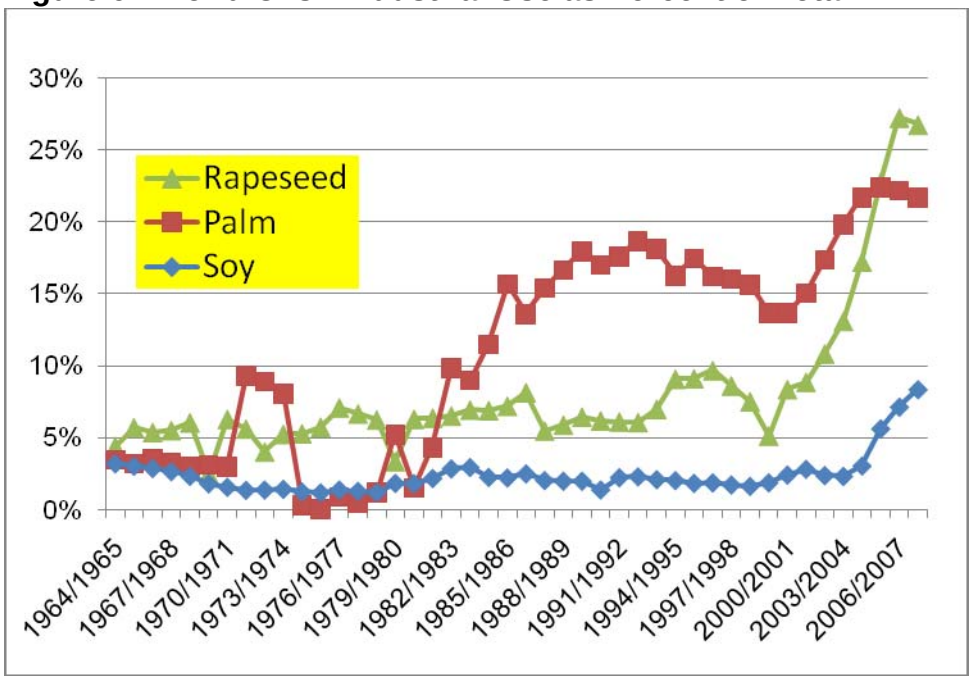
[1] Some adjustments in the data were made for corn. First, FSI includes uses other than corn use for ethanol. While data is not available for the entire world, the data for the U.S. show that all of the change in the FSI category was attributable to corn ethanol use during this three-year period. Secondly, ethanol production has a byproduct known as distillers' grains that is used as a livestock feed and substitutes for corn and some soybean meal in animal rations. The production of dry distillers' grains is about 18 pounds per bushel of corn (56 pounds) or about 1/3 of the weight of corn processed. For this analysis it was assumed that 1/3 of the corn estimated to be used for ethanol production was taken out of the FSI category and added to the feed category.

Figure 5. World Soy, Palm, and Rapeseed Oils and Use Components



As shown in Figure 6, the most dramatic percentage rise in industrial use (fuels) has been for rapeseed oil, growing from eight percent of total use at the start of the decade to 27 percent by 2007/08. This was primarily driven by the European Union's use of rapeseed oil for biodiesel. World industrial uses of soy oil rose from two percent of total in 2000/01 to eight percent by 2007/08. This was primarily from the United States' increase in soy oil use for biodiesel. Rapeseed as a low-value oil has had more industrial uses, but still, industrial use increased from about 18 percent of total use in the 1990s to 22 percent recently. As rapeseed and soy oil industrial uses mushroomed, developing countries relied more heavily on lower valued palm oil for food uses.

Figure 6. World Oils: Industrial Use as Percent of Total



For both soy and rapeseed oils, world consumption increases since 2004/05 have exceeded production increases and stocks-to-use ratios have dropped to the lowest levels since the 1970s. Palm oil production has essentially kept up with consumption surges since 2004/05, but stocks-to-use remain at levels of the 1970s.

How much of the world changes in oils use came from industrial uses (the category where biofuels use resides) and how much from food uses from 2004/05 to 2007/08? Table 2 provides these details for the three largest oils: palm oil, soybean oil and rapeseed oil.

Palm oil is unique from soybean or rapeseed oils in that the large increase in utilization was almost exactly offset by production expansion in the three years from 2004/05 to 2007/08. The increase in industrial production--that includes the growth in fuel—was 1.7 million metric tons, while food use expanded by 5.9 million metric tons. Thus, the industrial growth in these three years represented about 22 percent of the total growth in these two categories, and food use was 78 percent. While consumption over the three years was up by 7.6 million metric tons, production grew by the same amount.

For soybean oil, industrial production rose by 2.2 million metric tons and food consumption by 4.0 million metric tons in the three years after 2004/05. Thus, 35 percent was industrial and 65 percent of growth in these two categories was food usage. Usage growth exceeded production growth by 450,000 metric tons. This level of stocks draw down represents about 30 percent of 2004/05 stocks, which is also shown in the table. When stocks are already getting tight, small changes in ending stocks levels can have major price significance.

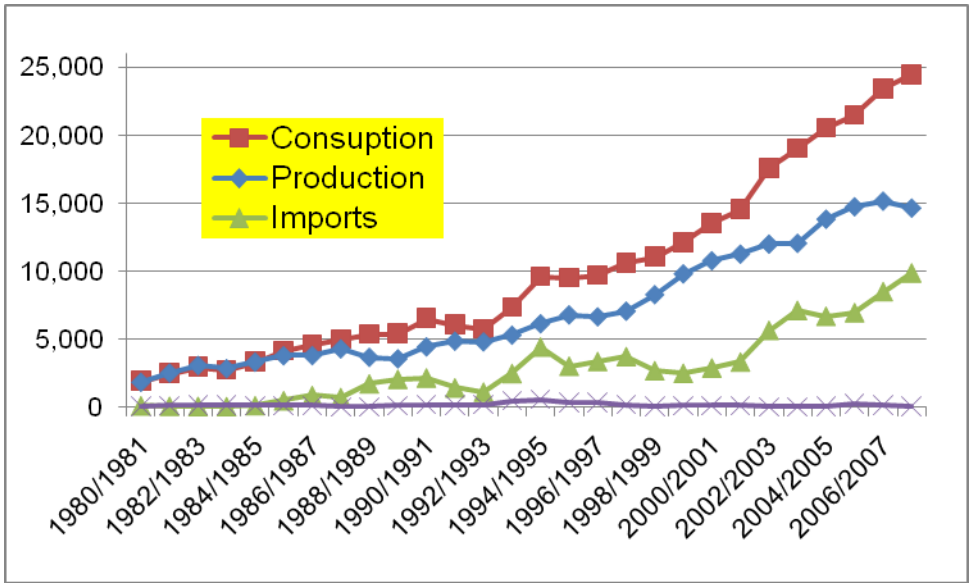
Rapeseed oil has a different pattern as the European Union was moving large amounts of rapeseed oil toward fuel uses. World industrial use from 2004/05 to 2007/08 grew by 2.2 million metric tons, while food use was only expanding .6 million metric tons. This meant industrial growth was 80 percent of the expansion in world usage, while food use was 20 percent.

When these three major oils were combined, the growth in industrial (fuel) use represented 37 percent increase and food 63 percent. Overall this may suggest that food consumption increases for these key oils was the most important reason for consumption expansion and tightening of stocks. While only 37 percent of the increase in usage was industrial, even small amounts can have big impacts on tightening ending stocks, especially once they are already getting small.

China has been sharply increasing consumption of food oils (Figure 7). Since the mid-1980s consumption growth has exceed production growth and China has imported the shortfall. The rate of consumption growth increased this decade and thus the rate of imports increased. China imported about 10 million metric tons of oils, recently consisting of 6 million metric tons of palm oil and 3 million metric tons of

soybean oil. So, in addition to biofuels, China's consumption growth has been an important factor for vegetable oils.

Figure 7. China All Oils: Production/Consumption: (1,000 mt)



Rice Situation

For rice, China and India represent somewhat more than 50 percent of world consumption. However, China trades very little. Since 2000, China's exports of rice have averaged one percent of production and five percent of world exports (Figures 8 and 9). For India, exports have averaged about four percent of production, but that represented 14 percent of total world exports this decade. India is a factor in the world rice market, but that importance has diminished to just seven to nine percent in the most recent two years (2007/08 and 2008/09). However, their recent role in banning rice exports may have had impacts on world prices due to the thinly traded market. China has had declining total consumption this decade, and India's consumption has been about at trend levels. These two major rice consuming countries do not demonstrate any surge in consumption this decade that would have led to sharply higher prices.

Figure 8. China Rice Production/Consumption: (1,000 mt)

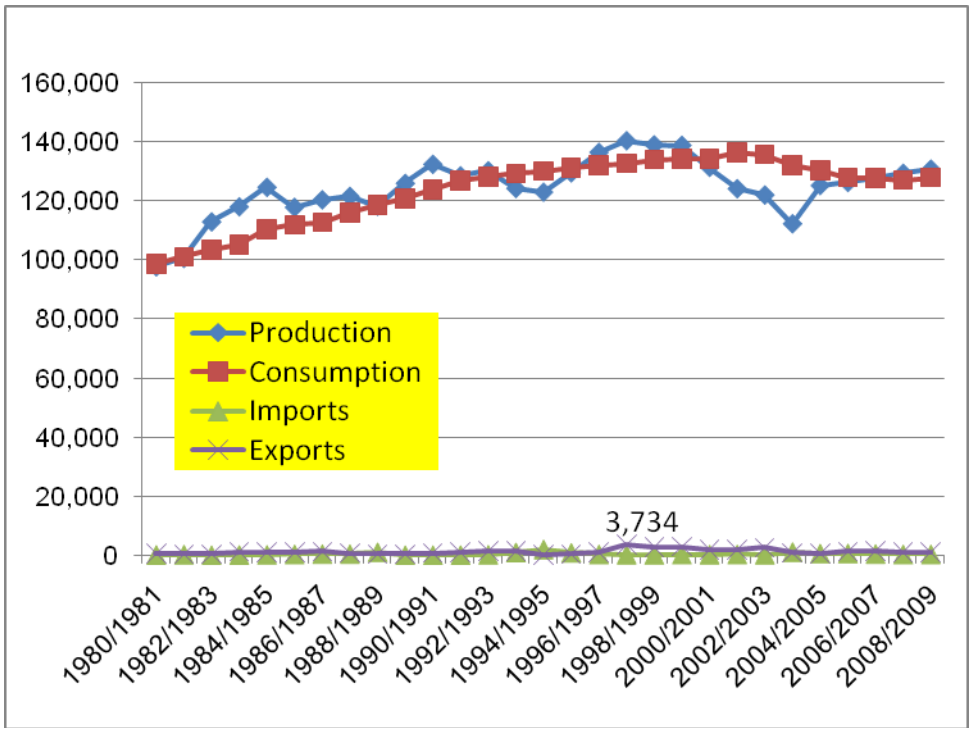
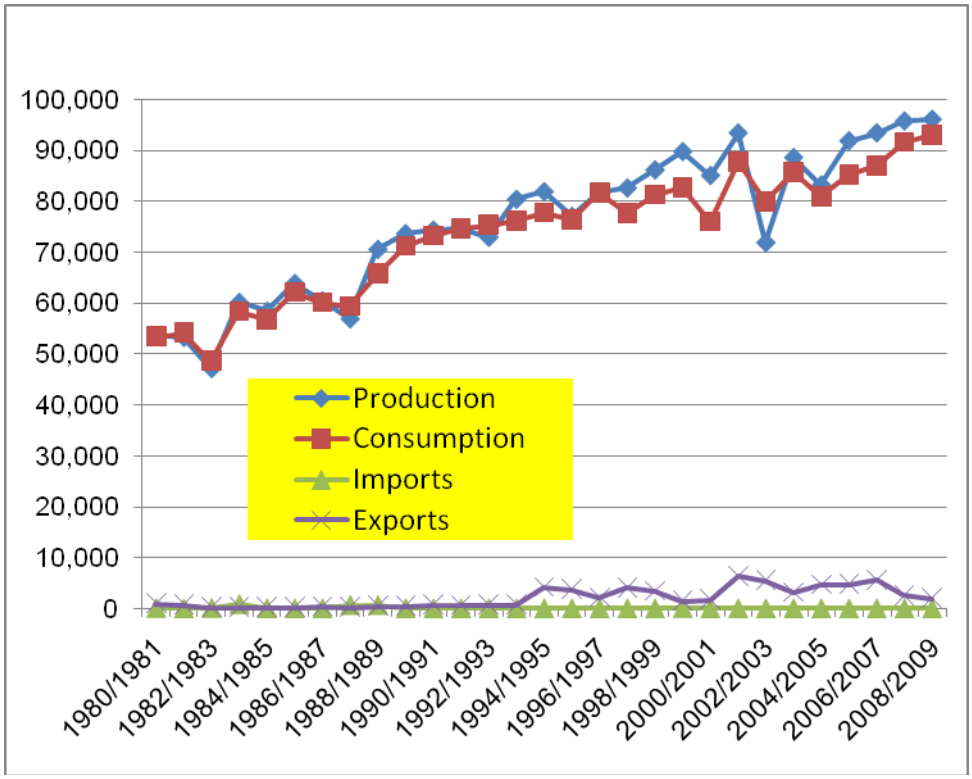
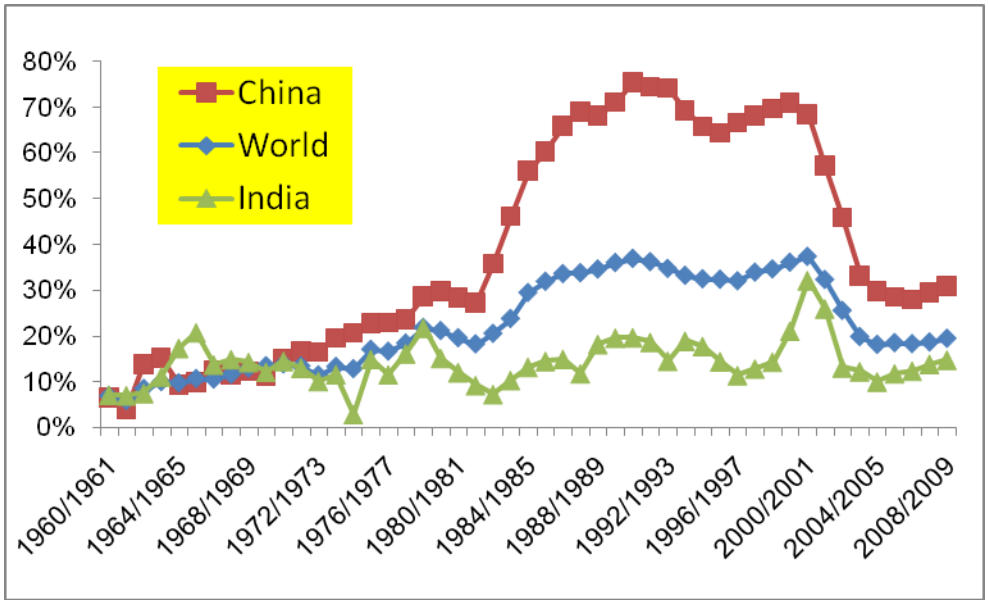


Figure 9. India Rice Production/Consumption: (1,000 mt)



In response to high stocks and low prices in the 1990s, the world's producers reduced harvested area between 1999/00 to 2002/03 by six percent. Stocks were further reduced by below trend yields in 2002/03, 2003/04, and 2005/06. As shown in Figure 10, recent stocks-to-use reached lows in 2004/05 for both the world and India. Chinese stocks reached their minimums in 2006/07. Stocks-to-use then improved for the world, China and India, and are projected to improve more in 2008/09.

Figure 10. China, World, and India Rice Stocks to Use



In simply observing stocks-to-use, one might conclude that rice prices would have peaked in 2004/05 rather than in 2007/08. The apparent reason why rice prices peaked in 2007/08 is that many basic food commodities are in short supply today, and escalating internal food inflation in some rice exporting countries caused those countries to protect internal rice stocks by placing restrictions on exports.

The vast amount of rice is consumed in the country it is produced. Rice trade is very thin, representing just seven percent of world consumption on average this decade. In comparison, corn world trade has been 12 percent, wheat 18 percent, and soybean 31 percent of world consumption.

In response to concerns over internal food price inflation and tightening stocks, a number of rice exporting countries, such as India, Egypt, Vietnam, Brazil, Indonesia, Bangladesh, and Cambodia, placed restrictions on exports in March-May 2008. Some importing countries, on the other hand, reduced import tariffs to encourage easier importation of rice and other agricultural products. Media coverage of these restrictions led to growing concerns among buyers, as well. Even U.S. rice consumers became concerned when rationing at some large retail outlets was noted in the media. Hoarding

of rice inventories by end-users was also noted in the press. These are natural responses to availability concerns.

In late May-June 2008, Cambodia and Vietnam eased export restrictions. USDA expects 2008/09 world production to be record large, with some modest rebuilding of stocks. These more recent events have resulted in moderation of rice prices from April highs. Clearly, export restrictions played a major role in disrupting normal rice trade thereby raising additional concerns about availability and helping cause rice prices to spike.

Wheat Situation

World wheat harvested area was in a general decline from the peak level in 1981/82. By 2006/07, world wheat area had declined by 11 percent, (Figure 11). Poor yields in major growing areas in 2006/07 and 2007/08 did keep world yields below the long-term trend. Figure 12 shows the decline in the stocks-to-use for world wheat. In 2000/01, wheat stocks-to-use was 36 percent. But by the 2007/08 crop year, that had dropped to 18 percent, the lowest in the data base dating to 1960/61. In 2006/07 and 2007/08, world wheat yields were below trends (1990-2007). If world yields had been on the trend line in those two years, this would have accounted for about 1/3 of the 32 million ton shortfall of production relative to consumption growth over the three year period. Projections for 2008/09 show wheat stocks beginning to recover with higher harvested acres and hope for “normal” yields.

