UNDERSTANDING THE IMPACT OF HIGHER CORN PRICES ON CONSUMER FOOD PRICES



Photo: NCGA



Photo: USDA

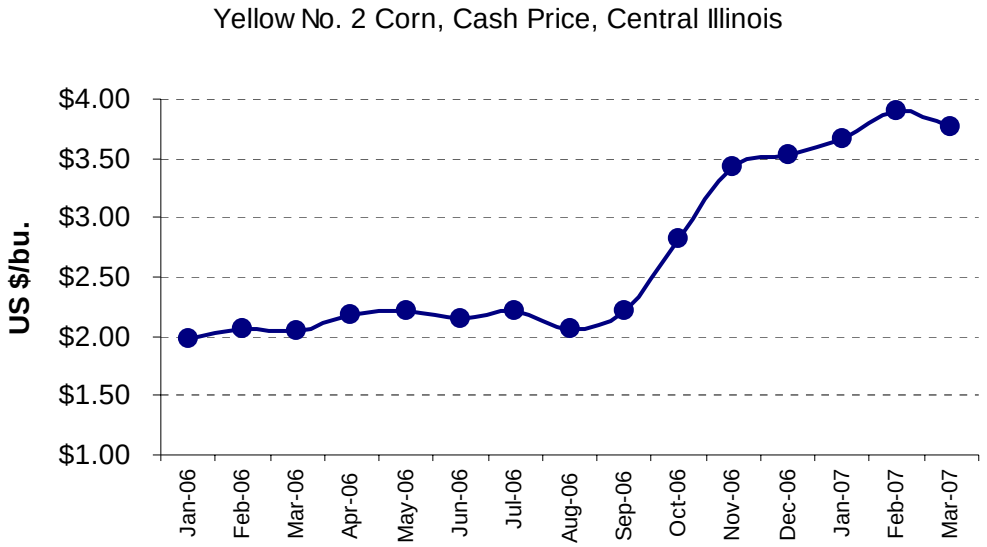
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UNDERSTANDING THE IMPACT OF HIGHER CORN PRICES ON CONSUMER FOOD PRICES

The production of fuel ethanol in the United States has created a remarkable growth market for corn in the last 10 years. In the 2006/07 marketing year, more than 2.1 billion bushels—or 20 percent of the 2006 corn crop—is being used for ethanol production. This amount is nearly twice the amount used for ethanol in 2002/03. Industry estimates suggest the ethanol industry's consumption of corn will double again in the next two years and more than 4 billion bushels of corn will be needed to satisfy ethanol demand as early as 2009.

In response to rapidly escalating demand for ethanol and steady demand from traditional markets, both corn futures and corn cash prices have increased considerably in recent months. The chart below illustrates the increase in cash corn prices in the Central Illinois market.



Source: USDA, AMS

Corn is the primary feed used to produce protein, dairy and egg products in the United States. Additionally, corn and processed corn products are key ingredients in hundreds of other grocery items. Recent corn price increases have caused much speculation that retail grocery prices will dramatically increase. Numerous media reports have fueled this speculation by publishing sensational headlines such as "Food vs. Fuel"[1] and "Let Them Eat Ethanol."[2]

In an effort to assess the true effects of higher corn prices, the National Corn Growers Association (NCGA) commissioned the consulting firm Advanced Economic Solutions (AES) to conduct an analysis on the impact of increased corn prices on retail food prices. NCGA also analyzed information on this issue from a number of other sources, such as the U.S. Department of Agriculture (USDA) and Bureau of Labor Statistics (BLS). This paper summarizes key results of the AES study and offers additional analysis based on information from a variety of other sources. Direct citations from the AES study are offset in italic print.

[1] BusinessWeek online, Feb. 5, 2007. www.businessweek.com/magazine/content/07_06/
[2] Rocky Mountain News, March 7, 2007. http://www.rockymountainnews.com/drmn/opinion_columnists/

SUMMARY COMMENTS

- If current corn prices prove to be temporary and prices recede to the $2.75-3.00 per bushel level, there would be little or no impact on consumer food prices. This could be a very real scenario with a significant increase in 2007 corn acres planted, normal weather, and trend or above-trend yields. If prices receded and were sustained in the $3.00-3.50 per bushel level, slight price increases to certain consumer food items might occur, but would likely be unnoticeable to the consumer.

- If corn prices are sustained in the $3.50-4.00 per bushel range, consumers could experience a minor increase in retail prices for some grocery items, though the impact would likely be trivial. In its "Agricultural Projections to 2016" report released in February 2007, the U.S. Department of Agriculture states, "On average over the next 10 years, retail food prices are projected to increase less than the general inflation rate, although food price increases are somewhat larger than general inflation in some years."

- USDA projects food inflation to increase just 1.9 percent in 2007 over 2006, 2.8 percent in 2008, and 2.9 percent in 2009. This compares to year-on-year food price increases of 2.4 percent in both 2005 and 2006, and an average of 2.9 percent in the past 25 years. USDA says, "Consumer prices for red meats, poultry, and eggs exceed the general inflation rate in 2008-10 as the livestock sector adjusts to higher feed costs due to the expansion in corn-based ethanol production. As a result, overall retail food prices rise faster than the general inflation rate in those years.

