

Factors that Determine the Cost of Food

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Issue Statement

Iowa has moved to the forefront amid the shift to biorenewable sources of energy. The state is currently the leading producer of ethanol and one of the top producers in wind energy. As Iowa's leaders, entrepreneurs, policy makers and researchers look to accelerate development of the state's biorenewable resources, other impacts emerge. Today we are making choices about our economic, environmental, and social development as well as hurdling technical issues. The recent increase in the utilization of the state's biological bounty for feed, food, and fuel has affected the economic, environmental, and social dynamics of Iowa.

Lofty goals have been set for our future. Now, with a deep breath, we need to:

- Gather information on the various ways Iowa is participating in the emerging bioeconomy.
- Understand Iowa's role in the global agricultural market.
- Engage in a discussion about the opportunities and challenges to reaching our goals in the bioeconomy.
- Establish educational, research, and policy directives to guide our progress.

This paper is one of a series that sets out to continue that process.

Global fuel, commodity, and food prices have increased substantially, particularly in the past two years. Media outlets have keyed on the food price increases as a negative and deflected blame onto growth in the biofuels industry. But there are a number of factors contributing to food cost increases. The U.S. food marketing system is a complex system linking farms to food consumers through a number of different entities.

Most food products in the U.S. pass through layers of food manufacturing, distribution, wholesale, and retail companies. Each layer within the food marketing system has its own associated costs of doing business. Food prices reflect the sum of these costs. To form a basis for comparison on food cost impacts, economists often look at what is referred to as the food dollar, a breakdown of the average costs embedded in an average dollar spent on food. This paper will outline the factors that make up the food dollar and examine how those factors have changed over the past few years and have impacted food costs in the U.S.

Current Situation

The U.S. food marketing system is made of five distinct sectors: agricultural production, food processing and manufacturing, wholesale distribution, retail distribution, and consumption. The middle three sectors link the farm to the food consumer and transform the basic agricultural commodities produced on the farm into the food products demanded by consumers. Based on U.S. Department of Agriculture (USDA) definitions, there are over 2 million farms across the United States. Production from these farms is purchased and processed by over 25,000 food and beverage companies. These companies, in turn, sell their production to nearly 33,000 food wholesalers, 113,000 food retailers, and 378,000 foodservice companies. The food products are

then sold and distributed to over 111 million households throughout the U.S. In 2001, government estimates showed that 23.7 million people were employed in the food marketing system, with the largest number employed in food service, and that the food marketing system made up over 12 percent of the nation’s gross domestic product. These numbers indicate the vast contribution that the food marketing system makes to the overall U.S. economy in employment and value.

The cost of food is based on the costs at each stage in the marketing system. One way to compare the various costs that make up food prices is to examine the food dollar, a breakdown of what a dollar spent on food actually pays for. The U.S. Department of Agriculture (USDA) tracks the costs in food. Figure 1 shows the latest food dollar estimate, based on 2006 data. The food dollar incorporates both food consumed at home and food consumed away from home (at restaurants, cafes, etc.) and divides costs into several major categories. On average, 19 cents of each dollar spent on food is used to purchase farm production. The other 81 cents covers the transformation of the farm production into the food products we purchase at grocery stores and restaurants. Labor costs are the largest component of the food dollar, making up nearly 39 cents. This is not surprising given the number of people employed in the food marketing system. Food packaging comprises 8 cents of the food dollar. USDA has computed that nearly half of all packaging materials in the U.S. are used by food processing and distribution companies. Transportation and energy account for 7.5 cents. Advertising and depreciation account for 7.5 cents. Rent, interest, repairs, business taxes, and other costs account for 15.5 cents.

