North American Credit Research
Industry Report
J.P. Morgan Securities Inc.
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The Meat Market: A Primer

- **Consolidation continues among U.S. chicken, beef, and pork processors, with more transactions likely over the next few years.**
- **Chicken processors are benefiting from sharply lower feed costs and modest improvement in product prices, but the prospect of slow export growth clouds the industry's outlook.**
- **Beef prices have risen strongly in recent weeks while cattle prices have eased, pointing to wider margins for beef processors in the coming months.**
- **Pork processors will continue to confront difficulties, as large supplies of hogs and frozen pork weigh on prices. A resurgence of imports from Canada also is limiting the pricing power of U.S. processors.**

Meat processors are major participants in the U.S. capital markets. The leading producers of beef, pork, and chicken have approximately $21 billion face value of bonds outstanding in the U.S. market, as well as loans and other financial instruments. JPMorgan has prepared this report as background on this important sector of the agricultural industry. This document analyzes supply, demand, and cost trends for the meat industry as a whole and for the beef, pork, and chicken subsectors, and also examines changes in market structure. The much smaller fish and seafood industry is beyond the scope of this report.

Contents

This report as well as our interactive financial modeling tool, Credit Ratios, is available on the JPMorganChase web site:
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The Food of Choice

As a society becomes wealthier, meat is a food of preference. Nowhere is that clearer than in the United States. As measured by the U.S. Department of Agriculture, average meat consumption per person has risen an astounding 57% since 1909 (Chart 1). Although common sense suggests that there must be physical limits to meat consumption, Americans apparently have not reached them. Per capita meat consumption in the 1990s was 3.7% higher than in the 1980s. Last year, the average American ate about 196 pounds of beef, pork, lamb, chicken, and fish. When the final figures are in, last year's per capita consumption may have exceeded the record set in 1999.

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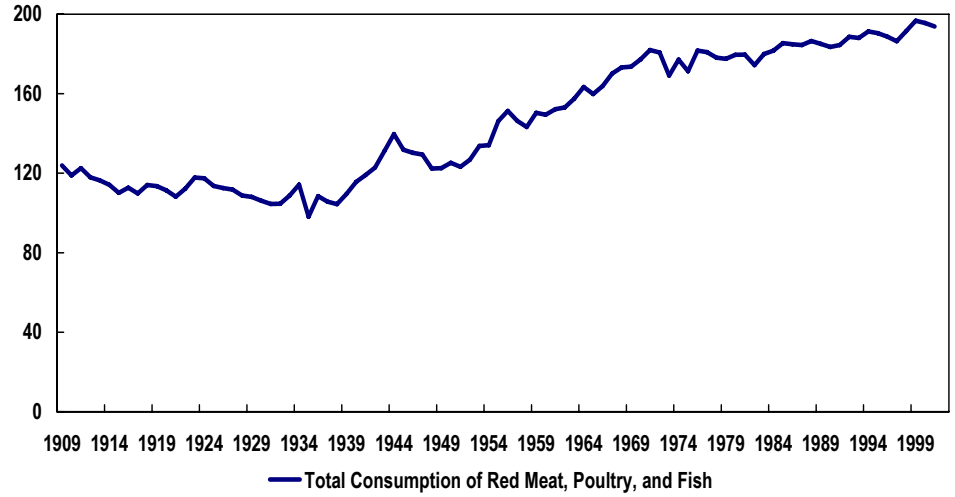
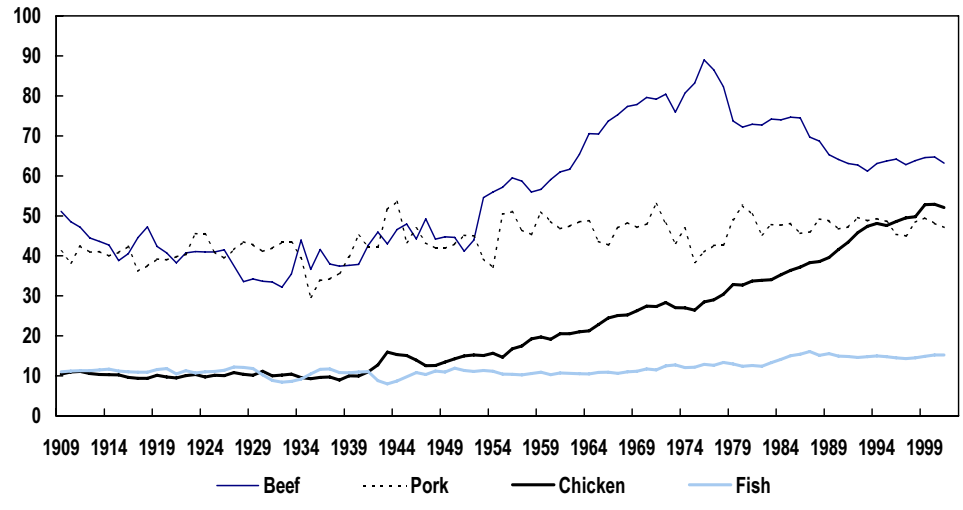
Chart 1
Meat Consumption Per Person
Pounds per Capita boneless trimmed equivalent



Source: U.S. Department of Agriculture. Annual data.

Even as they have been eating more meat, Americans' tastes in meat have undergone a notable change (Chart 2). Average consumption of red meats, including beef, veal, pork, and lamb, has barely risen over the past century, as a modest rise in the popularity of beef and pork has been balanced by much diminished consumption of veal and lamb. Per-capita consumption of poultry, on the other hand, has grown more than five-fold since 1909. Most of the additional meat Americans eat is chicken. In 1909, the average American ate barely 10 pounds of chicken meat. Last year, the average was approximately 54 pounds. These per capita figures have been revised downward from previous reports to reflect the population increase recorded in the 2000 Census.

Chart 2
Per-Capita Consumption of Various Meats
Pounds per Capita boneless trimmed equivalent



Source: U.S. Department of Agriculture. Annual data.

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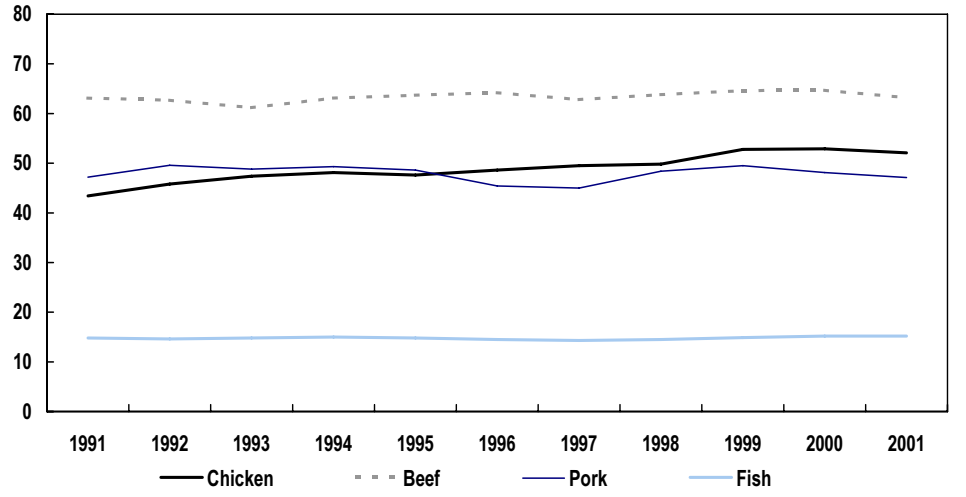
Nonetheless, the underlying trends remain. The average American's consumption of beef and pork barely changed since 1991, while consumption of chicken increased markedly (Chart 3). Despite much attention to the supposed health advantages of fish, fish consumption per person grew quite modestly over the decade.