- USDA's projections show average farm prices for corn peaking at $3.75 per bushel in 2009/10, then incrementally receding to $3.30 per bushel by 2016/17.

- If corn prices are sustained in the $3.50-4.00 per bushel range, prices for cereal and bakery items—such as corn flakes and corn chips—are likely to cost an average of 1 percent more annually between 2007-2009 than they would have without the corn price increase, according to the AES study. This is because the cost of food inputs represents just 4 percent of the retail price for these items. The AES analysis projects similarly inconsequential inflation for fats and oils and sweeteners.

- If corn prices are sustained in the $3.50-4.00 per bushel range, grocery items that are more sensitive to the cost of corn as an input—such as meat, dairy, and eggs—would see the greatest increases, but even those gains would be relatively minor. The following examples from the AES study show projected prices for several common items if corn prices stay in the $3.50 per bushel range:

    - If pork chops would have cost the consumer $3.66 in 2009 without the increase in corn prices, the retail price might now be $4.06 if corn prices stay in the $3.50 per bushel range.

    - If a gallon of milk would have been priced at $3.36 per gallon in 2009 in the absence of higher corn prices, it might now sell for $3.88 per gallon if corn prices stay at $3.50 per bushel.

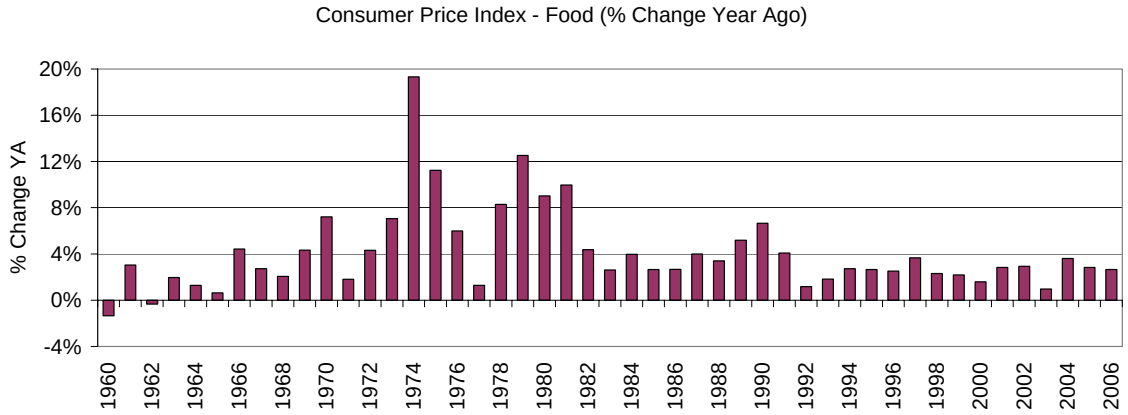
    - Large eggs that would have cost $1.17 in 2009 without an increase in corn prices might now cost $1.41 if corn prices remain at $3.50 per bushel.

BACKGROUND ON U.S. FOOD INFLATION

Both corn prices and food inflation have been largely static for the past 25 years. Corn prices have averaged just $2.40 per bushel since 1982 and food prices have increased at a rate slightly lower than the overall rate of inflation. According to the AES study:

Food inflation, as defined as the Commerce Department's "Consumer Price Index-Food" (CPI-Food) has been relatively benign since the early 1980s. During 1982-2006, the CPI-Food average annual rate of increase was 2.9%, virtually identical to the overall CPI (3.1%). Furthermore, the CPI-Food was above 5.0% in only two of the past 25 years (1989-90). ***Food inflation, similar to overall inflation rates, has clearly been benign for a majority of the past two decades, and has largely been an afterthought in the minds of consumers, food manufacturers, restaurants, as well as policy makers.***

This was not always the case, as the graphic below indicates. Food inflation during 1972-81 increased at an average annual rate of 8.9%. This includes a gain of 19% during 1974. Note that during this same period, the overall rate of consumer inflation (for all items, including food) was 8.6%, with the total CPI rising at a 12% rate during 1974.



Over the past 25 years (1982-2006), commodity prices have fluctuated for fundamental reasons (weather, government policy, demand), but have been stable in an overall sense. Crude oil prices (nominal) have gravitated to a $22-26 range over time, with other energy products following the lead of crude oil. At the same time, corn prices have tended to revert back to an average price of $2.40. ***Thus while food inflation has averaged 2.9% over the past 25 years, none of the inflation has been the result of rising commodity prices.***

Several factors contributed to higher rates of food inflation during the 1970s, including surging wage rates (rising at an average annual rate of 7.4%) and high interest rates (with the prime interest rate peaking at 21.5% in January 1981). However, the rise in the price of food inputs (led by corn) was a primary driver of the higher food inflation rates during the 1970s. Consumer food inflation averaged 8.9% during 1972-81, versus an average annual gain of 2.9% during 1982-2006. By comparison, the Commodity Research Bureau of Foodstuff prices, reflective of the price of food inputs, rose at an annual average rate of 7.9% during 1972-81, versus average annual gain of 0.8% during 1982-2006.

