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United States Government Accountability Office
Washington, DC 20548

June 30, 2009

The Honorable Herb Kohl
Chairman
Subcommittee on Antitrust, Competition Policy
and Consumer Rights
Committee on the Judiciary
United States Senate

The Honorable Charles E. Grassley
United States Senate

Subject: U.S. Agriculture: Retail Food Prices Grew Faster Than the Prices Farmers Received for Agricultural Commodities, but Economic Research Has Not Established That Concentration Has Affected These Trends

Over the past 25 years, farmers have received a decreasing share of the consumer food dollar. Some analysts and farm interest groups are concerned that this decline can be attributed, in part, to increasing concentration in agriculture.¹ They believe that firms in highly concentrated markets may be able to exert market power by raising retail food prices while also depressing prices farmers receive for agricultural commodities. Others have argued that concentration has facilitated changes, such as technological innovations, that have improved productivity and served to lower food prices while increasing some farm incomes.

The influence of any one factor, such as concentration, in determining agricultural commodity and retail food prices (commodity and food prices) varies and is difficult to isolate. Our prior work has noted that concentration may be one of a number of factors that can influence prices along the food marketing chain from farms to food processors, retail stores, and finally, consumers.² To better understand the impact of concentration on commodity and food prices, economists have used a variety of analytical techniques and data sets. However, their work has been complicated by various issues, such as the difficulty in fully accounting for shifting consumer demand for food products, the introduction of new

¹Concentration is the extent to which a small number of firms controls most of the sales or purchases in a specific industry or market. The term consolidation is closely related to concentration, and refers to the organizing of farms, food processors, or retail stores into fewer, larger firms. For the purposes of this report, we have focused on concentration because the relevant economic literature has assessed its role in market power and commodity and food price manipulation.

²GAO, *Dairy Industry: Information on Milk Prices, Factors Affecting Prices, and Dairy Policy Options*, GAO-05-50 (Washington, D.C.: Dec. 29, 2004); *Economic Models of Cattle Prices: How USDA Can Act to Improve Models to Explain Cattle Prices*, GAO-02-246 (Washington, D.C.: Mar. 15, 2002); and *Beef Industry: Packer Market Concentration and Cattle Prices*, GAO/RCED-91-28 (Washington, D.C.: Dec. 6, 1990).

processing and distribution technologies, interactions between various levels of the food marketing chain, and the evolution of agricultural and other government policies. For example, some have suggested that changes in consumer preferences, such as demand for quick, easy-to-prepare processed foods, may explain much of current trends in the declining farm share of consumer spending. Similarly, as the dairy industry has become more concentrated, it also has been affected by changes in how milk markets function. The introduction of better refrigeration, pasteurization, and packaging technologies has enabled milk to travel across broader regions. Meanwhile, changes in federal dairy policies have affected dairy farm incomes and prices. In order to isolate the effect of concentration, researchers must appropriately account for these and other factors that influence commodity and food prices.

In this context, you asked us to provide information on (1) trends in concentration for various levels of the food marketing chain in major agricultural sectors; (2) trends in retail food expenditures and prices; (3) trends in prices farmers received for major agricultural commodities; and (4) the views of experts on the potential effects of concentration on agricultural commodity and food prices.³ On April 24, 2009, we briefed your offices on the preliminary results of our review. Enclosure I contains the briefing slides we used, which have been updated to include more recent data. This report summarizes that briefing and provides further information on the views of experts on the effects of concentration on commodity and food prices. These views are detailed in enclosure II.

To review trends in concentration, expenditures, and commodity and food prices, we analyzed relevant data from government and industry sources and our prior work on milk prices.⁴ We analyzed data for agriculture overall and five major agricultural sectors—beef, pork, poultry, dairy, and grains. These sectors accounted for 86 percent of the market value of food-related agricultural products sold by U.S. farms in 2007. We assessed the reliability of these data and determined that they were sufficiently reliable for the purposes of this review—to illustrate broad trends in concentration and prices over time. To assess the views of experts on the potential effects of concentration on commodity and food prices, we analyzed peer-reviewed, empirical economic literature on the processing segment of the beef, pork, and dairy sectors and on the retail sector overall. On the basis of this literature review, we selected and interviewed experts in the sectors reviewed. Enclosure III contains additional information about our scope and methodology.

We conducted our work from November 2008 to June 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate

³Commodity and food prices are factors that impact farmer and consumer well being from the production and purchase of foods. Other factors, such as sales volumes and productivity, also affect farmers, while food safety and quality and environmental impacts can be important to consumers. Since these factors have changed over time and were outside the scope of our review, we did not conduct a full assessment of the impacts of concentration on farmer and consumer well being.

⁴GAO-05-50; *Dairy Industry: Information on Milk Prices and Changing Market Structure*, GAO-01-561 (Washington, D.C.: June 15, 2001); and *Dairy Industry: Information on Prices for Fluid Milk and the Factors That Influence Them*, GAO/RCED-99-4 (Washington, D.C.: Oct. 8, 1998).

evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions.

In summary, we found the following:

- Concentration generally has increased at all levels of the food marketing chain in all agricultural sectors since the 1980s. At the farm level, less than 2 percent of farms accounted for 50 percent of total sales in 2007. At the food processors' level, in general, a small number of companies accounted for a large and growing portion of sales in each of the five major agricultural sectors. For example, in the pork sector, the market share of the largest four hog slaughtering firms increased from 36 percent in 1982 to 63 percent in 2006. In addition, at the retail level, the share of grocery store sales held by the largest four firms more than doubled, from 16 percent in 1982 to 36 percent in 2005.
- While real annual per capita food expenditures have increased since 1982, households now spend a smaller share of disposable income on food. Total annual per capita food expenditures rose from \$3,358 in 1982 to \$3,888 in 2007, in constant 2008 dollars. Meanwhile, household spending on food decreased from 13 percent of disposable incomes in 1982 to 10 percent in 2007. Since 1982, overall food prices and food prices in each of the five major agricultural sectors have increased about as much as prices for consumer goods and services overall. However, from July 2008 through December 2008, food prices increased faster than the prices of other goods and services. Since then, food prices generally have not changed significantly.
- Since 1982, farmers have generally received higher monthly prices for their commodities, but these prices have increased less than food prices and inflation in the broader economy. Specifically, prices farmers received, including for beef, pork, dairy, and grains, increased by 34 percent from January 1982 to April 2009. For the same period, food prices rose by 128 percent, and prices in the general economy rose 102 percent. Commodity prices increased significantly in 2008, reaching a high of 68 percent above their 1982 levels in July 2008, but have declined since then.
- The empirical economic literature has not established that concentration in the processing segment of the beef, pork, or dairy sectors or the retail sector overall has adversely affected commodity or food prices. Most of the studies that we reviewed either found no evidence of market power or found efficiency effects that were larger than the market power effects of concentration. While a few studies found some evidence of market power, it is unclear whether this market power was caused by concentration or some other factor. All of the experts we spoke with said that concentration probably did not cause the 2008 increase in commodity and food prices, which were more likely due to factors such as higher energy costs and growing global demand for grains. Experts generally said that concentration is likely to increase in the future. Some said further increases in concentration may raise greater concerns in the future about the potential for market power and the manipulation of commodity or food prices. One expert said further increases in concentration would continue to generate efficiency gains and be beneficial. Enclosure II provides further information on the views of experts, and enclosure IV

lists the studies we reviewed on the impact of concentration on commodity or food prices in these sectors.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this report. At that time, we will send copies of this report to the Secretary of Agriculture, interested congressional committees, and other interested parties. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or shamesl@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Enclosure V lists key contributors to this report.