Chart 3
Meat Consumption Trends Over the Past Decade
Pounds Consumed per Capita, boneless trimmed equivalent



Source: U.S. Department of Agriculture. Annual data.

A Snapshot of the Industry

The meat products industry shipped $124 billion worth of products in 2002. Total shipments were flat from 1997 through 1999, then grew significantly in 2000 and 2001 before declining last year. Value added in the meatpacking process in 2001, the most recent year for which figures are available, was $38 billion, of which $14.7 billion was employee compensation. These aggregate figures conceal great differences in different stages of meat production (Table 1).

Table 1
The Meat Industry, 2001

Subsector	Shipments ($ million)	Value Added as % of Shipments	Employment	Compensation per Employee
Animal slaughtering (except poultry)	$60,590	16.9%	144,729	$32,348
Meat processed from carcasses	28,039	38.5%	107,060	35,215
Rendering and meat byproducts	2,252	52.3%	10,865	40,112
Poultry processing	34,529	45.9%	230,715	25,275

Source: U.S. Department of Commerce, Census Bureau.

In aggregate, the meat slaughtering and processing industry employs nearly half a million workers. A substantial proportion of production workers, perhaps as much as 20%, is covered by collective bargaining agreements. Nonetheless, unions have little bargaining power, as most meat plants are located in rural areas offering few employment alternatives and as the companies appear content to operate with high worker turnover. The average wage for production workers is less than $11 an hour,

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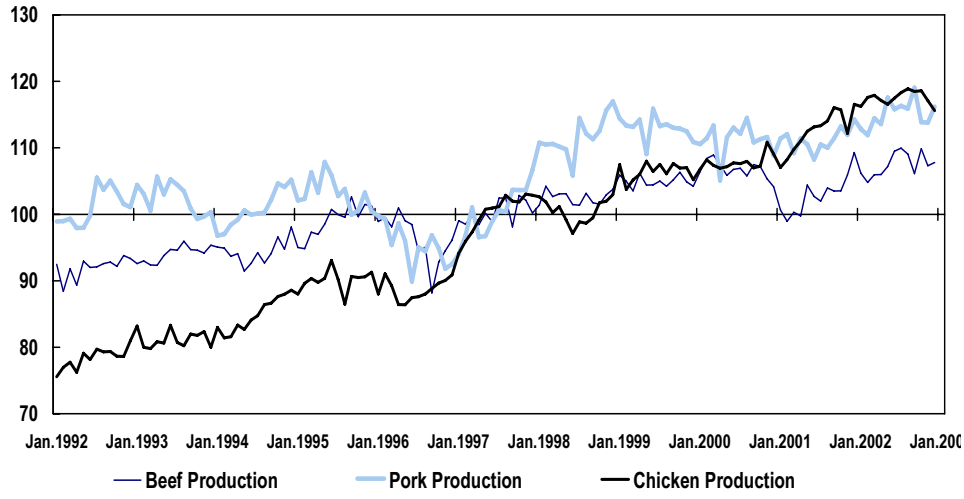
with workers in chicken plants earning less than $10 per hour. Wage increases in recent years have been in the range of 2% annually.

The industries producing the three main types of meat, beef, pork, and chicken, are similar in size. Domestic consumer sales of chicken last year were $32 billion, compared to $27 billion of beef and $24 billion of pork. The amounts sold to the domestic food service industry were probably similar, although no official figures are available. Production of chicken has expanded much more rapidly than production of beef and pork, in line with the consumption trends described above (Chart 4).

Chart 4
Meat Production Trends
Index, 1997=100



Source: Federal Reserve Board. Monthly data.

Meat prices, like commodity prices in general, have lagged inflation in recent years (Chart 5). Retail prices for poultry and pork products, for example, have increased at an annual rate of around 1% since 1996. Retail beef prices were flat for a decade before rising from 1999 to 2001, and have been flat again since the middle of 2001. Consumers tend to regard these meats as substitutes, so a rise in the price of one is quickly felt in the form of higher demand for others.

Demand for specific types of meat products also shifts constantly due to consumers' extreme sensitivity to price changes. Volume sales of boneless choice sirloin steak, for example, were only half as great in December 2002 as in December 2001, due to a 27% price rise and a much lower frequency of special offers. Instead of promoting sirloin, retailers ran extensive specials on round steak in December 2002—and volume sales were 68% higher than in December 2001.

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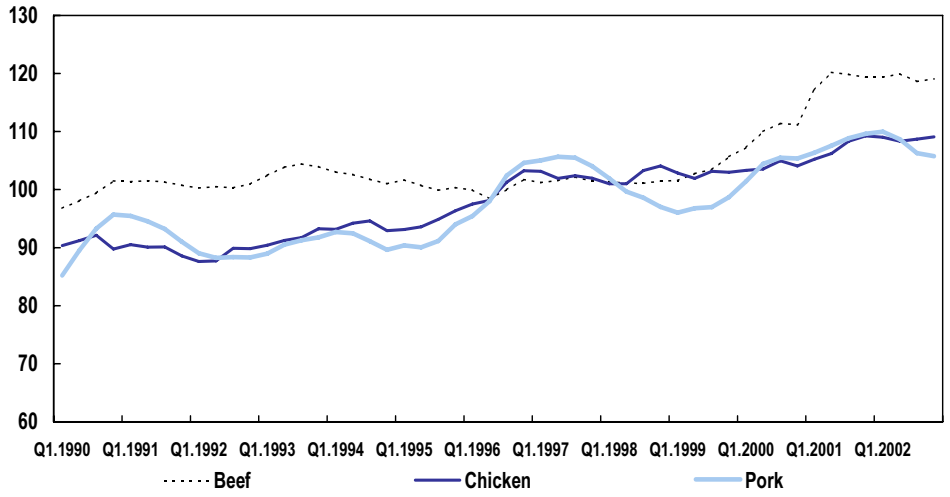
Chart 5
Consumer Price Inflation of Meat Products
Personal Consumption Expenditures Price Index, first quarter 1996=100



Source: U.S. Department of Commerce, Bureau of Economic Analysis. Quarterly data.

Chicken Processing

The chicken industry has suffered through difficult times in recent years. Although chicken consumption has grown strongly due to the rapid rise in the price of beef, prices have been weak. During most of 2002, chicken processors were squeezed between falling product prices and higher input costs, causing profit margins to narrow significantly. Both of these developments have now reversed, but international trade concerns and continued high energy costs will slow the improvement of earnings.

Nine Weeks from Egg to Drumstick

Chicken is the most vertically integrated of the meat-producing industries. Every stage of production is under the control of integrated producers. Typically, producers hatch chicks, then place them with contract growers who raise the birds for eight to nine weeks. Almost all growing of chickens for meat purposes occurs in the South, with the five largest states accounting for nearly 60% of U.S. broiler production (Table 2).

Table 2
Leading States for Broiler Production, 2001

State	Production (Billion Pounds)	Value of Production (Million Dollars)	Share of U.S. Output by Value
Georgia	6.24	$2.43	14.6%
Arkansas	5.74	$2.24	13.4%
Alabama	5.14	$2.00	12.0%
North Carolina	4.20	$1.68	10.1%
Mississippi	3.83	$1.49	8.9%
U.S. Total	42.45	$16.69	100.0%

Source: U.S. Department of Agriculture.

