United States
Department of
Agriculture

Economic
Research
Service

Economic
Information
Bulletin
Number 72

February 2011

# Agricultural Contracting Update: Contracts in 2008

James M. MacDonald and Penni Korb

www.ers.usda.gov

## Visit Our Website To Learn More!

***www.ers.usda.gov/***

**Recommended citation format for this publication:**

MacDonald, James M., and Penni Korb. *Agricultural Contracting Update: Contracts in 2008*. EIB-72. U.S. Dept. of Agriculture, Econ. Res. Serv. February 2011.

Cover photo: Thinkstock.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

United States Department of Agriculture

A Report from the Economic Research Service

www.ers.usda.gov

Economic Information Bulletin Number 72

February 2011

# Agricultural Contracting Update: Contracts in 2008

**James M. MacDonald,** macdonal@ers.usda.gov
**Penni Korb,** pkorb@ers.usda.gov

## Abstract

Marketing and production contracts covered 39 percent of the value of U.S. agricultural production in 2008, up from 36 percent in 2001, and a substantial increase over 28 percent in 1991 and 11 percent in 1969. However, aggregate contract use has stabilized in recent years and no longer suggests a strong trend. Contracts between farmers and their buyers are reached prior to harvest (or before the completion stage for livestock) and govern the terms under which products are transferred from the farm. Contracts are far more likely to be used on large farms than on small farms, and they form one element in a package of risk management tools available to farmers. Production contracts are used widely in livestock production, while marketing contracts are important to the production of many crops.

**Keywords:** Production contracts, marketing contracts, farm structure, farm size, farm income, contracting, Agricultural Resource Management Survey, ARMS, risk analysis

## Acknowledgments

We received helpful comments and advice from Richard Barton from USDA's National Agricultural Statistics Service, Gary McBryde from USDA's Grain Inspection, Packers and Stockyards Administration, Andrea Woolverton from USDA's Economic Research Service (ERS), and Darrel Good from the University of Illinois. John Weber and Susan DeGeorge from ERS provided excellent editing and design services.

# Contents

Summary . . . . . iii

Introduction . . . . . 1

Why Use Contracts? . . . . . 3

Data on Contracting . . . . . 7

The Use of Contracts in Agriculture . . . . . 8

Contracts in Selected Major Commodities . . . . . 16

Conclusions . . . . . 31

References . . . . . 33

# Summary


## What Is the Issue?

Formal contractual arrangements in agriculture are substitutes for spot market (cash) sales of farm commodities and now account for 40 percent of the value of U.S. agricultural production. Marketing and production contracts are reached prior to harvest (or before the completion stage for livestock). *Marketing contracts* govern the terms of exchange for sales of products from the farm—the product to be delivered; the quantity, location, and time window for delivery; and a price or pricing formula. Production contracts govern an entire production process—farmers are paid a fee to grow an animal or crop for a contractor who provides some production inputs and who removes the product from the farm for processing or marketing at the close of the production cycle.

Contracts can have many beneficial effects. They can help farmers manage price and production risks, they can elicit the production of products with specific quality attributes by tying prices to those attributes, and they can smooth flows of commodities to processing plants, thus encouraging more efficient use of farm and processing capacities. But contracts can also have less benign effects. They can introduce new and unexpected risks for farmers—in some circumstances, they can extend a buyer's market power—and they can effect fundamental changes in how farming is organized and carried out.

This study updates previous ERS research by tracking the use of contracts in U.S. agriculture through 2008. It also provides detailed analyses of contract use in three areas:

- Hog and poultry production, where production contracts predominate
- Major field crop production, where the use of marketing contracts has expanded
- Peanut and tobacco production, which has experienced a shift to marketing contracts following major changes in Government programs

In each case, ERS analyzes the functions filled by contracts, their design, and their adoption and impacts.

## What Did the Study Find?

- Agricultural contracts covered 39 percent of the value of U.S. agricultural production in 2008, compared with 28 percent in 1991 and 11 percent in 1969. In 2005, however, contracting covered 41 percent of production. The inter-year decline in the use of contracts after 2005 largely stemmed from a change in the composition of agricultural production, as prices and revenues rose for commodities less reliant on contracts.
- Contracts are more widely used in some commodities than in others. In 2008, contracts covered 90 percent of poultry production and 68 percent of hog production. They also covered 90 percent of sugar beet and tobacco production. Contracts are much less prevalent in corn (26 percent of

production), soybeans (25 percent), and wheat (23 percent), although use of contracting in each of those field crops grew by at least 10 percentage points between 2001 and 2008.

- Hog and poultry operations rely heavily on *production contract*s—which specify services provided by producers—but with important distinctions between the two industries. Hog contract enterprises are usually part of larger, diversified farming businesses, with the hog segment providing a relatively small share of the farm income. The farmers typically have a range of alternative outlets for contract hog production, and farm diversification provides a range of alternative uses for their own time. Farm households that engage in contract hog production have relatively high incomes compared with other households—both farm and nonfarm.

  In contrast, contract broiler enterprises are likely to be part of smaller and less diversified farm businesses, and many broiler operations have only a single contractor in their area. As a result, their farm businesses are much more dependent on contract production, and their income from contract production is much more dependent on a single buyer. Operators of broiler farms have lower household incomes, on average, than operators of hog farms, and they depend far more on off-farm employment and income.

- Corn, soybean, and wheat producers who use contracts tend to be larger producers who use marketing contracts to cover a substantial share of production. For these producers, marketing contracts—which focus on the commodity delivered rather than the services provided—are used to manage price risks in combination with cash sales, financial hedges, and storage options. Less than 20 percent of corn, wheat, and soybean production comes from farms that are fully exposed to cash markets for marketing options.

- Because larger farms tend to earn higher returns than smaller farms, production is expected to continue to shift to larger operations and to contracts. Contracting, however, is driven not only by expanding farm sizes but also by market developments that alter farmers' marketing risks.

  For example, Federal marketing programs for tobacco and peanuts limited price fluctuations for those commodities. Marketing contracts also help farmers to manage price risks; but as long as Federal programs limited such risks, farmers had little interest in marketing contracts. After Federal programs were terminated, however, and producers faced significant spot market price risks, contract production in peanuts and tobacco increased sharply. Marketing contracts in tobacco are also designed to better align prices to product qualities that buyers desire, and this feature played a role in processors' desire to shift to contracts. Thus, farmers turn to contracts when they perceive the efficacy of spot markets to be inadequate in handling their risks, and processors turn to contracts as a way to encourage farmers to produce specific products at desired times.

## How Was the Study Conducted?

The analysis primarily draws on data from USDA's Agricultural Resource Management Survey (ARMS), a joint effort conducted annually by ERS and USDA's National Agricultural Statistics Service (NASS). ARMS is USDA's primary source of information on the financial condition, production practices, resource use, and economic well-being of U.S. farm households. The survey asks farmers about the use of production or marketing contracts and the volume of production and receipts for each commodity under contract. ARMS has been conducted annually since 1996. The Farm Costs and Returns Survey (a predecessor to ARMS) provides contract data back to 1991, and the Census of Agriculture, conducted by NASS, provides contract data back to 1969.

# Introduction

Formal contractual arrangements cover a considerable share of U.S. agricultural production. Contracting is associated with other features of ongoing structural change in agriculture, including shifts of production to larger farms, increased farm specialization, and greater product differentiation.

This study was conducted to update ERS research that tracked agricultural contracting through 2005.[1] We extend data on trends in agricultural contracting through 2008 and then provide three new analyses of developments in contracting for specific commodities: the increased use of production contracts in the hog and broiler industries; the recent sharp expansion of marketing contracts in major field crops; and the expansion of contracting in peanuts and tobacco following changes in Federal agricultural policy.

In this study, we distinguish three methods for transferring commodities from farms to the next stages of food production:

1. **Spot (or cash) markets.** In spot markets, producers are paid for their products when ownership of the product is transferred off the farm, with prices based on prevailing market prices at the time of sale, under agreements reached at or after harvest. These may be thought of as cash-and-carry transactions. Buyers may pay premiums or discounts related to product quality, based on factors observable or agreed to at the time of sale. Farm operators control production decisions, such as the types of farm inputs to buy, as well as when and how to apply them. Operators also make financing decisions and marketing arrangements, including finding a seller, determining a price, and delivering the product. Spot markets still govern most farm product transactions.