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Director, Natural
Resources and Environment

Enclosures (5)



Agricultural Concentration and Agricultural Commodity and Retail Food Prices

**Briefing for Congressional Staff
April 24, 2009**

Note: Slides updated to include more recent information.

Objectives:

1. Provide time series data on trends in concentration for various levels of the food marketing chain in major agricultural sectors.¹
2. Provide time series data on trends in retail food expenditures and prices.
3. Provide time series data on trends in prices farmers received for major agricultural commodities.
4. Summarize the views of experts on the potential effects of concentration on agricultural commodity and retail food prices (commodity and food prices).

¹Concentration is the extent to which a small number of firms controls most of the sales or purchases in a specific market or industry. The food marketing chain includes farms, food processors, retail stores, and consumers.

- For objectives 1 to 3, we analyzed aggregate, national information on long-term trends, generally since 1982:
 - Trends in agriculture overall and in five major agricultural sectors—beef, pork, poultry, dairy, and grains—that accounted for 86 percent of the total market value of food-related agricultural products sold by farms in 2007. (See slide 13 for details.)
 - Data from government and industry sources: USDA’s Economic Research Service (ERS), National Agricultural Statistics Service (NASS), and Grain Inspection, Packers and Stockyards Administration (GIPSA); Department of Commerce’s Bureau of the Census and Bureau of Economic Analysis; Department of Labor’s Bureau of Labor Statistics (BLS); National Chicken Council; and prior GAO work on milk prices.¹
- For objective 4, we reviewed relevant literature and, on the basis of this review, selected and interviewed experts.
- We conducted this review in accordance with GAO’s quality assurance framework.

¹GAO-05-50, GAO-01-561, and GAO/RCED-99-4.

Results:

- Concentration generally has increased at all levels of the food marketing chain in all agricultural sectors since the 1980s.
- While real annual per capita food expenditures have increased since 1982, households now spend a smaller share of disposable income on food.
- Since 1982, farmers have generally received higher monthly prices for their agricultural commodities, but these prices have increased less than retail food prices and inflation in the broader economy.

- Economic literature review:
 - Economists have used several different techniques and sets of data to analyze the impact of concentration on commodity or food prices.
 - Our review focused on the processing segments of the beef, pork, and dairy sectors, and retail food sector.
 - Based on our review, empirical economic literature has not established that concentration has adversely affected commodity or food prices in these agricultural sectors.

Fewer farms make up a major portion of agricultural sales. In 2007, less than 2 percent of all farms (32,886 farms) accounted half of total sales.

Number of Farms and Farm Concentration, Various Sectors, 1987-2007

	Year	All farms	Cattle and calves	Hogs and pigs	Poultry and eggs	Dairy	Grains and other crops ^b
Total number of farms^a	1987	2,087,759	1,150,523	238,819	86,005	162,555	994,453
	1992	1,925,300	1,034,189	188,167	64,925	132,092	878,189
	1997	2,215,876	1,011,809	102,106	63,246	99,238	827,385
	2002	2,128,982	851,971	82,028	83,381	78,963	731,234
	2007	2,204,792	798,290	74,789	148,911	69,763	801,489
Fewest number of farms accounting for 50 percent of sales	1987	75,682	7,471	16,480	3,261	22,941	76,196
	1992	61,673	4,842	11,460	3,307	15,986	63,969
	1997	46,068	2,879	2,727	3,545	8,128	56,759
	2002	34,085	3,149	1,909	3,789	3,976	47,556
	2007	32,886	2,862	1,713	3,643	2,418	43,409

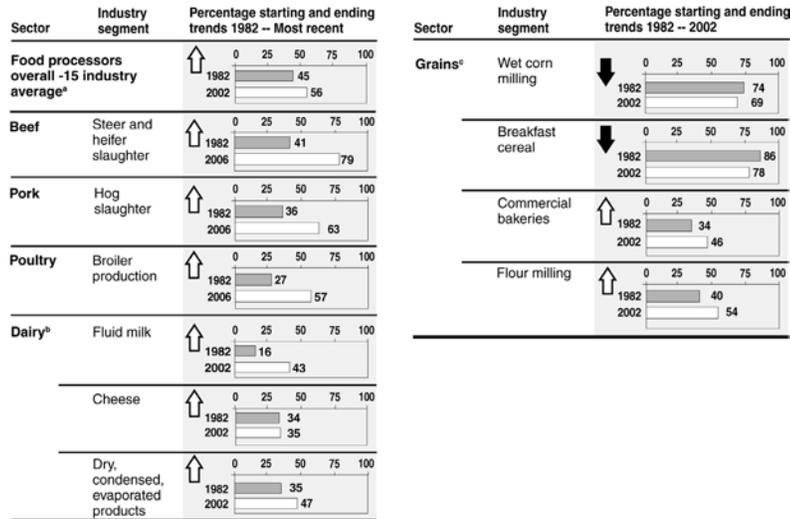
Source: Census of Agriculture.

^aCensus of Agriculture data on total number of farms (shaded) are not fully comparable across all years due to methodological and other changes. For instance, in 2002, the Census began to use sampling to adjust for undercoverage and, simultaneously, updated numbers for 1997. In addition, more extensive efforts and outreach may have allowed a more accurate count of small farms in 2007, contributing to the increase in total number of farms in that year.

^b"Grains and other crops" includes oilseeds, dry beans and peas, other crops and hay.

In General, Fewer Food Processors Account for a Larger Portion of Sales (Obj. 1)

Market Share of the Four Largest Food Processing Firms, Various Sectors, 1982 to Most Recent Year (See slide 14 for market share information for additional years.)



Source: GAO analysis of Department of Commerce, USDA, and National Chicken Council data.

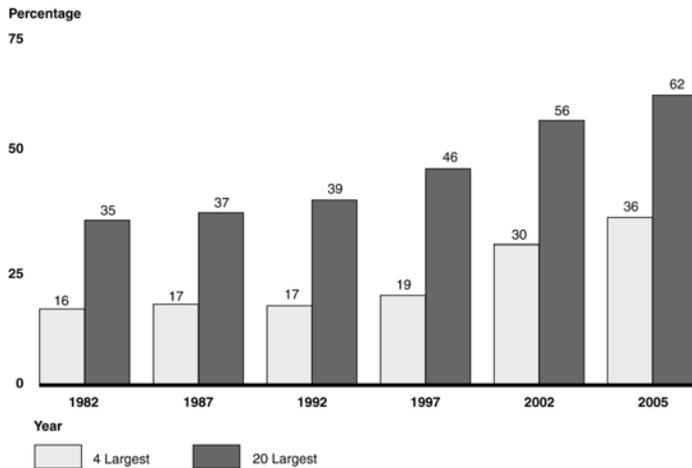
^aThe 15 food processing industries are flour milling; malt manufacturing; wet corn milling; breakfast cereals; sugarcane mills; beet sugar; frozen fruit, juice, and vegetables; fluid milk; creamery butter; cheese; dry, condensed, and evaporated dairy; ice cream and frozen desserts; animal (except poultry) slaughtering; seafood canning; and commercial bakeries. These 15 industries represented 41 percent of the sales of all 47 food processing industries in 2002.

^bThese three dairy industries made up 85 percent of all dairy manufacturing sales in 2002.

^cThese four industries made up 50 percent of total sales of all grain and oilseed milling and bakeries and tortilla manufacturing industries in 2002.

The share of total grocery store sales held by the largest four firms more than doubled from 1982 to 2005.