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Growers normally build growout houses to the processor's specifications, and are required to use only feed and medicine furnished by the processor. The processor may pay part, but rarely all, of the cost of heating chicken houses. Grower contracts contain a pricing formula, but they almost never obligate the producer to furnish chicks. The producer thus bears no long-term price risk; if market prices turn unfavorable, the producer can decline to furnish additional chicks unless the grower accepts changes in the contract.

The birds' health is a major concern during the growout process. Poultry is highly susceptible to avian influenza. Processors take considerable effort to preclude influenza outbreaks; grower contracts, for example, frequently prohibit growers from visiting one another's property lest they unwittingly track influenza virus. Omissions such as a processor's failure to decontaminate poultry trucks fully can enable the virus to spread quickly from farm to farm. Last summer, the most severe U.S. outbreak in 18 years forced the destruction of millions of birds in Virginia and led Japan and Korea to temporarily suspend poultry imports from the United States, costing processors and growers more than $100 million.

Various consumer activist groups have pushed for changes in the way poultry is raised. Last year, several poultry processors announced that they would stop routine use of antibiotics in response to fears that human consumption of antibiotics concentrated in meat could diminish the effectiveness of antibiotic medications. Animal-rights groups have demanded the redesign of chicken houses to allow the birds greater activity and the use of mechanized chicken catching to reduce injury to birds being collected for slaughter. Several fast-food chains have responded to consumer pressure by insisting that their poultry suppliers adhere to animal-welfare standards.

Growout has been altered considerably by scientific research. Improved breeding and nutrition have brought a steady increase in the average size of a chicken at slaughter, from 3.36 pounds in 1960 to 5.12 pounds today. Scales in growing houses constantly collect random weight information, and the processor can advise a grower to change feed, temperature, or lighting conditions if the birds are above or below their target weight. The average time between hatching and slaughter is declining towards eight weeks, barely half the average after World War II.

Value Added

The processor collects the grown chickens from the grower in accordance with its production requirements. Where processing once meant simply preparing carcasses for retail sale, the sale of whole birds now accounts for a relatively small part of the business. There are well-established markets for wings, leg quarters, and other pre-cut pieces, which typically generate much higher prices than the sale of whole birds. For example, while the recent wholesale price of whole chickens has been about $0.64 cents per pound, wings have been going for more than $0.70 per pound and breasts for $0.85.

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More highly processed products are even more lucrative. Boneless breasts, to give one example, command roughly twice the per-pound price of unboned breasts. The larger producers have sought to move into even more highly processed products, from "nuggets" to pre-packaged meals, in an effort to escape the commodity price cycle. These high-value-added products are sold mainly into the restaurant market rather than to retail customers. In the year ending Sept. 28, 2002, for example, Pilgrim's Pride, the third-largest chicken processor, sold nearly three times as much chicken to the foodservice industry as to supermarkets; for prepared chicken products, including breast fillets, the share going to foodservice buyers exceeded 80%.

In addition to promoting value-added products, poultry processors are pursuing other strategies to improve margins. Some, notably Tyson, offer logistical services to food retailers, in essence taking charge of the retailer's inventory management and product selection. Several companies have announced plans to take advantage of new government standards to offer organic chicken. Some are promoting their own brands on chicken products in hopes of achieving premium prices.

Supply Is Hard to Control

The chicken industry is relatively unconcentrated (Table 3). According to the 1997 U.S. Economic Census, the top four poultry processors accounted for 40.6% of all shipments, the top eight for 54.0%, with 249 other firms also claiming a share of the market. Although the intervening years have brought some consolidation—the top four producers now control half of the U.S. broiler slaughter— the industry remains fragmented. The large number of players and the ability to turn eggs into full-grown birds within nine weeks mean that supply is difficult to control.

Table 3
Shares of U.S. Broiler Processing, 2002

Company	Share
Tyson Foods	24.5%
Pilgrim's Pride	8.8%
ConAgra Foods	8.7%
Gold Kist	8.6%
Perdue Farms	6.7%
ContiGroup (Wayne Farms)	3.1%
Sanderson Farms	3.1%
Foster Farms	3.0%
George's Inc.	2.7%
Cagle's Inc.	2.4%

Source: Watt PoultryUSA.
Note: Market shares based on number of broilers slaughtered.

Broiler slaughterings have risen by 15% by weight since 1998. Export volumes have declined by one-fourth over this period, so all of the increased broiler production was consumed domestically. This ample supply has kept prices in check despite impressive growth in demand. Based on retail weight, Americans bought 81 pounds of chicken per person last year, a 33% increase since 1990. Half of this growth has occurred since the end of 1997.

Measuring only the trimmed, boneless amount of meat on Americans' dinner plates and sandwich rolls, the average American ate 50% more beef than chicken in 1990. Last year, per capita poultry consumption, including both chicken and turkey, exceeded per capita beef consumption. Health concerns about red meat and clever marketing of new chicken products may have played some role in spurring demand, but the most important force has been price. Since the start of 1999, consumer prices

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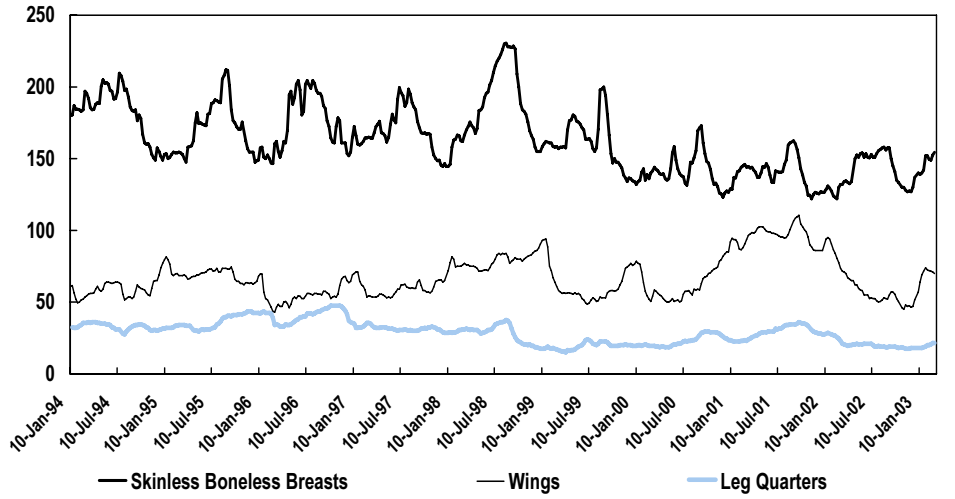
for beef and veal are up 19%, while the price of chicken has risen 6% at retail. When chicken is relatively cheap, consumers, predictably, respond by eating more chicken.

Prices have improved dramatically in the first part of 2003 after sagging badly in the second half of 2002. The most important indicators for chicken producers are the so-called Georgia Dock prices, obtained from that state's many processing plants, which slaughter an average 4.9 million birds per day. The long-term trend of Georgia Dock prices is downward, but the industry experiences frequent short price cycles (Chart 6). The most recent cycle began its upward phase just before Christmas. Since then, skinless, boneless breasts, the basic foodservice product, have risen from $1.27 to $1.55 per pound, while the price of chicken wings has jumped from $0.46 to $0.70.

Chart 6
Georgia Dock Prices Stage a Rally
Cents per pound



Source: Georgia Department of Agriculture. Weekly data.

As this chart indicates, chicken is subject to considerable price fluctuation within short periods of time. As eggs can be grown into finished birds within nine weeks, producers are able to respond to the slightest indication of higher prices by increasing supply in short order. This high price volatility means that the "chicken cycle" is not a particularly relevant concern for fixed-income investors; it is not unreasonable to assume that whenever cyclical factors drive prices up, a surge of supply will follow shortly. This will change only if the industry succeeds in reducing capacity. There are some indications that this is starting to occur: Perdue Farms closed a West Virginia chicken deboning plant last October, Cagle Inc. eliminated one shift at a Georgia plant in February, and Tyson has closed plants in Florida and Oklahoma. More consolidation among processors is likely.