2. **Vertical integration.** Products can also be transferred through vertical integration, which combines the farm and downstream use of a commodity under single ownership. For example, a winery may own and operate vineyards, a citrus processor may own and operate orange groves, and a meatpacker may own and operate hog farms or cattle feedlots.[2] Farmers can also integrate across stages of production—for example, a dairy farmer may choose to grow feed for the dairy onsite.[3]

3. **Agricultural contracts.** Many farm product transactions are organized through agreements between farmers and buyers that are reached prior to harvest (or before the completion of a production stage, as in the case of livestock) and that govern the terms under which products are transferred from the farm. Contracts provide for much closer linkages between farmers and specific buyers than spot markets and may provide the contractor/buyer with greater control of agricultural production decisions. Specific contractual designs in agriculture vary, but we find that a simple two-way classification is informative.[4]

   a. *Production contracts* specify services provided by a farmer for a contractor who owns the commodity while it is being produced. The contract covers (1) the services provided by the farmer, (2) the manner in which the farmer is to be compensated for the services, and (3) the

[1]MacDonald et al. (2004), MacDonald and Korb (2006), and MacDonald and Korb (2008). Earlier ERS analyses of contracting include Mighell and Jones (1963) and Perry et al. (1996).

[2]Vertical integration that links farms with processors or retailers is still relatively uncommon. USDA's 2008 Agricultural Resource Management Survey (ARMS) asked respondents if they "… were part of a larger firm or corporation, such as a branch of a firm that also processes the agricultural product of the operation?" Affirmative responses covered 7,450 farms (0.3 percent of all farms) and 5 percent of the value of production in agriculture.

[3]Farmers may also collectively integrate into commodity marketing and processing, or input provision, through farmer-owned cooperatives. According to ARMS, about 17 percent of farms received cooperative refunds or dividends in 2008, and those farms accounted for 43 percent of the value of agricultural production (not all of their production was marketed through co-ops, of course, and the production that was so marketed could have been transferred through spot market transactions or through contracts).

[4]ARMS questions must be understood by a broad cross-section of producers, and they must fill a limited space on a survey, so our choice is bound by survey considerations. But we have not found any other two-way classification to be a compelling alternative, nor have we found a three-way classification that will yield reporting benefits commensurate with the additional burden placed on respondents.

specific contractor responsibilities for provision of inputs. For example, farmers provide labor, housing, and equipment under livestock and poultry production contracts, while contractors provide such other inputs as feed, veterinary and livestock transportation services, and young animals.

The farmer's payment resembles a fee paid for the specific services provided by the farmer, instead of a payment for the market value of the product. Since contractor-provided inputs may account for a large share of production costs, the fee paid to the farmer may be a small fraction of the commodity's value.

b. *Marketing contracts* focus on the commodity as it is delivered to the contractor, rather than on the services provided by the farmer. They specify a commodity's price or a mechanism for determining the price, a delivery outlet, and a quantity to be delivered. The parties in a marketing contract agree to its terms before harvest or, for livestock, before transfer. We consider agreements reached on harvested commodities in storage to be cash market sales.

Forward cash contracts are one type of marketing contract, in which a specific price is agreed upon at the time of the agreement, with the commodity to be delivered at a later agreed-upon date. But other types of marketing contracts, often of longer duration, specify a method or formula for determining prices, rather than a specific price, at the time of agreement.

Contract pricing mechanisms may limit a farmer's exposure to the risks of wide fluctuations in market prices, and they often specify price premiums to be paid for commodities with desired levels of specified attributes (such as oil content in corn or leanness in hogs). The farmer owns the commodity during production and retains substantial control over major management decisions, with limited direction from the contractor, and, hence, retains more autonomy in decisionmaking than is available under production contracts.

## Why Use Contracts?

Contracts offer several advantages to farmers. First, they reduce the income risks that arise from fluctuations in commodity prices and yields. Second, contracts can assure farmers of outlets for commodities in markets with few buyers and, thus, assure a better return on investments in physical capital and time. Finally, contracts can also tie prices more closely to product attributes and, thereby, provide returns to farmers who can provide those attributes.[5]

[5]For a more complete discussion, with references, see MacDonald et al., 2004.

### Price and Production Risks

Production and price fluctuations provide two major sources of income risks. Most farmers seek to mitigate risk and would pay to do so; risk can also impose costs if farmers cannot meet recurring financial obligations or make long-term production and investment decisions.

Price risks arise from unanticipated changes in output or input prices, which occur commonly because of unexpected changes in production or demand. Production contracts can eliminate most or all output price risk by making contract fees independent of market prices. Such contracts can also eliminate most input price risk because contractors provide the inputs that account for most operating expenses. Marketing contracts, too, can substantially reduce a farmer's output price risks. The cash-forward marketing contracts used in grain and livestock production typically establish a base price before harvest and provide for delivery of a given quantity of a good within a specified time. Such contracts can set an exact price or they can set a "basis" price, tying a contract price to a price in a futures market, plus or minus some agreed-upon amount (the basis). Farmers can offset price fluctuations in the contracted crop by hedging with the purchase of a futures contract, thus eliminating price risks.

Production risks for crops result from unpredictable events such as drought, frost, hail, disease, and insect infestations. Production risks for livestock can arise from disease, feed supply shortages, extreme temperatures, or machinery malfunctions. Contracts can be designed to limit production risks. For example, production contracts that base compensation on a grower's relative performance can eliminate production risks that are common to all growers in a region.

### Holdup, Risks to Capital Investment, and Market Access

Contracts can also be used to provide assurance to farmers that specialized capital investments can be recouped, particularly in the case of investments associated with perishable products in markets with few buyers. For example, specialized broiler houses offer optimal growing conditions and are designed to facilitate feed delivery, regulate temperature through ventilation and cooling systems, and incorporate specific feed and water delivery systems. Similarly, sugar beet production requires highly specialized harvesting equipment and extensive prior investment in seed beds.

Chickens cannot be shipped far before losing value, due to both the direct costs of transport or extra feed and the indirect costs from the birds losing

value due to stress, weight loss, or death during transport, or aging during additional feeding. Similarly, sugar beets lose value quickly, and transport costs are still quite high. Because chickens and sugar beets are perishable, growers must produce for nearby buyers, and these outlets for their products may be limited in number.

Under such circumstances, a spot market buyer could force very low prices on a farmer, knowing that he or she has few or no alternative outlets (that is, the processor "holds up" the farmer for a lower price). The product's perishability matters here; in contrast, grain farmers can ship products long distances without deterioration or loss of value, and they can also store their products for long periods while searching for more marketing options. Consequently, grain producers have more marketing options and face fewer risks of holdup by local buyers.

The possibility of holdup can ultimately affect processors as well because farmers may respond to holdup risks by avoiding capital investments that would leave the farmer dependent on the goodwill of one buyer. In that case, processors would be unable to elicit investments in technology and expertise that would reduce costs, improve product qualities, and expand their businesses.

In this instance, a contract can benefit farmers and processors by enabling them to devise a compensation scheme before the investments are made, thus eliminating the risk of holdup. By offering such a contract, the processor can obtain investment commitments from farmers and thereby assure the commodity supply needed to support an expensive investment in processing facilities for perishable agricultural products.

More broadly, contracts can assure farmers of market outlets for products and can enable processors to obtain assured supplies of commodities. Such assurances are important in many production processes. For example, a hog integrator may remove market hogs from finishing houses on a Tuesday, clean and sanitize the houses on Wednesday and Thursday, and place a new batch of feeder pigs in the houses on Friday. Without an assured market outlet and delivery date for market hogs, the producer would not be able to realize the high-capacity utilization that this process provides. Similarly, meatpackers may realize economies of scale in slaughter and processing if they are able to move steady large volumes of livestock through their plants. Contracts enable them to manage those flows.

Lenders also prefer assured market outlets because such assurance reduces the risks of default on facility loans. Farmers that make substantial facilities investments often use debt financing, and lenders often require borrowers to have a contract and, therefore, an assured outlet in place before they provide a long-term facilities loan.

## Quality Assurance

Contracts can also lead to improvements in product quality. For example, processors of vegetables and fruits require commodities with specific qualities and varieties. Processors can secure the needed qualities and varieties through spot markets if effective measurement technologies and widely

understood metrics exist, to be applied at sale. For example, the key distinctive attributes in high-protein soybeans can be precisely measured with near-infrared measurement technology.

But some quality attributes are hard to measure, so quality must be assured in other ways. Most fresh market lettuce and virtually all processed vegetables are grown under contracts specifying a coordinated production process. These contracts typically specify seed stock, fertilizer and chemical inputs, and product qualities; the contractor may even provide these inputs to the farmer and monitor crop development and production processes through field visits. The contract helps assure quality attributes by closely specifying production processes.

Buyers are increasingly interested in identity-preserved products, such as organically produced commodities or specialty grains with specific attributes, which are segregated in the marketing chain. Contracts help assure compliance with identity-preserved standards by specifying production and harvesting practices, and the means to verify them, at key production stages. Attribute certification is met through contractual control and onsite inspection of practices, rather than through information, tests, and warranties provided by producers.

