Historical Food Price CPI Data

The actual data used for the sample period in the analysis is the second quarter of 1984 through the first quarter of 1997 and include all food, food at home, food away from home, and the 20 subcomponents. Table 1 shows the food items and their relative importance based on weight revisions from the Bureau of Labor Statistics (BLS) in December 1997. The Office of Prices and Living Conditions, Consumer Price Indexes, at BLS provides the CPI historical data series to ERS. Quarterly growth rates are constructed using simple averages for the 3 months in the quarter.

BLS revised the base period for the CPI from 1972 to 1982-84 in January 1987. While this revision affected the levels of the series, it had no impact on the percentage changes in the price levels. BLS provided adjustment factors for transforming the old CPI series into the new CPI series. Table 2 gives the adjustment multiplicative factors. In 1984q1 the actual value for the CPI of All Food was 301.3. This value was adjusted to the 1982-84 base by multiplying it by the factor 0.3411 to obtain a level of 102.77 for that quarter using the new CPI base year. We converted all of the actual data and the forecasts of that data to the 1982-84=100 level before calculating the growth rates.

Figures 5a-5w contain the histograms and the summary statistics of the actual quarterly growth rate for each of the 23 retail food CPI series that were examined. The Jarque-Bera test for normality is rejected for 9 of the 23 price series.[8] In one series, Processed Fruits, we can reject the null of normality at 5 percent, but not at 1 percent. There is a fair amount of variability among the series. The inflation rates for nine series range less than 5 percent.[9] The range is between 5 and 10 percent for another eight series, and the range of the remaining six series is between 10 and 20 percent.

In most cases, these inflation rates exhibit outliers and fat tails.[10] Fresh vegetables experienced the largest spike(s) in prices with a 115-percent increase in the third-quarter of 1994 followed by a 50-percent decline in the next quarter. Otherwise, this series ranged between -20- and 20-percent changes. Egg prices were the second most volatile, ranging from -17 to +20 percent. The range of variation for fresh fruits, third largest, was between -7.5 and 15.5 percent. The poultry and pork series varied about 20 percent each, ranging from approximately -5 to 15 percent. Both exhibit outliers and fat tails. The range of variation for the nonalcoholic beverages series was about 15 percent from -3 to 11 percent; however, removing three outliers leads to a range of just -3 to 3 percent. In some cases, the variability is due to seasonal fluctuations most likely caused by supply effects. The different magnitudes and forms of variability in the food price inflation rates suggest that more than one type of alternative model will be needed for forecasting purposes.

Retail Food Price Movements Since 1984: An Overview

This section reviews and summarizes food price movements over the sample period. It explains the primary forces driving the markets. The source for this section was monthly unpublished internal ERS documents. Figures 6a-6w can be examined while reading this section; they provide time series plots of the individual food price series annual growth rates.

1984 Update

The CPI for all food increased 3.8 percent in 1984, food at home increased 3.6 percent and food away from home was up 4.2 percent. Meat prices were the major moderating force in the food CPI. Beef production was up and retail prices were down because of continued liquidation of cattle herds in 1984. Pork supplies were slightly lower and prices rose slightly, they were moderated by large beef supplies and declining beef prices. The CPI for fresh fruit was up because of higher orange prices. A smaller California orange crop was due to tree damage sustained in 1983 spring floods. The CPI for fresh vegetables was also up because of a smaller 1983 fall potato crop that increased prices. Shorter vegetable oil supplies in 1984 caused by the previous year's drought contributed to higher fats and oil prices, particularly shortening and margarine. The all items CPI index increased 4.3 percent in 1984.

[8]They are All Food, Food at Home, Meats, Poultry and Fish, Poultry, Pork, Dairy Products, Fruits and Vegetables, and Nonalcoholic Beverages.

[9]They are All Food, Food Away from Home, Beef and Veal, Other Meats, Processed Fruits, Fresh Vegetables, Sugar and Sweets, Cereal and Bakery Products, and Other Prepared Foods.

[10]The series are Poultry, Pork, Eggs, Fruits and Vegetables, Fresh Fruits, Fresh Vegetables, Processed Fruits, and Nonalcoholic Beverages. Variation measured as maximum minus minimum.

1985 Update

The CPI for all food increased 2.3 percent in 1985, food at home increased 1.4 percent, and food away from home was up 4.0 percent. Large supplies of meats, eggs, and dairy products all contributed to lower price increases for these categories. Large supplies and lower prices for potatoes contributed to a small increase in the fresh vegetable CPI. The fresh fruit index was up again in 1985 due to the continued shortage of California Valencia oranges. The all items CPI index increased 3.6 percent in 1985.