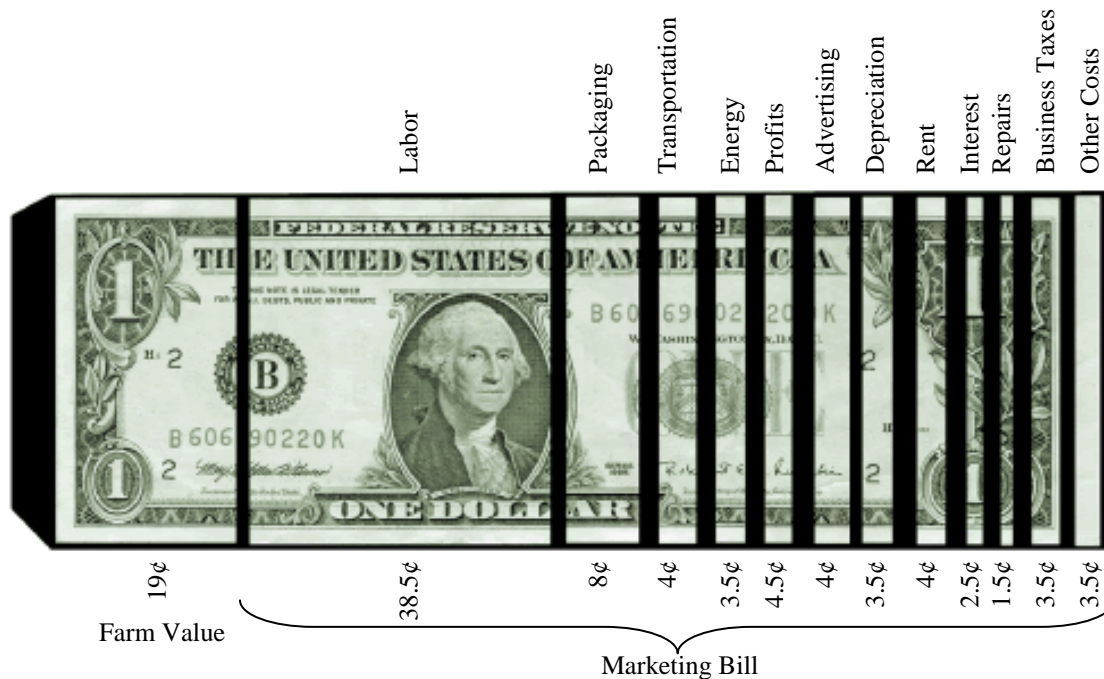


Figure 1. Components of the Food Dollar in 2006. *Source: USDA-Economic Research Service*

A Historical Perspective on the Food Dollar

The composition of the food dollar has changed dramatically over the last half-century. Figure 2 shows how the farm value in the food dollar has moved since 1950. In the early 1950s, over 40

percent of the food dollar was used to purchase agricultural products off the farm, in part because there was less processing, packaging, and preparation before the food reached the consumer. Since then, the farm value in the food dollar has declined to below 20 percent. Much of this change was driven by changes in U.S. eating patterns. In the 1950s roughly one-quarter of all food was purchased and consumed away from home (restaurants, cafes, etc.). That has risen to nearly 50 percent today. Food purchased and consumed away from home often carries a higher price due to increased preparation and packaging. This also implies that away-from-home foods have a lower farm value percentage in the food dollar.