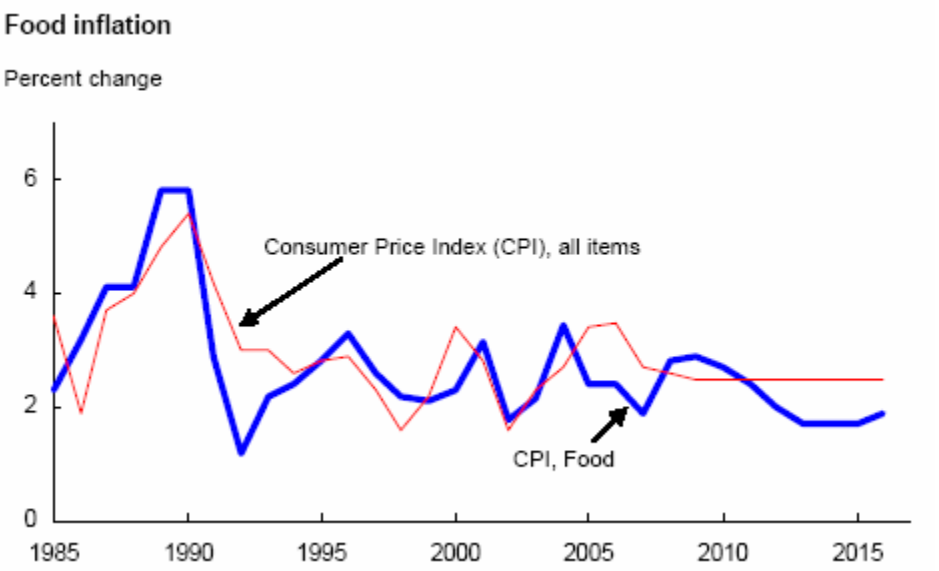
A key contributor to the higher rate of inflation was higher prices for corn and other food inputs. Between 1972 and 1981, corn prices (farm price) have averaged $2.42, more than double the average of the previous ten years ($1.15). Since 1982, corn prices have averaged $2.40. A similar rate of gain has been seen in the price of other food inputs.

Though there are similarities between the corn price increases seen in early 1970s and the increases experienced in recent months, the AES study points out key differences between that period and the current situation. According to the report:

> *There are two key contrasts between the current environment and the 1970s, and these are potential mitigating factors:*
>
> - *Overall inflation rates are benign – Inflation (CPI for all items) was accelerating during the late 60s (to 5-6%), and exceeded 10% four times between 1974 and 1981.* ***This contrasts to the current environment, where overall inflation remains under 3% and does not appear to be accelerating.***
>
> - *The world is "flatter" – There has been a dramatic increase in the global flow of human capital, information as well as goods and services over the past 30 years.* ***A supply response to a rise in U.S. corn prices will occur today in many more areas of the world than in the 1970s – including the former Soviet bloc of countries and southeast countries such as Vietnam.*** *If this truly becomes a mitigating factor, we should expect to see a significant decline in U.S. corn exports in the coming years.*

Additionally, corn production is expected to increase significantly in 2007 in other major corn-producing regions, such as China, Argentina, Brazil, Mexico and the European Union. The effect of increased production in these regions would be to moderate world corn prices.

USDA's projections for the consumer price index and food inflation for 2007 to 2016 are illustrated in the chart below. USDA shows food inflation increasing marginally above the general rate of inflation in 2008-2010, but receding in subsequent years.



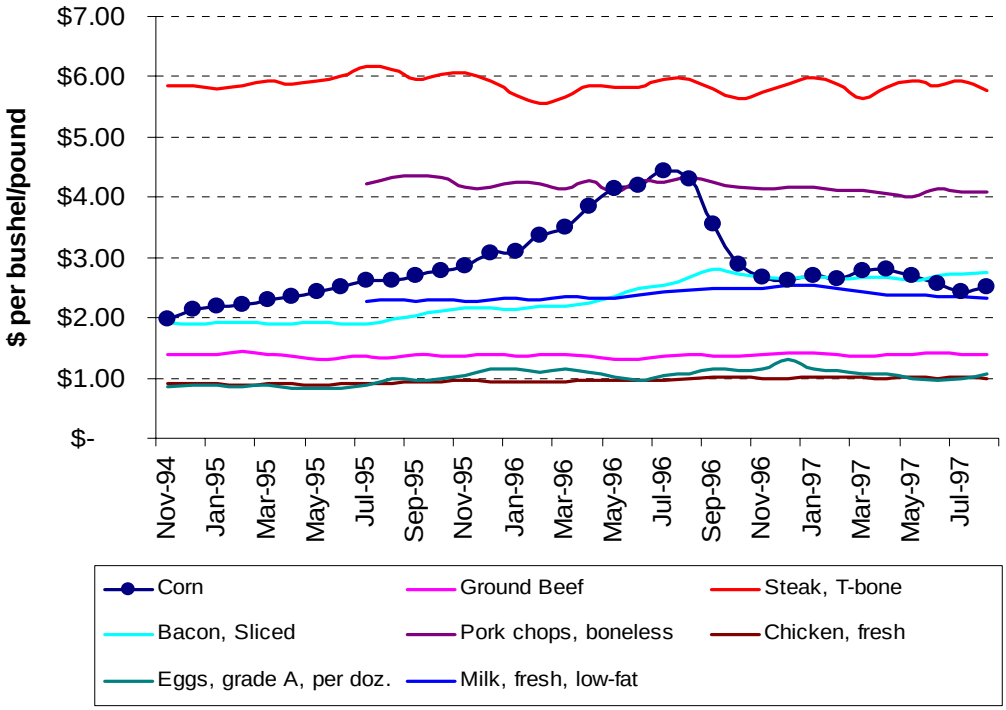
Source: USDA Agriculture Projections to 2016 (February 2007)