Figure 11. World Wheat Harvest Area: (1,000 hectacres)

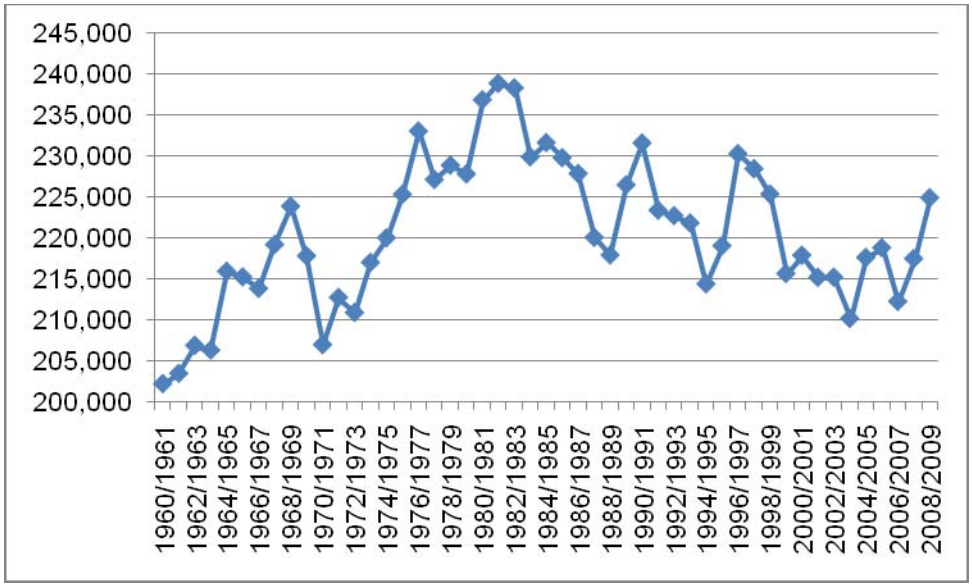
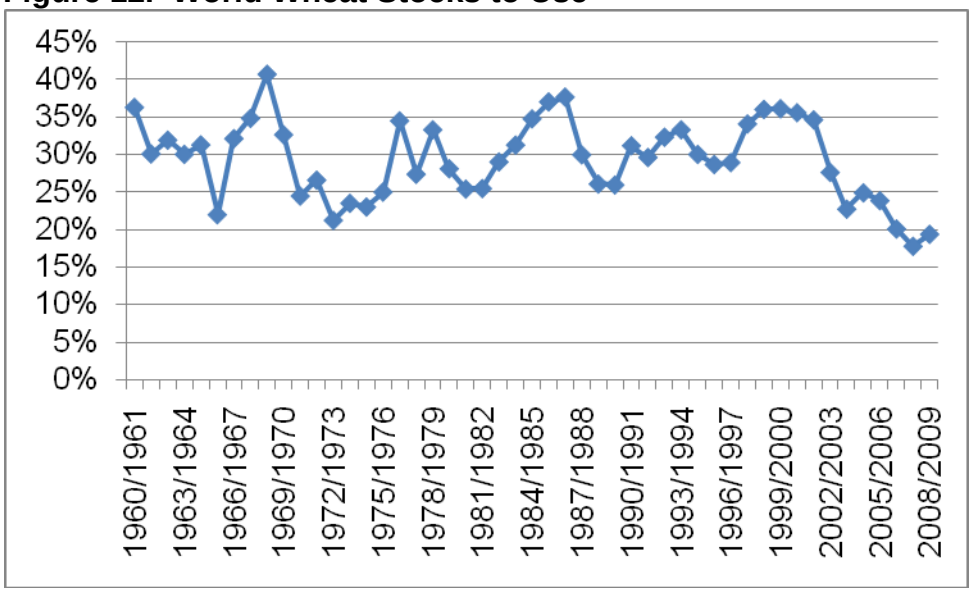


Figure 12. World Wheat Stocks to Use



From 2004/05 to 2007/08 world production dropped by 19 million metric tons as usage was increasing by 13 million metric tons. This meant usage exceeded production over these three years by 32 million metric tons—a huge amount (Table 2). Tight wheat stocks and high prices in the fall of 2007 and the spring of 2008 gave producers incentives to seed additional area around the world. The extent to which this new area is substituting for other crops or is new lands will become clearer as 2008/09 area is determined. The good news is that an improving stocks situation is projected by USDA for 2008/09 with "normal" world yields. Wheat may be the first of the major grain and oilseed crops to pull back from a near "crisis" stocks situation.

China and India are important producers and consumers of wheat, but have traded very little in recent years (Figures 13 and 14). China's production and consumption were declining in the first half of this decade. India basically consumes what it produces, trading only a modest amount when there is excess production or a production shortfall. Neither of these major countries demonstrate recent consumption surges that would be a cause for sharply higher world prices. In fact, both the absence of a growth surge and their isolation from world markets signal that China and India have not played a significant role in the wheat price run up, contrary to what one reads in the press**.**

Figure 13. China Wheat Production/Consumption: (1,000 mt)

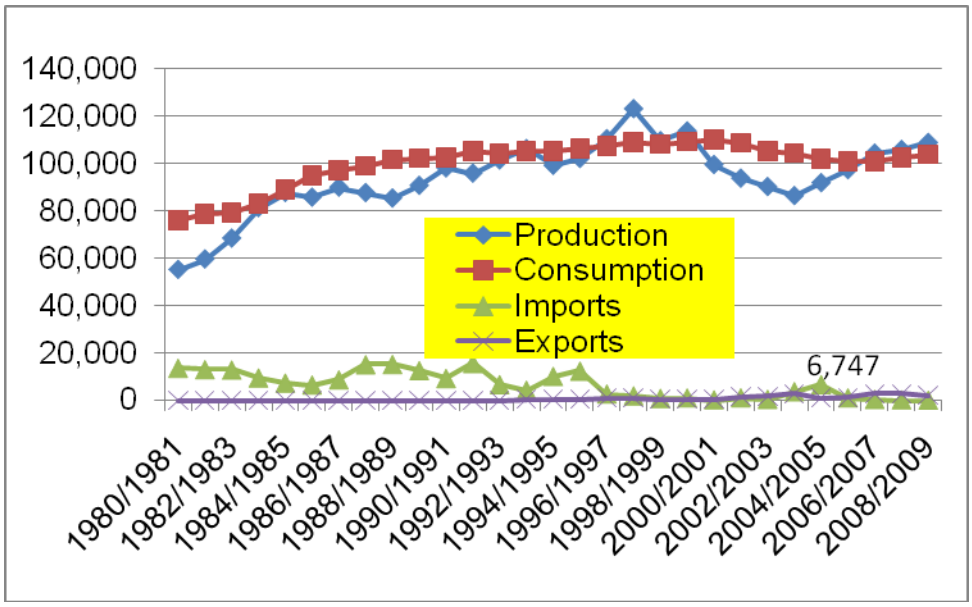
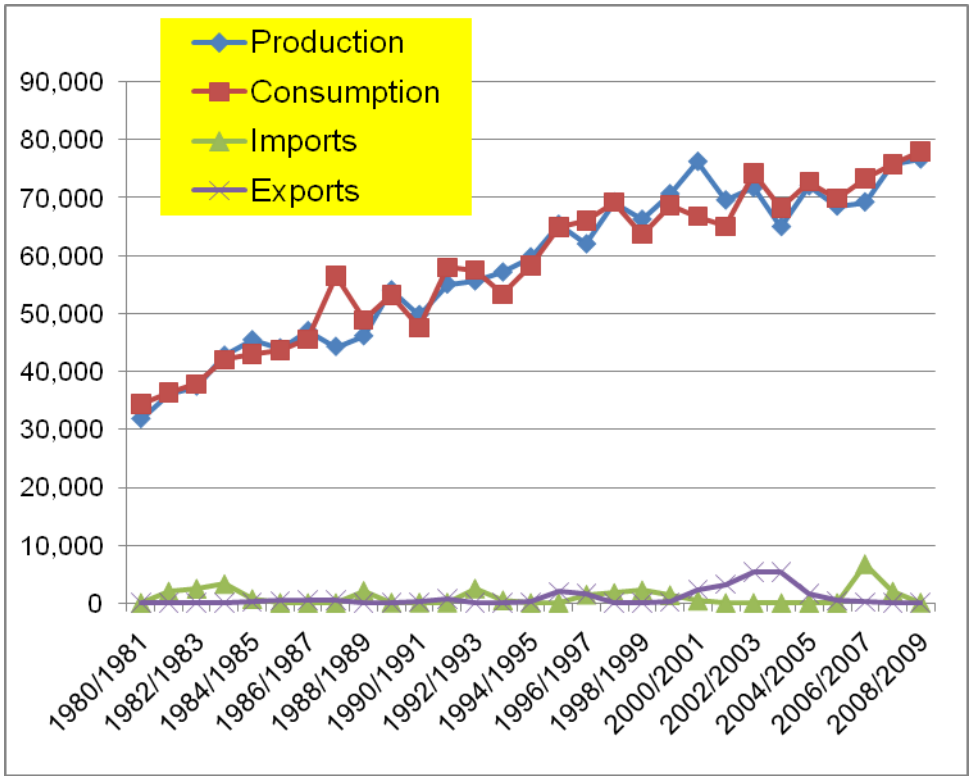


Figure 14. India Wheat Production/Consumption: (1,000 mt)



The Role of Market Institutions in Developing and Importing Countries

Large agricultural exporters, especially the United States, have maintained open borders and allowed changes in world prices to be transmitted to domestic prices. Importers and developing countries have generally utilized institutions, including state trading, variable levies and border taxes or subsidies that change with international market conditions to isolate their domestic markets from world market variability. For example, in the 1995 price run-ups the European Union switched from a variable levy to an export tax to maintain stable domestic agricultural prices set by their policy.

In the 1973-75 price run-ups it was observed that the very high prices had little effect in reducing imports as countries tried to maintain stable domestic prices and consumption in the face of high import costs. This is similar today. Structural adjustment reforms and commitments in the Uruguay Round of World Trade Organization (WTO) negotiations have weakened these institutions, and now permit greater transmission of world prices to domestic prices in many countries. Nevertheless, three pieces of evidence following the current food price increases suggest this stabilizing behavior persist for many countries. First, in spite of higher agricultural prices on international markets, exports grew rather than fell. Second, a number of countries, including India, Indonesia, Serbia, Thailand, the European Union, Korea, Mongolia and Morocco, have lowered import tariffs in the face of these higher prices (Trostle, 2008).

The rice case also showed that developing country exporters—notably Indian, Vietnam, Cambodia and Indonesia—have in several instances, instituted export taxes, and in the extreme, used export bans to isolate domestic markets from these effects. Other countries that have used export policy to isolate domestic markets include China, Argentina, Russia, Kazakhstan, Malaysia, Ukraine, Serbia and Egypt (Trostle, 2008). The lack of adjustment by importers and some exporters leads to more volatile world prices, with adjustments to global market shocks being mostly absorbed by the remaining exporters.

Market Participant Behavior and the Impact on Prices

To the factors discussed above can be add market behaviors that impact prices in the short run, but much less so in the long run. Prices in futures markets often peak during the anticipation of shortages rather than the actual event. In a similar vein, in a market economy, futures markets provide a vital role of price discovery. In anticipated periods of shortage, prices must rally to equilibrate consumption with available supplies. The exact price at which this equilibrium will be reached is never known. In their price discovery role futures markets generally must in the short run “overshoot” the ultimate equilibrium price, potentially leading to higher volatility. The price overshooting does not become evident until fundamental data begin to show that end-users are cutting back on consumption more than necessary to equate total consumption with available supplies.

The role of futures speculators has also been highly questioned as a potential cause for extreme energy and agricultural commodity prices. Speculators are vital to the price discovery process and provide liquidity to those who want to buy or sell immediately, even in large quantities. The Commodity Futures Trading Commission (CFTC) that regulates the U.S. futures markets had public hearings in early 2008 to garner opinions from market participants. Concerns ranged from failure of the futures delivery mechanisms to force convergence of futures and cash prices at delivery; to excessive contract risk for participants like grain traders in offering forward cash contracts to farmers; to concerns regarding the increased trading activity and position limits of pension, hedge, and index funds. Research has previously found little link between the degree of speculation and the level of commodity prices. The CFTC continues to investigate these concerns and is also looking for any indications of market manipulation.

Supply and Utilization: What Just Happened?

This supply and utilization evaluation tells a compelling story of a world that entered the 2006/07 marketing year not fully understanding the transition that had occurred from surplus stocks to tight supplies. World consumption growth for animal feeding and for cooking oils was growing and accelerated this decade. In general harvested area was in decline in the late 1990s and early this decade especially for grains, wheat and rice. A few commodities had weather disruptions, most notably wheat and rice, but these were only contributors to already tightening stocks.

Biofuels added major new demands on an already tightening stocks situation, especially since 2004/05. For the three main vegetable oils, industrial growth (primarily biodiesel) represented 37 percent of total growth from 2004/05 to 2007/08. For corn, the biofuels surge is even more compelling. By 2008/09, industrial use led by increases in corn use for ethanol will have accounted for 65 percent of consumption increase compared to 35 percent for feed use in the four years from 2004/05 to 2008/09.

USDA expects improvement in world inventories of both rice and wheat in the 2008/09 marketing year. However, there will be no improvement for corn, soybeans and vegetable oils in total. Late planting and flooding in the U.S. Midwest in June 2008 reduced production potential, especially for corn and soybeans. By mid-July the magnitude of acreage and yield losses is felt to be smaller than initial reactions and weather for the remainder of the Northern Hemisphere growing season will be important. , However, already dangerously tight inventories may be further pressed. Prices will have to remain high to ration usage. Biofuels usage will likely be lower and food prices will be higher in both the United States and other parts of the world than in the absence of these weather events.

Exchange Rates, Food Prices and Agricultural Trade

Food prices increase because of supply-utilization events in individual commodity markets and due to macroeconomic forces that set the environment within which markets adjust. Among macroeconomic variables, the most notable and directly related is the exchange rate, which determines how world prices are translated into domestic prices. The recent substantial depreciation of the U.S. dollar is cited by many studies as one of the forces shaping today's high commodity prices. But few, if any, of those studies try to quantify the effect, or put it into the context of the general rise of commodity prices, that in many cases exceed the increases in agricultural commodity prices. We provide background information here to highlight the extent of the current weakness of the dollar and attempt to put the effects of the recent dollar depreciation on commodity prices into a quantitative context.

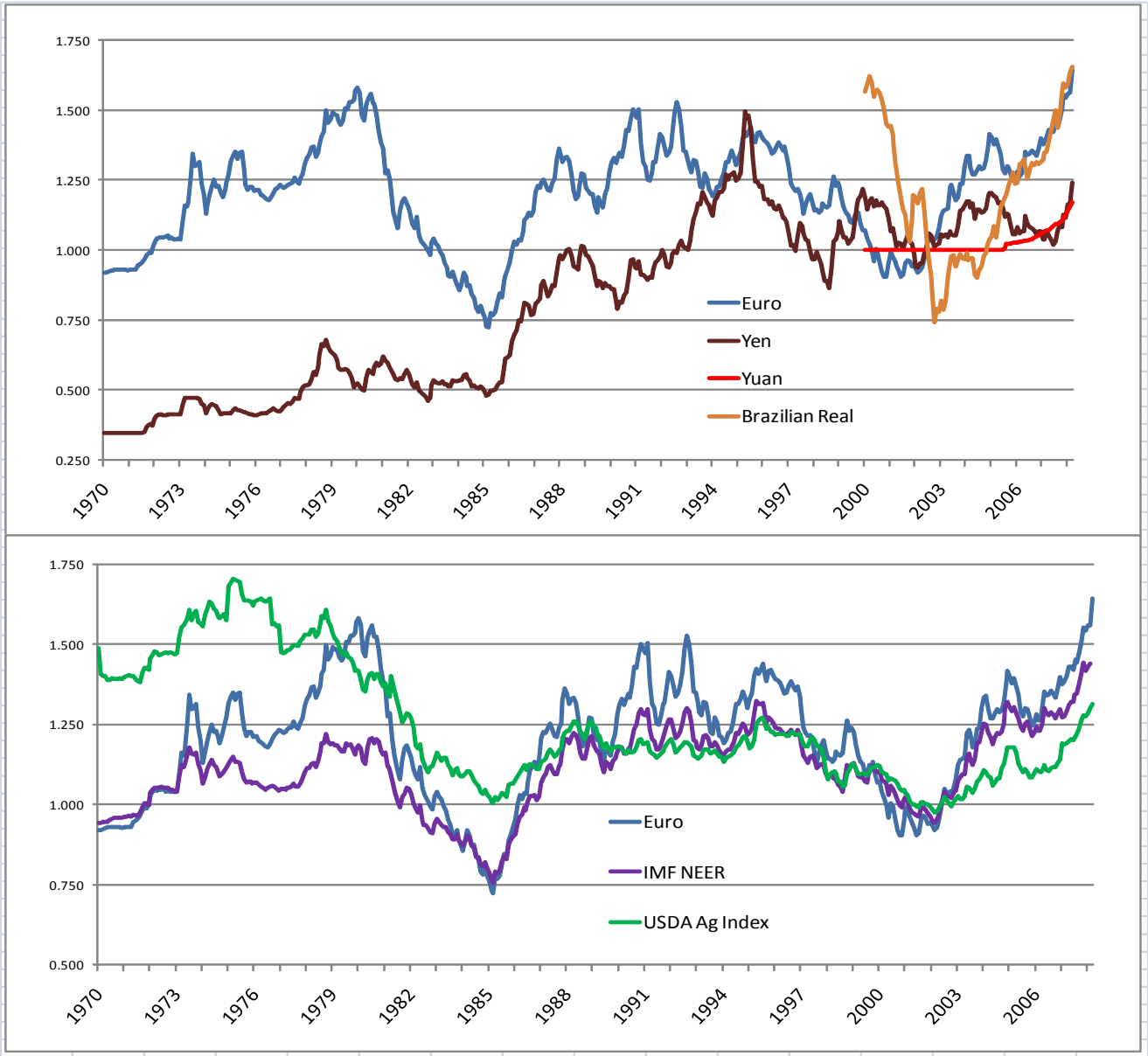
Bilateral Exchange Rates and Agricultural Trade

When the dollar weakens, agricultural exports and particularly grain and oilseed exports, grow. Using USDA Economic Research Service's agricultural trade-weighted index (USDA RER or USDA ag index) of real foreign currency per unit of deflated dollars, shows that from 2002 to 2007 the dollar depreciated 22%, and value of agricultural exports increased 54%. Grain and oilseed exports increased 63%, accounting for $14 billion of the overall U.S. agricultural trade increase. Assuming the United States is a large country in international agricultural markets, depreciation of the exchange rate should lead to higher prices in the United States, but lower prices in the rest of the world, if other things stay the same. Exchange rate-induced price changes, now and in the past, have influenced agricultural trade in a manner qualitatively similar to recent experience.