Share of Total Grocery Store Sales Accounted for by the 4 and 20 Largest Firms, 1982-2005



Source: USDA.

Note: These data include grocery product sales by Wal-Mart Supercenters, adjusted for sales of supermarket-like items, but do not include such sales in warehouse club stores such as Costco.

- Real annual per capita expenditures on food increased over \$500 from 1982 to 2007 (in 2008 dollars).^a
- Over the same time period, households spent a decreasing portion of disposable income on food.^b

Trends in U.S. Total and Household Food Expenditures, by Type of Expenditure, 1982-2007

	Year	At home	Away from home	Total
U.S. total annual food expenditures per capita (2008 dollars)^a	1982	\$2,012	\$1,345	\$3,358
	1987	1,922	1,558	3,480
	1992	1,904	1,585	3,490
	1997	1,870	1,633	3,503
	2002	1,904	1,752	3,656
	2007	2,002	1,886	3,888
U.S. household annual food expenditures as share of disposable income^b	1982	8.3%	4.3%	12.6%
	1987	7.3	4.2	11.5
	1992	6.6	4.0	10.6
	1997	6.3	4.1	10.4
	2002	5.8	4.0	9.8
	2007	5.7	4.0	9.7

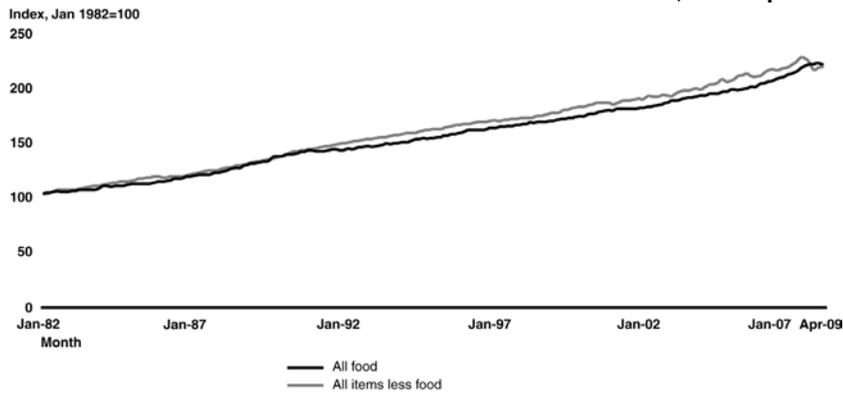
Source: GAO analysis of USDA data. Notes: "Total" food expenditures may not equal the sum of "at home" and "away from home" food expenditures due to rounding. Data adjusted to 2008 constant dollars using the Consumer Price Index (CPI).

^aIncludes all food expenditures divided by the U.S. population, including business and government spending such as expense-account meals, food provided to inmates and patients, and food donated to schools and institutions.

^bReflects only family and individual spending on food.

- Retail food prices increased 128 percent from 1982 through April 2009, about the same increase as seen in the prices of all other consumer items (126 percent).
- The retail prices of food in each of the five major agricultural sectors also increased, some more and some less than the rate of inflation. (For additional information, see slides 16 to 19 and 21.)

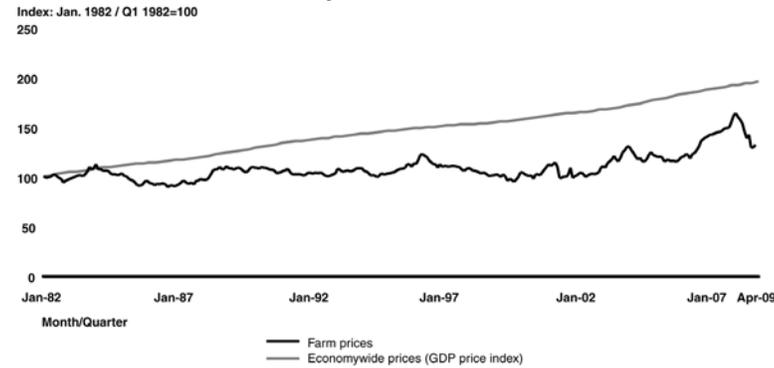
Consumer Price Indices of Food and All Items Less Food, 1982-April 2009 (Jan.1982=100)



Source: GAO analysis of Department of Labor data. Note: Price indices measure relative changes in prices over time as compared to a certain base period and do not show relative price levels or absolute values.

- The index of prices farmers received for their products increased 34 percent from January 1982 to April 2009. In July of 2008, these prices reached a twenty-six year high of 68 percent above their 1982 levels, but have declined more recently. Since 1982, commodity prices increased less than food prices and less than inflation in the broader economy (102 percent).
- Prices farmers received for beef, pork, dairy, and grains generally mirrored these overall trends. We did not identify reliable information on prices poultry farmers received. (For additional information, see slides 16 to 19 and 21.)

Indices of Prices Received by Farmers for All Farm Products and Economywide Prices, 1982-2009



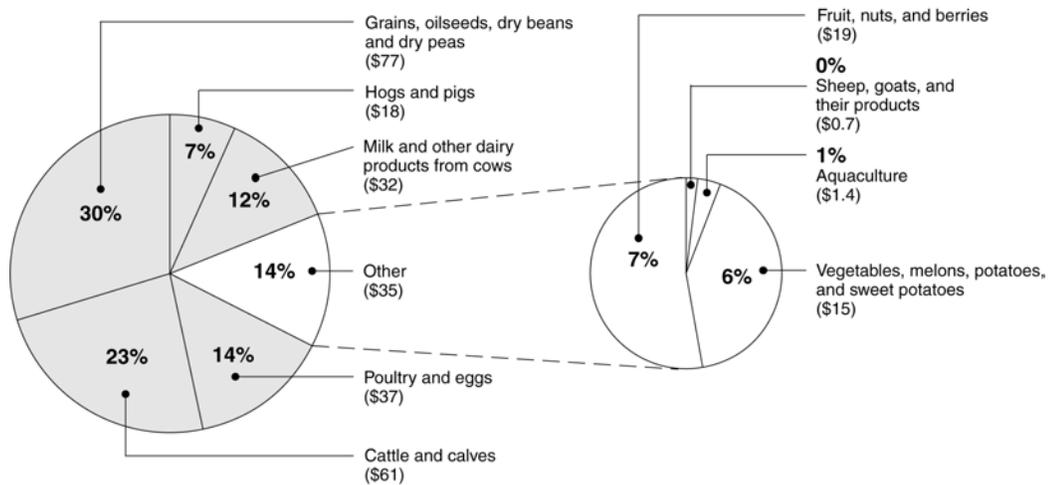
Source: GAO analysis of USDA and Department of Commerce data. Notes: Farm prices are monthly, and economywide prices are quarterly. Price indices measure relative changes in prices over time as compared to a certain base period and do not show relative price levels or absolute values.

Additional Information Related to Objectives

In 2007, the major agricultural sectors (shaded) examined in this review accounted for 86 percent of the total market value of food-related agricultural products sold.

Market Value of Food Related Agricultural Products Sold in 2007

Billions of 2007 year dollars



Source: GAO analysis of USDA data.

Note: Does not include some segments, such as cotton seed, which may also include some food-related production.