## Risks From Contracts

Agricultural contracts can lead to improvements in efficiency throughout the supply chain for products by providing farmers with incentives to deliver products that consumers want and to produce products in ways that reduce processing costs and, ultimately, retail prices (RTI International, 2005). However, contracts can also increase certain types of risks for farmers. While contracting can reduce the income risks arising from commodity price and yield fluctuations, they may create other kinds of income risks for producers. Contracts may commit the farmer to delivering a specific quantity, thus potentially increasing the cost of a production shortfall, if the commitment would have to be met through spot market purchases. Contracts that tie a grower to a single purchaser of a specialized commodity, even if they provide for fair compensation of the grower, still leave the grower subject to default risks should the contractor fail.

Contracts may create long-term holdup risks at the time of contract renewal. Some producers make substantial long-term capital investments as part of livestock or poultry production contracts, and those investments may tie the producer to a single buyer. If the contract covers a shorter term than the life of the capital, then the farmer may face the holdup risk that the contractor may require new investments or may impose lower returns at the time of contract renewal. If contractors already possess some market power, in the form of the ability to force grower prices below competitive levels, some contracts can extend that power by raising the costs of entry for new competitors, or allowing for price discrimination. Because contracts can create new risks, contract adoption depends not only on contract design but also on the performance of the primary alternatives—spot markets and vertical integration.

Producers may be able to avoid the costs of holdup risks, and of contractor market power, through vertical integration. But vertical integration makes for a more complex firm, which may be difficult to manage. Farm operators become farm managers in vertically integrated businesses and may not be required to provide the effort or the decisionmaking that they would in the role of an owner/operator.

If the spot market for a commodity exhibits significant price or production risks, or if spot market transactions cannot generate the information needed to manage risk, then farmers may prefer to use contracts. If spot markets are thin, such that there are few buyers for a product, then farmers will be more likely to use contracts.

## Data on Contracting

This report relies extensively on data collected in USDA's Agricultural Resource Management Survey (ARMS). Conducted by USDA's National Agricultural Statistics Service (NASS) and ERS, ARMS includes annual information from a stratified random sample of all U.S. farms. It is USDA's primary source of information on financial conditions, production practices, and resource use on U.S. farms, and on the economic well-being of U.S. farm households.

The survey consists of three phases:

1. **Phase I**, conducted during the summer of the reference year, screens farms that are targeted for sample inclusion for continued operation and commodity mix.
2. **Phase II**, conducted during the fall of the reference year, includes randomly selected operating farms from Phase I, which are interviewed to collect information on production practices and chemical use. Data in Phase II are collected at the individual field or production unit level.
3. **Phase III**, conducted during the following winter and spring (just after the end of the reference year), includes the collection of data on farm and farm household finances and farm production and marketing decisions.

Contracting information is drawn from Phase III, which contains multiple questionnaire versions (five in 2008). All versions ask farmers for the volume of production, receipts, and unit prices or fees received for each commodity under a marketing or production contract. Version 5, also known as the core version, is distributed and returned by mail and is shorter than the other versions, which are conducted through personal interviews. Version 1 is directed to all types of farms, while the remaining versions are directed to producers of specific commodities. Additional survey information can be found at www.ers.usda.gov/briefing/arms/.

In 2008, the full Phase III sample consisted of 34,000 farm operations, from which 21,816 usable surveys were obtained. The responses contained information on quantities and revenues, by commodity, for 12,121 marketing contracts and 2,195 production contracts. Additional detail was also obtained from the 3,378 marketing contracts and 885 production contracts reported in version 1 surveys.[6]

[6] Two features distinguish the contracting data in ARMS from that in other surveys. ARMS surveys farms, so the focus is on commodities as they leave the farm. Surveys of processors focus on processor commodity purchases from farmers and intermediaries. Also, ARMS defines contracts as agreements reached prior to harvest. Agreements covering the sale of harvested commodities from storage are not defined as agricultural contracts in ARMS.

# The Use of Contracts in Agriculture

We use recent data from ARMS, and earlier data from the Census of Agriculture, to trace the growth of contracting in agriculture and to show how that growth varies among commodities, contract types, and farm types.[7] This section extends analyses provided in earlier ERS reports to 2008.

[7]Because this report is aimed at a broad audience, we do not include tests of statistical significance. However, in all cases in which we state that one measure is larger than another, either in cross-section or over time, statistical tests support the assertion at a 95-percent level of confidence.

## Contracts and the Value of Production

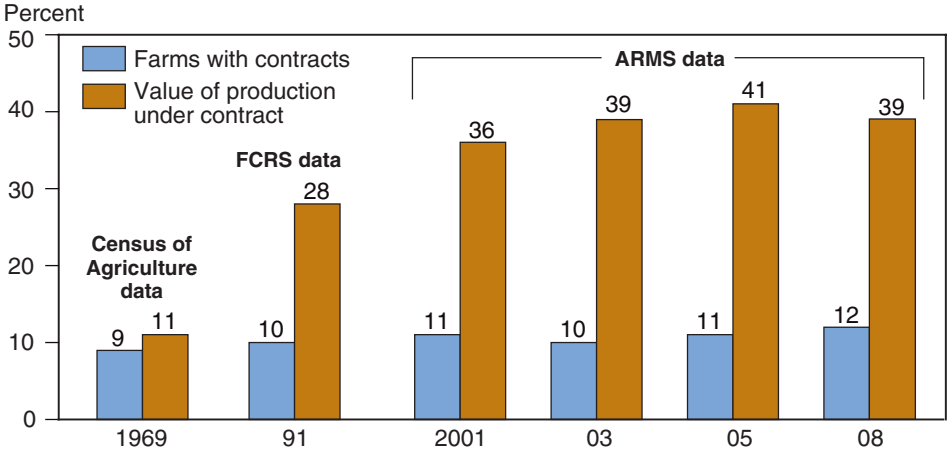
Only 12 percent of U.S. farms had contracts in 2008, but contracts covered 38.5 percent of the value of U.S. agricultural production. Over the last three decades, the share of the value of agricultural production covered by contracts has grown substantially, from 11 percent in 1969, to 28 percent in 1991, and to 36 percent in 2001 (fig. 1). However, this trend has slowed in recent years, and contracts actually covered a smaller share of the value of production in 2008 than in 2005.

The 2005-08 declines reflect compositional changes due to recent commodity price trends. Five major field crops—corn, cotton, rice, soybeans, and wheat—accounted for 22.1 percent of the value of all U.S. agricultural production in 2005. But because of sharp price increases, they accounted for 34 percent of the value of production in 2008 (fig. 2). Field crops are less likely than other commodities to be produced under contract and more likely to be traded in spot markets. With a higher weight accorded to field crops in 2008 than in 2005, the share of the value of production covered by contracts fell. Had field crops accounted for the same share of production in 2008 as in 2005, the overall contract share of production would not have fallen but instead would have remained unchanged at 41 percent.

Since the share of farms that use contracts is much lower than the share of production under contract, it follows that large farms are much more likely than other farms to use agricultural contracts.[8] A simple three-way classifica-