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Prices and Profits

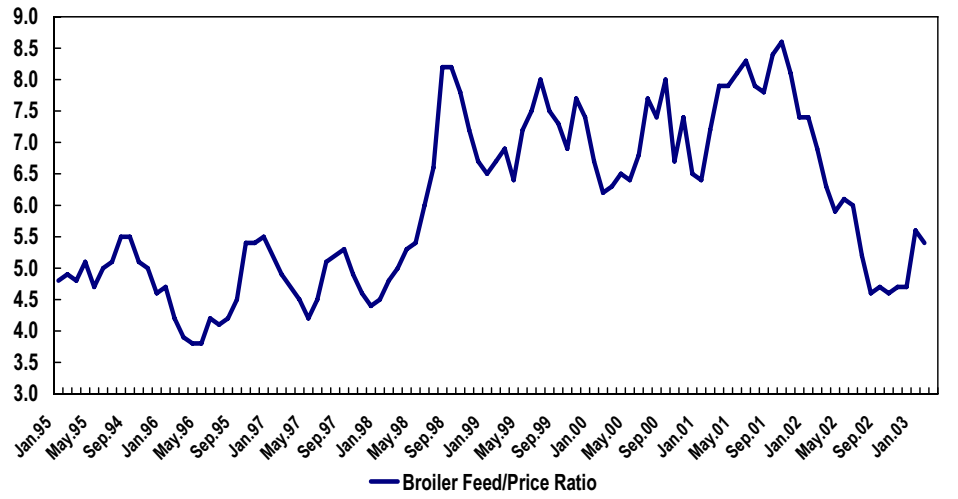
Two other factors are more important to the profit outlook for processors: the growing imbalance in demand for various parts of the chicken, and the gap between input costs and output prices.

The demand imbalance is driven by consumers' tastes and pocketbooks. Whether they are buying chicken at the supermarket or in a restaurant, U.S. consumers favor white meat. This leaves processors with the task of marketing huge quantities of chicken thighs and legs. Exports offer a natural way to balance the market, as consumers in Latin America and Russia are more able to afford lower-cost dark meat. Poor economic conditions in Latin America and Russian trade barriers have interrupted this pattern in recent months, leaving U.S. processors with a vast surplus of dark meat. Prices have been forced down to ruinous levels, with the Georgia Dock price for leg quarters falling from $0.35 per pound in late 2001 to $0.175 late last year. Although the price has edged up since, U.S. processors are likely to face a continuing challenge stimulating demand for dark meat.

The gap between input costs and output prices has shown more positive trends of late. Chicken feed and natural gas, which is used to heat chicken houses, are the two main production inputs. Typically, processors furnish feed to growers, so any changes in feed costs directly affect processors' bottom lines. The cost of natural gas is often shared between processors and growers according to a formula set forth in their contract. Changes in gas prices will tend to have a greater impact on the growers, but processors will generally share some of the cost or benefit.

For much of last year, one pound of live broiler was equal in value to less than five pounds of feed, as a poor harvest sent feed prices sky high (Chart 7). This was the lowest ratio in four years and dramatically affected processors' margins. The ratio

Chart 7
The Feed-Price Ratio Turns Favorable
Pounds of feed equal in value to 1 lb broiler liveweight



Source: U.S. Department of Agriculture. Monthly data.

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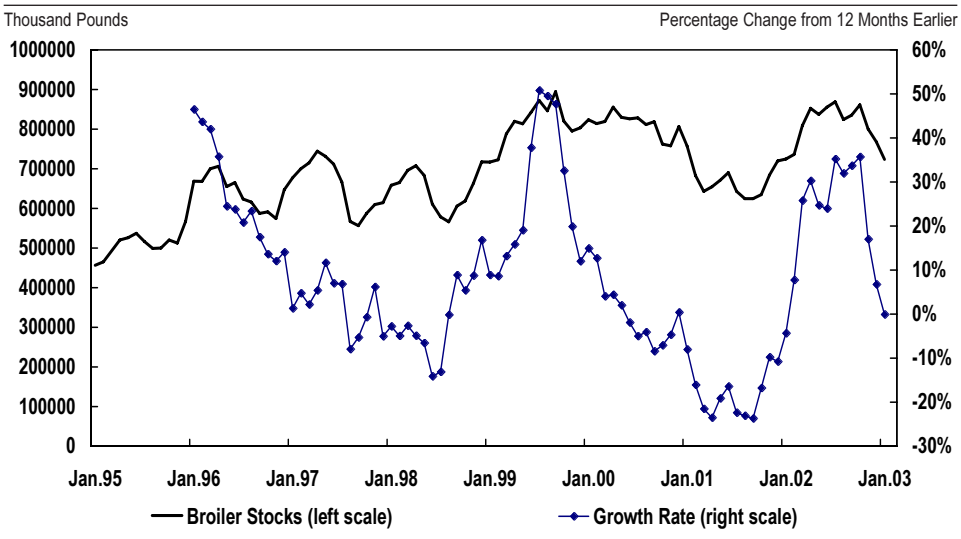
began increasing late last year as grain prices fell and chicken prices improved, but is still well below the average of the past four years. Further declines in feed costs will depend mainly upon next summer's harvest, and until the size of the U.S. crop becomes clear changes in the feed price ratio will be determined mainly by changes in the selling price of chicken.

Natural gas, meanwhile, has soared in price. After falling to less than $2 per million Btu in the winter of 2001-2002, wholesale gas prices have been above $5 for the past three months. Futures markets anticipate prices in the $5.30 range over the coming year. If this prognosis is accurate, high energy costs will be a significant drain on some processors' profits. The impact on individual producers depends heavily on the specifics of their contracts with growers, and the terms of these contracts are normally not known to the public.

Overall, however, the chicken industry's near-term prospects are modestly positive. Stocks of chicken in cold storage are the lowest in a year (Chart 8), reducing the overhang that helped depress prices in 2002. Although a sudden increase in stocks is not out of the question—the monthly figures are quite volatile—the numbers point to no surge of supply that will depress prices over the next several months. Higher beef prices over the next few months may stimulate chicken consumption and support prices. While Russia's new quotas on poultry imports will reduce U.S. shipments, they are likely also to lead to higher prices for U.S. exports to Russia and thus enhance U.S. processors' margins.

Chart 8
Broiler Stocks



Source: U.S. Department of Agriculture. Monthly data.

The longer-term prospects for U.S. poultry processors are a bit less positive. Foreign markets have been the key to U.S. processors' growth over the past decade. Two of the most important chicken-consuming countries, Russia and China, are engaged in concerted efforts to increase domestic production and reduce dependence on imports. Mexico, another large export market, has imposed temporary tariff quotas to sustain

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chicken production in the face of U.S. competition. In other countries, U.S. exports face increasing competition from Brazil, which has taken advantage of its large supplies of feedstuffs to boost chicken production and treble exports since 1998.

Industry experts estimate that lower labor costs give Brazil a cost advantage of 20% or more in broiler production. Although strong global demand growth should allow U.S. processors to maintain current export levels, increases in export volume will be hard to come by so long as Brazilian output continues to expand.