Indices are used to represent exchange rate movements because bilateral rates with one trading partner may mask changes in other currencies against one another, and each bilateral exchange rate may reflect particular circumstances in a single economy. But the changes in the dollar exchange rate as shown by the USDA ag index are less dramatic than are changes in other exchange rate measures—in particular the change in nominal dollars against nominal Euros. Figure 15 shows the USDA ag index plotted against the Euro. It also shows the Japanese Yen, the Chinese Yuan and the Brazilian Real (monthly through March 2008) to highlight special circumstances in those cases. An index of nominal dollar exchange rates created by the International Monetary Fund (IMF NEER) is also plotted on that graph, and shows more variation and greater recent depreciation of the dollar. The large variations in the Brazilian Real show the uniqueness of individual country cases. The USDA ag index puts more weight on developing country trading partners, who may peg sometimes over- or under-valued exchange rates to the dollar. For example, the Chinese Yuan was pegged to the dollar until 2005, and only recently has appreciated against the dollar, albeit less than other currencies. What is evident in Figure 15 is that the dollar was depreciating against the Euro since 2002, but until recently, other forces have influenced bilateral rates with

several key trade partners. In the last two years, however, the dollar has been depreciating against most currencies, to varying degrees.

Figure 15. US$ Exchange Rate Indices, 1970-2008



***Source: International Monetary Fund, *International Financial Statistics*.
* All exchange rates are normalized to equal 1.0 on average for 2002.

Since 2002 when it peaked, the dollar has depreciated 30% as of March 2008 according to the USDA ag index.[2] Against the Euro, the dollar had depreciated 56%,

[2] In this and later graphs, exchange rates and prices are normalized to an average for 2002 to more clearly see relative relationships in the data. Exchange rates are reported as dollars per unit of foreign currency.

and depreciated another 8% in April 2008.[3] The IMF NEER shows a similar but lower depreciation of 43% by March 2008. In subsequent analysis, we will focus on the recent period and will compare outcomes considering nominal Euros as our upper bound for exchange rate changes. Since inflation had been mild until very recently both in Europe and the United States, this better represents the opportunity cost of foreign exchange in major currencies, and we are trying to understand nominal dollar commodity price movements. Comparisons will then be made to the other indices to put these changes in perspective, in particular using the USDA ag index and real (deflated) Euros. Given the similarity of trends in indices, we can focus on those two indices and capture the range of variation observed in dollar depreciation.

Background on Dollar Depreciation

Some background is useful in putting into perspective the significance of the recent dollar depreciation. The U.S. trade deficit reached 5.75% of GDP in 2006, a record high, with the depreciation of the dollar bringing some small improvement in 2007. In 2006, the deficit equaled $759 billion, and fell by $50 billion in 2007, to 5.1% of GDP. Oil and gas imports were $326 billion in 2006 and increased by $27 billion in 2007, remaining about 15% of total imports, and up from 8% of total imports in 2002. Agricultural exports, on the other hand, increased from $53 billion in 2002 to $69 billion in 2006 and $82 billion in 2007. The $13.3 billion improvement in U.S. agricultural exports from 2006 to 2007 was a significant contributor to the recent improvement in the trade deficit, accounting for about one quarter of that change. USDA projects another $27 billion increase for 2008. Higher agricultural commodity prices have helped diminish the U.S. trade deficit, while the depreciated exchange rate, resulting in smaller price increases elsewhere, have helped export quantities to hold up in the face of these higher U.S. prices.

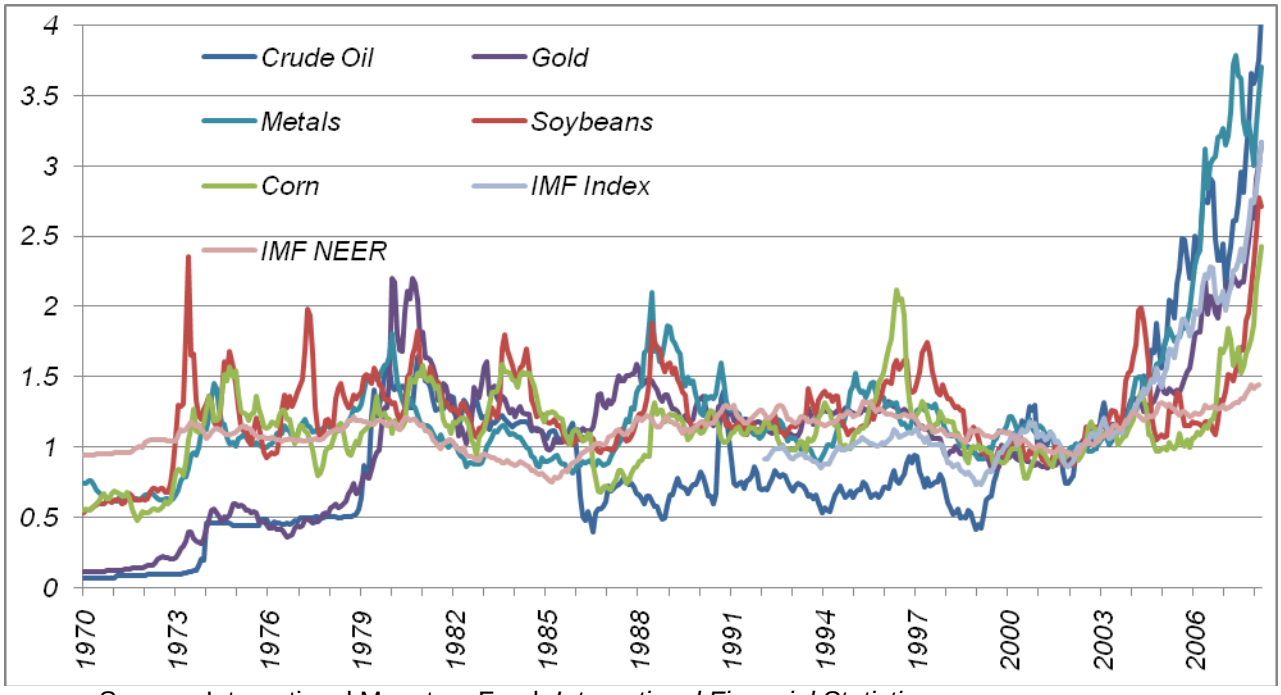
The dollar depreciation is surely a natural response to the unprecedented trade deficits the United States is realizing. But the trade deficit is matched by a capital account surplus as money flows into the United States to finance that deficit. One of the important U.S. “exports” has been financial assets. The IMF (2007) noted that OPEC has recycled petro-dollars into the U.S. economy, helping to account for the dollar’s relative strength until very recently in spite of large trade deficits. Trade deficits are also believed to be related to government budget deficits as spending and so borrowing by the government expands expenditure beyond income. “Exports” of treasury bills to finance public debt on international markets are another important component of the capital account. In particular, Chinese purchases of U.S. government securities have been a factor in limiting the depreciation of the dollar. The capital account is critical in explaining the evolution of the dollar exchange rate, and the Chinese treasury bill purchases plus OPEC investment in the United States helped the dollar to “defy gravity” until the recent credit crisis and interest rate cuts. The credit crisis has now made the United States a less safe haven for investments. The dollar’s descent was also

[3] The IMF has determined a Euro exchange rate before its creation in 1998 by taking weighted averages of European currencies that were converted to the Euro. We use their measure of the Euro back to 1970.

precipitated by Fed interest rate cuts. Thus, recent events related to U.S. capital account transactions have contributed to recent dollar depreciation.

An important issue in understanding relationships between exchange rates, deficits and commodity prices is the problem of identifying causality, which we will not attempt here. For example, high oil prices bring expanding current account deficits which in turn bring depreciating currency. Depreciating currency brings higher import and export prices, hence higher oil prices. For oil and other commodities, the relationships between their prices and exchange rates exhibit simultaneity. While we should probably think of exchange rates as a symptom of international macroeconomic phenomena, we can nevertheless identify factors related to exchange rates and commodity prices that help to explain the past and predict future outcomes. The extent of future dollar deprecation will depend on confidence of foreign investors in the U.S. economy, the extent to which depreciation continues to expand exports and eventually contract imports, the extent of inflation, and interest rates here and abroad.

Figure 16. Commodity Prices & Indices, 1970-2008*



Source: International Monetary Fund, *International Financial Statistics*.
* Commodity prices and indices are normalized to equal 1.0, on average, for 2002.

Commodity Prices and Exchange Rates

The recent surge in agricultural commodity prices has occurred as the dollar experienced another round of depreciation. But what has been happening in agricultural prices is reflected in other commodity prices, as well. Sometimes the changes were earlier and larger for the other commodities. This suggests that dollar

depreciation is related to broad impacts on commodity prices in general, and that food prices are a subset of that broader story. Figure 4 plots the IMF commodity price index, and prices for several key agricultural and non-agricultural commodities against the IMF (NEER) exchange rate index.

The patterns of commodity price changes and the IMF NEER have been similar since 1970. When the dollar is weak, commodity prices are generally high, and when the dollar is strong, commodity prices are lower. But the variations in commodity prices have always been greater than exchange rate changes, and that is especially true for the recent dollar depreciation. The IMF commodity price index and prices of individual commodities, including gold, have moved closely together.

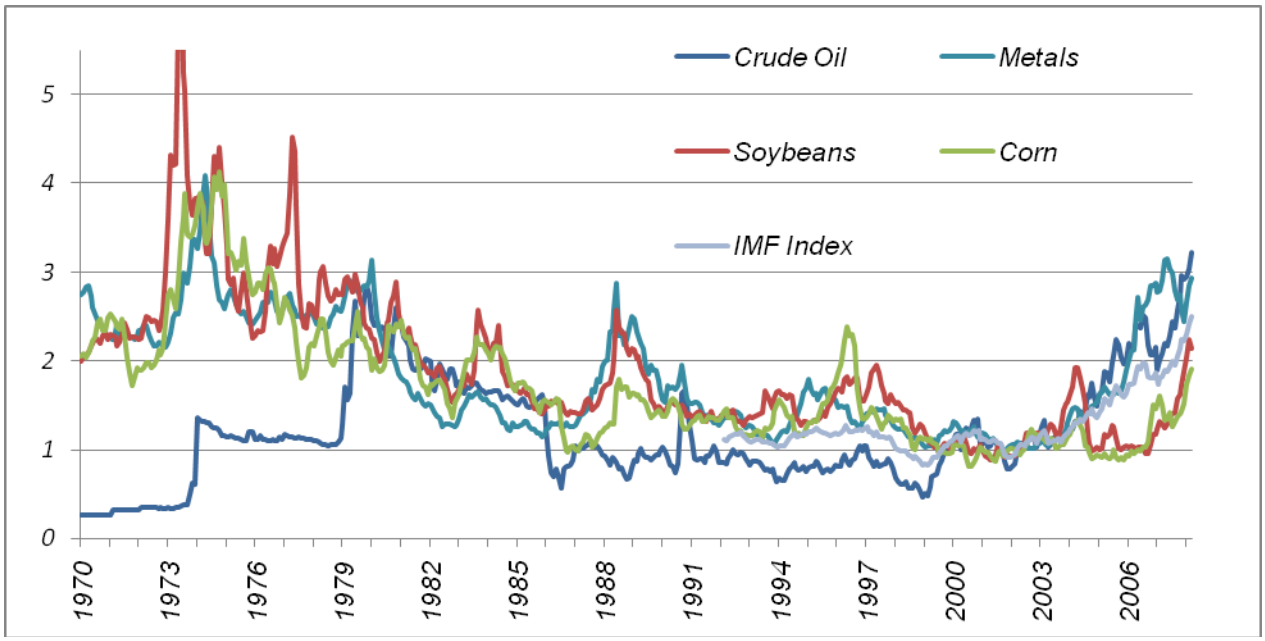
The price of crude oil has generally followed the pattern of other commodity prices, but with seemingly lower levels for the 1990s and the early 1970s. If one had normalized oil prices against other commodity price indices based on an earlier period, crude oil would now appear to be more expensive than other commodities. But in 2002, at $25 per barrel, it would seem that crude oil prices were similar to other commodities, at relatively low levels compared to earlier history. Crude oil prices also followed closely gold prices, except during the 1990s, when oil prices were relatively lower.

To put into better perspective current agricultural commodity, crude oil and metals prices relative to other historical peaks, especially in the 1970s, we deflated each index using the U.S. Consumer Price Index (CPI). Those deflated indices are shown in Figure 5. In real terms, the price of oil has fluctuated around a roughly constant mean since the first run-up in 1973, whereas agricultural commodity and metals prices show a decided downward trend from 1970 until 2002, consistent with productivity improvements lowering costs of production. On this basis, crude oil prices now are at levels similar to those observed in the second oil crisis around 1979, while today's high food prices are well below the real price peaks reached in the 1970s.

Figures 16 and 17 also show that agricultural commodity prices follow similar trends as many other commodities, but with some unique peaks due to supply-utilization events in those markets. The spikes in corn and soybean prices are notable in the mid-1990s, the early 1980s, and the mid-1970s. Changes in agricultural commodity prices also appear to have lagged other commodity price changes, especially since 2002. Today's high agricultural commodity prices are just now catching up with oil and metals price increases that began earlier.[4]

[4] Stocks adjustment, discussed earlier, helps to explain the lags in agricultural commodity prices. Stockpiles of agricultural commodities must be drawn down before prices rapidly rise.

Figure 17. Deflated Commodity Prices and Indices, 1970-2008*

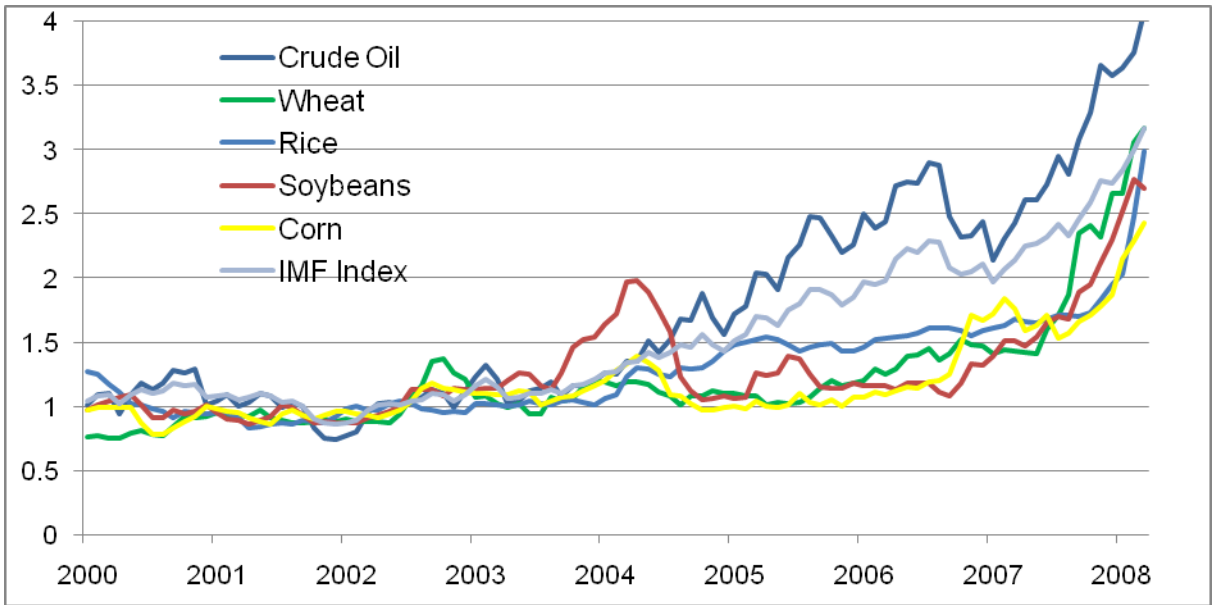


Source: International Monetary Fund, *International Financial Statistics*.
* Deflated commodity prices and indices are also normalized to equal 1.0, on average, for 2002

Figure 18 focuses on agricultural commodity, crude oil and other commodity prices from 2000 to 2008. The IMF index proxies commodity prices generally. Crude oil prices are also compared to corn, soybean, wheat and rice prices. Each index has been normalized to 2002, but the graph would be little different had we chosen to use any year between 2000 and 2003 as our base. Oil prices began their ascent in 2004, about the same time as other commodity prices. While rice prices show some increase starting about 2004, and soybeans show a peak due to a short crop in the United States in 2003, the large agricultural commodity price increases addressed here did not begin until late 2006. By March 2008, prices for wheat, rice and soybeans had reached the level of average commodity price increases (as measured by the IMF's commodity price index) since 2002, with corn at a slightly lower level.[5]

[5] This price information can quickly become out of date, as prices discussed here are as of March 2008. Recently corn prices have increased, certainly driven more by bad weather than by exchange rates.

Figure 18. Food and Commodity Prices, 2000-2008



Source: International Monetary Fund, *International Financial Statistics*.
* Food and commodity prices and indices are normalized to equal 1.0, on average, for 2002.