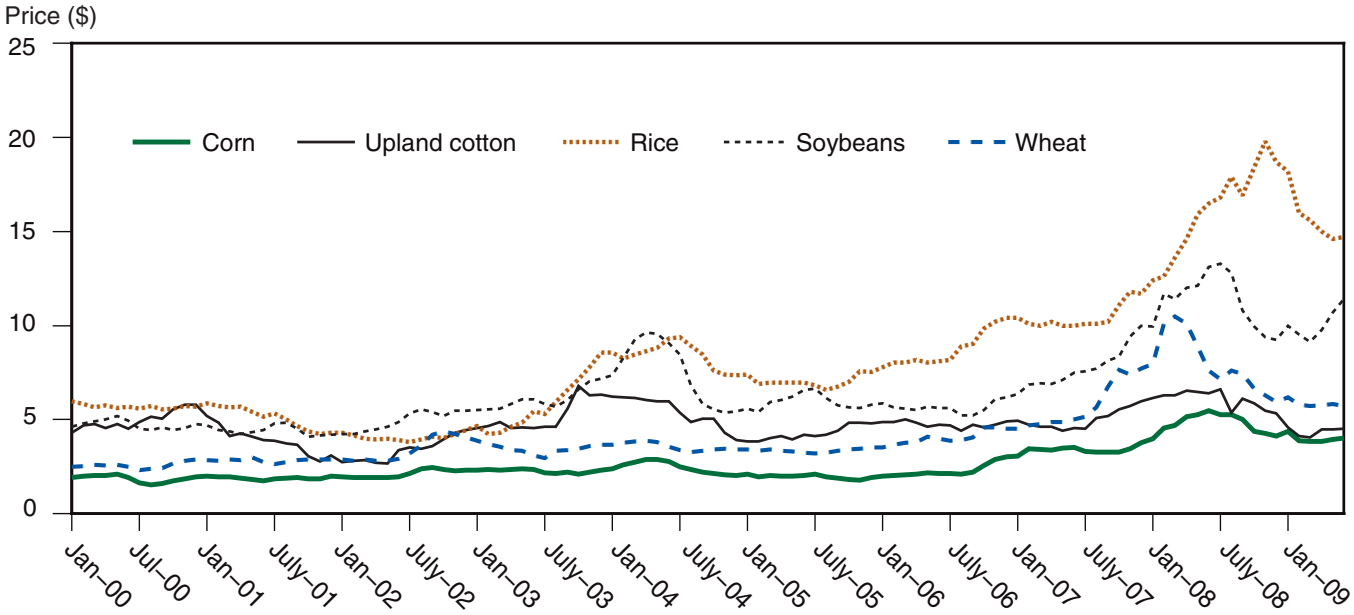
[8]U.S. farms are extremely heterogeneous. USDA defines a farm as any place that produces, or would normally produce, $1,000 worth of agricultural commodities in a year. More than half of the 2.2 million farms in the United States have sales of less than $10,000 (and nearly half of those have sales of less than $1,000). Few of those very small farms, which collectively account for less than 2 percent of U.S. agricultural production, use contracts. At the other extreme, about 3,400 farms with at least $5 million in annual sales account for nearly one-quarter of all agricultural production (Hoppe et al., 2007). Most use contracts for at least some of their production.

Figure 1
**Agricultural contracting, 1969-2008**




Sources: USDA, Economic Research Service using U.S. Census Bureau, Census of Agriculture, 1969; USDA's Farm Costs and Returns Survey, 1991; and USDA's Agricultural Resource Management Survey, 2001-2008.

Figure 2
**Price trends for major field crops, 2000-09**




Note: Prices are per bushel, except for cotton, which is per 10 pounds.
Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service monthly prices received.

tion of commercial, intermediate, and rural residence farms helps show how the use of contracts varies among different farm types (table 1).

*Commercial farms* include family-operated farms with annual gross sales in excess of $250,000 and all nonfamily farms, which can include cooperatives, nonfamily partnerships and corporations, or family-owned farms operated by a hired manager. *Intermediate farms* have annual sales below $250,000 but operators who report that farming is their major occupation. Most farms in the United States are *rural residence farms*—family-operated farms with annual sales below $250,000 whose operators report that they are retired or that their primary occupation is not farming. For temporal comparisons, sales classes are adjusted for inflation using the USDA/NASS index of prices received for farm products.

About half of farms with contracts (52 percent) are commercial farms, and commercial farms account for the vast bulk of contract production—92 percent in 2008 (table 1). Only 13 percent of production at rural residence farms and 21 percent at intermediate farms were under contract in 2008, compared with 43 percent at commercial farms.[9]

Contracting is closely tied to farm size (table 2). Nearly 70 percent of the largest farms (those with at least $1 million in annual sales) used contracts in 2008, compared with 7 percent of small farms. Contracts covered 49 percent of production among the largest farms, compared with 16 percent among small farms (those with less than $250,000 in annual sales). For the largest farms, however, the share in 2008 reflects a dropoff from the share in 2005 (54 percent).

[9]Note that commercial farms had a higher share of production—48 percent—under contract in 2005 than in 2008. This fall largely reflects shifts in commodity prices.

Table 1

**Share of U.S. farms using contracts and share of value of production under contract, by farm type**

| Item | Farm type: Rural residence | Intermediate | Commercial | All farms |
|---|---|---|---|---|
| | *----------Shares of contracts within each farm type (percent)----------* | | | |
| Farms with contracts | | | | |
| 2001 | 3.6 | 16.0 | 41.7 | 11.0 |
| 2003 | 3.4 | 13.5 | 46.7 | 9.6 |
| 2005 | 4.1 | 15.8 | 49.3 | 11.1 |
| 2008 | 4.1 | 13.9 | 50.6 | 12.1 |
| Production under contract | | | | |
| 2001 | 13.3 | 24.2 | 42.2 | 36.4 |
| 2003 | 11.6 | 22.5 | 46.6 | 39.1 |
| 2005 | 12.7 | 19.8 | 47.5 | 40.7 |
| 2008 | 13.1 | 21.2 | 42.5 | 38.5 |
| | *----------Shares of each farm type in all contracts (percent)----------* | | | |
| Farms with contracts | | | | |
| 2001 | 19.6 | 44.6 | 35.8 | 100.0 |
| 2003 | 23.9 | 33.3 | 42.9 | 100.0 |
| 2005 | 25.0 | 32.6 | 42.4 | 100.0 |
| 2008 | 22.1 | 26.0 | 51.9 | 100.0 |
| Production under contract | | | | |
| 2001 | 2.3 | 14.4 | 83.2 | 100.0 |
| 2003 | 2.4 | 10.9 | 86.7 | 100.0 |
| 2005 | 2.4 | 7.4 | 90.2 | 100.0 |
| 2008 | 2.1 | 5.7 | 92.2 | 100.0 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2001-08.

Table 2

**Contracting by U.S. farm size class, 2001-08**

| Year | Farm sales class: <$250,000 | <$250,000-499,999 | $500,000-999,999 | $1 million or more |
|---|---|---|---|---|
| | *----------Shares of farms with contracts (percent)----------* | | | |
| 2001 | 6.7 | 40.3 | 54.7 | 65.0 |
| 2003 | 5.5 | 35.1 | 52.8 | 62.6 |
| 2005 | 6.3 | 41.6 | 55.8 | 67.7 |
| 2008 | 6.6 | 53.2 | 61.6 | 69.9 |
| | *----------Shares of production under contract (percent)----------* | | | |
| 2001 | 17.9 | 25.5 | 38.0 | 50.4 |
| 2003 | 17.9 | 25.0 | 38.8 | 51.4 |
| 2005 | 15.7 | 25.5 | 36.7 | 53.5 |
| 2008 | 16.3 | 28.5 | 35.1 | 48.9 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2001, 2003, 2005, and 2008 (all versions).

Table 3 presents data on marketing and production contracts separately. Data from earlier years are combined to expand sample sizes and smooth out some random fluctuations.[10] In 2008, more farms used marketing contracts (10 percent) than used production contracts (2 percent) (table 3). Marketing contracts also covered a greater share of agricultural output—22 percent versus 17 percent. However, production contract coverage has increased substantially since 1991-93, a development that primarily reflects the growth of poultry production, where production contracts are commonly used to produce and market birds, as well as the rapid expansion of production contracts in the hog sector.

[10]Expanded funding allowed for increased sample sizes after 2002.

Production contracts are rarely used in crops, outside of some seed and horticultural production; livestock accounts for 97 percent of the value of production covered by such contracts. Marketing contracts are used in both crop and livestock production, although crops accounts for nearly two-thirds of the production covered by marketing contracts.

## Contract Coverage of Commodities

An analysis of trends in contract use across commodities finds that contracting coverage tilts to livestock, which accounted for 60 percent of the value of production under contract in 2008, compared with 40 percent for crops (table 4). The commodity shares are nearly reversed for all (contract and noncontract) production during the same period, with crops accounting

Table 3
**U.S. farm contracts by type**

| Item | 1991-93 | 1996-97 | 2001-02 | 2005 | 2008 |
|---|---|---|---|---|---|
| | ----------*Percent*---------- | | | | |
| Share of farms with contracts | | | | | |
| Any contracts | 10.1 | 12.1 | 11.2 | 11.1 | 12.1 |
| Marketing contracts | 8.2 | 10.2 | 9.0 | 9.3 | 10.3 |
| Crop | 6.6 | 8.3 | 7.4 | 7.6 | 9.0 |
| Livestock | 1.6 | 2.0 | 1.6 | 1.9 | 1.4 |
| Production contracts | 2.1 | 2.2 | 2.6 | 2.1 | 2.2 |
| Crop | 0.6 | 0.6 | 0.5 | 0.4 | 0.3 |
| Livestock | 1.6 | 1.6 | 2.1 | 1.7 | 1.8 |
| Share of production under contract | | | | | |
| Any contracts | 28.8 | 32.1 | 37.7 | 40.7 | 38.5 |
| Marketing contracts | 17.0 | 21.5 | 19.7 | 22.0 | 21.7 |
| Crop | 11.0 | 12.2 | 12.7 | 13.1 | 14.9 |
| Livestock | 6.0 | 9.3 | 7.0 | 8.9 | 6.9 |
| Production contracts | 11.8 | 10.6 | 18.0 | 18.7 | 16.8 |
| Crop | .9 | 1.0 | 1.6 | 0.8 | 0.5 |
| Livestock | 10.9 | 9.6 | 16.4 | 17.9 | 16.3 |

Note: Some farms may have production and marketing contracts, so the share of farms with production contracts, plus the share with marketing contracts, adds to more than the share of farms with either kind of contract.
Sources: USDA, Economic Research Service using data from USDA's Farm Costs and Returns Survey/Agricultural Resource Management Survey, 1991, 1992, 1993, 1996, 1997, 2001, 2002, 2005, and 2008.

for 57 percent of the value of all agricultural production and livestock accounting for 43 percent.