WHAT IS THE IMPACT ON FOOD PRICES IF HIGHER CORN PRICES ARE TEMPORARY?

While the AES study is predicated on the assumption that corn prices will remain in the $3.50-4.00 per bushel range for a sustained period, the analysis also examines a scenario in which corn prices revert to historical levels. Under this scenario, the spike in corn prices has virtually no impact on retail food prices, as temporary food input cost increases are absorbed by "middle men."

If the current increase in corn prices proves to be transitory, it seems logical that the reaction of food prices would be similar to the 1995/96 marketing year when corn prices surged to record levels because of drought. Despite the spike in corn prices in 1995/96, retail prices for common food items did not deviate from normal, and food inflation did not increase abnormally. The chart below shows the steady ascent of corn prices from $2 per bushel in November 1994 to more than $4 per bushel in the summer of 1996. Retail prices for major protein, dairy and egg products—used here as examples of items that are more sensitive to corn prices—remained flat during and after the surge in corn prices.

Cash Corn and Retail Food Prices, 11/94 to 8/97



SOURCE: USDA, ERS & BLS

The AES study suggests short-term food input cost increases have negligible effects on retail food prices, which is demonstrated well by the chart above and a look at the benign CPI-Food inflation rates from 1996 and 1997. The AES study states:

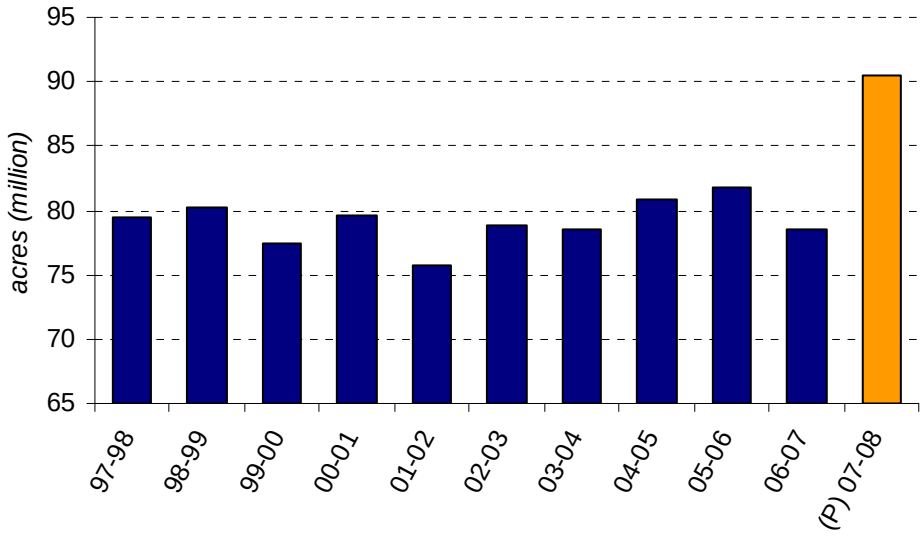
> *The willingness of the "middle-man" to absorb short-term price increases reflects the competitive nature of the U.S. food industry. The initial processors, manufacturers, distributors and retailers of food each have a strong incentive to maintain market share. For most of the past 20 years, they viewed the decision to absorb cost increases as a trade-off of losing a bit of margin today but maintaining their customer base over the long-haul.* ***As a result, consumers have been insulated from most of the short-term inflationary shocks, as reflected in the relatively benign consumer price index for food.***

The short-lived market drivers of higher input prices would include seasonal factors (such as holiday demand), unexpected export demand, weather-related crop shortages in a single year, or a livestock cycle. ***With the expectation that a "high-priced" input would decline at some point, participants in the U.S. food industry have historically gone out of their way to avoid presenting the consumer with "sticker shock."***

Another key difference between the period of food inflation in the 1970s and today is the fact that more consumers get their groceries from super-center or warehouse-style stores. In an effort to offer their customers the lowest prices, these "big box" retailers put competitive pressure on vendors to offer wholesale grocery items at the lowest possible prices. Additionally, there are more food retailers in the marketplace today, increasing the level of competition.