The Beef Industry

The beef industry differs from the chicken industry in fundamental ways:

- The main chicken producers are vertically integrated and exercise contractual control over the only non-integrated part of the production process, the growing of the birds. Beef producers, in contrast, generally buy cattle at arm's length. Prior to their purchase at auction, individual cattle may have been raised by any number of independent growers, typically including a "cow/calf operator," specializing in calves, and one or more "feeders," who raise the calves to marketable size. Although contractual relationships between cattle raisers and beef producers are becoming more common, beef producers as a rule have little or no control over or even knowledge of the circumstances under which the cattle were raised.
- Weather conditions have little effect on the chicken industry, except on the cost of heating chicken houses in the winter. The size of cattle herds and the market weight of cattle, on the other hand, can be dramatically affected by harsh weather that kills animals on the range or reduces the growth of grass, forcing ranchers to use more hay or purchased feeds.
- The beef industry has a much longer production cycle than the chicken industry, as it can take two years or more to raise cattle to marketable size. While supply can diminish quickly due to increased slaughter, the normal supply response is measured in years, not months. A typical cattle price cycle, from peak to peak, can last from 10 to 12 years.
- Beef processors, unlike chicken processors, have access to a wide array of futures products in order to hedge supply and demand risk.

On a per-person basis, consumption of beef has been in very slow decline in the United States and in most other wealthy countries, including Japan and Western Europe. However, overall consumption continues to rise. Total production in the major beef-raising countries[1] has been growing at a 1.2% annual rate since 1990. U.S. output has been growing at an annual rate of about 1.6%. The U.S. has accounted for an average of about 27% of worldwide beef production in recent years (Chart 9).

Despite weak consumption growth, U.S. beef production has fallen short of domestic demand since 1958. Imports tend to be cyclical, rising in response to declines in U.S.

1. This includes the United States, Canada, Mexico, Argentina, Brazil, the European Union, Russia, China, Japan, Korea, Australia, New Zealand, India, and South Africa.

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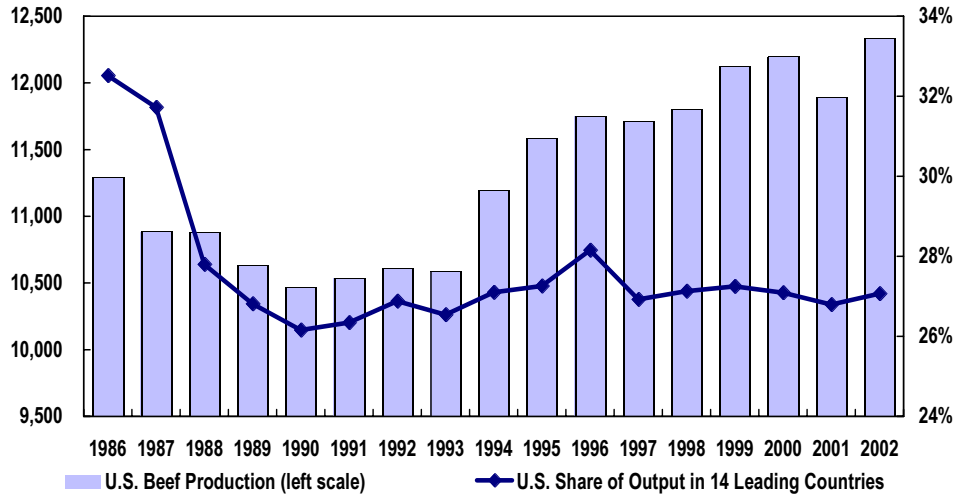
Chart 9
U.S. Beef Production

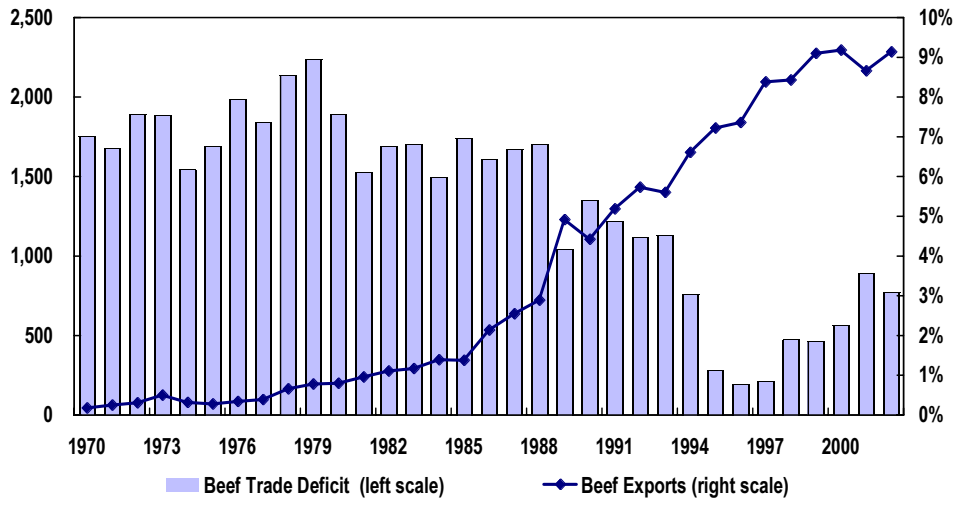


Source: U.S. Department of Agriculture. Annual data.
Note: The 14 leading producers, including the European Union, account for more than 90% of global beef production.

herds. Imports have rebounded after falling to very low levels in 1996 and 1997 (Chart 10). The largest foreign sources of supply are Australia, Canada, and New Zealand, which jointly accounted for 88% of beef imports last year. Imports from South America are severely restricted by animal health regulations due to the presence of hoof and mouth disease in key production regions.

At the same time as imports are rising, U.S. beef producers have actively targeted export markets. Beef consumption in most parts of the world is low by U.S. standards; only in Argentina does the average person eat more beef than in the

Chart 10
U.S. Beef Trade



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United States. Low consumption levels have provided ample room for market expansion. U.S. exports exceed 2.4 billion pounds annually, and account for more than 9% of domestic production. Japan is the largest market for U.S. beef exports, but exports to Mexico and South Korea have been rising rapidly. Japanese purchases of U.S. beef fell 22% in 2002 as reports of bovine spongiform encephalopathy ("mad cow disease") in Japanese herds caused total beef consumption to plummet.

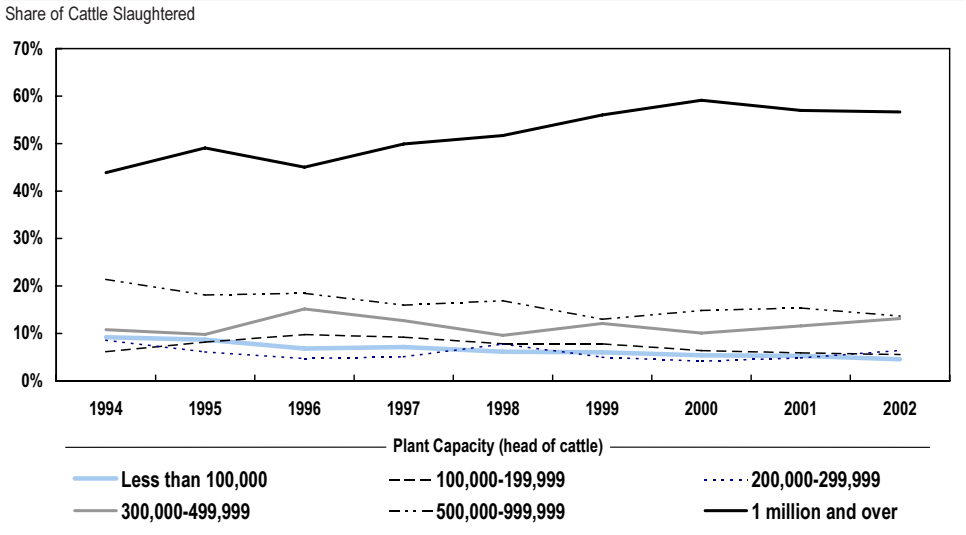
Beef Processing

Production in U.S. beef packing is highly concentrated. The five largest processors, Tyson Foods, Cargill, Swift & Co., Farmland Industries, and Smithfield Foods, slaughter more than 85% of all cattle and control nearly 90% of boxed beef shipments. Tyson is by far the biggest player, with a beef market share of about 29%.