The commodity mix in contract agriculture differs because contract coverage varies widely across commodities. Contracts covered 90 percent of poultry and egg production in 2008, as well as 68 percent of hog production and

Table 4
**Share of total contract value, by commodity, contract type, and year**

| Item | 1991-93 | 1996-97 | 2001-02 | 2005 | 2008 |
|---|---|---|---|---|---|
| By commodity | ----------*Share of contract production (percent)*---------- | | | | |
| All commodities | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Crops | 41.4 | 41.2 | 37.9 | 34.2 | 39.8 |
| Corn | 3.5 | 5.1 | 3.5 | 4.2 | 10.8 |
| Soybeans | 2.6 | 3.9 | 1.7 | 3.5 | 6.4 |
| Fruit | 11.6 | 10.6 | 9.4 | 9.9 | 5.9 |
| Vegetables | 9.8 | 8.1 | 6.5 | 7.4 | 5.0 |
| All other crops | 14.0 | 13.6 | 16.8 | 9.2 | 11.7 |
| Livestock | 58.6 | 58.8 | 62.1 | 65.8 | 60.2 |
| Cattle | 18.6 | 7.6 | 10.1 | 9.6 | 12.4 |
| Hogs | 2.8 | 5.1 | 10.8 | 13.3 | 10.3 |
| Poultry and eggs | 20.4 | 21.1 | 25.6 | 24.9 | 21.8 |
| Dairy | 16.6 | 24.7 | 15.1 | 17.9 | 15.6 |
| All other livestock | 0.2 | 0.2 | 0.4 | 0.1 | 0.2 |
| By contract type/commodity | | | | | |
| Both contract types | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Marketing contracts: | | | | | |
| All commodities | 59.0 | 67.0 | 52.3 | 54.1 | 56.4 |
| Crops | 38.3 | 38.1 | 33.7 | 32.2 | 38.6 |
| Corn | 3.1 | 5.0 | 3.5 | 4.1 | 10.7 |
| Soybeans | 2.5 | 3.9 | 1.7 | 3.4 | 6.4 |
| Fruit | 11.2 | 10.1 | 9.1 | 9.9 | 5.7 |
| Vegetables | 8.3 | 6.7 | 4.9 | 6.1 | 4.3 |
| All other crops | 13.1 | 12.3 | 14.6 | 8.7 | 11.5 |
| Livestock | 20.8 | 28.9 | 18.6 | 21.9 | 17.8 |
| Dairy | 16.1 | 24.6 | 14.9 | 17.9 | 15.5 |
| All other livestock | 4.3 | 4.3 | 3.7 | 4.0 | 2.3 |
| Production contracts: | | | | | |
| All commodities | 41.0 | 33.0 | 47.7 | 45.9 | 43.6 |
| Crops | 3.2 | 3.2 | 4.2 | 2.0 | 1.2 |
| Vegetables | 1.5 | 1.3 | 1.6 | 1.3 | 0.7 |
| All other crops | 1.7 | 1.9 | 2.6 | 0.7 | 0.5 |
| Livestock | 37.8 | 29.9 | 43.5 | 43.9 | 42.4 |
| Cattle | 16.1 | 5.0 | 8.8 | 7.8 | 11.1 |
| Hogs | 2.4 | 4.7 | 9.8 | 11.1 | 9.9 |
| Poultry and eggs | 19.0 | 20.2 | 24.4 | 24.7 | 21.2 |
| All other livestock | 0.2 | 0.1 | 0.4 | 0.0 | 0.1 |

Sources: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 1996-2005, all versions; and USDA's Farm Costs and Returns Survey, 1991-93.

nearly 54 percent of dairy production (table 5).[11] Since the early 1990s, contracting has expanded sharply in the hog sector. More broadly, contracts covered 53 percent of all livestock production in 2008, up from 33 percent in 1991-93, and 27 percent of all crop production, up from 25 percent in 1991-93.

Among commodities, poultry, hogs, and dairy occupy a much larger role of contract agriculture than their share of all U.S. agriculture (fig. 3). Taken together, hogs and poultry (including broilers, turkeys, and eggs) account for 32 percent of all contract production, more than double their share of all agricultural production. In contrast, major field crops (corn, cotton, soybeans, rice, and wheat) account for a much smaller share of contract agriculture than their share of all U.S. agriculture.

Livestock production has been shifting toward a greater reliance on large and specialized confinement feeding operations, and these operations often have extensive contractual arrangements. Large cattle feedlots often hold production contracts with cattle owners and marketing contracts with meatpackers. Large dairy farms make use of forward contracts to price milk, and they may enter into production contracts with other dairy operations to raise their heifers. However, contracts are not used exclusively by large operations in

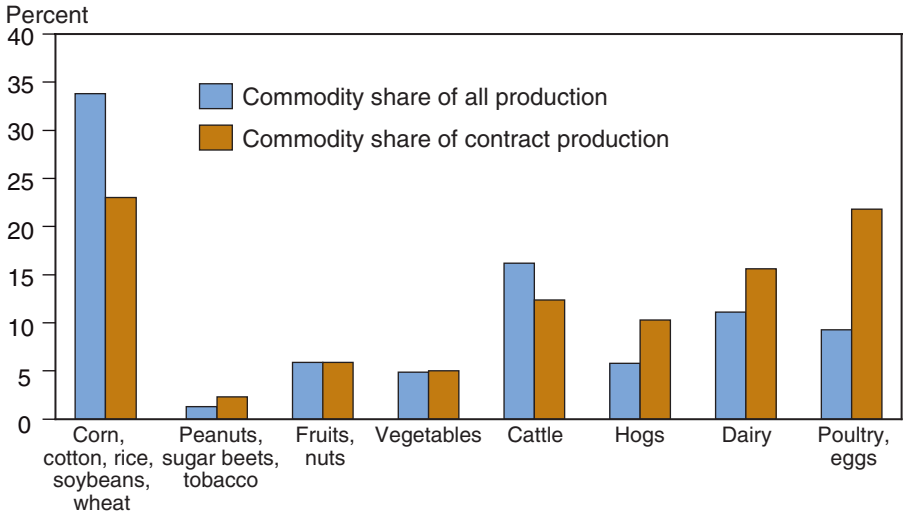
[11]The estimates do not imply that spot markets account for the remainder of hog and poultry production because vertical integration is important in those sectors, with processors operating some farming operations. Shared equity investments, in which feedlots share ownership of cattle with cow-calf or stocker operations, are also common.

Table 5
**Share of commodity production under contract, by commodity**

| Commodity/Contract type | 1991-93 | 1996-97 | 2001-02 | 2005 | 2008 |
|---|---|---|---|---|---|
| | *---------Share of production under contract (percent)--------* | | | | |
| All commodities | 28.8 | 32.1 | 37.7 | 40.7 | 38.5 |
| Crops | 24.7 | 22.8 | 27.8 | 29.9 | 27.3 |
| Corn | 11.3 | 12.9 | 14.8 | 19.6 | 26.1 |
| Soybeans | 10.1 | 13.4 | 9.4 | 18.4 | 25.1 |
| Wheat | 5.9 | 9.0 | 6.5 | 7.5 | 22.5 |
| Sugar Beets | 91.1 | 75.2 | 96.7 | 82.1 | 90.8 |
| Rice | 19.7 | 25.9 | 38.7 | 27.1 | 45.4 |
| Peanuts | 47.5 | 34.4 | 28.0 | 65.3 | 73.1 |
| Tobacco | 0.3 | 0.3 | 52.7 | 79.3 | 99.3 |
| Cotton | 30.4 | 33.8 | 52.6 | 45.0 | 36.2 |
| Fruit | na | 41.7 | 41.9 | 48.9 | 38.4 |
| Vegetables | na | 28.0 | 28.2 | 40.9 | 39.3 |
| Other crops | 7.8 | 23.8 | 39.5 | 25.9 | 22.5 |
| Livestock | 32.8 | 44.9 | 48.2 | 50.1 | 52.8 |
| Cattle | na | 17.2 | 21.0 | 17.6 | 29.4 |
| Hogs | na | 34.2 | 62.5 | 76.2 | 68.1 |
| Poultry and eggs | 88.7 | 83.8 | 92.3 | 94.2 | 89.9 |
| Dairy | 36.8 | 58.3 | 48.6 | 59.2 | 53.9 |
| All other livestock | 0.2 | 4.9 | 9.0 | 2.0 | 5.0 |

na = data not available for commodity detail.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 1996-2005 (all versions); and USDA's Farm Costs and Returns Survey, 1991-93.