Lending credence to the theory that current corn prices may recede is the fact that U.S. farmers have historically reacted to high crop prices and strong demand signals by increasing production. According to USDA's Prospective Plantings report released March 30, farmers are expected to plant 90.45 million acres to corn in 2007, a 15 percent increase over 2006 and the highest level since 1944.

CORN, PLANTED ACRES



Based on this acreage estimate, achievement of trend yield per acre would result in production of a record corn crop, an increase in corn ending stocks, and a corresponding decrease in corn prices. According to its Long-Term Projections released in February 2007, USDA anticipates total demand for corn to be 12.35 billion bushels in 2007/08. A trend yield of 152 bushels per acre on 90.5 million acres (83.5 million harvested) would result in a crop of 12.69 billion bushels. With 2007/08 carry-in of 750 million bushels, total supply would be 13.44 billion bushels. This means that after all demands were satisfied, ending stocks would be more than 1 billion bushels.

WHAT IF CORN PRICES ARE SUSTAINED AT $3.50-4.00 PER BUSHEL?

Prospects for a steady increase in corn demand have led some economists to suggest corn prices may be maintained at the $3.50-4.00 per bushel level for the next several years. The AES study commissioned by NCGA sought to determine the potential impact on the CPI-Food if corn prices remain at these levels. According to the study (which based these findings on an assumption of $3.50-4.00 corn):

> *According to USDA analysis, input costs on average are 19% of the cost of the price paid by consumers, but this varies widely depending upon the item. Livestock prices are on average equal to about 50% of the finished retail price, while cereal and bakery items are equal to an estimated 4% of the price paid by consumers. The relationship between input costs and final consumer price is a critical component of the estimation of inflation impacts from higher corn prices.*
>
> *The USDA estimates of food input costs as a percentage of retail prices are incorporated into this study, and are as follows:*
>
> - ***Cereal and bakery items**: input costs represent 4% of the price paid by consumers*
> - ***Beef**: input costs represent 48% of the price paid by consumers*
> - ***Pork**: input costs represent 27% of the price paid by consumers*
> - ***Chicken (fryers)**: input costs represent 50% of the price paid by consumers*
> - ***Dairy products**: input costs represent 38% of the price paid by consumers*
> - ***Fats and oils**: input costs represent 15% of the price paid by consumers*
> - *All other (including fruits and vegetables) were assumed to not be impacted by a sustained increase in the price of corn*

The study suggests the greatest inflation for consumers would be in meat, poultry, fish and eggs. Inflation for these items from 2007 to 2009 could, on average, be 4 to 11 percent higher annually than without the rise in corn prices. It is important to note that beef, veal, pork, and poultry combined constitute 10.3 percent of the average American consumer's spending on food items, according to BLS.

Consumer prices for dairy products (milk, cheese, butter) over the next three years could be an average of 4.3 to 8.3 percent higher annually than without the rise in corn prices. Dairy products account for 6.1 percent of the average American consumer's spending on food items, according to BLS.

The study says more limited incremental food inflation over the next three years is forecast for fats and oils (+2.3 to 3.3 percent annually), cereal/bakery items (+0.67 to 1 percent annually), and sweeteners (+0.33 to 0.67 percent annually). This reflects the smaller portion of their value represented by the food inputs. According to the analysis, little or no impact on food inflation is forecast for fruits, vegetables as a result of higher corn prices.

Another key assumption made in the AES study is that margin compression for food processors and meat producers will occur, but ultimately all of the increase in corn prices (because it is expected to be sustained) will be passed on to consumers. Thus, the AES analysis assumes the worst case; if some level of margin compression is sustained for a longer period, less of the price increase would be passed on to consumers.

It is important to note that USDA's Agriculture Projections to 2016 predict significantly lower annual food inflation rates than the AES study, even if corn prices are sustained in the $3.40-$3.75 per bushel range.

HOW ARE INPUT COSTS REFLECTED IN RETAIL FOOD PRICES?

USDA estimates that the cost of food inputs accounts for just 19 cents of every consumer dollar spent at the retail level. Accordingly, any increases in food input costs—such as rising prices for corn, other grains and oilseeds—is not likely to translate to significant increases at the retail level. According to the AES study:

While the cost of inputs is significant, a majority of the cost a consumer pays for food items is for other aspects of producing and delivering a food to the consumer. The USDA estimates that in 2003 on average, the cost of the food inputs (or as the USDA describes it, the "farm value") represents only 19 cents of every dollar spent. The largest share of the cost is in labor (38 cents of every dollar), followed by packaging (8 cents); the remainder is divided among 10 other categories. This is consistent with anecdotal evidence that 25%-30% of the typical restaurant check goes toward the cost of food and packaging.



Source: USDA's Economic Research Service.