The big firms' dominance has continued to grow through recent transactions. Cargill's Excel Foods division, the second-largest beef processor, increased its market share by purchasing packers Emmpak Foods in 2001 and Taylor Packing in 2002. Smithfield bought Packerland Holdings and Moyer Packing in 2001. Further changes may be in store depending upon the reorganization of Farmland Industries, which filed for Chapter 11 bankruptcy in May 2002. Farmland, a cooperative, received bankruptcy court approval in January 2003 to prepare its beef and pork operations for sale. Smithfield, the fifth-largest beef processor, has indicated interest in acquiring Farmland's beef-packing assets, and other bidders may yet surface. The outcome may have a significant impact on the structure of the market.

Increased concentration is visible at the plant level. One-fifth of beef plants slaughtering fewer than 100,000 cattle per year have closed since 1994, and the number of mid-sized plants has fallen as well. Production has shifted to extremely large plants: just 15 active plants, each slaughtering more than one million cattle per year, are responsible for nearly 60% of all cattle slaughtered (Chart 11).

Chart 11
Share of Beef Slaughter by Slaughterhouse Size



Source: U.S. Department of Agriculture. Annual data.

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This increased capital intensity is gradually driving slaughtering plants to make supply arrangements with ranchers and feedlots, as the lack of a steady supply of animals for slaughter can lead to a severe loss of operating efficiency. Government data indicate that 9% of cattle slaughtered in 2000 were purchased from feedlots owned by the beef packers themselves, and 29% were purchased from outside suppliers under various types of forward contracts and marketing agreements. The feedlot industry mirrors the beef packing industry's trend toward fewer but larger locations. Although there are 94,000 cattle feedlots nationwide, just 53 supply a quarter of the nation's beef cattle.

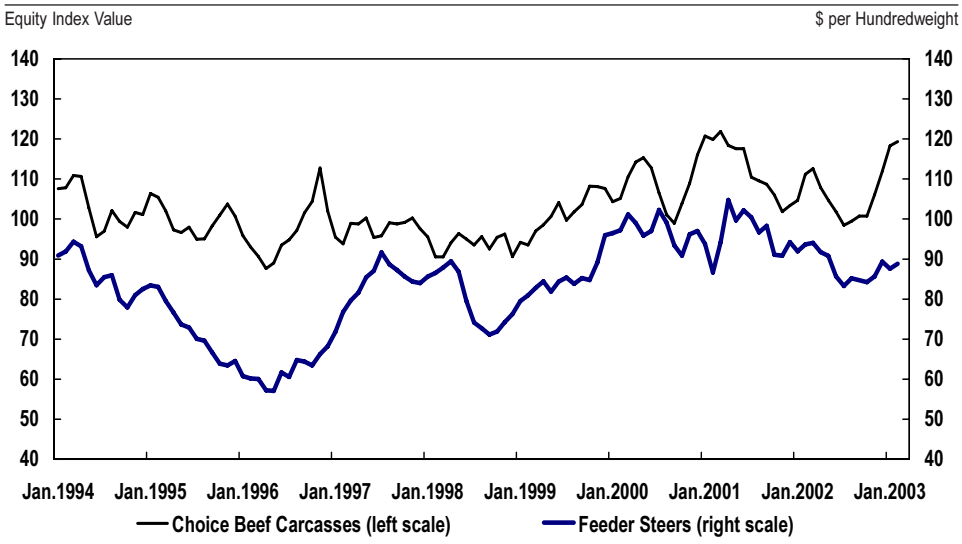
The large beef companies all have integrated downstream as well. Where they once simply slaughtered animals and shipped the carcasses to processors, the beef majors now handle all stages of processing themselves. In most cases, their slaughter plants have fabrication plants attached. After being chilled following slaughter, large pieces of meat are stripped from the carcass and sold as "boxed beef," which is now the main packing-plant product. Many plants go further and cut retail portions, which are then vacuum wrapped and delivered to supermarkets as "case-ready" beef, reducing or eliminating the need for in-store butchers.

Processors have built entirely new plants to handle this value-added production. Most large beef plants are non-union operations located in small communities on the Great Plains, well away from the industry's historic roots in the Upper Midwest. Just three states, Nebraska, Kansas, and Texas, account for 60% of all cattle slaughtered.

The Beef Price Outlook

Beef prices have been fairly strong in recent years. Both cattle and beef prices fell sharply during 2002, as drought conditions on the range and high costs for purchased feeds persuaded many growers that it was cheaper to slaughter their cattle rather than feed them. This depressed prices last summer, then led to tighter supplies of beef and

Chart 12
Beef and Steer Prices



Source: The Wall Street Journal and Haver Analytics. Monthly data.

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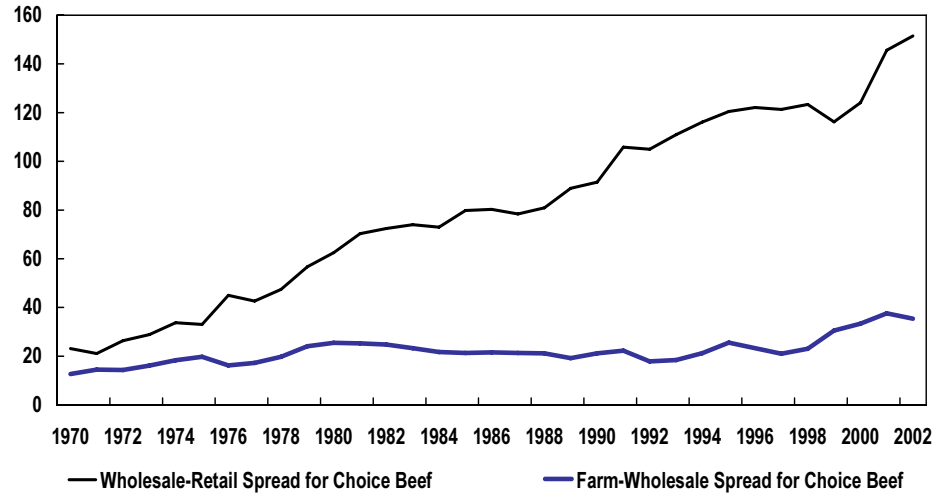
a 20% increase in beef carcass prices over the past six months, even as cattle prices have languished (Chart 12). This suggests that processors are enjoying wider margins after a difficult year in 2002. The average consumer price of beef was $3.06 per pound in December, unchanged from a year earlier, with shoppers showing a surprising willingness to buy expensive cuts such as steaks even at a time of economic worry.

In addition to contending with price fluctuations and changing consumer tastes, the beef market has been strongly affected by the increased market power of retailers and branded food packagers. As a result, the distribution of rents within the beef complex has changed dramatically.

In the early 1970s, farmers captured about two-thirds of the retail price of beef. In recent years, however, the price received by farmers has averaged less than half the price that consumers pay at retail. Primary processors—slaughterhouses that sell beef carcasses—have increased their take from barely $0.12 per retail pound in 1970 to $0.35 last year, and their share of the retail price has risen from less than 7% in the early 1990s to more than 10% since 1999.