Figure 3
**Contract agriculture covers a different mix of commodities**




Source: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 2008.

the sector. Small producers of organic poultry or milk rely on contracts to assure outlets for their products and to realize the price premiums that such products can bring.

## Contracts and Debt Use

Farms with contracts carry considerably more debt than farms that do not use contracts (Key, 2004). This is true even when we control for, or remove the effects of, the farm's commodity mix and the net worth of the farm business. Table 6 provides data on debt use among contract farms and noncontract farms sorted into four quartiles of net worth. Contract farms have higher ratios of debt to net worth in each quartile. For example, contract farms in the highest net worth quartile hold debt equal to 16 percent of net worth, on average, compared with 6 percent among noncontract operations. In lower net worth quartiles, farms hold higher ratios of debt to net worth than in higher quartiles, but contract operations still have much higher ratios than noncontract operations.

The pattern holds when farms are further sorted by their primary commodity specialization. Grain and oilseed contract operations carry much more debt, per dollar of net worth, in every net worth category than noncontract operations; the same result holds for cattle, hog, and poultry operations (table 6). Contract operations carry as much or more debt than noncontract operations in 30 of the 32 commodity/net worth categories in table 6. In 17 cases, contract operations carry more than twice as much debt, per dollar of net worth; in only 2 cases do they carry significantly less debt than noncontract operations.

Note that contract livestock operations in the lower net worth quartiles (Q1 and Q2) carry considerable amounts of debt. On average, contract dairy and poultry operations in the lowest net worth quartile carry $8 of debt for every dollar of net worth, while contract hog operations carry nearly $2. Crop operations tend to carry much less debt.

Why is debt associated with contract use? Confined livestock feeding operations require substantial investments in structures, equipment, and livestock inventories. Contractors finance livestock and feed inventories under production contracts, which reduces the total investment needed by operators. Lenders may often require borrowers to have a contract in place before financing structures and equipment. In examining production contracts for hogs, Key (2010) finds some impact of contract adoption, and debt use, on subsequent farm growth. Specifically, small hog operations (with less than 1,000 head in inventory) grew very rapidly after adopting a production contract. Larger operations, up to 5,000 head in inventory, also grew faster after adopting such contracts. The results suggest that farmers who wished to expand may have been better positioned to obtain financing once they adopted a production contract.

Table 6
**Contracts and debt use among U.S. farms, 2008**

| Farms by commodity specialization | Net worth quartiles | | | |
|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 |
| | *----------Mean ratio of total debt to net worth----------* | | | |
| All farms | | | | |
| Noncontract | 0.67 | 0.11 | 0.08 | 0.06 |
| Contract | 2.59 | 0.43 | 0.24 | 0.16 |
| Grains, oilseeds | | | | |
| Noncontract | 0.62 | 0.18 | 0.13 | 0.08 |
| Contract | 1.11 | 0.39 | 0.21 | 0.16 |
| Cotton | | | | |
| Noncontract | **1.51** | 0.17 | 0.15 | 0.08 |
| Contract | **0.83** | 0.23 | 0.31 | 0.13 |
| Vegetables | | | | |
| Noncontract | **0.35** | 0.09 | 0.06 | 0.05 |
| Contract | **0.30** | 0.10 | 0.34 | 0.22 |
| Fruits | | | | |
| Noncontract | 2.47 | **0.08** | 0.07 | 0.06 |
| Contract | 2.55 | **0.08** | 0.13 | 0.09 |
| Hogs and pigs | | | | |
| Noncontract | 0.97 | 0.31 | 0.07 | 0.16 |
| Contract | 1.89 | 0.57 | 0.30 | 0.27 |
| Dairy | | | | |
| Noncontract | 0.48 | 0.26 | 0.18 | **0.17** |
| Contract | 8.17 | 0.39 | 0.30 | **0.16** |
| Cattle | | | | |
| Noncontract | 0.60 | 0.09 | 0.06 | 0.04 |
| Contract | 1.51 | 0.55 | 0.22 | 0.15 |
| Poultry | | | | |
| Noncontract | 0.43 | 0.13 | 0.11 | 0.06 |
| Contract | 8.08 | 0.94 | 0.36 | 0.15 |

Note: Bolded cells are those for which contract farms have lower ratio.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

# Contracts in Selected Major Commodities

Contract use varies widely across commodities, and contracts for different commodities also exhibit distinctive features. The large sample sizes in ARMS, as well as commodity-specific versions of the ARMS questionnaire, allow for a detailed look at contract use in certain specific commodities.[12]

- *Production contracts in the hog and poultry industries.* In 2008, poultry alone accounted for over half of all fee revenue received by farmers from production contracts, while hog production accounted for 19 percent (table 7). The focus here is specifically on broiler grow-out and hog finishing, the largest contract segments of each industry.
- *Marketing contracts for major field crops*. Corn, rice, soybeans, and wheat together accounted for 41 percent of all marketing contract revenues in 2008 (table 8), up from 12 percent in 2005. Part of that increase reflects increased commodity prices (and, hence, contract revenues), but marketing contracts cover growing shares of production in each crop.
- *Contracting in two specialty crops—peanuts and tobacco—following major changes in Federal programs*. In each case, policy changes altered the risk environment faced by producers, and contracts provided a channel for managing new price risks.

[12]While ARMS covers all agricultural commodities, sample sizes are not large enough to allow for useful analyses of contracting for specific fruit or vegetable products. Other studies have examined contracting in those sectors, including Hueth et al. (1999) for tomatoes, Dimitri (2001) for apples, Goodhue et al. (2003) for wine grapes, and Mohapatra et al. (2010) for strawberries.

## Market Organization in Broilers and Hogs

Contract poultry and hog production accounted for 12.3 percent of the value of all U.S. agricultural production in 2008, up from 6.7 percent in 1991-93. That increase reflects the growth of poultry production, the high share of contracting in poultry, and the rapid expansion of hog contracting during the 1990s.

Production contracts can be controversial. They link farmers who make substantial long-term investments to specific buyers, in relationships that can lead to significant commercial disputes. The poultry and hog industries are each concentrated, with a few firms dominating slaughter and processing.

Table 7
**Production contracts and fee volume by commodity, 2008**

| Commodity | Contract fees | Share of total fees |
|---|---|---|
| | *$ million* | *Percent* |
| All commodities | 7,357 | 100.0 |
| All poultry | 3,726 | 50.6 |
| *Broiler grow-out* | *2,174* | *29.5* |
| All hogs | 1,410 | 19.2 |
| *Hog finishing* | *800* | *10.9* |
| All cattle | 1,381 | 18.7 |
| *Cattle finishing* | *769* | *10.4* |
| All other livestock | 41 | 0.6 |
| All crops | 799 | 10.9 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

Critics contend that contracts can be designed to extend processor market power, while supporters argue that contracts reduce costs and increase efficiency. There have been several congressional proposals to regulate production contracts, and interest in legislation continues (Johnson and Becker, 2009; MacDonald, 2006). In June 2010, USDA's Grain Inspection, Packers and Stockyards Administration, in response to provisions of the 2008 farm bill, issued a proposed ruling that would introduce new regulations for production contracts in hog and poultry industries (U.S. Department of Agriculture, 2010).

Firms in each industry rely extensively on contracts and on vertical integration to manage production, processing, and distribution. Nevertheless, production contracts in the two industries differ in design and use.

The broiler industry has a high degree of vertical integration (MacDonald, 2008). Broiler companies (integrators) own slaughter and processing plants from which they ship branded consumer products, and they usually own hatcheries and feed mills as well. Hatchery chicks are shipped to contract growers, whom integrators also provide with feed and veterinary services. Growers provide labor and utilities, along with structures and equipment that are usually designed to the integrator's specifications. Some contract growers produce replacement birds for breeding flocks, but most grow broilers for meat.