Over time, the cost of inputs relative to total expenditures has declined sharply, from 33% in 1970 to 19% in 2003. While per capita consumer expenditures on food have risen at an annual rate of 5.1% since 1970, only 20% of the increase over the past 35 years has been for inputs costs. Three factors, the drive toward convenience, speed of delivery and away from home dining, have each contributed to this decline. Because the cost of food inputs now represents a smaller share of the final cost (19% vs. 33% in the 1970s), a sustained rise in food inputs costs would be expected to have a less pronounced impact on food inflation at the consumer level.

The USDA estimates that the food inputs represent 19% of the overall share of consumer outlays on food, but the share of dollars spent on input costs (farm value) varies widely. Items with limited "value added" (such as livestock and dairy items) will see a much greater impact from higher corn prices, while items with more "value added" (such as bread or cereal) is expected to have a more limited impact from higher food input costs.

HOW MUCH CORN IS ACTUALLY REPRESENTED IN MEAT PRODUCTS?

Corn is the primary source of carbohydrate energy for livestock and poultry in the United States. As such, higher corn prices are expected to have some impact on the cost of meat production. Meat producers consistently cite feed grains as the most important inputs in meat production. To gain a better understanding of how much corn is actually represented in meat products, it is interesting to examine the amount of corn required to produce one pound of each respective type of meat (this is commonly referred to as the "feed-to-weight" ratio).

- There are 56 pounds of corn in a bushel. When corn is $3.50 per bushel, a pound of corn is worth 6.3 cents. At $4.00 per bushel, a pound of corn is worth 7.1 cents.

- According to the Beef Checkoff, it takes 2.6 pounds of corn to produce one pound of beef, live weight (includes bone, fat, etc.). This equates to 18.6 cents worth of corn when corn is $4.00 per bushel.

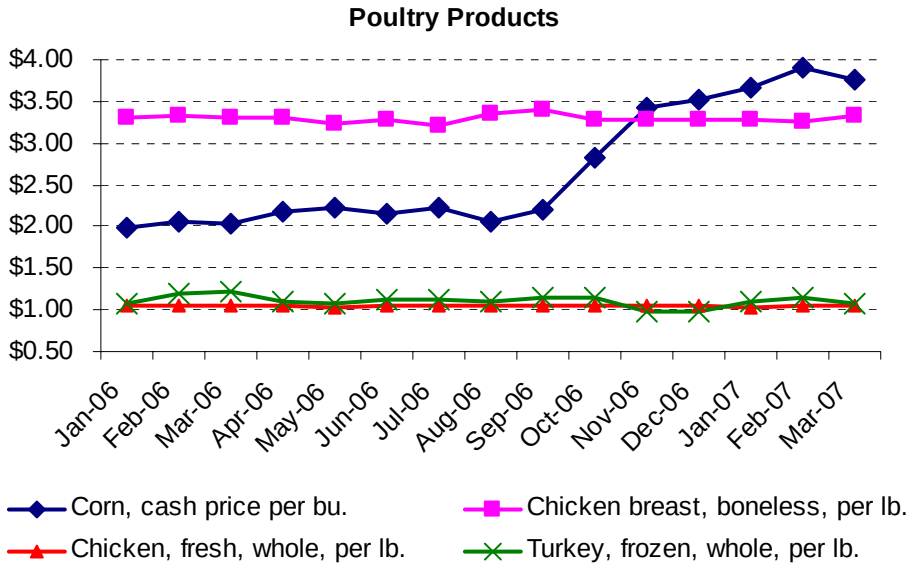
- The National Pork Board says it takes 3.6 pounds of corn to produce one pound of pork, live weight. This equates to 25.7 cents worth of corn when corn is $4.00 per bushel.

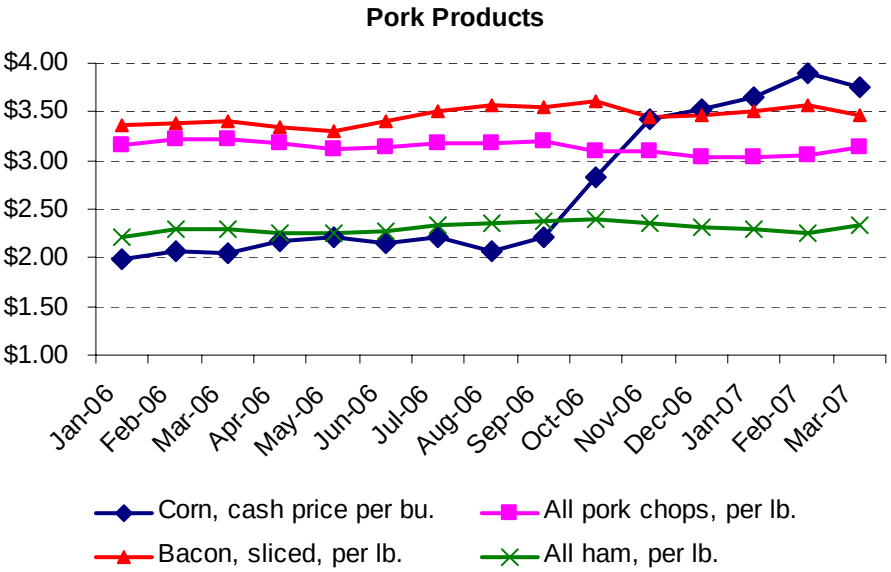
- It takes 2.0 pounds of corn to produce one pound of chicken, live weight, according to the National Chicken Council. This equates to 14.3 cents worth of corn when corn is $4.00 per bushel.