1986 Update

The CPI for all food increased 3.2 percent in 1986, food at home increased 2.8 percent, and food away from home was up 3.9 percent. Lower support prices for a number of farm commodities led to lower farm prices in 1986. Costs of processing and distributing foods were also lower. Higher consumer demand due to a slightly lower unemployment rate and a modest increase in real disposable personal income had a positive effect on consumer demand for food. Tight supplies of seafood products worldwide and increasing domestic demand caused a significant increase in the CPI for fish and seafood. Large worldwide supplies of vegetable oils put downward pressure on retail prices for margarine, salad oils, and shortening. Pork and poultry prices rose sharply in mid-year due to lower production levels. Pork supplies were the lowest since 1982. Poultry producers operated at capacity to meet consumer demand because of smaller red meat supplies. Demand for poultry and higher retail prices were the result of a declining supply of red meat. Coffee prices were up because of reduced Brazilian supplies. Consumers bought up supplies at grocery stores to avoid higher prices in the early part of the year, and prices rose 40 percent from year earlier levels in January and February. The all items CPI increased 1.9 percent.

1987 Update

The CPI for all food increased 4.2 percent in 1987, food at home increased 4.3 percent, and food away from home was up 4.0 percent. Larger supplies of poultry and pork helped to ease prices for all meats, including beef. Tight supplies of world seafood, which began in 1986, contributed to higher retail prices for fish and seafood for a second year. In spite of larger citrus fruit production, retail fresh fruit prices were higher due to large exports of oranges and grapefruit. Fresh vegetable prices were also higher due to reduced supplies, resulting from cold weather in California and Mexico. Also, the poor weather severely damaged the Mexican winter vegetable crop, which normally supplements domestic supplies of fresh vegetables. Poultry production continued to expand, helping to reduce retail prices and the demand for poultry was stronger because of higher red meat prices. The CPI for all items was up 3.6 percent in 1987.

1988 Update

The CPI for all food increased 4.1 percent in 1988, food at home increased 4.2 percent, and food away from home was up 4.0 percent. The CPI for processed fruits was up because of tight supplies of frozen concentrated orange juice (FCOJ) and canned fruits. Brazil raised its FCOJ prices, pushing world market prices and domestic retail prices up. In addition, carryover stocks of many canned fruits were low. Poultry prices were higher, reflecting demand from the fast food industry. Egg prices were higher because of reduced production caused by high feed costs. The CPI for all items increased 4.1 percent.

1989 Update

The CPI for all food increased 5.8 percent in 1989, food at home increased 6.6 percent, and food away from home was up 4.6 percent. Fresh fruit prices were up because of the withdrawal of Chilean fruit from the U.S. market. The discovery of small traces of cyanide in grapes and the subsequent embargo caused large volumes of fresh fruits to be removed from the retail market. Cold weather in Florida, California, and Mexico disrupted vegetable shipments during the first quarter of 1989 and led to higher prices for fresh vegetables. Tomato prices were high due to a short supply following freeze damage in Florida and an increased demand for tomatoes from the fast food market. Although poultry production continued to increase, retail prices also increased as poultry prices were bid up by fast food firms, which were expanding their menus with new chicken entrees, leaving supplies for grocery stores relatively tight. The CPI for all items increased 4.8 percent.

1990 Update

The CPI for all food increased 5.8 percent in 1990, food at home increased 6.5 percent, and food away

from home was up 4.7 percent. Retail prices for pork were up because of a decrease in pork production. Pork production was expected to be higher, but was revised downward and caused tight supplies and higher retail prices. A freeze in Florida and Texas, December 1989, caused severe damage to the grapefruit and orange crops, which was reflected in higher retail prices for fresh market grapefruit. The freeze also lowered fresh market vegetable production, and caused an increase in the CPI for fresh vegetables. The CPI for all items increased 5.4 percent.

1991 Update

The CPI for all food increased 2.9 percent in 1991, food at home increased 2.7 percent, and food away from home was up 3.4 percent. Fresh fruit prices were higher because of a smaller Washington State apple crop and freeze damage to the California orange orchards. Both led to a smaller crop. The CPI for all items increased 4.2 percent.

1992 Update

The CPI for all food increased 1.2 percent in 1992, food at home increased 0.7 percent, and food away from home was up 2.0 percent. Larger supplies of red meat and poultry contributed to lower retail prices for meats. Also, the economy was slowly recovering from the recession, and consumer demand did not rebound quickly. There was rigorous competition with the fast food market and the retail market for the consumer's food dollar. The CPI for all items increased 3.0 percent.