Why commodity prices are more volatile than exchange rates remains to be explained. Capital flows have always muted the changes in exchange rates, and exchange rate determination models must take capital flows and interest rates into account, especially to explain short-term movements. Assertions that one may look at only the trade deficit or only interest rate changes to predict future exchange rates are likely to be misleading. Exchange rates are likely a symptom of broader international macroeconomic phenomena.[6]

Quantifying Agricultural Commodity Price Impacts of Dollar Depreciation

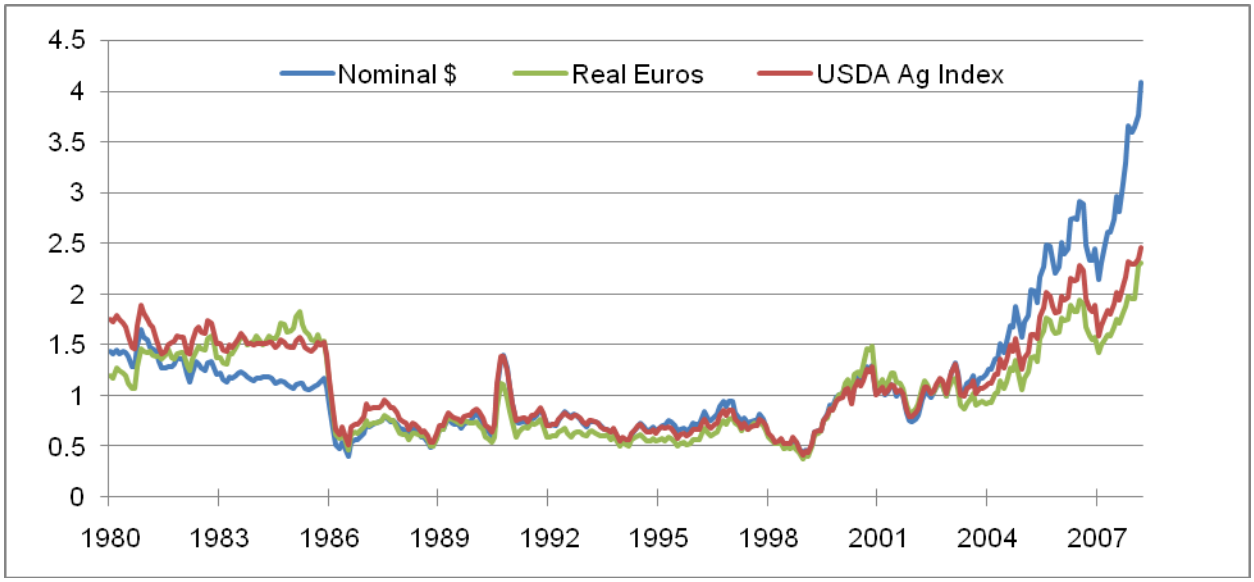
Price may be denominated in dollars, and trade may occur in dollars, but domestic commerce is in local currency—traders can convert to Euros! The price linkage representing the "law of one price" is more likely to hold for commodities than for manufactured goods or services. We can use that simple price linkage to compare the recent trajectory of agricultural commodity prices in different currencies. Comparing prices in Euro's versus dollars across the recent and past commodity price run-ups allows us to assess the relative importance of supply-utilization events versus international macroeconomic events and the weak dollar.

Figure 19 presents crude oil price indices, normalized to one in 2002, and expressed in nominal $, in real Euros and in the real foreign currency of U.S. trade

[6] This is evidence that the overshooting models of Dornbusch (1976) for goods versus capital flows, and Rausser, Chalfant, Love and Stamoulis (1986) for agricultural commodities, provide insight into not only volatile exchange rate changes, but also variations in commodity prices generally.

partners and competitors utilizing the USDA ag index.[7] The latter two indices, corresponding with real prices elsewhere, should give a better indication of prices driving supply-demand balance worldwide.[8] While the real price measures are a lower bound on the effects of supply-utilization shocks, the discrepancies between nominal $ and all other prices highlights the important role played by exchange rates in determining today's high food and oil prices.

Figure 19. Crude Oil Price Indices in Various Currencies, 1980-2008*



Source: International Monetary Fund, *International Financial Statistics*. and Economic Research Service, USDA.
* Crude oil prices are normalized to equal 1.0, on average, for 2002.

Figure 19 shows that from 1986 until 2004 crude oil prices, regardless of currency, moved closely together and appear to be very low. The increase in nominal dollar prices relative to all other indices after 2004 is noticeable. Using our 2002 normalization, since that is when most commodity prices began to increase, we find nominal $ crude oil prices increased 308% as of March 2008. In nominal Euros, that increase has been only 148%, and in real Euros it was only 130%. The USDA ag index in this case and others, gives similar results to those found for nominal Euros, and the

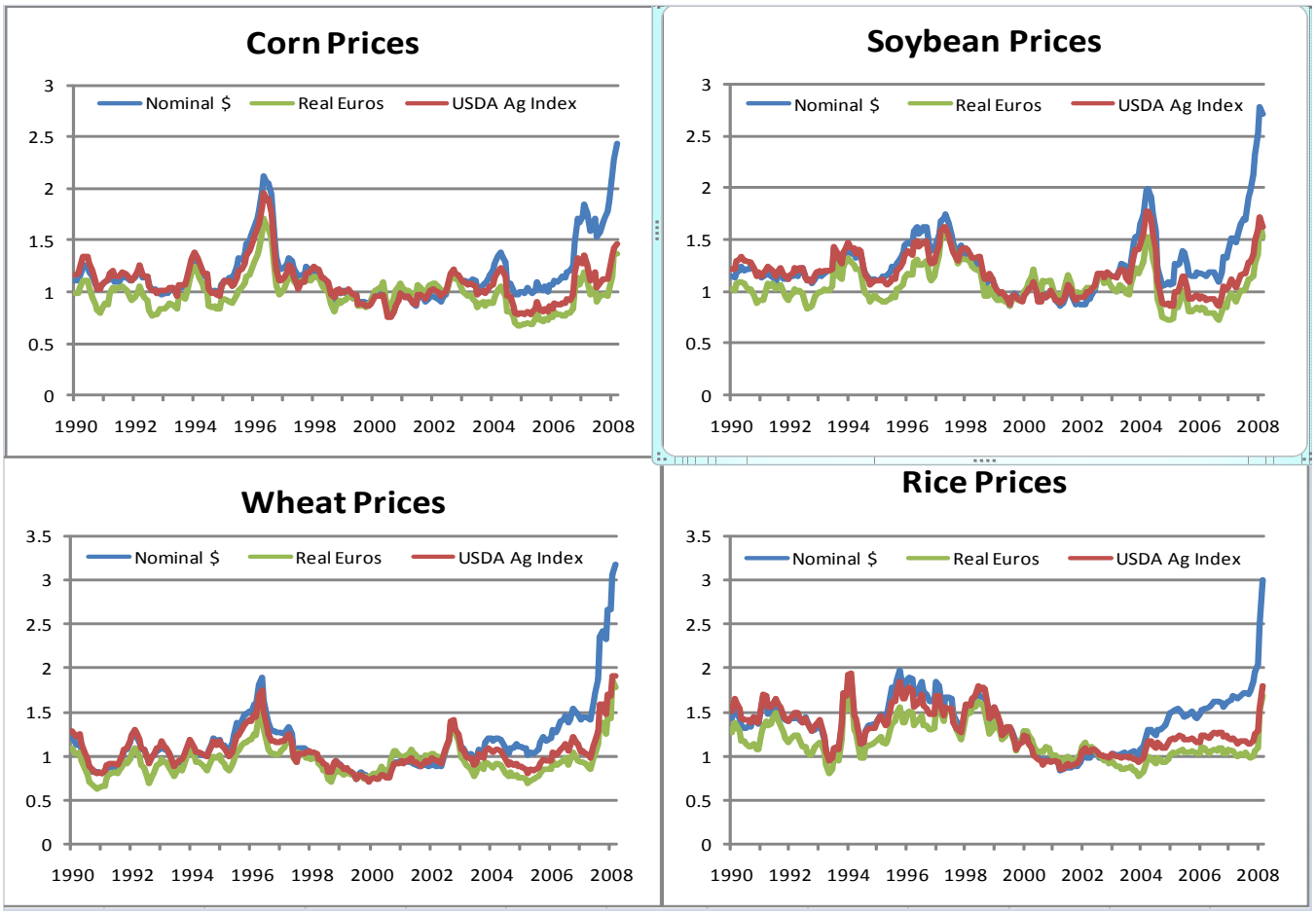
[7] Other exchange rate measures were also used but are not on figures, including the IMF's NEER and REER as well as nominal Euros. The IMF indices and the USDA index moved closely together before 2002, and the USDA index now shows somewhat less depreciation than other indices. While it may have seemed more logical to use an IMF index for oil, we will use the USDA index for agricultural commodities that are analyzed below, and so use it here to consistently use a subset of our exchange rate indices. Little additional information is provided by including additional measures, as the currency converted indices move closely together and the indices chosen show the range of outcomes.

[8] Of course, with its substantial depreciation and so much larger price changes, a greater adjustment burden is borne in the United States. Thus, real price changes elsewhere will be somewhat lower if the United States is large enough that its trade moves world prices. In most of these cases that is likely to be true– the United States is a large country in each of these markets.

IMF REER gives a slightly lower change than is found for real Euros. Thus, over half of the crude oil price increase seems to be linked with the depreciating dollar.

Figure 6 presents agricultural commodity prices since 1990 using the same measures as found in Figure 19 for crude oil. Table 3 summarizes key results from Figures 19 and 20 and also looks back to the early 1970s. Table 3 also includes soybean oil and soybean meal price indices to examine how the prices of these joint products have moved relative to soybeans.

Figure 20. Agricultural Commodity Price Indices in Various Currencies, 1990-2008



Source: International Monetary Fund, *International Financial Statistics* and Economic Research Service USDA.
* Commodity prices are normalized to equal 1.0, on average, for 2002.

Since 2002, corn prices in nominal dollars have increased 143%. In real Euros the increase is only 37%. What is more interesting is that corn, along with other agricultural commodities, experienced a price run-up around 1995-96. What is

obviously different about that episode is that price increases were much more similar across currencies. From July 1994 to July 1996, nominal $ corn prices increased 105%, and real Euro corn prices increased 94%. We conclude from this evidence that the 1995 corn price increases were largely due to supply-utilization shocks, whereas the current U.S. corn price increases are decidedly different, and are much more closely tied to the weak dollar.

Table 3. Increases in Food, Crude Oil and Gold Prices

Period:	Corn	Wheat	Rice	Soybeans	Soyoil	Soymeal	Crude Oil	Gold
2002 to March 2008								
$	143%	217%	199%	171%	240%	107%	308%	217%
Real Euro	37%	79%	69%	53%	91%	16%	130%	79%
USDA RE	46%	91%	80%	63%	104%	24%	145%	90%
1994 to 1997*								
$	100%	190%	50%	50%	-2%	69%	29%	1%
Real Euro	88%	183%	60%	60%	5%	81%	27%	-7%
USDA RE	85%	176%	41%	41%	-7%	60%	19%	-8%
1973 to 1974 **								
$	43%	92%	206%	245%	100%	268%	370%	72%
Real Euro	37%	104%	153%	161%	51%	178%	274%	70%
USDA RE	23%	75%	152%	193%	70%	213%	279%	55%

* Periods vary for the 1990s price run-up to capture the differing timing of peaks for each crop. Periods typically begin in 7/94. Ending months are: Corn, 7/96; Soybeans and products, 4/97; Wheat, 5/97; Rice, 5/97; Crude Oil 1/97; Gold, 8/96.

** Periods for the 1970s typically begin in 10/73 and end in 4/74, and vary by good to capture peaks.

Figure 20 and Table 3 also explore the linkage between exchange rates and high prices for soybeans, wheat and rice today, and show that supply and utilization changes mattered more in the mid-1990s. For soybeans, similar peaks for nominal dollars versus real Euros are seen in 1994, 1997-98, and 2004. As of March 2008, nominal $ soybean prices are 171% higher, while real Euro prices are only 53% higher. Soyoil prices show the same earlier peaks as soybeans, but have recently risen faster than soybean or meal prices, at 240% in nominal $ and 91% in real Euros. In the earlier periods, meal prices grew faster than oil prices, and currency differences mattered less. For wheat, nominal $ prices are 217% higher while real Euro prices are 79% higher. For rice, nominal $ prices are 199% higher, while real Euro prices are 69% higher. Wheat prices show similar peaks, regardless of currency, in late 1996 and 2003. Rice shows similar peaks in 1994 through 2000. In each of these cases, earlier price increases occur across currencies, suggesting supply and utilization balances explain those changes, while recent history looks quite different, with dollar depreciation playing a much more important role.

In summary, for the period 2002 to 2008 nominal dollar price increases for corn, soybeans and its products, wheat and rice are now typically more than three times equivalent changes in other, deflated currencies. This holds for crude oil and gold, as well, and highlights the key role played by exchange rates (or whatever they are a

symptom of) in the current price run-ups. For the 1994 to 1997 period,[9] results are strikingly different. Price changes in the three currency measures are nearly the same. This is strong evidence that price run-ups in the mid-1990s were largely driven by supply-utilization factors, with exchange rates playing almost no role. The different timing of price increases by commodity in earlier periods is also likely due to differing agricultural events in each market driving those increases.

Results for 1973-74 are more mixed, with a less evident exchange rate story than was found since 2002, but some variation in real prices across currencies. For the agricultural commodities exhibiting the largest price increases (wheat and rice), as well as for crude oil, real rest of world prices changed about three-quarters as much as nominal dollar prices. Attempts to understand the price increases around 1980 were confounded by substantial inflation, the U.S. Federal Reserve's ultimate decision to limit inflation, and important, specific agriculture events at the time of the second oil crisis.

We conclude that the mix of international macroeconomic forces versus individual commodity market forces varies over time. While 2006-2008 appears to be closely linked with dollar depreciation, and the mid-1990s price run-ups were mostly due to crop shortages or international demand. The 1970s to mid-1980s appear to incorporate a mix of these forces. This suggests generalizations from these past events as to how the current agricultural commodity price increases will play out in the future is problematic. The weak dollar linkage appears to be stronger now than it was in the past.

Inflation and Recession

Depreciation of a country's currency, particularly of the magnitude occurring now for the United States often brings inflation as wages and non-tradable good prices are slowly bid up to the increased price levels of imports and exportables. Moreover, the solution to high oil and food prices in the 1970s was inflationary monetary policy. While this brought down real food and oil prices, the nominal crude oil price increase of 1973 was not undone until after 1983, albeit with peaks in nominal oil prices induced by the second oil crisis starting in 1979.

One of the oddities of the current food price increases, and of the depreciating dollar, is that it seems to be bringing stronger inflationary pressure elsewhere in the world rather than in the United States. The recent IMF World Economic Outlook (2008) put U.S. core inflation for 2008 at only 2.2%, while noting rising inflation at rates typically more than three times the U.S. rate for many developing countries. Table 4 summarizes recent data compiled by the OECD and FAO on food price inflation and CPI increases in selected developed and developing countries from February 2007 to February 2008. It shows the much greater extent to which agricultural commodity price increases are being felt as food price increases and as escalating inflation in the world. Several of the studies reviewed here also noted the rather mild U.S. food price inflation, even if it is more than twice the core inflation rate of 2.2%. Many also noted the greater

[9] We picked different beginning and ending points by commodity for price comparisons to find the peak prices of that period (which occur with less simultaneity than in the current event).

food price inflation in the developing world. Several observations can be noted to explain this, and most are found in earlier studies. In the United States, food expenditures are only 10% of consumption expenditures, and expenditures on cereals are a small fraction of food expenditures. In Bangladesh and Sri Lanka, where food riots have occurred, food shares of consumer expenditure are above 60%. Table 4 presents food expenditure shares for numerous other developing countries, where food inflation is also shown to be higher now than in the United States. It supports the notion that food inflation and so, general inflation are higher now in countries that consume greater shares of their budgets as staple foods.

Table 4. Food and Consumer Price Inflation in Selected Countries, 2007-08

Country	Food price Inflation	Consumer price inflation	Expenditure share of food
Developed			
U.S.	5.1	4.0	10
Germany	7.4	2.8	10
Developing			
South Africa	13.6	8.6	21
China	23.3	8.7	28
Peru	6.4	4.0	30
India	5.8	4.6	33
Guatemala	11.6	8.0	39
Jordan	9.1	5.4	40
Egypt	13.5	9.5	42
Haiti	11.8	9.9	50
Kenya	24.6	15.4	51
Sri Lanka	25.6	19.4	62
Bangladesh	14.2	10.3	65

Source: OECD and FAO, OECD-FAO Agricultural Outlook 2008-2017, Paris and Rome, 2008.

Inflation rates in % per year and food expenditure as a percentage of total consumer expenditure are estimates of the OECD secretariat for developed countries and the FAO secretariat for developing countries for February 2007 to February 2008.

Getting the share of grains and oilseeds in consumption expenditures would need to take into account feeding those goods to livestock. The effect of that on inflation is diminished by the extent to which livestock producers have at least initially been unable to pass their higher feed and energy costs on to consumers. In contrast, expenditure shares of food in poor countries are much higher, and grains are a much bigger fraction of food expenditures. A much larger share of the diet and of total consumer purchases is direct commodity consumption. A second important linkage concerns marketing and distribution costs. It is well known that exchange rate changes have not historically been fully passed to consumer prices as producer, processor and distributor margins absorb cost increases. This happened, at least initially, for U.S. pork

producers, for example. It is also well known that U.S. food costs valued at farmgate prices are a very small fraction of consumer prices. In developing countries, margins are much smaller, so changes in commodity prices get passed more fully to consumers, and margins to absorb cost increases are much smaller.[10] Thus, with higher commodity prices, low consumer expenditure shares and large margins mean smaller inflationary impacts in the United States. But larger expenditure shares and smaller margins mean developing country consumers see much bigger price increases—unless governments intervene. A confounding factor is that one component of those margins is energy costs, which can be more important than the direct food costs in high margin countries like the United States.

The "solution" to high food and oil prices in the 1970s was inflation, and the "solution" to the second oil crisis was recession. Policy makers in the early 1980s were dissatisfied with the consequences of high inflation, and the Federal Reserve deliberately changed policy to bring inflation under control. Figure 20 shows declines in many commodity prices following the 1973-75, 1980, 1981-82, 1990-91 and 2002 U.S. recessions. There is also a decline in commodity prices following the Asian Financial Crisis of 1997-98, where recession occurred most everywhere but the United States. Timing of commodity price cycles does not always coincide with these business cycles; international business cycles are not well coordinated across the world, except that since recovery began in the United States in 2002, there has been strong economic growth worldwide. Surely, to some extent commodity price booms are led by economic growth and the demands on resources as economies recover. But these effects would be stronger for high-income elasticity of demand goods, like construction and energy, than for low-elasticity goods like food. Construction booms in China and in OPEC countries, for example, are likely to be an important part of the explanation for rising commodity prices since 2002.

History suggests that incipient inflation could erode the real value of today's high commodity prices. High nominal commodity prices, including those for agricultural commodities, have persisted in the past until worldwide recession slows demand or supply response catches up with that growing demand.

How Long Will this Commodity Cycle Last?