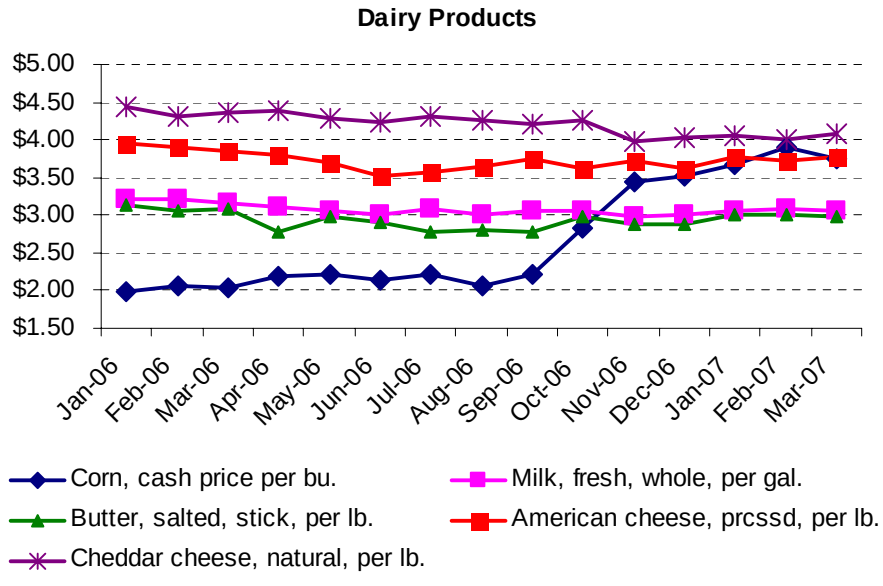


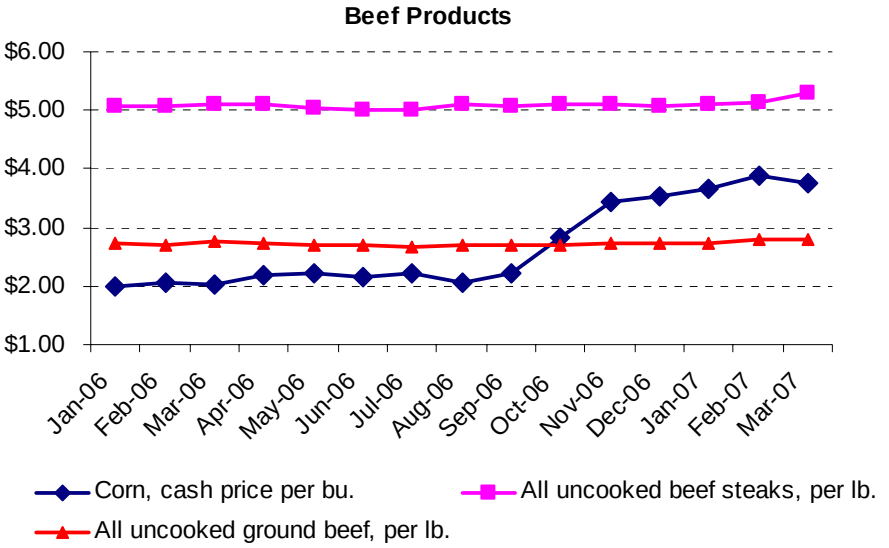
WHAT IMPACTS HAVE HIGHER CORN PRICES HAD SO FAR?