Market Share of the Four Largest Food Processing Firms, Various Sectors, 1982-Most Recent

Sector	Industry segment	Years					Percentage starting and ending trends 1982 – Most recent			
		1982	1987	1992	1997	2002	2006	1982	2002	
Food processors overall -15 industry average^a		45%	46%	48%	51%	56%	↑	45	56	
	Beef									
	Steer and heifer slaughter	41%	67%	78%	78%	79%	79%	↑	41	79
	Pork									
	Hog slaughter	36%	37%	44%	54%	56%	63%	↑	36	63
	Poultry									
	Broiler production	27%	36%	40%	44%	48%	57%	↑	27	57
	Dairy^b									
	Fluid milk	16%	21%	22%	21%	43%		↑	16	43
	Cheese	34%	43%	42%	35%	35%		↑	34	35
Dry, condensed, evaporated products	35%	45%	43%	47%	47%		↑	35	47	
Grains^c										
	Wet corn milling	74%	74%	73%	72%	69%	↓	74	69	
	Breakfast cereal	86%	87%	85%	83%	78%	↓	86	78	
	Commercial bakeries	34%	34%	34%	39%	46%	↑	34	46	
Flour milling	40%	44%	56%	48%	54%	↑	40	54		

Source: GAO analysis of Department of Commerce, USDA, and National Chicken Council data.

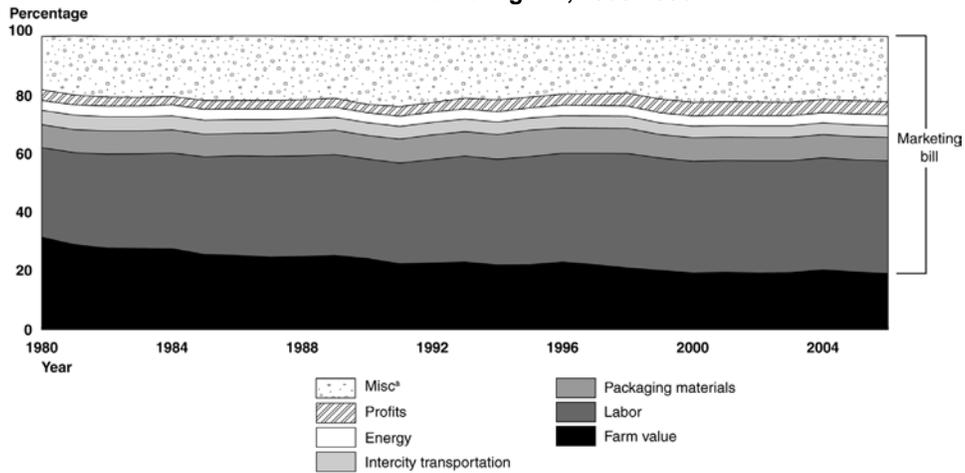
^aThe 15 food processing industries are flour milling; malt manufacturing; wet corn milling; sugarcane mills; beet sugar; frozen fruit, juice, and vegetables; fluid milk; creamery butter; cheese; dry, condensed, and evaporated dairy; ice cream and frozen desserts; animal (except poultry) slaughtering; seafood canning; and commercial bakeries. These 15 industries represented 41 percent of the sales of all 47 food processing industries in 2002.

^bThese three dairy segments made up 85 percent of all dairy manufacturing sales in 2002.

^cThese four segments made up 50 percent of total sales of all grain and oilseed milling and bakeries and tortilla manufacturing industries in 2002.

Postfarm value added, also known as the marketing bill, has increased from 1980 to 2006 as a share of consumer expenditures on domestically produced farm food.

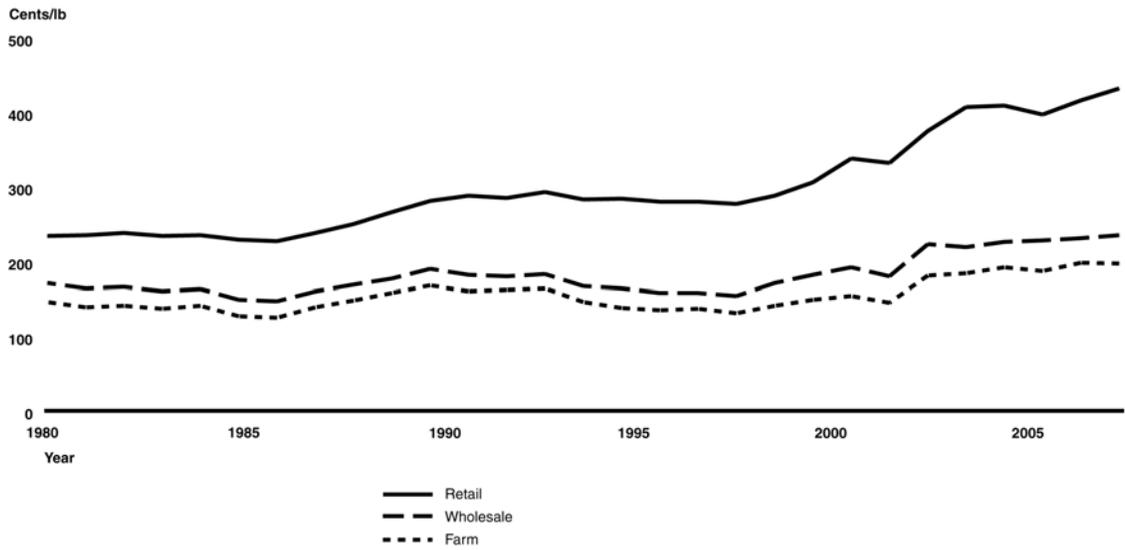
Share of Consumer Expenditures for Domestically Produced Farm Food by Farm Value and Marketing Bill, 1980-2006



Source: USDA

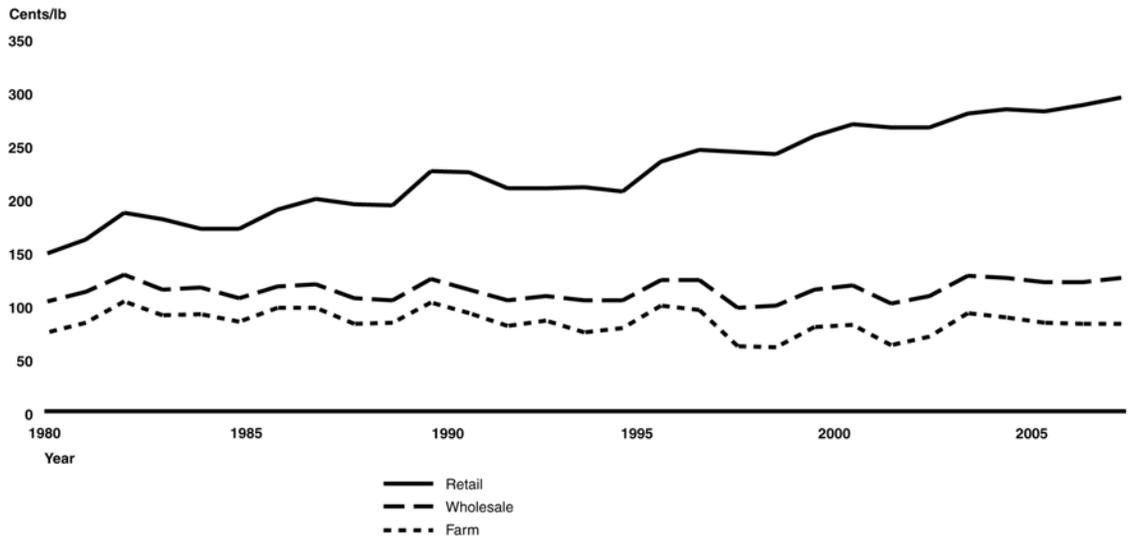
Misc includes such items as depreciation, rent, advertising, interest, taxes, licenses, and insurance.