Most of the gain in beef prices, however, has been captured after the wholesale stage, either by retailers or by processors who buy cuts of 550-900 pounds and use them to make prepared foods. Last year, the average spread between the wholesale and retail prices of choice beef was $1.52 per pound, far and away the widest ever recorded (Chart 13), and the share of the final sales dollar pocketed after the wholesale stage hit a record 46%. This explains why the major beef packers have eagerly moved into more advanced processing—and why they have sought to expand their already large market shares.

Chart 13
Price Spreads for Choice Beef
Cents per pound



Source: U.S. Department of Agriculture. Annual data.

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As cattle supplies tighten, beef production in 2003 is likely to be 3% to 4% lower than in 2002. Renewed demand from Japan should lead to increased exports. These factors can be expected to push beef prices higher over the balance of 2003. The producer price index for the output of beef packing plants and the consumer price index for beef both have risen sharply, and there is a good chance that they will hit record levels before the year is out. Although higher prices eventually will lead to herd expansion, this cannot happen quickly in the cattle industry. High beef prices are likely to persist at least through 2004.

The Pork Market

The pork processing industry has undergone enormous structural changes in recent years. Arguably, it has been through two revolutions. In the first, during the 1980s, hog processors sought economies of scale by building vastly larger slaughter plants and turning further processing over to specialist plants. In 1982, most bacon, ham, and sausage came from plants that also slaughtered animals, but by 1992 plants without slaughter operations dominated the business.

The second revolution came in the 1990s, as pork processors began building extremely large processing complexes. In 1995, some 19% of the nation's pork supply came from four plants each slaughtering more than four million animals a year. By 2002 there were nine of these mega-plants, and they accounted for 43% of all hogs slaughtered.

To function economically, these complexes require a reliable supply of pork, so the producers encouraged the establishment of vary large farms in the vicinity of their new plants. This led to a dramatic shift in hog production. In 1978, farms selling less than 1,000 hogs per year accounted for two-thirds of all hogs on the market. By 2000, farms of this size accounted for less than 2% of all hogs sold. At the other end of the spectrum 20 giant operations sold more than 500,000 hogs apiece, accounting for 35% of total hog sales. Few of these very large farm operations are in the traditional hog-raising states of the Midwest. Hog production has shifted to new areas, notably North Carolina.

The degree of vertical integration varies from company to company. In some cases, the large packers have chosen to own hog farming operations. More commonly, however, they have sought contractual relationships with independent growers, similar to those in the poultry industry. The spot market for hogs has withered. As explained in a recent filing by Hormel Foods Corp.,

> The hog production industry has been rapidly moving to very large, vertically integrated, year-round confinement operations operating under long-term supply agreements. This has resulted in fewer hogs being available on the spot cash market, which decreases the supply of hogs on the open market and can severely diminish the utilization of slaughter facilities and increase the cost of the raw materials they produce. The Company, along with others in the industry, uses long-term supply contracts to manage the effects of this

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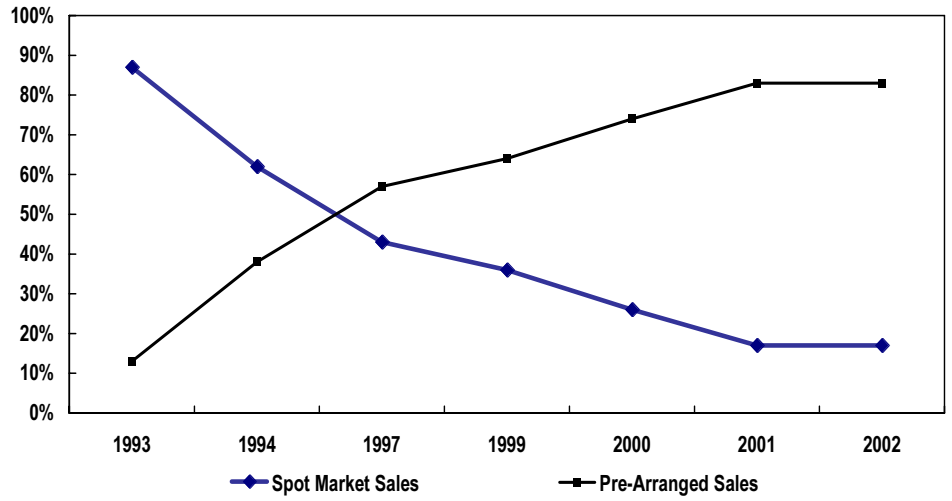
trend and to assure a stable supply of raw materials while minimizing extreme fluctuations in costs over the long-term. This may result in costs for live hogs that are either higher or lower than the spot cash market depending on the relationship of the cash spot market to contract prices.

According to a study by the National Pork Board, only 16.7% of packers' hog requirements in January 2002 were met on the spot market. This is down sharply from 87% in 1993 (Chart 14). Studies indicate that about one-fifth of slaughter hogs are owned by companies that also own packing plants, and perhaps 5% are owned by feed companies.

Chart 14
Hog Marketing Arrangements
Percent of number of hogs



Sources: U.S. Department of Agriculture, University of Missouri, and National Pork Board.

In principle, pork processors could seek to mitigate price risk through their contractual arrangements with hog producers. In practice, this is uncommon. More than 60% of hog sales, and almost three-quarters of sales of hogs not owned by packing companies, occur either at spot-market prices or under a pricing formula based on a reported spot price plus a mark-up (Table 4). Given the fact that the spot market for hogs is becoming increasingly thin, these arrangements are leading to concern that packers can manipulate the prices paid under formula-based contracts by manipulating spot-market prices. This issue has been the subject of numerous studies and legislative hearings.

Table 4
Proportion of Hogs Sold under Various Pricing Arrangements

	1999	2000	2001	2002
Formula tied to spot market prices	44.2%	47.2%	54.0%	44.5%
Spot price	35.8%	25.7%	17.3%	16.7%
Formula tied to grain or futures market prices	13.2%	20.8%	21.9%	11.8%
Gains/losses shared if price is outside "window"	4.6%	4.6%	6.6%	8.6%
Owned by Packers and Sold Internally				16.4%
Owned by Packers and Sold Outside				2.1%

Source: University of Missouri and National Pork Board

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Pork processing is significantly less concentrated than beef processing, with eight companies accounting for 80% of the federally inspected hog slaughter. New companies such as Seaboard Farms and Premium Standard Farms entered the industry in the late 1980s and early 1990s, as vertical integration was in its infancy, and now have significant market shares (Table 5). Many smaller players have been acquired or have closed over the past decade, and approximately 150 hog slaughterhouses have closed. As with beef, the disposition of Farmland Industries' pork operations may lead to greater industry concentration.

Table 5
Pork Industry Market Shares, 2002

Company	Share of Slaughter Capacity
Smithfield Foods	21.3%
Tyson Foods (IBP)	18.9%
Swift & Co.	11.4%
Cargill (Excel)	8.5%
Hormel	6.9%
Farmland Industries	6.8%
Premium Standard	4.5%
Seaboard Corp.	4.3%
Mitsubishi Corp. (Indiana Packers)	3.2%
Sara Lee	2.4%

Source: National Pork Board.

A number of factors, including lack of capital and environmental concerns, are likely to limit the further growth of extremely large hog-raising operations. However, the average size of hog farms will continue to grow, as the number of growers selling fewer than 5,000 hogs per year declines.