Because feed is costly to ship, and because chicks and live chickens cannot be shipped very far due to the risk of unacceptable mortality losses, contract

Table 8
**Marketing contracts, revenues by commodity**

| 2008 rank | 2005 rank | Commodity | 2008 contract revenues | Share of total revenues |
|---|---|---|---|---|
| | | | *$ million* | *Percent* |
| | | All commodities | 58,128 | 100.0 |
| 1 | 1 | Milk and dairy products | 17,440 | 30.0 |
| 2 | 4 | Corn | 12,117 | 20.8 |
| 3 | 6 | Soybeans | 7,340 | 12.6 |
| 4 | 23 | Wheat, winter | 2,198 | 3.8 |
| 5 | 5 | Grapes, fresh | 1,554 | 2.7 |
| 6 | 25 | Rice | 1,248 | 2.1 |
| 7 | 2 | Cotton, upland | 1,045 | 1.8 |
| 8 | 15 | Tomatoes, processed | 920 | 1.6 |
| 9 | 71 | Wheat, other spring | 857 | 1.5 |
| 10 | 21 | Peanuts | 812 | 1.4 |
| 11 | 19 | Tobacco, flue-cured | 796 | 1.4 |
| 12 | 29 | Potatoes | 715 | 1.2 |
| 13 | 8 | Almonds | 704 | 1.2 |
| 14 | 9 | Sugar beets | 609 | 1.0 |
| 15 | 10 | Oranges, not Valencia | 586 | 1.0 |
| | | 178 other commodities | 9,245 | 15.9 |

Note: Top 15 commodities from 2005 that dropped out of the 2008 ranking include vegetables, other (3), feeder calves (7), farrow to finish hogs (11), dates (12), nursery crops (13), and strawberries (14).
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

growers and integrator-owned facilities are typically located within 100 miles of the integrator's complex. Compensation of contract growers is usually based on their relative performance, under a tournament scheme. That is, growers receive a base payment after a flock is delivered for processing, and they may receive additional payments that vary with the grower's feed efficiency and mortality performance (percent of chicks that survive), compared with the average performance of a group of other growers of similar birds.

Production contracts and vertical integration are widespread in the hog industry, but not to the degree in the broiler industry (McBride and Key, 2007). Some hog industry integrators follow the broiler model, in that they own feed mills and sow facilities from which they provide pigs to contract growers who raise them to market weight before they are transferred to the integrator's slaughter plant. But there are many other models. Some integrators own sow operations, contract with growers to raise the pigs to market weight, and then sell the hogs to packers, usually under marketing contracts. Others purchase pigs and feed from independent sow operations and feed mills, place them on contract growing operations, and then sell the market hogs to slaughter plants under a marketing contract. Those integrators own no facilities, but instead coordinate the process through contracts and spot market purchases. In each case, contract growers receive pigs, feed, veterinary services, and supervision from integrators and provide labor, capital, and utilities. [13]

[13]In some cases, the integrator or a third party will own the houses on a grower's operation, with the grower providing labor and obtaining manure for fertilizer.

The industry also has a significant number of traditional operations. These growers raise pigs from birth to market weight and sell them to processors through a marketing contract or a cash market sale.

Hog producers do not face the same geographic constraints that broiler producers face—hogs and pigs can travel much farther without the risk of animals dying en route. With larger geographic markets, hog producers have a greater choice of contracting options. Some producers also have spot market options, although those are disappearing as spot markets now account for less than 10 percent of market hog shipments.

## Production Contracting for Broilers and Hogs

In 2008, the median quantity removed under a production contract amounted to 380,000 broilers and 6,000 hogs (table 9). Given the capacity of modern houses and the amount of time needed to raise broilers and hogs, those quantities were likely met with three to five broiler houses or two hog houses per operation. These are typical sizes, but larger operations accounted for most production: half of all hog production occurred on farms that raised at least 15,500 hogs, while half of all broiler production occurred on farms that raised at least 682,200 broilers. Operations of that size would have six to seven hog houses or five to six broiler houses. [14]

[14]In this analysis, we focus on hog finishing operations, which receive pigs and raise them to market weight. Farrow to wean operations, with sows in inventory, are often much larger and more specialized.

Contract broiler operations are much smaller and more specialized than contract hog operations. Broiler operations have just 91 acres of cropland, on average, and nearly half have no crop production at all (table 10). Fees from

production contracts account for about 75 percent of their gross cash farm income. In contrast, contract hog producers have significantly larger crop enterprises (590 acres, on average), and production contract fees account for less than 20 percent of gross cash income.[15]

Farm households derive income from off-farm employment, from "unearned" off-farm sources such as pensions or returns from financial investments, and from the net income that is provided by the farm business, after accounting for expenses and for any claims on the farm's net income from other entities. For most broiler operations, farming is not the primary source of household

[15]Contract hog operations use hog manure as fertilizer for their crops. Contract poultry farms are less likely to have crops, and most litter is removed from operations and transferred to other farms for use as fertilizer (MacDonald and McBride, 2009).

Table 9
**Characteristics of production contracts for U.S. hogs and broilers, 2008**

| Item | Broilers | Market hogs |
|---|---|---|
| | ----------*Head*---------- | |
| Annual quantity removed | | |
| Mean | 485,116 | 8,644 |
| Median | 380,000 | 6,000 |
| 25th percentile | 225,000 | 2,400 |
| 75th percentile | 675,000 | 10,800 |
| | ----------*Dollars per head*---------- | |
| Fee received | | |
| Mean | 0.36 | 13.40 |
| Median | 0.30 | 12.00 |
| 25th percentile | 0.24 | 10.67 |
| 75th percentile | 0.38 | 13.73 |

Note: The sample includes 916 broiler contract producers and 349 market hog contract producers.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

Table 10
**U.S. broiler and hog operations with production contracts, 2008**

| Item | Broilers | Hog finishing |
|---|---|---|
| Farm operations | | |
| Median head removed | 380,000 | 6,000 |
| Weighted by production | 682,200 | 15,600 |
| Acres operated (mean) | 209 | 666 |
| Cropland acres (mean) | 91 | 590 |
| Percent with no cropland | 44 | 8 |
| Farm financial measures ($) | | |
| Gross cash farm income | 198,011 | 623,379 |
| Production contract income | 147,850 | 114,947 |
| Farm household income ($) | | |
| Mean total household income | 64,179 | 116,584 |
| Mean off-farm income | 49,289 | 42,353 |
| 25th percentile, household income | 9,793 | 33,082 |
| 50th percentile, household income | 53,487 | 74,542 |
| 75th percentile, household income | 93,995 | 176,906 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

income. Mean household income from farming operations amounted to $14,890 on broiler operations in 2008, compared with mean off-farm income of $49,289. The ratio of farm to off-farm income is reversed in households that operate contract hog operations, where farming provides 64 percent of the household's income (table 10).

Contract growers are not, in general, low-income households. In 2008, mean household income among all U.S. households was $68,424. Mean household income among contract broiler producers was $64,179, when measured on a comparable basis using the net income flowing from the farm business, while mean household income for contract hog producers was $116,584.[16]

[16] Among all households of primary farm operators, mean household income was $81,596.

Incomes among farm households are skewed, as are incomes among all households, by the fact that some households earn very high incomes, thus raising the mean above the amounts earned by most. For that reason, it is important to look at median household incomes and the range of income earned by looking at the 25th and 75th percentiles.

For example, a quarter of households with contract hog operations had incomes above $176,906 (the 75th percentile). Those incomes raised the mean substantially. The median income was $74,542, well below the mean, while another quarter earned incomes below $33,082 (table 10).

The median household income among broiler farms was $53,487, also well below the mean. A quarter of those households earned incomes above $93,995, while a quarter earned incomes below $9,793.[17] The medians compare favorably to nationwide estimates—median income among all U.S. households in 2008 amounted to $50,303, below the medians for broiler or hog households.

[17] Broiler and hog operations with recent investments in housing are able to claim accelerated depreciation expenses from those investments. Many consequently have negative net farm income and relatively low reported household incomes, as the depreciation provisions allow them to shelter income from taxation.

Household incomes for broiler producers were considerably lower in 2008 than in 2004, when median household income as reported in an earlier ERS study was $64,447. It should be noted that consumer prices rose by 13.9 percent between 2004 and 2008, so that real (adjusted for inflation) median income fell by 27 percent. Fee payments, on a per pound basis, have not grown in recent years, while industry production growth also slowed.

Farmers face risks from many sources. While production contracts can reduce the risks from variation in input and product prices and from regional weather and disease problems, they can introduce new holdup risks for producers who commit to major long- term investments. Specifically, integrators may fail, they may cancel a contract, and they may impose new investment requirements on producers. Such risks may be less challenging for diversified producers with alternative contract options—that is, hog contract growers, as opposed to poultry.