1993 Update

The CPI for all food increased 2.2 percent in 1993, food at home increased 2.4 percent, and food away from home was up 1.8 percent. The CPI for fresh vegetables was up because of shortages of tomatoes during the spring. Price increases for most items were modest as consumers continued to be cautious in food spending, as the recovery from the recession continued but many people faced an uncertain employment outlook. The CPI for all items increased 3.0 percent.

1994 Update

The CPI for all food increased 2.4 percent in 1994, food at home increased 2.9 percent, and food away from home was up 1.7 percent. Sustained large beef, pork, and poultry supplies in the market kept retail prices down. Large supplies of oranges, grapefruit, apples, and pears kept fresh fruit prices lower. An increase in the fresh vegetable CPI was caused by damage by Tropical Storm Gordon that hit Florida and heavy rains that delayed harvesting in California. The nonalcoholic beverage CPI increased because of higher coffee prices. Tight global coffee supplies and two major frosts that hit Brazilian coffee producers contributed to higher retail prices. The CPI for all items increased 2.6 percent.

1995 Update

The CPI for all food increased 2.8 percent in 1995, food at home increased 3.3 percent, and food away from home was up 2.3 percent. Higher retail lettuce prices in April and May, contributed to an increase in the fresh vegetable CPI. Cold, wet, and windy spring weather in the Washington and California fruit areas resulted in poor pollination and fruit set, especially for apples and grapes. This contributed to an increase in the CPI for fresh fruits. Steep declines in the 1995 coffee crop in Brazil, combined with an agreement by the Association of Coffee Producing Countries to restrict exports, kept coffee prices higher for a second year. The CPI for all items increased 2.8 percent.

1996 Update

The CPI for all food increased 3.3 percent in 1996, food at home increased 3.7 percent, and food away from home was up 2.5 percent. High grain prices contributed to price increases for meats, poultry, eggs, dairy products, and cereals and bakery products. Although meat production was higher in 1996, strong domestic and export demand contributed to higher retail prices. The CPI for all items increased 3.0 percent.

1997 Update

The CPI for all food increased 2.6 percent in 1997, food at home increased 2.5 percent, and food away from home was up 2.8 percent. Higher minimum wage rates, which went into effect fall 1996 and fall 1997 contributed to the increase in food away from home. Speculation about a lower 1997/98 coffee crop in Brazil and an uncertain labor situation in Colombia were responsible for higher coffee prices, which is a component of the nonalcoholic beverages index. The CPI for all items increased 2.3 percent.

The Forecast Data

ERS initiated an evaluation of the accuracy of internal ERS consumer food price index forecasts in 1996. Preliminary results are reported in Denbaly and others. The evaluation in this report is a continuation of the 1996 study and contains all the food categories that ERS forecasts.

Below is an example that explains how quarterly forecasts of food CPI inflation rates were constructed from the monthly CPI food price level forecasts. The forecasts are made up to 15 months ahead. Table 3 contains six columns from the ALL FOODS part of the forecast database. The second column contains the historical quarterly averages. The third column gives the 1-month-ahead forecast for the quarter. For example, the forecast for the first quarter of 1990 based on data through March 31st, 1990 was 130.9. The 4-month-ahead forecast for the second quarter of 1990 made on the same day was 130.0. (See column six and the last row.) The forecasters were predicting that prices would drop in the second quarter. The actual rate of inflation between the first and second quarter is

$$\pi_{90q2} = \left(\frac{P_{90q2}}{P_{90q1}} - 1 \right) * 100 = \left(\frac{131.5}{131.1} - 1 \right) * 100 = 0.305\%.$$

The forecasted growth rate for the second quarter made with a lead of 1 month ahead is

$$\pi_{90q2,1} = \left(\frac{P_{90q2,1}}{P_{90q1}} - 1 \right) * 100 = \left(\frac{131.0}{131.1} - 1 \right) * 100 = -0.08\%.$$

The forecasted growth rate for the second quarter with a lead of 4 months ahead is

$$\pi_{90q2,4} = \left(\frac{130.0}{130.9} - 1 \right) * 100 = -0.69\%.$$

Note that for the 4-month-ahead forecast of the second quarter, the denominator is equal to the predicted first-quarter level based on the forecast that was made on the same date. This can be expressed as

$$\pi_{90q2,4} = \left(\frac{P_{90q2,4}}{P_{90q1,1}} - 1 \right) * 100.$$

Thus a 7-month-ahead inflation forecast would be constructed using the 7-month-ahead predicted price level of that quarter relative to the 4-month-ahead predicted price level of the previous quarter.