A bottom line is that price increases we now see for agricultural commodities have occurred before. Cycles driven by exchange rate movements and business cycles here and abroad may ultimately bring lower real commodity prices. Business cycles, inflation, and macroeconomic policy will play key roles in determining how long the current cycle of high prices continue. Based on this analysis, high prices will persist as long as high oil prices remain and the dollar stays weak. A strengthening of the dollar, and lower oil prices, which would likely come together, would bring pressure for other commodity prices to fall. If there is loose monetary policy, inflation would bring both

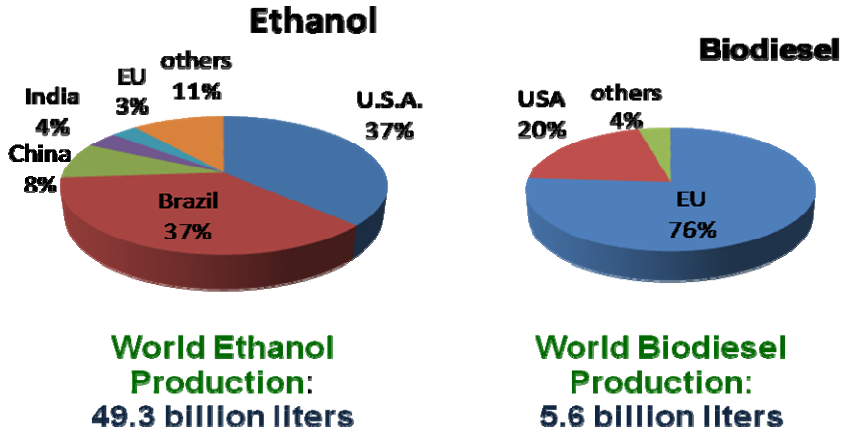
[10] While margins can absorb commodity price increases and mute exchange rate pass through in the short run, it is unlikely that those cost increase will never be passed on to consumers if the commodity price increases are "permanent."

lower real oil and food prices, even if high nominal prices persist (as in the 1970s). Recession would bring lower nominal prices. It should also be remembered that high agricultural prices in the past, as today, depend on supply-utilization balances in individual markets, as well.

What is driving biofuels production and corn prices?

Biofuels have grown significantly in recent years in several regions of the world. The main biofuels are ethanol from corn or sugarcane and biodiesel from oilseeds or palm. Figure 21 shows the distribution of global biofuel production in 2006. For ethanol, the global leaders are the United States and Brazil. U.S. ethanol is mainly from corn. Brazil uses sugarcane. In 2007, the United States overtook Brazil as the leading ethanol producer in the world. Brazil and the United States together make up about three-fourths of global ethanol production, with small amounts produced in the European Union, China, India and other countries.

Figure 21. Global Biofuels Production, 2006

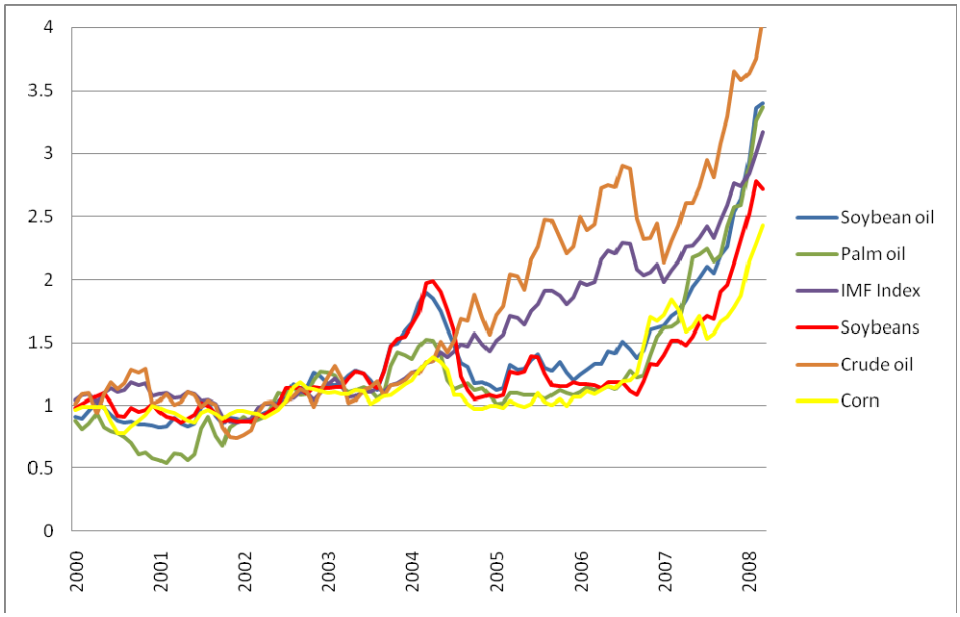


Biodiesel

For biodiesel, the global leader is the European Union (EU) with more than three-fourths of global production. In 2006, the United States had 20 percent of global production, but that share is probably smaller today as biodiesel has stagnated in the United States and continued to grow in the EU. Biodiesel is more important in the EU than ethanol because a much higher percentage of the automobile fleet is diesel. The U.S. fleet is predominantly gasoline, for which ethanol is a substitute. In the EU, rapeseed is the primary feedstock, whereas soybeans are used in the United States. Rapeseed contains about 40 percent oil, and soybeans about 18 percent. The EU has ambitious targets to grow biodiesel production and consumption in the years to come. Thus, the major global player in the biodiesel arena is the EU.

In the United States, biodiesel produced from plant materials has in recent years enjoyed a greater subsidy—$1 per gallon—than ethanol. If produced from such byproducts as restaurant grease, the subsidy is $0.50 per gallon. Even with the higher subsidy, biodiesel generally is not profitable because soy oil prices have risen to the point that it cannot be economically converted to biodiesel in most circumstances. Figure 22 shows that vegetable oil (soybean and palm) prices have moved together, as would be expected, and have increased proportionately more than corn prices.

Figure 22. Indices of Vegetable Oil, Corn, and Crude Oil Prices



The United States currently has more than 800 million gallons of biodiesel production capacity, with less than one-third of that amount being produced. The U.S. Renewable Fuel Standard requires one billion gallons of biodiesel by 2022. Unless the economic outlook for biodiesel improves considerably, U.S. production capacity will not grow much in the years to come.

It is impossible to say for sure how important the growth of biodiesel has been in the increase in vegetable oil prices. For rape seed oil, 80 percent of the growth in world usage since the 2004/05 marketing year was in the industrial category, as Europe aggressively moved rape seed oil into fuel. In contrast, only 35 percent of world expansion in soybean oil use since 2004/05 has been in the industrial category (fuels), with the rest being food related. U.S. production of biodiesel from soybean oil has probably not been as large a driver of higher vegetable oil prices as the EU program relying on rapeseed. The reduction in U.S. soybean production in 2007 due to the substantial increase in corn acreage driven by ethanol demand for corn also has been a factor. While we cannot quantify with any precision the degree of vegetable oil price

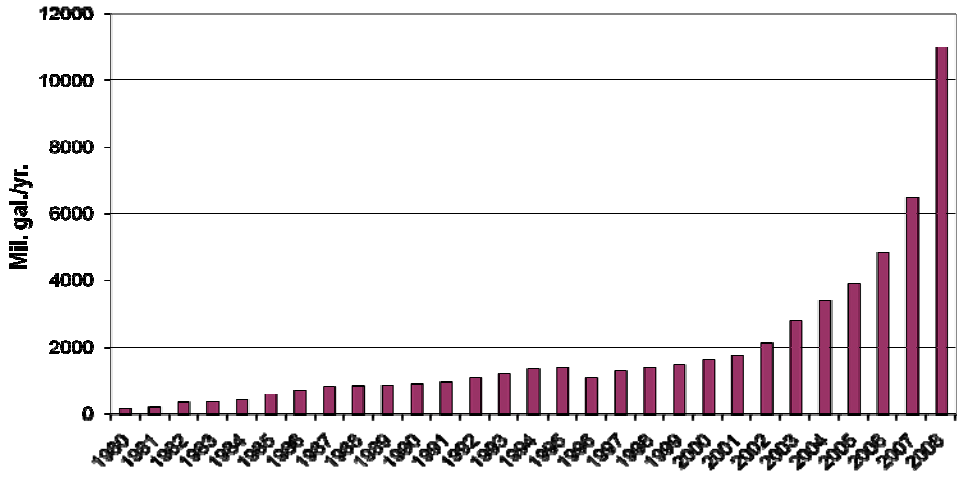
increases due to biofuels, it is likely that the global growth in biofuels has played an important part in vegetable oil price increases.

Ethanol

There has been a lot of debate on the merits of U.S. and EU policies promoting biofuels. In the United States, ethanol has been subsidized since 1978. Fuel ethanol production began in the early 1980s and for the 20 that followed, oil prices ranged between $10 and $30 per barrel with a couple of brief exceptions. Between 1983 and 2002, the price of crude oil averaged $20/bbl, and the ethanol subsidy ranged between 40 cents and 60 cents per gallon, averaging 50 cents per gallon. There was sufficient incentive for the ethanol industry to grow slowly. Figure 23 illustrates this slow steady growth and the recent surge in ethanol production. It is important to note that with corn in the $2.25 range, crude oil would have needed to be about $60 for ethanol to be profitable without a subsidy. The subsidy was required to counter the relatively low oil prices to bring the industry into being and permit it to grow slowly**.**

Since 2004, crude oil price has been increasing, and the U.S.$ has been depreciating. Both these factors are linked to higher corn prices. The fall in the value of the U.S.$ has meant corn exports are cheaper in foreign currency. In other words, corn prices have not risen as much in other currencies as in US$. For that reason, corn exports have not dropped as corn price has increased in dollar terms.

Figure 23. Ethanol Production 1980-2008



Recently, the oil price part of the equation has changed dramatically. Oil moved to $60 (April 2006), then on to $120 (May 2008), and now higher. The combination of the high oil prices, the fixed ethanol subsidy, and low corn prices has brought about a boom in investment in ethanol production, and, consequently, a boom in ethanol demand for corn. There were strong incentives to build ethanol plants to reap the gains induced by the high oil prices and other factors, leading to a rush to construct new

plants in 2006. The increased demand for corn for ethanol led to higher corn prices. Essentially, the mechanism is higher crude leads to higher gasoline, which leads to higher ethanol, which leads to more ethanol production, which increases corn demand, which increases corn price. The effect of the subsidy today is to enhance the effect of the higher oil price. This effect is in sharp contrast with the impact in the 1980s and 1990s—to permit the industry to exist and grow slowly.

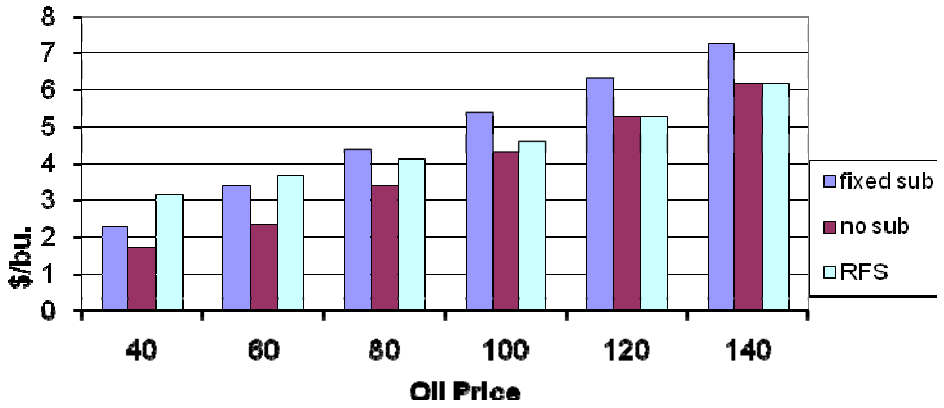
Current U.S. policy consists of a fixed subsidy of 51-cents per gallon of ethanol plus a Renewable Fuel Standard (RFS), which imposes a minimum renewable fuel usage requirement each year. An important question is what the relative importance is of these policies and of higher oil price. Figure 7 shows the strong link between today's oil and corn prices under the assumption of no subsidy or RFS, with the 51-cent per gallon fixed subsidy, and with a Renewable Fuel Standard of 15 billion gallons of corn-based ethanol and no subsidy.[11] At $40 oil, the corn price is 32% higher with the subsidy than without. However, at $140 oil, the corn price is only 17% higher with the subsidy, adding $1.07 per bushel to the corn price. This illustrates the fact that a fixed (specific) subsidy is equivalent to a declining ad valorem (percentage) subsidy.

Most of the corn price increase is due to the higher oil price—not the subsidy. With no subsidy or mandate, corn moves from $1.71 at $40 oil to $5.26 at $120 oil. With the subsidy, corn moves from $2.26 at $40 oil to $6.33 at $120 oil. Put in round numbers, when crude went from $40 to $120, corn went from $2 to $6, a tripling of both prices. About $1 of the corn price increase was due to the subsidy, and $3 to the higher crude price. As oil has increased, corn-based ethanol is demanded to substitute for gasoline. At high oil prices, this would happen with or without the subsidy.[12] However, the subsidy does increase the price of corn $1.07 over what it would be with no subsidy in place. A dollar a bushel is important whether corn is $3 or $6. Whether the subsidy should be maintained, removed or changed to a variable subsidy is a question for debate. But removing the subsidy would not return us to corn prices seen over the past decade unless crude oil prices fell as well.

[11] The model used for this analysis is documented in Tyner, Wallace E. and Taheripour, Farzad. "Policy Analysis for Integrated Energy and Agricultural Markets in a Partial Equilibrium Framework." Paper presented at the Transition to a Bio-Economy: Integration of Agricultural and Energy Systems conference on February 12-13, 2008, and to be published in a proceedings volume. www.agecon.purdue.edu/papers

[12] Babcock and McPhail estimate that eliminating the ethanol mandate would reduce corn price for 2008 by $0.26 to $5.34, a decrease of 5%. They estimate that eliminating both the subsidy and the mandate would reduce corn prices 14% for 2008. These short-run results are generally consistent with our results presented above and demonstrate the current power of oil prices in driving ethanol demand.

Figure 24. **Corn Price Under Different Policies and a Range of Oil Prices**



It is very important to distinguish between the historic and current roles U.S. policies have played. At present, the policies induce a higher corn price, but the role of high oil price is more important than policy in driving corn price. But the link exists whether moving up the oil price ladder or down. Suppose there is a global recession and oil drops to $80. There are two possible outcomes: 1) the price of corn falls sufficiently to keep most existing plants in production, or 2) many ethanol plants could not afford to continue production and would cease operations, at least temporarily. Any drop in ethanol production would "release" millions of bushels of corn on the market, driving down the price of corn would fall until it reaches a new equilibrium corresponding to $80 oil. We could expect to see ethanol production come back on stream if oil prices started back up the ladder.

The third policy instrument included in Figure 24 is the Renewable Fuel Standard (RFS) with no subsidy. The RFS has not been binding at oil prices of $120 or higher. It is binding in these model results at oil prices of $100 or lower.[13] The mandate becomes binding if the market would use less than the level required by the mandate. Since its beginning, the RFS has never been binding, meaning production has always exceeded the RFS. The impact of removing a non-binding mandate is null. That is, in this example, with no subsidy and just a RFS, corn would still be $6.16, because the market would produce a bit more than 15 billion gallons of ethanol. However, if oil were to drop back to $40 (unlikely), our analysis suggests corn would be $3.15, instead of $1.71 with no subsidy or $2.26 with the subsidy. The RFS would be binding in requiring much more ethanol than the market would produce. In other words, again, the RFS has an impact at lower oil prices, but normally not at high oil prices.

The U.S. tariff on imported ethanol introduces a potentially greater distortion than does the subsidy or mandate. Since high oil prices directly lead to higher corn prices,

[13] Given the recent U.S. floods and related surge in corn prices, the mandate could become binding in 2009 or possibly even in 2008. This could happen because ethanol producers cease production with the higher corn prices, and the market does not produce enough ethanol to meet the mandate. Under this type of condition, the EPA administrator has authority to temporarily waive or reduce the mandate level.

corn ethanol becomes much more expensive. Sugarcane-based ethanol is less expensive to produce than corn ethanol at any oil price, but the gap widens at higher oil prices. So removal of the tariff on imported ethanol would lead to the biofuel coming from the lowest cost source–sugarcane–which would reduce some pressure on corn prices and provide the United States with lower cost ethanol. Brazil has the potential to expand ethanol production substantially without increasing world sugar prices substantially, so imports down the road could be quite high.

However, the question is more complicated because it depends on the extent to which imported ethanol adds to total consumption and the extent to which it displaces corn ethanol. For that portion that displaced corn ethanol, each billion gallons of imports would displace about 358 million bushels of corn used for ethanol. So you would get price impacts as the ethanol industry demanded less corn. The problem is figuring out how much would go to increase total consumption and how much to displace corn ethanol. In the United States, the limit of how much ethanol can be blended is called the blending wall.[14] Until we hit the blending wall, most of it likely would increase total consumption and not displace corn ethanol. However, we will probably reach the blending wall in 2009, at which point imports would likely displace domestic corn ethanol and thereby lower corn price.

Finally, given that the oil price has become such an important driver of corn price, the next logical question is what will happen to oil prices. The answer, of course, is we don't know. However, we can point to some important drivers. First, as was clear from the first section, the oil price is clearly linked to the US$ exchange rate. We would expect the US$ value and oil price to move in opposite directions. Second, while we downplay the role of China and India in driving cereal prices, the opposite is true for oil. China especially has a huge and growing appetite for oil. Its economic growth to date has been relatively energy intensive, and it has been an important factor in the global growth in oil demand. Globally, oil demand is linked to economic activity, so a global recession would dampen oil price, while continued economic growth would support higher prices. On the supply side, there has been much discussion that we are near the peak in global oil production and consumption. We take no position on that argument, but just as for the agricultural commodities, we believe market signals will elicit greater production, albeit with greater lags than for agriculture. Whether the added production will be enough to keep up with increased demand is unknown. However, any appreciation of the US$, such as might result from interest rate increases, likely would be accompanied by a decline in oil prices.

[14] The blending wall is the maximum amount of ethanol that can be blended at the regulatory maximum of 10%. Currently, we consume about 140 billion gallons of ethanol, so the max level for the blending wall would be 14 billion gallons of ethanol. However, for logistical reasons, the practical level is likely to be much lower, perhaps around 12 billion gallons. See Tyner, Dooley, Hurt, and Quear (2008).