Retail, Wholesale, and Farm Beef Prices, 1980-2008



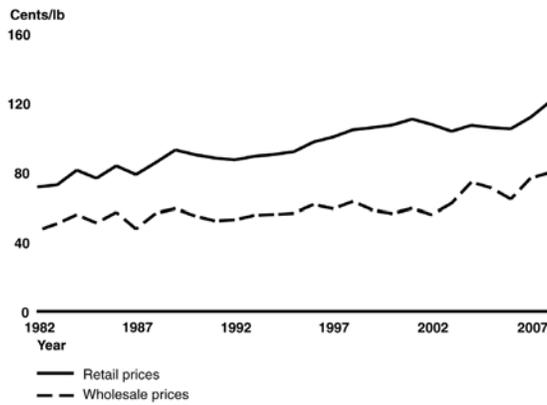
Source: GAO analysis of USDA data.
 Note: Data, presented in nominal terms, are retail weight equivalents and represent annual averages of monthly data.

Retail, Wholesale, and Farm Pork Prices, 1980-2008



Source: GAO analysis of USDA data.
 Note: Data, presented in nominal terms, are retail weight equivalents and represent annual averages of monthly data.

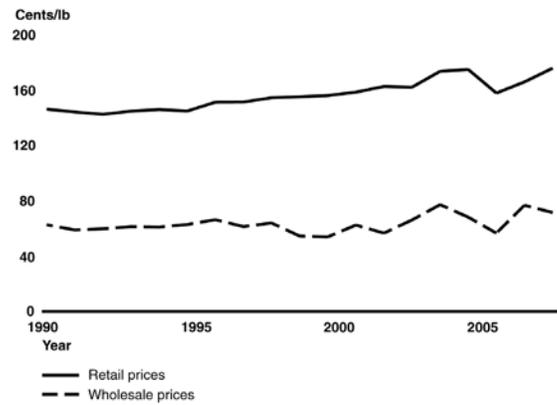
Retail and Wholesale Prices for Whole Chickens, 1982-2008



Source: GAO analysis of USDA data.

Notes: Data are in nominal terms. The reported wholesale price for whole chicken is based on a weighted combination of data from twelve cities.

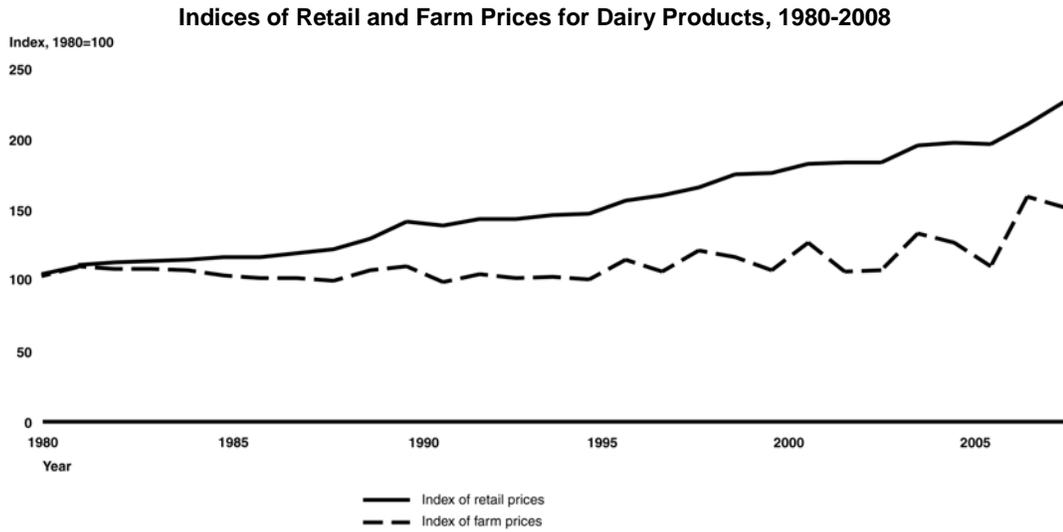
Retail and Wholesale Prices for Chicken Composite, 1990-2008



Source: GAO analysis of USDA data.

Notes: Data are in nominal terms. "Composite" chicken includes whole bird, breast, and leg pieces weighted by estimated quantities purchased by consumers each year. Composite chicken does not include any boneless or skinless meat.

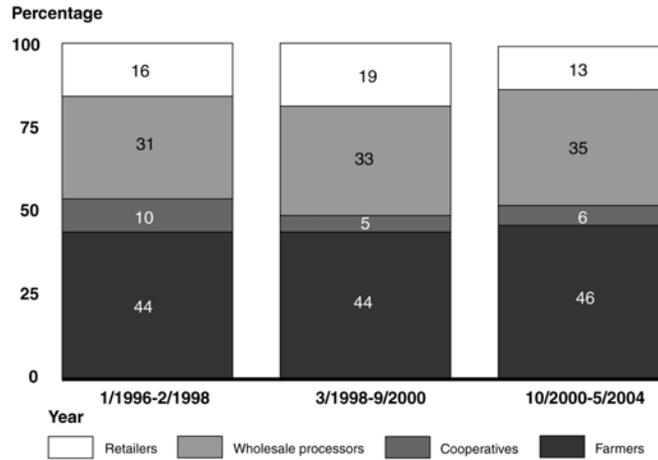
Prices farmers received for dairy products increased less than retail dairy prices from 1980 to 2008.



Source: GAO analysis of Department of Labor and USDA data. Note: Price indices measure relative changes in prices over time as compared to a certain base period and do not show relative price levels or absolute values.

From 1996 to May 2004, farmers received a consistent share (ranging from 44 to 46 percent) of the retail price of a gallon of 2-percent milk.

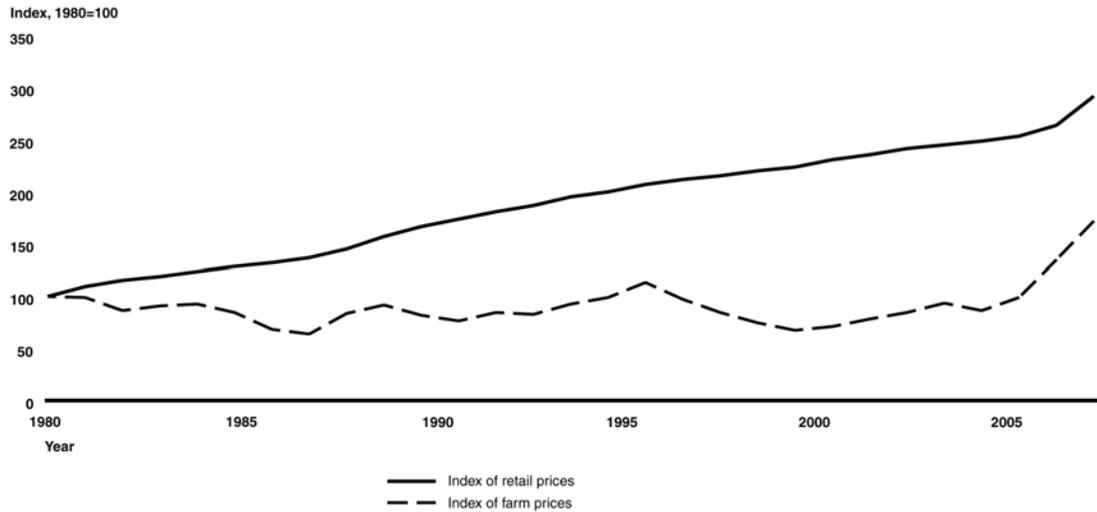
Portion of the Retail Price of a Gallon of 2-Percent Milk Received by Farmers, Cooperatives, Wholesale Processors,^a and Retailers, Select Markets, January 1996-May 2004



Source: GAO analysis of earlier GAO reports. Notes: Percentages may not total 100 due to rounding. The select markets are Atlanta, Boston, Cincinnati, Dallas, Denver, Miami, Milwaukee, Minneapolis, New Orleans, Phoenix, Salt Lake City, San Diego, Seattle, and Washington, D.C. More recent data for retail and wholesale prices were not readily available – retail data must be purchased and wholesale data are proprietary.
^aWe used commissary price data, obtained from the Defense Commissary Agency, as a proxy for wholesale price data because the latter data are proprietary. In general, commissary prices for milk do not include a mark-up similar to that in retail stores.