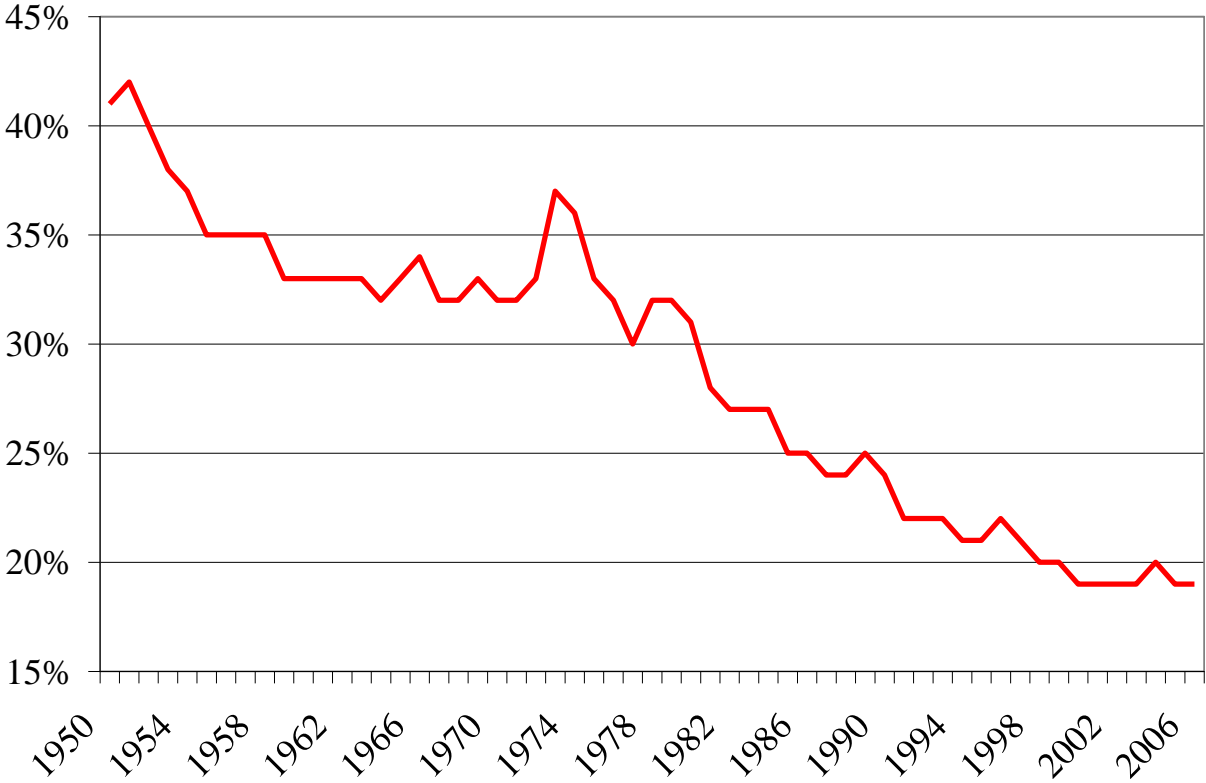


Figure 2. Farm Value Share of the Food Dollar. *Source: USDA-Economic Research Service*

Examining the Food Dollar for Individual Foods

The food dollar is also not constant across food products. Over the years, USDA has tracked the farm share in individual food items. Table 1 contains the 1998-2000 farm shares for various food products (this is the latest available from USDA for individual food items). As the table shows, the farm value varies sizably across foods. For dairy products, the typical farm value is between 30 and 40 percent. For fruits and vegetables, the farm value can range from below 10 percent to nearly 40 percent. For prepared foods, the range of farm values runs from less than 5 percent for bread and corn flakes to 25 percent for peanut butter. The farm values for meat products are approximately the same as for dairy products. Averaging over the 1998 to 2000 time period, farm values for pork were around 30 percent, while farm values for beef were nearly 50 percent. For 2006, USDA has released some farm value shares for food groups. The farm value share for cereals and bakery products is 6 percent; for fats and oils, it's 16 percent; and for

dairy products, it's 27 percent. The farm value shares for fruits and vegetables are 16 percent for processing fruits and vegetables, 25 percent for fresh vegetables, and 30 percent for fresh fruits.