Summary and Conclusions

Clearly the major themes in our analysis of the current agricultural commodity price situation are the linkages with the US$ exchange rate, supply and utilization stories that differ by commodity both in terms of relative importance and underlying causes, and the fundamental change in the relationship between energy and agricultural markets evidenced by biofuels growth. We have tended to focus on those areas or factors where our review points in somewhat different directions from the conclusions in the work done to date. A useful way to conclude is to go back to the brief summary of what we gleaned as being the most important factors identified in the earlier studies. We can then point out where we agree completely with what others are saying and where there may be large or small differences.

Following are the major conclusions gleaned from the other studies and reports plus our take on these conclusions:

- *Growing food demand and dietary transition to more animal protein in developing countries resulting in global consumption increasing faster than production. Many of these focus on China and India.* We agree that global growth in demand and lagging supply are major drivers of the current situation. The ERS report effectively made the point that this difference in global supply and demand is not new–it has been developing over the past eight years. Our analysis supports this conclusion. What may be new is that these supply shocks in 2007 were on top of very low stocks-to-use ratios that emerged over the past four to eight years depending on commodity.

  Almost all the previous reports that have developed the theme of consumption growing faster than demand have focused on India and China. But India and China are not significant traders of agricultural commodities, except that China imports soybeans and vegetable oils and India exports some rice. For corn, wheat, and rice (China), they trade little. Essentially, the policies of both China and India have been policies of agricultural self-sufficiency. They have attempted to grow production to keep up with consumption. In recent years China has reduced domestic stocks, but still has not become an important trader in agricultural commodities, except for soybeans and vegetable oils. World prices are formed by those who trade. The fact that consumption has been growing at a good pace in China and India is not a major factor in determining world commodity prices because they do not trade. This distinction is important and has been overlooked by most other studies.

- *Lower level of investment in agricultural research leading to lower growth in productivity in commodity production. Some of the studies that include this factor fail to distinguish between short and long run impacts.* We agree with this conclusion, but our take is a bit different. The world was in agricultural surplus in the 1980s and 1990s. It is difficult to persuade policy makers on the importance of investments in agricultural research when the accompanying request is for

measures to deal with agricultural surplus. The change from surplus to relative scarcity began early in the 21st century depending on the commodity. Over the past four to eight years, stocks have been dwindling, setting the stage for the current situation.

Another important distinction is the difference between short-term and long-term measures. At this point, everyone agrees that we need to increase investments in agricultural research. At the same time, no one should believe that this change will be a quick fix. Even if we increase investments in agricultural research substantially in 2009 and onward, the payoff in terms of higher yields will be five to 10 years down the road at the earliest The bottom line: invest in agricultural research but don't expect a quick turnaround. However, changes in policies to permit more widespread adoption of existing technologies could have rapid payoff in terms of yield increases in some areas.

- *Weather and crop disease issues in 2006-2007 that made an already difficult situation worse.* We agree, but again, the shocks were not large under normal circumstances—except the biofuels shock for corn. The shocks had large price impacts because the stocks-to-use ratio was already very low. Under normal circumstances, the Australian drought would not have had much of an impact on prices, but with very tight stocks, it had a greater influence on prices. Also, the reactions of many traders to isolate their domestic markets made the situation much worse. This is particularly the case for rice, which is so thinly traded.

- *Biofuels programs in the United States and European Union, which provide subsidies and mandates for biofuels leading to greater use of corn and vegetable oil for biofuels, thereby increasing the prices of these commodities.* We agree that biofuels have significantly increased the demand for corn and vegetable oils. We focus mainly on corn and the U.S. biofuels program. The U.S. ethanol industry would not have come into existence in the 1980s without subsidies. The same is true for the U.S. biodiesel industry, which occurred later. The EU biodiesel industry was made possible by mandates and subsidies. Most of the global increase in demand for corn in the past four years has come from the growth in United States' use of corn for ethanol. Many of the other studies blame U.S. subsidy and mandate policies for this increase. The reality is that most of the increase in corn demand has been driven by the higher oil price and the fall in the U.S.$. In round numbers, corn has gone from about $2 to $6 as oil has gone from $40 to $120. About $3 of the corn price increase is due to the higher oil price and $1 to the ethanol subsidy. The U.S. mandates have not yet been binding, so have not yet had any significant impact on corn price. At lower oil prices the RFS would become binding and have an impact on corn price. The bottom line: biofuels have had a major impact on corn prices, but in recent years, most of those increases have been driven by oil. The subsidy increases corn price by about $1 per bushel, which is significant. Eliminating the ethanol import tariff would serve to reduce pressure on corn price.

- *Depreciation of the U.S. dollar relative to the Euro and other world currencies.* We think most other studies grossly understate the importance of the link between the exchange rate and commodity prices. The analysis presented here clearly shows the historic links and how they have differed from one period to another depending on what else was going on in the global economy. Oil, agricultural commodities, and most other commodities are priced in US$, but are purchased in the local currency. So when the US$ falls as it has over the past six years, there must be a link with commodity prices. Unfortunately, economists cannot separate out cause and effect, but we can identify simultaneity–prices moving together, which has been happening. We believe the link between the US$ exchange rate and commodity prices is stronger and more important than many other studies imply.

- *Increases in the price of crude oil.* The crude oil price increases have been very important, especially for biofuels. As described above, the crude oil price has been the major factor in recent growth in ethanol demand in the United States. Higher crude oil means higher gasoline, which increases investment in ethanol plants, which increases demand for corn, which increases corn price. Most other studies have not examined this link. Also, the crude oil price increase is linked to the depreciation of the dollar. If the US$ were to appreciate and crude oil fall, we would expect corn and other prices generally to follow suit.

  Other studies have concluded that a significant driver of current commodity price increases is the price of crude oil. We argue that the major impact of oil price increases has been on the demand side, not the supply side. Higher crude oil prices have increased production costs of all goods and services, including food.

- *Production cost increases, especially those driven by higher crude oil prices such as fertilizer and diesel.* As argued above, the major influence of the higher crude oil price is on the demand for corn. Initially, it is the higher corn demand and production that has pulled up costs of agricultural inputs. In other words, the initial cost increases were “demand pull.” Crude oil price increases subsequently have increased the cost of producing agricultural commodities through increases in the price of fertilizer, diesel, propane, agricultural chemicals and other inputs.

  However, these production cost increases, in turn, could mean that supply response will be more muted than would otherwise be the case. This may be particularly true in developing countries where obtaining credit for purchase of agricultural inputs is often problematic at best.

- *Speculation in the commodity markets.* There is no doubt that the amount of pension, hedge and index funds in the commodity markets has mushroomed. Because of this change, some have blamed “speculators” for a good part of the price increases. However, speculators play an important role in the functioning of commodity markets. The two questions are whether the increased speculative activity increased price volatility, and if it increased the overall level of prices.

Volatility has increased, in part due to the increased volume being traded. It is impossible to say, based on existing research, if the overall price levels have been influenced by speculative activity.

In addition to the above factors influencing current agricultural commodity prices, we have also identified the following points as longer term issues in the commodity price arena:

- Higher agricultural commodity prices have greater adverse impacts on the poor. This point has been made especially by the international organizations working with developing countries such as the World Bank, IMF, and IFPRI. We agree with the World Bank, IFPRI, FAO and other organizations on the need for short-term measures to help the poor. As indicated in the arguments above, wheat and rice, and in some cases, corn are significant parts of consumer diets as direct consumption items in many developing countries. So price increases in these commodities have a much greater impact on these poor consumers. Also, food is a much larger fraction of total expenditures in many countries. The impacts of higher commodity prices are certainly felt in poor countries and regions much more than in rich areas.

  Another aspect of the higher commodity price story has gotten relatively little attention. That is the large potential supply response that could come from developing country farmers increasing their production and productivity in response to the higher prices. The World Bank has argued for years that 70% of the world's poor live in rural areas in developing countries and gain their primary livelihood from agriculture. For the net sellers or those who could become net sellers, they stand to gain from the higher prices. The higher commodity prices could well induce them to purchase and use more modern inputs such as improved seeds and fertilizer, which would lead to substantial productivity and economic gains. Thus, for some poor farmers in some regions, higher commodity prices could be an engine of economic development. IFPRI and FAO have argued that most poor farmers are net buyers. That is true is some regions. But even then, if agricultural wages increase, some of these farmers could still be better off.

  The key point here is that in adopting short-term measures, targeted food programs that still permit world prices to be transmitted to developing country farmers are key. We need policy measures that handle the short-term food problems without destroying longer term potential for economic gain for developing country farmers.

- Prices rise and prices fall. That is the cyclical history of commodity prices. It is impossible to identify where the peak is or how long it will last. However, we do know that markets adjust. Supply response occurs, demand changes. The cycle may function differently for oil and food commodities. China, for example, has been a major force in the world oil price increase and much less in the food price

increase. It could be that enough underlying factors have changed to keep oil at new levels compared to historic norms. We cannot be sure.

- The history of agricultural markets is that supply response has occurred when prices increase substantially. We will need investments in agricultural research, but with those investments, we would expect agricultural supply response to be significant over the long term. Even in the near term, there will be supply response. Will corn yields increase enough to bring corn prices down to historic levels? Unlikely, because if oil prices remain high, lower corn prices would increase the use of corn for ethanol. However, we would expect to see increased supply in general in response to the higher commodity prices.

- We have not yet seen the full transmission of commodity prices to consumers. Meat and animal product prices do not yet fully reflect the higher corn and soybean meal prices. Over time, these prices will have to increase more to cover the higher costs. In poor countries, these price increases get transmitted more quickly.

As should be clear, we agree with a lot of what has been written in the previous studies. Yet, our emphasis in some cases is quite different, and in others, our conclusions depart from conventional wisdom. There is no doubt that the causes of the current agricultural commodity price increases are complex. We make no attempt to derive percentages attributable to the many disparate causes, and, indeed, think it impossible to do so. However, looking at the many causes together, one gets a good picture of what has been happening.

We began this paper by posing several questions: Is there some major driving force that is behind all the price increases or is it a perfect storm of individual commodity supply and demand circumstances that just happened to come together at the same time, or is it a combination of several factors? It is a combination of diverse and complex factors. The challenge before public and private decision makers is to find policy options that deal with the short-term effects created by rising food prices without creating a new set of long-term problems.

Appendix A

Annotated Bibliography of Articles Related to Food Price Increases

This bibliography cannot possibly cover all the information relevant to food price increases. However, we have attempted to include the most important and relevant pieces concerning the current food price crisis. All of the pieces included are dated 2007 or 2008 because anything earlier would not focus on the current situation. We have not generally included academic journal pieces because they would inevitably cover earlier periods. We have limited our coverage to material available on the Web from organizations, associations and institutions interested in the topic plus a few magazine stories. We have not included any op-ed pieces or any press releases. The descriptions of the papers, studies, reports and position pieces in this appendix represent interpretations by the authors of this review only. The brief descriptions are not intended to cover all the points included in the original piece.We gratefully acknowledge the assistance of Sarah Brechbill in preparing this annotated bibliography.

25 x ’25: *Biofuels Impact on Food Prices* (May 2008)

Major objective – This testimony attempts to counter reports calling for the current levels of biofuels production to be reduced or completely eliminated. They argue that sustainable production of biofuels can provide long-term economic and environmental benefits over the use of fossil fuels without compromising the nation’s food needs.

Methods – The study makes reference to recent USDA, Texas A&M, and University of Tennessee studies. These are primarily used as affirmations of their position that biofuels production is not the major contributor to rising food prices.

Results – With respect to rising food prices, 25 x ’25 cites increasing fuel and energy costs, erratic weather, increased demand coupled with low stocks, and speculative purchasing behavior in grain commodity markets as more significant contributors to high global food prices than biofuels production. As USDA reports suggest, only 20 percent of each dollar spent by consumers on food accounts for the food product itself. The rest is made up of costs associated with activities such as transportation, packaging, and marketing. They also argue that shortages in wheat and rice stocks should not be attributed to biofuels production, because neither of these is used as a biofuels feedstock. They also argue that neither corn nor soybeans are directly used to feed humans. Both of these arguments fail to acknowledge links across commodity markets, land competition, and the use of biofuels feedstocks in the production of human food (i.e. livestock).

Perspective – As a group pushing for 25 percent of U.S. fuel consumption by 2025 to be from biofuels, 25 x ’25 is obviously on the side of biofuels and wants to see current production levels expand. They ultimately conclude that biofuels production is not primarily to blame for increasing food prices. They are also quick to point out the benefits of biofuels use over fossil fuel use and the upcoming second-generation technologies that will use cellulosic materials as feedstocks.

Congressional Research Service: *Rising Food Prices and Global Food Needs: The U.S. Response* (May 2008)

Major objective – This report provides an objective overview of the drivers and consequences of rising food prices. It also outlines policy recommendations and responses by both international food aid organizations and the U.S. federal government.

Method – The report cites findings from various research organizations but does not settle on any one particular driver as being the cause of rising food prices. It is in some ways a chronicle of recent events pertaining to rising food prices and also broadly identifies the drivers and consequences of rising food prices without specifically taking a side on the matter.

Results – Several drivers are identified, and no particular one is labeled the primary cause. Drought conditions in Australia and Eastern Europe and poor weather in Canada, Western Europe, and Ukraine have reduced global stocks of corn, wheat, and soybeans. Many countries, including Asian rice producing countries, have introduced export restrictions due to low domestic stocks. This has further exacerbated the global short supply situation for many commodities and has consequently driven up world prices. Rising oil and energy prices have made each step along the food supply chain (i.e. fertilizer, transportation, processing, etc.) more expensive. Developing countries, especially China and India, are experiencing higher incomes, which is consequently increasing their demand for food commodities such as meat and dairy and processed foods. Increased biofuels production due to government mandates and subsidies is reducing the availability of feedstocks such as corn and soybeans.

Countries throughout the world are responding to rising food prices in a variety of ways. Some countries have reduced or eliminated import duties, introduced price controls, begun to subsidize inputs, or restricted exports. Others have expanded their social safety net programs that provide cash or food to poor people. International food aid programs, such as WRP and USAID, are experiencing a shortfall in emergency food aid funds during 2008 and have made requests for additional funding. Proposals have also been recommended to allow USAID to purchase commodities in locations closer to where they are needed. FAO, the World Bank, and IMF are considering policies to help reduce the effects of rising food prices on vulnerable countries in the short run. More long-term solutions include increasing resources devoted to agricultural development, especially in sub-Saharan Africa, as the share of agricultural development assistance has been declining since the 1980s.

Perspective – As the primary research arm of the U.S. Congress, Congressional Research Service is intended to report facts and observations rather than give recommendations. This accounts for the lack of a position in this report and instead an objective and overarching view of the issue.

Congressional Research Service: *High Agricultural Commodity Prices: What Are the Issues?* (May 2008)

Major objective – This report outlines the current grain commodity stocks situation and their record prices levels. It also identifies the factors and implications of these high prices and a market outlook for farm commodities. A summary of policy responses on both the US and international levels is also provided.

Method – This report uses USDA, FAO, CBOT, and BLS data to show that a variety of factors contribute to rising food prices. It also cites the findings of several studies by international research organizations. No particular factor is considered the primary cause of rising food prices but rather several different drivers are discussed.

Results – Current commodity prices (both export prices and US farm prices) are increasing rapidly, and stock-to-use ratios are low both nationally and globally. Futures prices are also setting all-time record highs, and commodity prices are becoming more volatile.

Factors behind these high food prices include crop shortfalls due to poor weather, strong economic growth in developing countries, a weak U.S. dollar that makes U.S. exports less expensive, government biofuels policies in the United States, European Union, and Brazil, export limitation policies by foreign governments, and high energy prices.

These drivers are having widespread implications in the US and around the world. U.S. farm incomes are at record highs. The government is spending less on farm programs outlays. Crop insurance premiums are more expensive. Feed costs are rising. The effectiveness of the futures market is declining. Agricultural production is expanding and becoming more intense through increasing yields and/or cultivated acres. Acres currently in conservation programs (i.e. CRP) are being converted into crop production. Households spending a large percentage of their total income on food are experiencing less flexibility in their expenditures. Food security throughout net importer developing countries is threatened, as they may be unable to handle the rising cost of imported commodities. International food aid programs, including WFP and USAID, are anticipating shortages in the funds necessary to meet emergency food needs. Proposed policy responses vary among industry groups depending on the sector they represent. International aid agencies are seeking ways to handle short-run emergency fund shortages, while also increasing the resources devoted to agricultural development in the long-run.

Perspective – Again, CRS does not really have a specific position on which driver is contributing most to food price inflation. Instead, CRS is simply providing a detailed yet broad view of the current situation.

National Corn Growers Association: *U.S. Corn Growers: Producing Food and Fuel* (2007)

Major objective – This report argues that the "food versus fuel" fallacy will never result in a situation where U.S. corn growers are faced with a food or fuel dilemma when marketing their grain and will, instead, be able to supply both. It takes aim at dispelling what it considers common myths related to the "food versus fuel" debate.

Method – This report uses U.S. crop production and price data to indicate the benefits of biofuels production and reasons why it is not the primary driver of rising food prices. There is little consideration of what is taking place on the world market, how prices of commodities are correlated with one another, and the effects of land competition among grains.

Results – Even with record demand, there have been record supplies through increasing acreage and yields to match, indicating that there will be no shortage of corn. Corn demand for feed and food has a 10-year growth rate of 3.9 percent, while corn demand for ethanol has a 10-year growth rate of 492 percent, so that new supplies can be used for biofuels production. Field corn used as a feedstock in ethanol production is not directly consumed by humans and is mostly used as livestock feed or exported. Biofuels production from corn also produces distillers grains, which is a good source of energy and protein for livestock and poultry, since the ethanol process only removes the starch from the grain. Only 19 cents of every consumer dollar spent on food is due to food inputs, while the rest is due to costs such as labor, fuel, packaging, transportation, and advertising. Even as feed to livestock for meat products, corn is a relatively small share of the retail price. Current high corn prices (2006/07 average of $3.05 per bushel) are not unprecedented, and levels such as these have been reached three other times in the past 30 years. High grain prices are also contributing to decreasing federal farm payments.

Perspective – NCGA has a major vested interest in continued and expanded biofuels production from corn. They also favor higher market prices and their effect on net farm income in the United States. With such an initial position, NCGA has it in their interest to do as much as possible to ensure that no blame is placed on biofuels for the current increases in food prices.

Federal Reserve Bank of Kansas City: *What is Driving Food Price Inflation?* (2008)

Major objective – This report attempts to shed light on what is causing rising food prices and what these increases will continue to do in the future.