Data on prices farmers received for grains are not directly comparable to the prices consumers pay for such processed foods as cereals and breads made, in part, with grains.

Indices of Retail and Farm Prices for Grains (Cereals and Bakery Products), 1980-2008



Source: GAO analysis of Department of Labor and USDA data. Note: Price indices measure relative changes in prices over time as compared to a certain base period and do not show relative price levels or absolute values.

Enclosure II: Potential Effects of Concentration on Agricultural Commodity and Retail Food Prices

Empirical economic literature has not established that concentration—the extent to which a small number of firms controls most of the sales or purchases in a specific market or industry—in the processing segment of the beef, pork, or dairy sectors, or the retail sector overall has adversely affected agricultural commodity or retail food prices (commodity or food prices). Most of the studies that we reviewed found either no evidence of market power, or efficiency effects that were larger than the market power effects of concentration. While several studies found some evidence of market power, it is unclear whether concentration caused it. All the experts we spoke with said that concentration probably did not cause the 2008 increase in commodity and food prices, which were more likely due to factors such as higher energy costs and growing global demand for grains. Experts generally said that concentration is likely to increase in the future. Some said further increases may raise greater concerns in the future about the potential for market power and the manipulation of commodity or food prices. One expert said further increases in concentration would continue to generate efficiency gains and be beneficial.

Background

Concentration in agricultural industries can have two opposing impacts on commodity or food prices—the adverse impact of market power and the beneficial impact of efficiency gains. First, economists have suggested that higher levels of concentration can contribute to market power in a given market, other things being equal. In turn, market power can enable firms to affect the commodity or food prices of goods they buy or sell. Therefore, concentration could adversely affect commodity or food prices by enabling food processors, for example, to pay farmers lower than competitive prices for cattle or to sell beef to retailers for more than competitive prices. On the other hand, concentration may also lead to cost savings and efficiency gains, which may be passed on in the form of lower food prices. To the extent that efficiency gains lead to lower food prices, this can potentially also lead to greater demand for products at the farm level and, therefore, positively affect farmers. Ultimately, the impact of concentration on commodity and food prices depends on which of these two effects—market power or efficiency—dominates.

The influence of any one factor, such as concentration, in determining commodity and food prices varies and is difficult to isolate. To better understand the impact of concentration on commodity and food prices, economists have used a variety of analytical techniques and data sets. They have sought evidence of market power, examined the link between market power and efficiency, or analyzed the behavior of firms to assess whether they act competitively. In particular, economists have looked at these issues in concentrated sectors such as the processing segments of the beef, pork, and dairy sectors, and in the retail sector overall. Their efforts have been complicated by a variety of issues, including that many other factors could also influence market power and generate efficiency gains. For example, market power can be affected by product differentiation, the difficulty firms have in entering a market, and the structure of contracts between farmers and food processors. Similarly, technological changes, new business practices, and other factors can drive efficiency gains. In addition, government policies or economic events can affect concentration and commodity and food prices. Therefore, it is not easy to establish the effect of concentration on these prices.

To summarize the views of experts on the potential effects of concentration on commodity and food prices, we reviewed the literature and interviewed experts in the processing segment of the beef, pork, and dairy sectors, and in the retail sector overall. (Encl. III provides further information on our scope and methodology.)

Experts and Economic Literature Have Not Established That Concentration Has Had an Adverse Effect on Commodity and Food Prices

Experts Said Concentration Probably Did Not Cause the 2008 Increase in Commodity and Food Prices

Prices for many agricultural commodities and consumer foods increased significantly in 2008, although all the experts we spoke with told us that concentration probably did not cause these trends. By July 2008, the prices farmers received for their commodities had reached a 26-year high, 68 percent above their 1982 levels according to U.S. Department of Agriculture (USDA) data. Meanwhile, food prices overall, as measured by the Bureau of Labor Statistics' (BLS) Consumer Price Index, increased 5 percent from December 2007 to August 2008, the fastest 8-month increase in food prices since 1990. Commodity prices have since declined, and food prices have stabilized. According to all experts we spoke with, concentration was probably not the cause of these commodity and food price increases for two broad reasons. First, many experts said that several other factors were more likely to be the causes, such as the use of crops for the production of biofuels, higher energy costs, and the growing global demand for grains in developing countries.⁵ Second, some experts said that although there has been a long-term trend toward increasingly concentrated markets, there was no sudden jump in concentration in 2008 that could have generated significant increases in market power and the potential for price manipulation. While experts told us concentration did not cause the commodity and food price increases, some experts suggested that concentration may nevertheless have affected food prices. Some experts told us that market power, to the extent it exists in these industries, would likely have dampened this food price impact. This is because firms with market power may absorb some rising input costs, rather than pass them on to consumers in the form of higher food prices. However, other experts said that market power, specifically at the retail level, may have played a role in maintaining high food prices. Commodity prices declined significantly after the 2008 price spike, and these declines may not have been reflected in food prices. Experts suggested that market power could be a contributing factor in these trends.

Research Has Not Established That Concentration Adversely Affected Commodity or Food Prices

Empirical economic literature has not established that concentration in the processing segment of the beef, pork, or dairy sectors or in the retail sector overall has adversely affected commodity or food prices. We reviewed 33 studies published since 1990 that were relevant to assessing the effect of concentration on commodity and food prices in these

⁵For further information on factors contributing to increases in agricultural commodity prices, see R. Trostle, "Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices," *Outlook Report*, no. WRS-0801, U.S. Department of Agriculture, Economic Research Service (2008).

sectors.⁶ Most of these found either no evidence of market power, or efficiency effects that were larger than the market power effects of concentration. For example, one study compared the market power and efficiency effects of concentration to evaluate the impact of concentration in the beef processing sector.⁷ Results from that study suggested that from 1970 to 1992, the benefits from efficiencies from concentration were twice as large as the costs from market power.

While several studies we reviewed found evidence of market power, primarily in the retail and dairy sectors, it is unclear whether concentration affected this market power. Even though concentration is one potential source of market power, other sources could also affect market power, depending on the particular characteristics of the industry. Therefore, the evidence of market power does not, by itself, mean that concentration is the source of that market power.

Specifically, in the four sectors reviewed, we found the following.

Beef Processing. The 13 studies we reviewed in this sector suggested that concentration has not enabled beef processors to pay farmers less than the competitive price for cattle or to charge retailers more than the competitive price for beef. These studies fell into three broad categories. In the first, four studies explicitly took cost considerations into account and measured the relative importance of the market power versus efficiency effects of concentration. All of these studies found that concentration in the beef processing sector has been, overall, beneficial because the efficiency effects dominated the market power effects. For example, three studies by one economist found little evidence of exploitation of market power, but significant evidence of efficiencies.⁸

In the second category, five studies used relatively newer empirical techniques to test for market power, and only one of these found evidence of market power among beef processors. That study used data from 1988 to 1991 and identified evidence that beef processors had market power over farmers.⁹ However, the other studies found no evidence of beef processors exercising market power over farmers or retailers.¹⁰

In the third category, four studies used more disaggregated data and advanced techniques to evaluate market power. Two of these found little or no evidence of processor market power in the procurement of cattle, though one did find evidence of market power over retailers.¹¹ The other two studies examined bidding data from cattle auctions in Texas.¹² One of these concluded that the bidding process was not very competitive, and the other found some

⁶Encl. IV lists the studies we reviewed, including full references for the studies cited in this enclosure.