Table 1. Farm Share for Individual Foods

| Food | Farm share of retail price ¹ | | |
|---------------------------------------|---|------|------|
| | 1998 | 1999 | 2000 |
| | (Percent) | | |
| Dairy products: | | | |
| Milk, ½ gal. | 41 | 39 | 34 |
| Cheese, natural cheddar, 1 lb. | 39 | 32 | 29 |
| Fruit and vegetables: | | | |
| Frozen— | | | |
| Orange juice conc., 12 fl. oz. | 38 | 37 | 33 |
| Broccoli, cut, 1 lb. | 11 | 10 | 12 |
| Corn, 1 lb. | 8 | 8 | 7 |
| Canned and bottled— | | | |
| Corn, 303 can (17 oz.) | 23 | 22 | 22 |
| Applesauce, 25-oz. jar | 14 | 14 | 16 |
| Apple juice, 64-oz. bottle | 32 | 19 | 18 |
| Green beans, cut, 303 can | 14 | 13 | 13 |
| Tomatoes, whole, 303 can | 7 | 7 | 7 |
| Dried— | | | |
| Beans, 1 lb. | 20 | 20 | 19 |
| Raisins, 15-oz. box | 29 | 36 | 16 |
| Crop products: | | | |
| Sugar, 1 lb. | 32 | 31 | 27 |
| Flour, wheat, 5 lbs. | 20 | 18 | 19 |
| Margarine, 1 lb. | 26 | 17 | 15 |
| Rice, long grain, 1 lb. | 22 | 19 | 14 |
| Prepared foods: | | | |
| Peanut butter, 1 lb. | 26 | 23 | 22 |
| Pork and beans, 303 can (16 oz.) | 11 | 11 | 11 |
| Potato chips, regular, 1-lb. bag | 8 | 9 | 8 |
| Chicken dinner, fried, frozen, 11 oz. | 13 | 13 | 14 |
| Potatoes, french fried, frozen, 1 lb. | 11 | 11 | 10 |
| Bread, 1 lb. | 5 | 5 | 5 |
| Corn flakes, 18-oz. box | 4 | 4 | 4 |
| Oatmeal regular, 42-oz. box | 6 | 5 | 5 |
| Corn syrup, 16-oz. bottle | 3 | 3 | 3 |

¹Computed from unrounded farm values.

Source: Calculated by ERS based on data from government and private sources.

Discussion

As the above discussion highlights, the food dollar continues to evolve with our eating patterns and changes in food technology. The general linkage between farm and food prices has declined dramatically over the last half-century. Farm values in food prices tend to be the highest for meat and dairy products or for food products with minimal processing. Processing, packaging, transportation, and advertising costs for our foods now make up a substantial portion of the food dollar. And these costs will continue to grow in importance as we continue to shift to consuming more foods away from home or more highly processed or prepared foods at home.

Over the past few years, fuel, food, and commodity prices have risen and U.S. consumers have felt the impacts on the family budget. Typically, food prices increase by 2.5 percent per year. Table 2 displays the percent changes in consumer price indexes for food from 2005 to 2009. And while the U.S. experienced typical food price inflation in 2005 and 2006, the rate of food price increases has picked up in 2007 and is projected to remain higher than normal for 2008 and 2009. Higher commodity prices for corn, soybeans, and wheat, driven by crop demands for feed, food, and fuel, have contributed to this increase. Corn and soybean prices have more than doubled since September 2006, but food prices have on average increased by 4 percent during 2007. While food prices do react to commodity prices, as the farm value data shows, the reaction is fairly small. On average, 80 percent of food prices are covering costs beyond the farm gate. Energy and labor costs make up the largest portions of these additional costs. Crude oil prices were between \$55 and \$60 per barrel at the beginning of 2007 and they are well over \$100 per barrel today, after peaking above \$145 per barrel earlier this year. As crude oil enters the food marketing system in several ways (diesel fuel to power the tractors on the farm and semis across the country, plastic to package foods), its price increases also impact food costs.

As the table shows, food costs are expected to increase by 4 to 5.5 percent both this year and next. The price increases range across all types of foods. For 2008, eggs, fats and oils, and bakery products will likely see the highest increases. For 2009, meat and dairy product prices are projected to increase the most. Some of the price support for the meat and dairy sectors is coming from stronger export demand for pork and dairy. While biofuel production can be pointed to as a possible reason in some categories (meats, dairy, bakery), it has minimal impact on others (fruits and vegetables). The prevalence of crude oil in the food marketing system implies that higher energy costs are also a driving factor in the projected food price increases.

Summary

U.S. consumers have been facing higher fuel, commodity, and food prices over the past couple of years. The growth of the biofuels industry has coincided with these challenging cost trends making it easy for pundits and analysts to argue cause and effect. The biofuels industry is a significant new end user of commodities which certainly has an effect on supply and demand relationships, but there are a number of other factors that have influenced food prices as well. The increase in crude oil prices not only pushes food prices higher, but also has provided incentives for the biofuel expansion. To understand all of the various forces that affect food prices, we must examine the U.S. food marketing system and explore the numerous costs that must be covered by our food dollars.