The contractual relationships between pork packers and hog producers almost certainly will continue to strengthen. One motivating force is processors' desire to escape the commodity price cycle by offering higher-value products, such as organic pork or meat from hogs raised under "humane" conditions; certification that such standards were maintained requires close oversight of the hog-raising process. Worries about safety are also forcing greater cooperation up and down the supply chain. As two leading academics recently wrote, "Food safety concerns are likely to encourage or even mandate identity preservation in production and marketing systems that link export, retail, food service, and processor customers for pork more closely to packers, producers, and their suppliers of feed, veterinary supplies, and services."[2]

The Pork Price Picture

Pork processors have experienced difficult conditions in recent months after enjoying high prices in 2000 and 2001 (Chart 15). The popularity of bacon as a foodservice item has helped the average annual price of pork bellies remain well above its long-run average, although extreme month to month volatility has caused problems for some processors. The price of fresh pork "cutout," far more important to most processors' bottom lines, has been less buoyant. The average wholesale price over the past year, less than 54 cents per pound, is 15% below the average price since 1980.

Pork prices tend to be extremely volatile over short periods of time. In 1999, to take but one example, the average wholesale price of pork bellies soared from 48 cents per pound to 71 cents within the span of three months. Although many factors influence product prices, seasonal tendencies are significant. Over the past 30 years,

2. Lawrence, John D., and Glenn Grimes, "Production and Marketing Characteristics of U.S. Pork Producers, 2000." Staff Paper No. 343, Iowa State University. August 2001.

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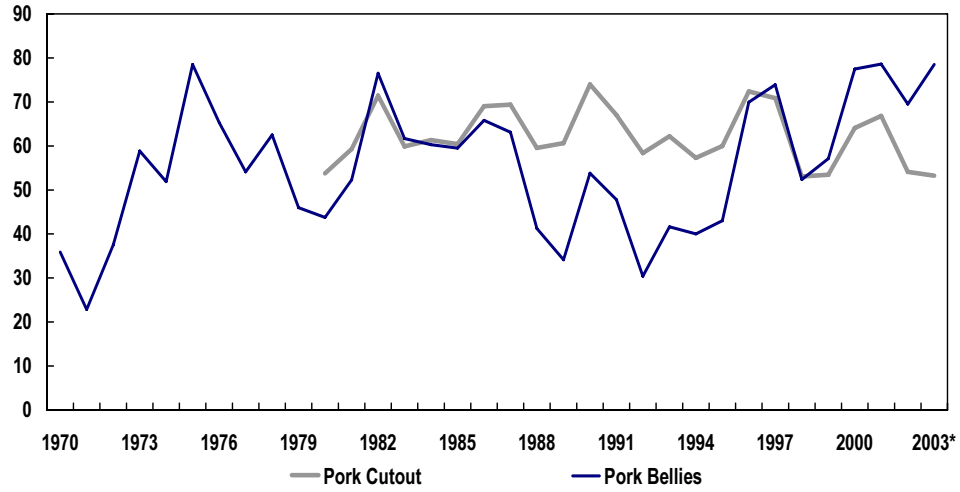
Chart 15
Annual Average Prices of Pork Products

Cents per pound



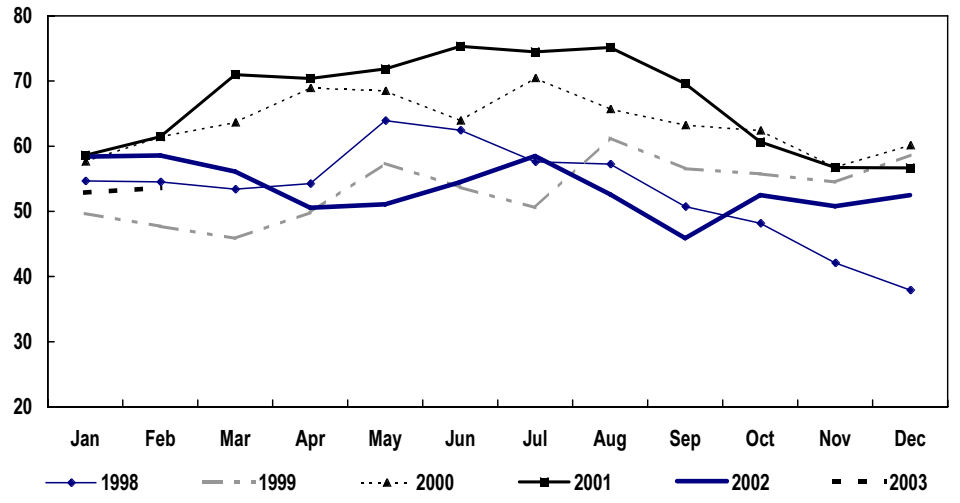
Source: U.S. Department of Agriculture.
* 2003 data through February.

the wholesale price of pork bellies has been, on average, 20% higher in July than in December.

The past year's price trends have been quite negative for processors. As hog inventories expanded, the weighted average wholesale price of pork fell from a $1.18 per pound average in 2001 to just $0.91 last September. Prices remain low: in January and February, the average wholesale price of pork cutout—meat cut from the carcass—was lower than in four of the five previous years (Chart 16). The amount of pork in cold storage is extremely high, which will weigh on prices for the balance of this year.

Chart 16
Monthly Average Pork Cutout Price

Monthly average wholesale price, cents per pound



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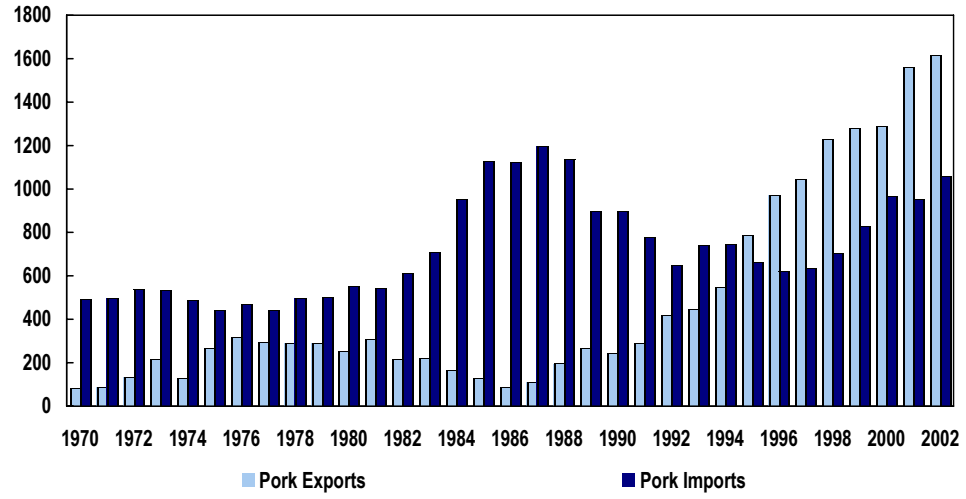
Prices were also depressed in 2002 by very sluggish growth of exports (Chart 17). Exports by weight jumped 21% in 2001, as the outbreak of hoof-and-mouth disease in Europe caused importers to cancel European orders and buy American pork instead. Exports rose only 3% in 2002, and the U.S. Department of Agriculture projects volume growth of only 2% in 2003.

Meanwhile, imports, which come overwhelmingly from Canada, have been recovering after declining through most of the 1990s. Canada has displaced the United States as the world's largest pork exporting country, and almost 60% of its exports go to the United States. Imports rose 11% by volume in 2002 and are projected to rise another 2% in 2003. The rapid expansion of the Canadian pork industry is expected to continue, and this may well put persistent downward pressure on U.S. prices.

Chart 17
Pork Exports and Imports
Million pounds (carcass weight)



Source: U.S. Department of Agriculture. Annual data.

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