⁷Azzam (1997).

⁸Morrison Paul (2001a, 2001b, and 1999).

⁹Azzam (1992).

¹⁰Matthews, et al. (1999); Muth and Wohlgenant (1999); Reed and Clark (2000); Schroeter, et al. (2000).

¹¹Driscoll, et al. (1997); and Weliwita and Azzam (1996).

¹²Crespi and Sexton (2005); and Crespi and Sexton (2004).

evidence of market power abuse in the form of mark-downs in the prices paid to farmers for cattle.

Although we reviewed a number of more recent studies in the beef processing sector, our findings were not substantially different from those of a 1996 study sponsored by USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA), which reviewed a number of empirical studies on this issue.¹³ The GIPSA study found that the empirical evidence suggesting that the industry was uncompetitive was not convincing, but by the same token, this did not mean the industry was perfectly competitive.

Pork Processing. Overall, the six studies we reviewed did not find conclusive evidence of the effect of concentration in pork processing on commodity or food prices. Two of these found some recent evidence of market power.¹⁴ However, neither attempted to evaluate whether concentration was a source of that market power. Another study attempted to measure how market power changed with concentration, and found evidence of market power in the 1970s but not in 1980s, despite the increasing concentration over this period.¹⁵ The authors suggested that large processing plants achieved cost economies by ensuring a smooth and undisrupted flow of hogs so they could operate their plants at near full capacity. Therefore, their desire to continue purchasing hogs to achieve these cost savings could overwhelm any incentives to exercise market power by restricting purchases.

Dairy Processing. Overall, four studies found that concentration in dairy processing had little or no adverse impact on commodity or food prices. For example, one study found some evidence of market power but concluded that the market power identified was close to competitive levels.¹⁶ Three studies attempted to identify the market power and efficiency effects of concentration in various food processing industries, including fluid milk. These studies generally found that concentration had a statistically significant effect on market power, but the efficiency benefits were greater than the market power effects of concentration in the fluid milk processing sector. For example, one study found that fluid milk consumers would benefit considerably with additional increases in concentration owing to these efficiency effects.¹⁷ To the extent that dairy processors do have market power, its

¹³A.M. Azzam and D. Anderson, *Assessing Competition in Meatpacking: Economic History, Theory and Evidence*, report prepared for USDA Grain Inspection, Packers and Stockyards Administration, GIPSA-RR 96-6 (1996).

¹⁴Zheng and Vukina (2009); and Morrison (1999).

¹⁵Schroeter and Azzam (1991).

¹⁶Liu, et al. (1995).

¹⁷Lopez and Liron-Espana (2003).

impact on commodity prices dairy farmers receive may be offset by the market power of dairy cooperatives.¹⁸

Retail. The 12 studies we reviewed were generally insufficient to assess the influence of concentration in the retail sector on food prices, although all found indications of market power. Most of the studies sought to assess whether retailers had market power. None of the studies assessed whether (1) concentration is a source of market power or (2) retail concentration generated efficiency gains. The results from a study on retail sales of breakfast cereals suggested that firms with larger market shares had lower costs.¹⁹ This implies that increases in concentration may be associated with efficiency gains. Moreover, retail firms may engage in nonprice competition, such as by offering greater variety and level of service to consumers. To the extent that retail firms compete in this manner, measures of market power used by many economists may not appropriately capture how firms compete. Since current economic research has not addressed these aspects, the literature offers only a partial picture of the possible impact of retail concentration on food prices.

All of the retail studies found some indications of market power. However, economists have not been able to do a comprehensive analysis of the existence of retail market power overall.²⁰ Instead, studies have either looked at specific products or firm behaviors to deduce the degree of retail competition. For example, one study examined retail grocers' behavior in purchasing iceberg lettuce from California and Arizona and tomatoes from California and Florida.²¹ The study found evidence of grocers' market power in the purchase of lettuce from California and Arizona and for tomatoes from California, but not for tomatoes from Florida. Another study looked at supermarket data and found some evidence of collusion, the coordination of pricing and other decisions by competing firms, which may be facilitated in concentrated markets.²² Other studies looked at competition among retail stores for the sale of specific products and concluded that retailers had some degree of market power in these markets.²³ Finally, two studies analyzed the relationship between retail concentration and food prices and found little evidence of concentration affecting food prices in recent years.²⁴

We also reviewed three studies of regional retail milk markets that, for the most part, suggest evidence of market power. For example, one found evidence of noncompetitive behavior in nine metropolitan markets in California and four other western states. Two other studies

¹⁸Dairy cooperatives are member-owned organizations that assist producers in the marketing of their milk. Research on dairy cooperatives' market power has found mixed effects on commodity and food prices. A 2002 study examined the role of cooperatives in facilitating premiums for milk sold in the Michigan milk market. This study found that these premiums increased fluid milk retail prices by about 6 percent in 1998. See Christopher Wolf and Duane Banderob, "Voluntary Over-order Fluid Milk Premium Agreements and Implications for Policy Choices," *Journal of Cooperatives*, 17 (2002): 33-48.

¹⁹Chidmi and Lopez (2007).

²⁰Since retailers can carry in excess of 30,000 products, more sophisticated techniques are not possible.

²¹Sexton, et al. (2005).

²²Richards and Patterson (2005).

²³Arnade, Gopinath, and Pick (2009), three cheese products; Chavas and Mehta (2004), butter; Villas-Boas (2006), yogurt.

²⁴Marion (1998); and Stiegert and Sharkey (2007).

looked at the Boston retail fluid milk market and found evidence of some market power among retailers.

Studies Have Significant Limitations

In general, the studies we reviewed had several significant drawbacks that limit their usefulness in assessing the role of concentration on commodity and food prices. First, many of these studies only measured market power's effect on commodity and food prices and did not assess cost-efficiency effects. In addition, many studies did not account for the causes of this market power or link it to concentration. Some experts noted that one significant limitation was that some studies used data at a level of aggregation that was too high to be meaningful for certain products. Some experts, as well as the economic literature, found that certain models of market power use assumptions to facilitate their analysis, but these assumptions may not be realistic. Other experts explained that most current studies do not examine the market power and efficiency effects of successive layers of the food marketing chain—such as how market power at the processor level may interact with market power at the retail level. However, some experts also noted that there may be good reasons for some of these deficiencies in the studies, such as a lack of appropriate data for certain levels of the food marketing chain.

Current Trends of Increasing Concentration May Raise Concerns in Future

Most experts we spoke with said that concentration is likely to increase, leading to fewer, larger beef, pork, and dairy processors and retail outlets, although opinions were mixed on the likely impact of this potential trend. Several said that the potential for efficiency gains for larger companies will provide incentives for companies to merge or grow larger to take advantage of lower costs. However, some experts said that economies of size already may have been exhausted in some sectors. A few experts told us that large retail firms may be exerting pressure on food processors to consolidate because some retailers prefer to deal with relatively large suppliers. In this way, concentration at the retail level can lead to further concentration at the food processor level.