Values at the farm level make up less than 20 percent of food costs. This means that 80 percent of the cost of food is due to events beyond the farm gate. And while biofuel production has been one of the major reasons for higher commodity prices, it has little impact on food costs beyond the farm. Higher energy prices and general economic conditions also have impacts on food costs at and beyond the farm.

Table 2. Changes in Food Price Indexes, 2005-2009

| Consumer price indexes | Relative importance ¹ | Final 2005 | Final 2006 | Final 2007 | Forecast 2008 ² | Forecast 2009 ² |
|---------------------------|----------------------------------|------------------|------------|------------|----------------------------|----------------------------|
| | (Percent) | (Percent change) | | | | |
| All food | 100.0 | 2.4 | 2.4 | 4.0 | 5.0 to 6.0 | 4.0 to 5.0 |
| Food away from home | 44.6 | 3.1 | 3.1 | 3.6 | 3.5 to 4.5 | 4.0 to 5.0 |
| Food at home | 55.4 | 1.9 | 1.7 | 4.2 | 5.5 to 6.5 | 4.0 to 5.0 |
| Meats, poultry, and fish | 12.2 | 2.4 | 0.8 | 3.8 | 2.5 to 3.5 | 5.0 to 6.0 |
| Meats | 7.9 | 2.3 | 0.7 | 3.3 | 1.5 to 2.5 | 5.5 to 6.5 |
| Beef and Veal | 3.8 | 2.6 | 0.8 | 4.4 | 2.5 to 3.5 | 6.0 to 7.0 |
| Pork | 2.4 | 2.0 | -0.2 | 2.0 | 1.5 to 2.5 | 5.0 to 6.0 |
| Other meats | 1.7 | 2.4 | 1.8 | 2.3 | 0.0 to 1.0 | 2.5 to 3.5 |
| Poultry | 2.3 | 2.0 | -1.8 | 5.2 | 3.5 to 4.5 | 5.0 to 6.0 |
| Fish and seafood | 2.0 | 3.0 | 4.7 | 4.6 | 4.5 to 5.5 | 4.0 to 5.0 |
| Eggs | 0.9 | -13.7 | 4.9 | 29.2 | 13.5 to 14.5 | 2.5 to 3.5 |
| Dairy products | 6.4 | 1.2 | -0.6 | 7.4 | 8.0 to 9.0 | 4.0 to 5.0 |
| Fats and oils | 1.5 | -0.1 | 0.2 | 2.9 | 13.0 to 14.0 | 3.0 to 4.0 |
| Fruits and vegetables | 8.4 | 3.7 | 4.8 | 3.8 | 5.0 to 6.0 | 3.5 to 4.5 |
| Fresh fruits & vegetables | 6.6 | 3.9 | 5.3 | 3.9 | 5.0 to 6.0 | 4.0 to 5.0 |
| Fresh fruits | 3.4 | 3.7 | 6.0 | 4.5 | 5.0 to 6.0 | 4.0 to 5.0 |
| Fresh vegetables | 3.2 | 4.0 | 4.6 | 3.2 | 5.0 to 6.0 | 3.5 to 4.5 |

| | | | | | | |
|-------------------------------|-----|-----|-----|-----|-------------|------------|
| Processed fruits & vegetables | 1.8 | 3.3 | 2.9 | 3.6 | 6.0 to 7.0 | 3.0 to 4.0 |
| Sugar and sweets | 2.0 | 1.2 | 3.8 | 3.1 | 4.5 to 5.5 | 3.0 to 4.0 |
| Cereals and bakery products | 7.4 | 1.5 | 1.8 | 4.4 | 9.0 to 10.0 | 3.5 to 4.5 |
| Nonalcoholic beverages | 6.7 | 2.9 | 2.0 | 4.1 | 3.5 to 4.5 | 3.0 to 4.0 |
| Other foods | 9.9 | 1.6 | 1.4 | 1.8 | 4.0 to 5.0 | 3.0 to 4.0 |

¹BLS estimated expenditure shares, December 2007.

²Forecasts updated July 21, 2008.

*Source of historical data: Bureau of Labor Statistics
Forecasts by USDA-Economic Research Service.*