Methods – This report uses crop prices, cost, consumption and production data to tell a broad story of how the world is experiencing a new era of rising food prices. No one cause is identified as the primary factor behind these rising prices.

Results – Retail food prices increased throughout 2007 due to such reasons as increasing food demand, high crop prices, and increasing labor and energy costs. These effects are not likely to stop, and the same increases will be experienced in 2008. Rising marketing costs (the difference between farm value and what consumers spend on food) are accounting for an increasing share of retail food expenditures. Higher and more volatile energy prices are quickly being passed onto the consumer. At the same time, the share of retail food expenditures spent on farm commodities is declining. Global economic conditions may result in continued food inflation. Global crop stocks are at record lows due to crops being used for non-food purposes. Expanding global populations with rising incomes are also cutting into global food supplies. This growth in population and consumption could outpace the projected growth of agricultural production and maintain high food inflation unless agricultural productivity is boosted.

Perspective – The report covers a broad range of topics in identifying the drivers of food price inflation. Since it is a government agency, it attempts to be comprehensive and unbiased.

International Food Policy Research Institute (IFPRI): *Rising Food Prices: What Should Be Done?* (April 2008)

Major objective – This report identifies the sources of current food price increases, what impacts these rising prices have had, what the policy responses have been so far, and proposes a set of sound policy actions for both the short and long run.

Method – This report is basically a commentary and is not really based on any empirical research or even existing data.

Results – Sources of the current food price increases include the United States' shift of corn to biofuels production, high energy prices, a growing world population that is demanding more and different types of food, poor weather, and speculative capital. The impacts of these high food prices are experienced differently around the world. Net exporters that have not banned or restricted exports are enjoying improved terms of trade. Net importers, however, are struggling to meet domestic demand. The exact effect in a particular country will depend on the balance between net buyer households and net seller households, since the former benefit and latter do not. Poor households often spend between 50 and 60 percent of their budget on food, which makes the effects of rising prices more detrimental.

Policy responses that have occurred thus far include export restrictions, food price controls, and relaxed import restrictions. These policies, however, may contribute to further food price increases by making the global food market smaller and may not be sound long-term solutions. Policy suggestions from IFPRI include short-run expansion of social protection programs in developing countries, the elimination of biofuel subsidies and import tariffs, the elimination of agricultural trade barriers to create a level playing field, and increased investment in agricultural research, extension, infrastructure, and market access.

Perspective – IFPRI seeks sustainable solutions for ending hunger and poverty. With this goal, these overall policy recommendations are likely to not be much different than their policy recommendations would be were food prices not increasing. Social protection programs, fewer subsidies and trade barriers, and agricultural development investment are not just ways to combat rising food prices. The rising food prices provide an opportunity for IFPRI to push a set of policies that will promote their organizational vision.

IFPRI: *Biofuels and Grain Prices: Impacts and Policy Responses* (May 2008)

Major objective – This report states the driving factors of rising food prices, but it specifically seeks to identify the role of biofuels production in causing food price inflation by examining the effect of various biofuels policy scenarios on select world grain prices.

Method – IFPRI's partial equilibrium agricultural commodity trade model, IMPACT, is used to assess the following three alternative scenarios for biofuels production: recent food price evolution with and without high biofuels demand, the impact of a freeze on biofuels production at 2007 levels, and the impact of a moratorium on biofuels production after 2007.

Results – The triggers and underlying factors for increasing grain prices include biofuels policies, bad weather, high oil prices, speculative trading and storage behavior, rapid growth in demand by the developing world, strong economic growth in sub-Saharan Africa, rapid income growth in developing Asia, and underinvestment in agricultural research and technology. Biofuels policies, in particular, have increased production of biofuels from corn, which have caused an increase in the price of corn. High corn prices have caused consumers to shift their demand to rice and wheat, while also making it more profitable to grow corn at the expense of rice and wheat.

IFPRI concludes that biofuels production accounts for 30 percent of the increase in average grain prices and that both a freeze and a moratorium on biofuels production would result in a decline in corn, wheat, oilseeds, sugar and cassava prices. IFPRI acknowledges that biofuels production is just one contributor to rising food prices but labels it a major one. Recommended short-run policies are focused on eliminating biofuels subsides and mandates, while recommend long-run policies seek to increase agricultural productivity growth through research investment. In a sense, these conclusions represent one of the failings of "black box" models in that the cross elasticities are much higher than real world reality. No one else is concluding that biofuels policies cause increases in commodity prices across the board.

Perspective – While stating that biofuels production is not the only contributor to high food prices, IFPRI still takes a strong stance on existing biofuels policies by calling for their elimination in the short run. Modifying other policies is not really mentioned as a possible short run solution. It is somewhat disappointing that IFPRI in this study sounds more like one of the advocacy groups than like an unbiased international research organization.

IFPRI: *The World Food Situation – New Driving Forces and Required Actions* (December 2007)

Major objective – This study attempts to explain the major drivers of food price increases now and in the near future and to evaluate the impacts of these price increases on global poverty. It also provides policy recommendations for developed and developing country governments.

Methods – The study makes reference to recent literature in the area and uses the IFPRI IMPACT model to project future agricultural commodity prices under two scenarios, named biofuel expansion and drastic biofuel expansion. No details are provided on model assumptions other than results that indicate in the base model food commodity prices are expected to increase in unison between now and 2015.

Results – Results are reported for the two biofuels scenarios for cassava, maize, oilseeds, sugar, and wheat. Prices increase modestly in the biofuel expansion scenario going up 8% for wheat and 26% for maize, with the other commodities ranging in between. For the drastic scenario, wheat increases 20%, maize 72%, and the other commodities ranging in between.

In terms of drivers of food price increases, the report identifies rapid growth in developing countries, low growth in production, and biofuels as major drivers. For the future, the report focuses on climate change induced drops in agricultural productions as a major driver with significant effects even by 2020.

The report also underlines the fact that the poor globally are adversely affected by food price increases. For policy changes, the report advocates free trade, investments in rural infrastructure and agricultural research, expanded social safety nets, and focusing attention on the agricultural impacts expected from climate change.

Perspective – In its conclusions and recommendations, the report recommends more of the kinds of things IFPRI does in the policy arena, which is not surprising and appropriate. It is a bit surprising that climate change is given such prominence in a near term outlook.

LECG: *The Relative Impact of Corn and Energy Prices in the Grocery Aisle* (June 2007)

Major objective – This study examines the impacts on food prices from increases in both oil and corn prices. It also seeks to determine which of these impacts is most significant in contributing to rising food costs.

Method – This study looks at annual changes in the consumer price index for all items, for all food items, and for specific types of food items. Two studies are also cited for their conclusions on the effect of increasing energy prices on consumer food prices.

Results – Meat, poultry, eggs, and dairy products are most affected by rising corn prices because corn is used as a feedstock, but overall rising energy prices have had a more significant impact on food prices than increases in corn prices. A $1.00 increase in retail gasoline prices increases the Consumer Price Index (CPI) for food by 0.6 to 0.9 percent. A $1.00 increase in corn prices increases the CPI for food by only 0.3 percent. This is due to the relative importance of energy in food production, packaging, distribution, and transportation compared to the single input of the actual commodity. LECG expects that corn prices will remain near $3.00 per bushel and that prices may be more stable as corn production expands to meet ethanol demand and second-generation ethanol technologies emerge.

Perspective – This study has often been cited by biofuels proponents as demonstrating that other factors such as energy prices play a more important role in driving food prices than do biofuels.

Jeffrey Sachs: "Surging Food Prices Mean Global Instability" *Scientific American* (May 2008)

Major objective – This is an editorial commentary on the effects of rising food prices throughout the world and some suggested policy responses.

Method – This article is a set of observations with a few statistics to support the arguments.

Results – Many of the effects from rising food prices have not yet fully been felt or reported in the press. These effects will only get worse unless offsetting policies are implemented. Factors causing rising food prices include increased world incomes, climate shocks that have decreased supplies, US subsidies of corn ethanol production, and export restrictions.

Measures to respond to these increasing prices include increasing food production in Africa through financing for new technologies, the elimination of misguided US corn ethanol production subsidies, support for long-run research for increased agricultural production, and following through on the Climate Adaptation Fund that will help poor countries handle risks associated with food production in adverse climates.

There is little or no analytical backing to the arguments, especially those on biofuels policies.

Perspective – Sachs has long portrayed himself as an advocate for the world's poor.

Chris Delgado, Agriculture & Rural Development Department, World Bank: *Food Policy Implications of Longer-Run Price Rise* (April 2008)

Major objective – This presentation discusses the short-run policy responses to rising food prices that affect long-run outcomes, the threats of high food prices on rural employment, and potential growth opportunities of high long-run food prices.

Method – This presentation is basically a set of observations with a few statistics accompanying it. It is a simple and concise presentation meant to hit the highlights of food price inflation effects on rural areas.

Results – Many short-run policies responding to rising food prices may have long-run implications. There is a need for an exit strategy should conditions change. Short-run policies may not work the same way depending on initial conditions. As global demand, stocks, and prices change, policy tools must be suitable for the conditions. Short-run policy options (increasing in magnitude of negative long-run impact) include reduced grain taxes and tariffs, school food programs, cash transfers to the poor, targeted food subsidies, food for work programs, food aid programs, building up government stocks, food rationing, price controls, export restrictions and taxes, and export bans. With respect to households, unless high food prices are matched by productivity growth, developing countries will experience increases in costs that are larger than increases in household income. Growth opportunities include reform of price floors, shifting from public to private grain procurement, market based risk management approaches, and investment in grain productivity.

Perspective – As a government agency responsible for rural development, this presentation is most interested in the effects of rising food prices on rural household incomes and wage rates.

Testimony of Scott Faber of the Grocery Manufacturers Association before the House Committee on Energy and Commerce (May 8, 2008)

Major objective – The major objective of this testimony was to convince members of Congress to eliminate the corn renewable fuel standard for ethanol and ethanol subsidies.

Method – The approach used in the testimony was to summon all the arguments available on why renewable fuel mandates and subsidies are a bad idea.

Results – The major points in the testimony are the following:

- Food prices are now rising at twice the overall rate of inflation
- Soaring food prices pose significant challenges for poorest 20 percent of Americans
- Rising food prices also pose significant challenges to the hungry in developing countries
- Rising food prices pose significant challenges for livestock producers
- Food prices will continue to rise as more and more corn and soy oils are diverted to our fuel supplies
- Food to fuel mandates have little impact on energy imports or prices
- Food to fuel mandates increase greenhouse gas emissions and pose other environmental challenges

The testimony concludes that Congress should abandon the "food-to-fuel" mandates and subsidies and accelerate the development of other biofuels. In addition Congress should address the needs of the hungry and invest in global agricultural development.

Perspective – The perspective here clearly is that of the Grocery Manufacturers Association and livestock producers. These groups see higher corn costs as increasing costs of a broad range of food products, which poses short-run and potentially long-run problems for firms in these sectors.

R. Fortenberry and H. Park, University of Wisconsin: The Effect of Ethanol Production on the U.S. National Corn Price (April 2008)

Major objective – The main objective of this study was to determine the role of ethanol production in determining changes in national corn prices.

Method – A three stage least squares econometric model was developed to examine the role of ethanol in determining corn price. The log-log model includes demand for corn for feed, food, alcohol, and industrial (FAI), and exports as well as corn supply. Two model versions were developed with generally similar results.

Results – The effects of each demand factor for the three different demands (feed, FAI, and exports) on corn price as measured by the coefficients (also elasticities) were quite different. FAI had the largest elasticity and therefore the largest impact on corn price, followed by exports, and feed. The feed coefficient was not statistically significant even though it is the single largest user of corn. Their results suggest that increasing corn demand from FAI is more important in explaining corn price than the other use categories. However, the authors conclude that despite what is often written in the popular press, the high 2007 corn prices cannot be entirely attributed to ethanol.

Perspective – This study is an academic endeavor to attempt to quantify the importance of ethanol, feed demand, and export demand in explaining changing corn prices. It does not evidence any bias one way or another.

World Bank. Rising Food Prices: Policy Options and World Bank Response (2008)

Major objective – The major objective of this paper was to explain in very brief and general terms what is happening in world commodity markets, but to focus on policy alternatives countries could consider and what actions the World Bank might take to help client countries.

Method – The report first provides the context for the food price problem. Then it examines the impacts on countries and households. Following is an assessment of the options available to governments together with a discussion of the advantages and disadvantages of different approaches. Finally, the document discusses what the World Bank and other donors can do.

Results – In the context section, the report argues that the recent food price increase in not temporary and is likely to persist in the medium term. They also argue that part of the cause is biofuels noting that from 2004 to 2007 global maize production increased 51 million tons while US use of maize for biofuels increased 50 million tons. They focus on the impacts on poor households in developing countries. Many poor households are net food buyers who are being adversely affected by the increasing prices.

In terms of what governments can do, the first best option is to address food insecurity through targeted cash transfers to vulnerable groups. Other good policies included food for work and school feeding programs. Food prices also can be reduced by lower border protection. Measures to stimulate medium term supply response also are quite important.

The report calls on the Bank to provide support for government rapid policy responses and to help with short-run financing needs. The report calls upon the Bank to again make agricultural development a priority.

Perspective – This report is mainly an internal World Bank document designed for discussion within the Bank and with the donor community. It is focused on what governments and the World Bank and donor community can and should do to help reduce adverse poverty impacts of rising food prices.

Maros Ivanic and Will Martin (World Bank): *Implications of Higher Global Food Prices for Poverty in Low-Income Countries* (April 2008)

Major objective – This study determines the short-run impacts of high food prices in nine low-income, developing countries on poverty levels. It also demonstrates how different countries can experience different impacts depending on their initial economic conditions.

Method – This study uses 10 observations of household data from various years and countries in a partial equilibrium model to determine the direct impacts on households of changes in the price of staple food items, as well as impacts related to changes in the unskilled labor wage rate via the GTAP model. Measures of poverty that are considered include the poverty headcount and the poverty gap.

Results – The impacts on poverty associated with changes in the prices of certain commodities will vary among products and countries. It will ultimately depend on whether the country is net buyer or a net seller of food. In general, increases in the prices of all commodities results in increased poverty. The impacts are more severe in urban areas than in rural areas since urban areas tend to be less likely to be net sellers of food. When considering the impacts from wages, the increases in poverty are less. Considering the recent situation and the fact that most poor people spend a large percentage of their income on food and are net buyers, the average impact of high global food prices has been a 3 percent increase in poverty. The prices of corn, wheat, rice, and dairy have been the largest contributors to increases in poverty.

Perspective – This study is much more empirical than some of the others that have been reviewed and is not simply a commentary supplemented with select statistics. It does not attempt to determine the primary cause of high food prices, so an initial position does not really affect the study findings. Instead, it seeks to find how rising prices of many different commodity types are affecting poverty levels in various countries.

International Rice Research Institute (IRRI): *The Rice Crisis: What Needs to be Done?* (2008)

Major objective – This report illustrates the reasons behind rapid increases in rice prices. It also provides a list of recommendations for achieving an affordable and plentiful supply of rice.

Method – This report uses rice statistics related to price, production, stocks, yield growth, area planted, and public investment as a backdrop to the current situation of high rice prices. From there, recommendations are made to improve the rice outlook in particular, rather than the food outlook more generally.

Results – Almost two-thirds of the world's poor people are living in rice-growing countries throughout Asia, and these people tend to spend up to 30 to 40 percent of their total income on rice alone. Reasons for the current rice crisis are numerous. Rice consumption is outpacing rice production, and stocks are being rapidly depleted. Annual rice yield growth is slowing. There is little land area available to expand rice production. Since the Green Revolution in Asia in the 1960s, public investment in agricultural research and development has been reduced. Africa is becoming a larger consumer and importer of rice, and this demand is expected to grow. The global population is increasing and demanding more rice. Irrigation infrastructure is deteriorating. Both oil and fertilizer prices are rapidly increasing. Up until now, biofuels policies in developed countries have had little effect on rice production and trade, but this effect may become more serious if biofuels production is expanded. Changing weather conditions and pest outbreaks are also decreasing rice production.

Rising rice prices equates to decreases in real income for poor urban consumers and landless rural laborers. A 25 percent increase in rice prices translates to a 7 to 10 percent decrease in real income for poor consumers. Productivity growth is the only long-run, viable solution for rising rice prices. IRRI recommends several responses to contribute to this solution. The existing unexploited yield gap of 1 to 2 tons per hectare must be reduced. New postharvest technologies could reduce losses associated with storing, drying, and processing. Higher yielding rice varieties must be introduced and adopted. Rice breeding and research must be strengthened and upgraded. Several rice varieties are not currently being used in research and may provide insights. A new generation of rice scientists and researchers must be trained. Public investment in agricultural infrastructure must be increased. Marketing systems for both inputs and outputs must be made more efficient. The food safety net of poor people must also be strengthened.

Perspective – IRRI is committed to correcting the rice crisis. However, a fix for overall increasing food prices must take into account more commodities. The report is self-serving in that the major conclusion is to increase agricultural research.

USDA Economic Research Service: *Global Agricultural Supply & Demand: Factors Contributing to the Recent Increase in Food Commodity Prices* (May 2008)

Major objective –This report outlines the factors contributing to rising world food prices and the role each of these factors has played. It discusses current policy responses that exporting and importing countries have implemented to cope with higher food prices. Possible implications for the future are also summarized.

Method – This report gives an objective overview of the current food price situation and utilizes USDA data and forecasts to give an unbiased account.

Results – Rising food prices are being caused by several factors. Some are significant structural changes, while others are short-term shocks to global supply and demand. In general, prices of major program crops have followed a similar pattern and have tended to decline back to the levels they were before dramatic price increases occurred. It remains to be seen whether the current increases will behave in the same way. Other non-food commodities have also been rising in recent history. However, the effect of food inflation on poor consumers makes food price increases more socially and politically sensitive.

Long-term trends affecting food prices include very little land being converted to agricultural use, limited water availability for agricultural use, and climate change. High income growth and rising population levels are contributing to increased demand for food and energy. Higher incomes are resulting in more diversified food purchases including meat and dairy products, requiring more grain for feed. Global consumption of grain has exceeded production in seven out of the past eight years. The declining value of the U.S. dollar is making imports less expensive and causing them to rise. Increased biofuels production in the United States, European Union and Brazil are causing biofuels to impact changes in world supply and demand much more than in the past when production levels were low. Policy responses from exporting countries have included eliminating export subsidies, export taxes, export restrictions, and export bans. Policy responses from importing countries have included reduced import tariffs and subsidies to consumers. Reduced supplies from exporters and increased demand from importers is resulting in low global grain stocks.