While most experts said they expect the concentration to increase, they differed on the likely impact. One expert said the increase would likely be beneficial, on balance, because efficiency gains were likely to continue to outweigh market power effects. In the retail sector, some experts said that future growth in concentration is less of a concern because of healthy competition from new retail outlets such as super center stores. Others said that future trends could heighten concerns about the potential for market power and the manipulation of commodity and food prices. They suggested that, particularly in meatpacking, additional mergers in already concentrated industries could allow processors to realize market power without corresponding efficiency gains. In other words, even though current research suggests that efficiency gains have outweighed market power effects in the past, additional increases in concentration may tilt this balance because efficiency gains may be exhausted while market power could continue to increase. In the retail sector, one expert expressed concerns about the effect on food prices in the future if food retailing becomes dominated by a handful of large chains.

Enclosure III: Objectives, Scope and Methodology

Our congressional requesters asked us to provide information on (1) trends in concentration for various levels of the food marketing chain in major agricultural sectors; (2) trends in retail food expenditures and prices; (3) trends in prices farmers received for major agricultural commodities; and (4) the views of experts on the potential effects of concentration on agricultural commodity and food prices. Concentration is the extent to which a small number of firms controls most of the sales or purchases in a specific market or industry.

To provide trend information on the first three objectives, we generally considered data from 1982 to the most recent year available in each case. We collected aggregate, national data on three levels of the food marketing chain—farms, processors, and retailers.²⁵ At each level, we examined agricultural markets overall and five major sectors—beef, pork, poultry, dairy, and grains. These sectors accounted for 86 percent of the market value of food-related agricultural products sold by U.S. farms in 2007. We adjusted indexed data so that the base period is the earliest period presented in this report.²⁶ All price data are presented in nominal terms, and we adjusted expenditure data to constant 2008 dollars using the Consumer Price Index published by the Department of Labor’s Bureau of Labor Statistics (BLS).²⁷

More specifically, to provide information on trends in concentration for various levels of the food marketing chain, we took the following steps. At the farm level, we analyzed data from the Census of Agriculture and data compiled for us by the U.S. Department of Agriculture’s (USDA) National Agricultural Statistics Service (NASS) that were based on the Census of Agriculture.²⁸ We reported trends for “grains and other crops” rather than grains alone to ensure data are consistent for all years. At the food processor level, we examined data on the market share held by the largest four firms from three sources: (1) the Department of Commerce’s Economic Census, conducted by the Bureau of the Census, for food processors overall and the dairy and grains sectors;²⁹ (2) USDA’s Grain Inspection, Packers and Stockyards Administration for beef and pork sectors; and (3) the National Chicken Council for poultry (broiler) production. Finally, at the retail level, we reported estimates made by

²⁵Concentration and price trends on a regional or local basis, or for specific products within these agricultural sectors, may differ from the aggregate, national level data presented here.

²⁶Price indices measure relative changes in prices over time as compared to a certain base period and do not show relative price levels or absolute values. We used indexed data when actual aggregate prices were not available.

²⁷We did not adjust price data to constant dollars because doing so would require making a number of assumptions about the appropriate deflator to use for each level of the food marketing chain in each sector. The use of different deflators can affect conclusions, and there is no consensus about which deflator is most appropriate in each case. Therefore, we present unadjusted, nominal prices.

²⁸The Census of Agriculture defines a farm as any place from which \$1,000 or more of agricultural products were produced or sold, or normally would have been sold, during the census year. This includes a large number of small farms. In 2007, about half of all farms produced less than \$5,000 in sales.

²⁹We used the bureau’s crosswalk to identify and link data for comparable industry segments across two different industry classification systems. We reported data for the 15 industry segments with comparable data from 1982 to 2002.

USDA's Economic Research Service (ERS) of the share of grocery store sales accounted for by the 4 and 20 largest firms nationwide.

To provide information on trends in retail food expenditures and prices, we obtained data from ERS and BLS. We used BLS's Consumer Price Index data for trends in prices for food and non-food items, and for dairy and grains-related foods.³⁰ To analyze trends in the retail prices of beef, pork, and poultry, we analyzed ERS data. We used ERS data to show components of the marketing bill, the postfarm value added to retail food such as for processing and packaging, and farm value as a share of total consumer food expenditures over time.

To provide information on trends in agricultural commodity prices, we analyzed data from NASS, the Department of Commerce's Bureau of Economic Analysis (BEA), ERS, and BLS. We used NASS data to assess trends in prices farmers received for farm products overall and BEA data to compare these trends to economywide price trends. We used ERS data to assess trends in beef, pork, dairy, and grain prices at the farm level and poultry prices at the wholesale level and BLS data to compare the farm-level trends to trends in food prices. We also analyzed past GAO reports to provide additional information on the share of the retail price of a gallon of 2-percent milk received by farmers, wholesale processors, and retailers in 14 U.S. markets.³¹

To summarize the views of experts on the potential effects of concentration on commodity and food prices, we analyzed 33 peer-reviewed, empirical economic studies and interviewed 10 experts we identified through the literature. We examined the processing segment of the beef, pork, and dairy sectors, and the retail sector. These sectors are among those with a significant body of empirical economic research on the effects of concentration. We used three criteria to select studies for review: (1) published in peer-reviewed journals; (2) involved an empirical analysis of data in one of the relevant sectors; and (3) published in 1990 or more recently, using data from at least the 1990s.³² To identify studies, we first conducted key word searches on academic databases. In addition, we obtained recommendations of additional studies from relevant experts. Enclosure IV lists the studies we reviewed. We identified experts on the basis of their contributions to the literature and ensured that we had coverage for each of the four sectors selected. We interviewed these experts and summarized their views on the role of concentration in the 2008 increase in commodity and food prices, and on potential future trends in concentration and their likely impacts. Since we did not speak to a probability sample of experts, our results may not be representative of the views of all experts.

³⁰We used the "Dairy and Related Products" index for dairy prices and the "Cereal and Bakery Products" index as representative of trends in prices for grains and products made with grains.

³¹GAO, *Dairy Industry: Information on Milk Prices, Factors Affecting Prices, and Dairy Policy Options*, GAO-05-50 (Washington, D.C.: Dec. 29, 2004); *Dairy Industry: Information on Milk Prices and Changing Market Structure*, GAO-01-561 (Washington, D.C.: June 15, 2001); and *Dairy Industry: Information on Prices for Fluid Milk and the Factors That Influence Them*, GAO/RCED-99-4 (Washington, D.C.: Oct. 8, 1998).

³²For the pork processing sector, we also included papers with data in the 1980s since this sector has not been studied as much in more recent years.

To assess the reliability of the data used to address these objectives, we reviewed the data and relevant documentation describing how the data were developed, interviewed officials responsible for the data regarding the steps they take to ensure the data's accuracy, and, where possible, compared these data with those from other sources. We discussed discrepancies identified through this process with agency officials and, where necessary, adjusted data accordingly. While not all data sources are completely comparable over time, we determined the data were sufficiently reliable and similar for illustrating broad trends in concentration and commodity and food prices.

We conducted our work from November 2008 to June 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions.

Enclosure IV: Empirical Economic Studies on the Impact of Concentration in the Beef, Pork, and Dairy Processing Sectors, and Retail Sector Overall on Agricultural Commodity and Food Prices

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Enclosure V: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

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Web site: www.gao.gov/fraudnet/fraudnet.htm

E-mail: fraudnet@gao.gov

Automated answering system: (800) 424-5454 or (202) 512-7470

Congressional Relations

Ralph Dawn, Managing Director, dawnr@gao.gov, (202) 512-4400
U.S. Government Accountability Office, 441 G Street NW, Room 7125
Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800
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