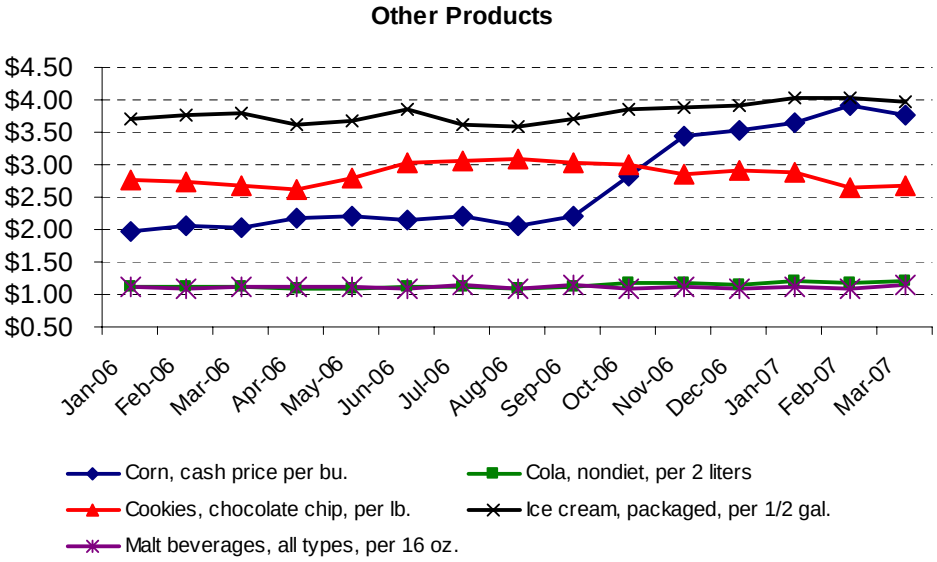
Numerous media reports and some economists have suggested higher corn prices have already caused consumer food prices to rise. In a February 27, 2007, Associated Press article, an Iowa State University economist said, "We've seen a little of the retail food price impact already…" But according to retail food price data from the Bureau of Labor Statistics, **consumer prices for a number of common meat, dairy, and other products have not risen since January 2006**. **Prices for some items have actually declined in this time.** During this same period, cash corn prices have increased 97 percent. The charts below show retail prices for a number of common grocery items that include corn or corn products (such as high fructose corn syrup) as an input. Retail prices for these items are compared to cash corn prices during the period of January 2006 through March 2007. All BLS prices are based on U.S. city averages.







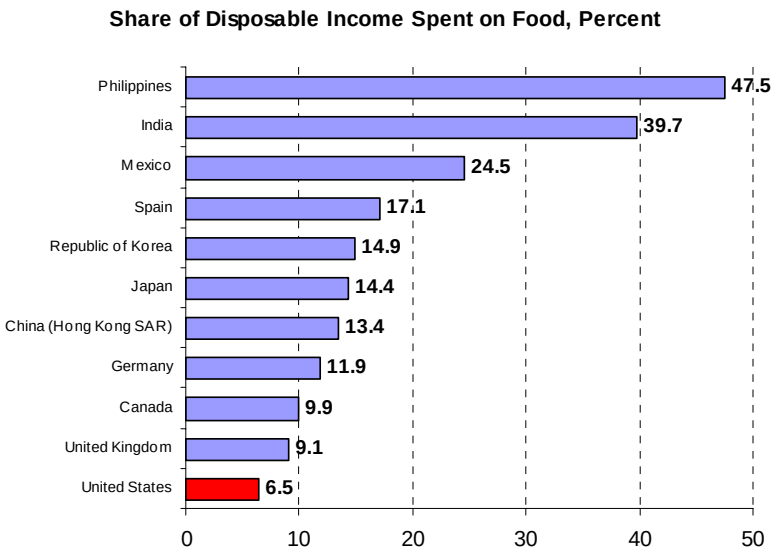




Sources for all charts: USDA, AMS & BLS

PUTTING THE ISSUE INTO PERSPECTIVE

Today, Americans spend less of their disposable income on food than ever before. According to USDA survey data, the typical U.S. household spends just 6.5 percent of its income on food (excluding beverages). This figure is down from approximately 20 percent in the early 1950s and 13 to 15 percent in the mid-1970s. Other developed countries generally spend 10 to 15 percent of their income on food, while most of the poorest countries in the world spend more than 20 percent of their disposable income on food. Accordingly, if marginal increases in food prices do materialize during the next several years, the impact on total household spending is likely to be negligible.



Source: Meade, USDA-ERS

For the sake of comparison, consider the cost inflation of other consumer goods and services—such as health care, energy, education and housing—in the last 25 years. While food prices have increased at a rate slightly lower than the overall rate of inflation, many other goods and services have increased dramatically. According to the Henry J. Kaiser Family Foundation, health care costs have increased seven-fold since 1980. Four-year college tuition and fees have increased 32 percent just since 2001, according to the College Board. Energy prices have surged to record highs in the last five years, driven by unprecedented crude oil, natural gas and gasoline prices. Because American consumers have not experienced noticeable food inflation since the 1970s, we have come to expect our food to be inexpensive, abundant and safe.

U.S. farmers have long served as the most efficient producers of food in the world. Today, the American farmer is also embracing his role as a producer of energy. Increased consumption of corn by the renewable fuels sector is believed to be the principal cause of the recent increase in corn prices. In 2006, the industry produced 4.9 billion gallons of ethanol. Production is expected to top 10 billion gallons in the next two years. Ethanol is likely to constitute 10 percent of the nation's gasoline supply within the next five years and many predict a steady growth curve for the next several decades.

Domestically produced renewable fuels are helping to extend tight fuel supplies and a number of studies have shown ethanol's ability to reduce gasoline prices. Every gallon of ethanol blended into the U.S. fuel supply is one less gallon needed of gasoline or petrochemical additives derived from foreign oil. Aren't the goals of enhanced energy security and the development of a robust domestic renewable fuels industry worth the potential of spending a few extra pennies on the dollar at the grocery store?

For more information, contact:
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NCGA
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