Much uncertainty exists for the future with respect to global economic growth, energy prices, and biofuels production. Production shortfalls have particularly strong effects on food prices and can be driven by the cost of inputs, the amount and quality of cropland, water availability, seed technologies, and plant response to climate change.

Perspective – ERS is providing a comprehensive story with statistics and data to make the case for each factor contributing to some extent to rising food prices. No one factor is blamed for causing rising food prices more so than another.

American Coalition for Ethanol. The Facts: Ethanol, Corn and Food (2008)

Major objectives – The main objective of this piece was to convince others that ethanol is only a small piece of the global picture of grain, food, and prices.

Method – The approach was to present a series of facts that are used to bolster the arguments of the association.

Results – The results are a series of facts used to make the argument that there are many factors at play, and that ethanol is but one of many:

- The increase in the price of oil has been much more important than corn price increases. Oil has quintupled since 2002. Energy price increase have at least twice the impact on food prices as do corn prices.
- Global supply and demand issues for ag commodities have been more important than ethanol. Global demand, especially in developing countries, has grown very rapidly, while global supply has grown more slowly. Crop disease and weather have played important roles in the past two years. Corn for ethanol is 2% of the global corn market – not enough to make it the major cause of food price increases.
- Ethanol only uses the starch in corn preserving the corn oil and protein for use as animal feed. About one-third of the corn made into ethanol goes back into the animal feed system.
- Speculation in the commodity markets has driven up commodity prices.

The rest of the document cites results from other studies: Texas A&M, Federal Reserve Bank of Kansas City, Food and Water Watch, LEGG, and CARD at Iowa State. The document concludes with some quotes from political leaders like the Secretaries of Agriculture and State.

Perspective – The document presents well the arguments for why ethanol is not the major culprit.

***Business Week* (John Carey), Is Ethanol Getting a Bum Rap? Corn-base fuel isn't the villain critics contend, but shifting to other crops is critical (May 2008)**

Major objectives – The major objective of this piece was to put in perspective the role of ethanol in corn and food price increases. In addition, the piece attempts to look at longer run consequences of higher food commodity prices.

Method – As a journalistic piece, the story uses secondary sources for all its coverage. It pieces together information on both sides of the corn price story.

Results – It begins by quoting Lester Brown, "What started as an energy policy is leading to spreading hunger and political instability around the world." Then the piece turns to recent data arguing that about a quarter of the corn crop is going to ethanol, and there is no way that cannot lead to price increases. However, it argues that the feed and export demands have been met and could continue to be met even at the 2015 level of mandated ethanol through yield increases. The piece cites other sources who argue that biofuels are a small part of the overall food price increase.

Next, the piece takes an interesting and important turn not often seen in the media. While it acknowledges that higher food prices will cause hardships for poor households, it also indicates that higher commodity prices might offer quite positive benefits for developing country farmers. Developing countries have long argued that rich country policies have kept commodity prices artificially low thereby depriving developing country farmers of opportunities to increase productivity and production.

In addition, the piece argues that ethanol critics forget that ethanol supplies have had a moderating impact on gasoline prices. The piece even implies understanding the link between the price of crude and corn indicating that corn price will rise until the price chokes off ethanol profitability.

Finally, the piece argues that we need to move faster towards second generation cellulosic based biofuels. It also cites the Texas A&M study, which concludes that oil prices are more important in determining food prices than ethanol.

Perspective – The perspective is that of a journalist trying to put the food-fuel debate into a balanced perspective.

Farm Econ LLC (Tom Elam), Biofuel Support Policy Costs to the U.S. Economy (March 2008)

Major objectives – As the title indicates, the major objective of this study was to estimate the high costs current biofuels policies impose on consumers, livestock producers, and taxpayers.

Method – The paper provides substantial background on how the ethanol, gasoline, and biodiesel markets work and how the subsidies and mandates play into these markets. The author develops an analytical model of how the ethanol and gasoline markets would function with and without the renewable fuel standard. The model uses only a non-binding version of the mandate, which has historically been the case, but may not be in the future.

The remainder of the analysis was done using the FarmEcon ethanol/feedstock model, a partial equilibrium model of the corn, livestock, and ethanol sectors.

Results – We have been subsidizing biofuels in the United States for 30 years. Why has it only become a major issue in recent years? The reason is that previously oil prices were low enough that the industry could grow only very slowly even with the subsidies. But with oil prices five times higher today than they were just a few years ago, the combination of high prices and subsidies has led to a boom in growth of the sector.

Because of this boom the cost increases faced by domestic corn users for the 2007 corn crop will be $14.7 billion and $8.5 billion for soybeans. These higher prices increase revenue for corn and soybean farmers but decrease revenue for everyone else up the food chain. Treasury costs for the subsidies also increase substantially.

The model results show that corn prices would have increased anyway given the increase in oil prices, but that they increase faster and higher with the subsidies and mandates in place. For 2007/08 the model results indicate that ethanol would have been $1.69 instead of $2.20 without the subsidy, the difference being the value of the $0.51 cent subsidy. The results also show declines in meat, egg, and milk production.

The last section provides assessments on a number of related issues. The author concludes “the alarm bells on the unintended effects of U.S. biofuels support policy are ringing loud and clear.”

Perspective – This study was done for the Coalition for Balanced Food and Fuel Policy, which is a coalition of meat, livestock, and poultry organizations. The study takes a position favorable to that industry. While there are errors of omission, much of the analysis appears to be objective.

Agricultural Food and Policy Center, Texas A&M University. The Effects of Ethanol on Texas Food and Feed (April 2008)

Major objectives – The major objectives of this study were to examine the role of various factors in driving food price increases and also to evaluate the impacts of the higher prices on Texas agriculture, which is more heavily weighted toward livestock than to crops.

Method – The study is rather far reaching in that it covered many topics. It provides lots of background information on ethanol and its byproducts, crop and livestock production costs in Texas, farm share of retail prices, an overview of causes of high prices, and a discussion of the role of speculation in driving prices. They use econometric modeling to address some of the questions including effects on equilibrium food market prices and livestock margins and the effects of a waiver of the renewable fuel standard. They also estimate the economic impacts of higher corn prices on the Texas economy.

Results – Their major conclusion is that higher oil prices are the main driver of changes in the agricultural industry. Part of this conclusion is demand pull and part is cost push. That is, higher oil prices pull more ag products into the energy market, and higher petroleum product prices lead to increased cost of producing ag commodities.

They conclude that higher corn prices have very little to do with higher food prices. There is only a small effect on some food items.

Speculative activity in commodity markets has led to perhaps higher prices but certainly to higher volatility. The volatility has increased to the point that some operators can no longer use the futures markets. With the increased volatility and low stocks, any weather event this year likely will lead to huge increased in crop prices, especially corn.

The livestock industry has born most of the burden of increased corn prices. It will take some time before they can pass on these costs to the consumer, and that will happen through contraction of the livestock industry.

Relaxing the RFS will not significantly lower corn prices

Perspective – This paper is a university publication. They have tried to achieve a balance in presenting the issues.

International Monetary Fund. Impact of High Food and Fuel Prices on Developing Countries – Frequently Asked Questions (April 2008)

Major objectives – The major objective of this short piece was to explain what is happening in these markets, how long might the high prices last, what can and should be done, and how might the IMF help.

Method – Since this is a short FAQ piece, there is really no set of methods apparent in the piece. No doubt there are underlying IMF documents to support the statements made in this piece.

Results – In terms of what is happening now, food prices have risen by 45% since the end of 2006. Many prices are at record highs, but others have not exceeded (in real terms) peaks reached in the 1970s or 1980s. Prices are going up for the following reasons:

- Fast growth in food demand in developing countries
- Rising biofuels production leads to increases in corn and rapeseed prices
- Policy responses in some countries, like export bans, are exacerbating the problem
- Drought conditions combined with other drivers have made matters worse
- The depreciating US$ also is a factor

The following implications were noted:

- Effects of commodity prices on terms of trade have varied widely
- Food price increases have been passed through in many countries, but there are many exceptions.
- Social implication for urban poor can be severe
- External balances for commodity exporters have improved

Oil prices are likely to moderate if there is a global economic slowdown. However, there will not be much relief this year.

One of the most important things to be done is to make efforts in developing countries to take advantage of the higher prices and expand agricultural production. Efforts should be augmented to move towards freer agricultural trade.

IMF could play a role in helping developing countries through temporary problems.

Perspective – This is an IMF document intended for external audiences and IMF staff. As such, it does not exhibit any apparent bias.

Ford Runge and Benjamin Senauer. Foreign Affairs How Biofuels Could Starve the Poor (May/June 2007)

Major objectives – The major objective of this piece appears to be to point out that US policies towards biofuels are misguided and could lead to increased hunger and starvation for the poor.

Method – There is no in-depth analysis in the piece. It is essentially a qualitative analysis of possible impacts of policies that promote biofuels.

Results – This paper is a well written and emotional plea to change course on biofuels so that the United States and other rich countries no longer promote biofuels. It provides the history of biofuels in the United States, describes problems with subsidies that promote biofuels, and then discusses potential adverse impacts U.S. biofuels policies could have on the poor in developing countries. The paper demonstrates little understanding of the changing nature of energy and agricultural markets. The major driver of biofuels development today is high oil prices. If government subsidies ended tomorrow, there would be some pull back, but essentially little would change unless oil prices fell.

The paper also goes into net energy arguments and environmental arguments. Most of it is old news, but it is a well written rehash of those topics.

The most positive point about the paper is the last paragraph in which the authors argue for a balanced and comprehensive energy policy that lets the market rather than governments choose technologies.

Perspective – This paper is clearly designed to argue against any government promotion of biofuels.

***The Economist*. The Silent Tsunami – the food crisis and how to solve it (April 2008)**

Major objective – The main objective of this report is to provide a diagnosis of the current food price problem and to advance recommendations on how the problem could be solved short and long term.

Method – As a journalistic piece, the method was to interview numerous sources to obtain a factual understanding of the situation and then apply economic principles to provide recommendation for short and long-term solutions.

Results – The story begins by pointing out that wheat, rice, and, maize prices have all increased substantially since the beginning of 2007, with wheat and rice increasing much more than maize. In terms of how severe is the problem, the article makes a point ignored by many other sources, which is that there is a paucity of national statistics on what is actually happening now. All the data is historic, and much of it has been surpassed by recent changes.

The Economist acutely distinguishes between the short-term solutions and long-term solutions. Good short-term solutions include targeted food programs such as rations, school lunch, work for food, and cash transfers. For the long-term, it is imperative that the higher prices be transmitted to poor smallholder farmers in developing countries. Three fourths of the world's poverty is in rural areas in developing countries, where agriculture is the primary source of livelihood. Policy interventions should be focused on helping the poor farmers take advantage of the higher commodity prices. Means must be found to provide farmers credit to purchase fertilizers and other modern inputs to improve their productivity. Even longer term, yields must be increased through investments in agricultural research. In the 1980s and 1990s, the globe was in a period of agricultural surpluses, so investments in agricultural research decline significantly.

In addition to these short and long-term measures, there are many market failures in developing countries that require policy interventions and/or institutional reform. The story also points out the disruption in trade and pricing implications of actions by some countries to restrict exports or rice, wheat, or corn.

Perspective – This is an objective journalistic piece that has become the trademark of *The Economist*. There is no apparent bias in the story.

OECD-FAO *Agricultural Outlook 2008-2017* (May 2008)

Major objectives – This report is an annual agricultural outlook published Jointly by OECD and FAO. The authors acknowledge that this outlook was prepared in a context of very high commodity price increases and price volatility, which made preparing the outlook unusually difficult. The major task the authors took upon themselves in this context was to try to determine to what extent and for which commodities might the current high prices be maintained.

Methods – The analysts made use of commodity data bases, but it was not clear exactly what forecasting tool may have been used. One suspects models resident in OECD and FAO were employed. The outlook contains projections for the period 2008-2017.

Results – the authors argue that much of the recent price increases was due to weather and crop disease yield reducing events, so in time the prices will come back down with increased production. However, they also argue that for the medium term, commodity prices will not return to their levels of the 1990s. Because of factors on both the demand and supply sides, near term prices are expected to above the average of the past 10 years. Wheat is expected to come down to around $6.25/bu., corn to about $4.30/bu., and soybeans to about $12.80/bu. In addition, these and other commodity prices may be more volatile in the future.

The report provides estimates of food price impacts for a number of developing and developed countries. While food price inflation was 5% in the US and France (February 2007-February 2008), it was 25% in Kenya and Sri Lanka, and 14% in Egypt and South Africa. The share of income spent on food in the US is 10%, France 16%, Kenya 51%, Sri Lanka 62%, Egypt 42%, and South Africa 21%. Thus, the contribution of food price increases to overall cost of living was 0.5% for the US, 0.8% for France, 12.4 and 15.9% for Kenya and Sri Lanka, and 5.6 and 2.9 for Egypt and South Africa.

The document also calls for increased agricultural research as part of the long-term solution.

Perspective – This document is an annual 10-year outlook. As such, it is not really an in-depth examination of why the prices of many commodities spiked in recent months. Rather, given that, it asks and answers the question of what can we expect for the next ten years. The answer is not a return to the price levels of the last ten years.

References

25 x ’25 National Steering Committee. “Joint Economic Committee Hearing: Biofuel Impact on Food Prices.” May 2008.

Agricultural Food and Policy Center. “The Effects of Ethanol on Texas Food and Feed.” *Texas A&M University.* April 2008.

American Coalition for Ethanol. “The Facts: Ethanol, Corn, and Food.” 2008.

Bureau of Economic Analysis (BEA), U.S. Dept. Of Commerce, U.S. Economic Accounts, BEA, Dept. of Commerce, Website accessed June 2008: http://www.bea.gov/

Carey, J. “Is Ethanol Getting a Bum Rap? Corn-base fuel isn’t the villain critics contend, but shifting to other crops is critical.” *Business Week.* May 2008.

Dornbusch, Rudiger. “Expectations and Exchange Rate Dynamics,” *Journal of Political Economy* 84 (6) December 1976, pp. 1161-1176.

Economic Research Service (ERS), USDA, Agricultural Exchange Rate Data set, ERS, USDA, Washington, DC. Website accessed June 2008: *http://www.ers.usda.gov/Data/ExchangeRates/*

Delgado, C. “Food Policy Implications of Longer-Run Price Rise.” Agriculture and Rural Development Department. *World Bank.* April 2008.

The Economist, “The Silent Tsunami – the food crisis and how to solve it.” April 2008.

Elam, T. “Biofuel Support Policy Costs to the US Economy.” *FarmEcon, LLC.* March 2008.

Faber, S. “Testimony of the Grocery Manufacturers Association before the House Committee on Energy and Commerce.” May 2008.

Fortenberry, R. and H. Park. “The Effect of Ethanol Production on the U.S. National Corn Price.” *University of Wisconsin.* April 2008.

Hanrahan, C.E. “Rising Food Prices and Global Food Needs: The U.S. Response.” *Congressional Research Service*. May 2008.

Henderson, J. “What is Driving Food Price Inflation?” *Federal Reserve Bank of Kansas City.* 2008.

International Food Policy Research Institute. “The World Food Situation – New Driving Forces and Required Actions.” December 2007.

International Monetary Fund. "Impact of High Food and Fuel Prices on Developing Countries – Frequently Asked Questions." April 2008.

International Monetary Fund (IMF), *International Financial Statistics*, IMF, Washington DC, 2008. Website accessed June 2008: *http://www.imfstatistics.org/imf/*

International Monetary Fund (IMF), *World Economic Outlook*, IMF, Washington DC, April, 2007.

International Monetary Fund (IMF), *World Economic Outlook*, IMF, Washington DC, April, 2008.

International Rice Research Institute. "The Rice Crisis: What Needs to be Done?" 2008.

Ivanic, M. and W. Martin. "Implications of Higher Global Food Prices for Poverty in Low-Income Countries." Policy Research Working Paper. *World Bank.* April 2008.

National Corn Growers Association. "U.S. Corn Growers: Producing Food and Fuel."

OECD-FAO. *OECD-FAO Agricultural Outlook 2008-2017*. May 2008.

Rausser, Gordon, James Chalfant, Alan Love and Kostas Stamoulis, "Macroeconomic Linkages, Taxes and Subsidies in the US Agricultural Sector," *American Journal of Agricultural Economics* 68(2) May 1986, pp.399-412.

Rosegrant, M.W. "Biofuels and Grain Prices: Impacts and Policy Responses." Testimony for the U.S. Senate Committee on Homeland Security and Governmental Affairs. *International Food Policy Research Institute.* May 2008.

Runge, F. and B. Senauer. "How Biofuels Could Starve the Poor." *Foreign Affairs.* May-June 2007.

Sachs, J.D. "Surging Food Prices Mean Global Instability." *Scientific American Magazine.* May 2008.

Schnept, R. "High Agricultural Commodity Prices: What Are the Issues?" *Congressional Research Service.* May 2008.

Trostle, R. "Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices." Economic Research Service. *United State Department of Agriculture.* May 2008.

Tyner, Wallace E., Dooley, Frank, Hurt, Chris, and Quear, Justin. "Ethanol Pricing Issues for 2008," *Industrial Fuels and Power*, February 2008, pp.50-57.

Tyner, Wallace E. and Taheripour, Farzad. "Policy Analysis for Integrated Energy and Agricultural Markets in a Partial Equilibrium Framework." Paper presented at the Transition to a Bio-Economy: Integration of Agricultural and Energy Systems conference on February 12-13, 2008, and to be published in a proceedings volume. *www.agecon.purdue.edu/papers*

Urbanchuk, J.M. "The Relative Impact of Corn and Energy Prices in the Grocery Aisle." *LECG, LLC.* June 2007.

Von Braun, J. "Rising Food Prices: What Should Be Done?" *International Food Policy Research Institute.* April 2008.

World Bank. "Rising Food Prices: Policy Options and World Bank Responses." 2008.

Mission Statement

Farm Foundation serves as a catalyst for sound public policy by providing objective information to foster a deeper understanding of issues shaping the future for agriculture, food systems and rural regions.

This publication is intended to stimulate discussion and debate about challenges facing agriculture, the food system and rural regions.

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