Broiler producers are closely tied to a single integrator. More than half assert that they have no alternative outlets, other than their present integrator, for their broilers, compared with less than a quarter of hog producers (MacDonald and Korb, 2008). Broiler contract features are unique to the industry and not widely understood by outsiders (see box, "Broiler Contract Design"). Broiler operators' household incomes from farming tend to be lower than those of hog producers and more closely tied to the returns from

## Broiler Contract Design

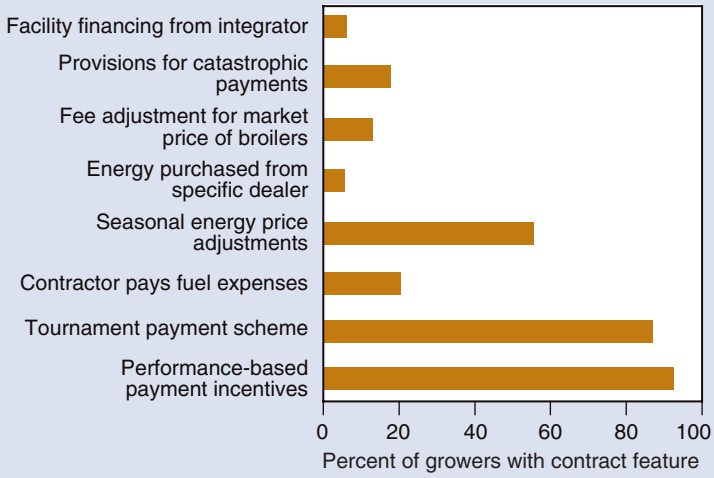
Production contracts cover nearly 99 percent of commercial broiler production, with processor-owned facilities accounting for less than 1 percent (table 1).[1] The few independent broiler farms produced an estimated 31 million broilers in 2006, but that accounts for less than 0.4 percent of production.

On average, growers earn fees of about 5 cents per pound, on a live-weight basis, of broilers delivered to the processing plant (table 2). Actual payments vary widely around the average and range from 4.0 to 6.6 cents per pound. Integrators pay for grower fuel expenses in some regions, such as the Delmarva Peninsula in the Mid-Atlantic region, and grower fees are lower in those areas. Fees also vary with the size of bird produced and tend to fall slightly, on a per pound basis, for larger birds. Payments also depend on a flock's production performance, compared with that of flocks of other growers. Flocks with lower rates of mortality and feed conversion (pounds of feed relative to pounds of weight gain) generate higher payments.

Contract features do vary (see figure). Over 90 percent of contracts in 2006 based grower payments on performance, and almost all of those used a tournament scheme, in which performance is measured relative to other producers. But tournaments are not universal—13 percent of farms did not receive payments based on tournament performance. Over half of producers received seasonal fee adjustments in response to changes in energy prices, while 20 percent had fuel expenses covered by integrators. Smaller fractions received fee adjustments based on the market price for broilers, facility financing from the integrator, or contract provisions that provided for payments in the event of catastrophes.

[1]Data are drawn from USDA's ARMS, 2006, version 4, which was aimed at commercial broiler operations in the 17 largest States for broiler production. In turn, those States accounted for over 90 percent of production.

### Broiler contract features




Source: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 2006, version 4.

Table 1
**U.S. broiler production, by type of operation, 2006**

| Type of operation | Farms | Removals | Production |
|---|---|---|---|
| | *No.* | *Million head* | *Million lbs* |
| Production contract | 17,200 | 8,310 | 45,606 |
| Processor-owned | 163 | 84 | 402 |
| Independent | 52 | 31 | 160 |
| More than one type | 14 | 8 | 43 |
| Refusal/don't know | 11 | 5 | 26 |
| All operations | 17,440 | 8,438 | 46,237 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2006, version 4.

Table 2
**Fees paid in U.S. broiler production contracts, 2006**

| | Share of farms | Share of production | Contract fee per pound: Mean | Median | 90th percentile | 10th percentile |
|---|---|---|---|---|---|---|
| | *Percent* | *Percent* | *Cents* | | | |
| Contractor pays for fuel? | | | | | | |
| Yes | 20 | 18 | 4.6 | 4.3 | 5.8 | 3.4 |
| No | 80 | 82 | 5.1 | 5.0 | 6.2 | 4.0 |
| Bird size (lbs) | | | | | | |
| <4.26 | 27 | 22 | 5.3 | 5.1 | 6.6 | 4.0 |
| 4.26-6.25 | 30 | 31 | 5.0 | 5.0 | 6.1 | 4.0 |
| 6.26-7.75 | 16 | 20 | 5.1 | 5.1 | 6.2 | 3.8 |
| >7.75 | 7 | 9 | 4.9 | 5.0 | 5.9 | 3.7 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2006, version 4, production contracts only.

contract production. These patterns may help to explain why broiler contract relationships have attracted widespread legislative interest and regulatory proposals (Doby, 2007; Philippi, 2007; Lawrence and Grimes, 2007).

## Marketing Contracts in Field Crops

Contract coverage varies widely among producers of specific field crops. Most use no contracts, while those who do usually contract substantial shares of production. Moreover, contract use in major field crops has expanded sharply in recent years. Crop operations that contract differ in important ways from those that do not.

Most field crop operations do not use contracts, while those that do use them extensively (table 11). For example, 103,193 corn producers used a marketing contract for corn in 2008, while 177,623—63 percent of the total—did not. Similarly, 66 percent of soybean producers and 76 percent of wheat producers did not use contracts. Even among farms producing commodities with higher levels of contract coverage, many do not use contracts. Sixty-seven percent of cotton producers, 33 percent of peanut producers, and 46 percent of rice producers do not use marketing contracts.

Among field crop farms, those that contract are considerably larger, on average, than those that do not, when size is measured by the whole farm's value of production, the specific crop's value of production, or the crop's harvested acreage. Farms that contract for one crop tend to contract for others. For example, corn operations that used a contract in 2008 placed 48 percent of their corn under contract and also placed 42 percent of their other crop production under contracts. Farms that did not use contracts for their corn production used contracts for only 6 percent of their other crop production.

Contracts form part of a broad marketing strategy for field crop operators.[18] On average, contract corn operations placed about half of their total corn production under contract in 2008 but did not necessarily use spot markets for the remainder. Some corn was used onfarm, while some went to landlords who held share leases on the land. We estimate that contract corn growers diverted 13 percent of their corn production to those channels in 2008, leaving 38 percent to be sold through spot markets or retained in storage. Contract soybean and wheat producers each diverted about 10 percent of production to onfarm use and landlord commitments, leaving 36 percent of their soybean production and 34 percent of wheat production to spot markets or storage.[19] For these producers, noncontract production provides a form of "contract insurance"—in the event of low yields, production that is not committed to a contract may be used to help fulfill any shortfalls in production that is committed to a contract.

The data cited above refer to average contract shares. But individual contracting farms varied widely around the mean. Table 12 presents contracting farms sorted into quintiles, according to the share of production under contract. Among corn, soybean, and wheat operations that used contracts, over 60 percent put between 20 and 60 percent of production under contract. Many farms, however, fell outside that range: some put all of their production under contract, and surprisingly large numbers put either a high

[18]Prior studies of risk management strategies find that producers concerned with managing commodity price risks frequently combine several tools, including marketing contracts, hedging, storage, and enterprise diversification (Harwood et al., 1999).

[19]As a result, corn, soybean, and wheat producers who contracted committed most of their market production to contracts (56, 60, and 62 percent, respectively).

share (81-100 percent of production) or a low share (1-20 percent) under contract.

Marketing of rice and cotton looks distinctly different than marketing of other field crops. Cotton producers who used contracts shipped most of their marketed crops through contracts, and many shipped all of their production under contract. Very little went to spot markets. This was also true, to a lesser extent, for rice producers.

Table 11
**Contract and noncontract U.S. field crop producers in 2008**

| Commodity and contract status | Number of farms | Farm value of production ($) | Commodity value of production ($) | Enterprise harvested acres | Contracting share (%) | |
|---|---|---|---|---|---|---|
| | | | | | Commodity | Other crops |
| | *Mean values, across farms* | | | | | |
| Corn | | | | | | |
| Contract | 103,193 | 589,043 | 274,173 | 386 | 48.2 | 41.5 |
| Noncontract | 177,623 | 334,670 | 120,221 | 194 | 0 | 5.6 |
| Cotton | | | | | | |
| Contract | 5,110 | 782,205 | 252,512 | 629 | 88.5 | 67.9 |
| Noncontract | 10,389 | 553,282 | 162,451 | 419 | 0.0 | 24.3 |
| Peanuts | | | | | | |
| Contract | 4,736 | 470,714 | 158,506 | 219 | 94.5 | 41.5 |
| Noncontract | 2,291 | 368,004 | 99,188 | 200 | 0.0 | 7.2 |
| Rice | | | | | | |
| Contract | 3,575 | 1,117,378 | 726,973 | 535 | 71.3 | 53.8 |
| Noncontract | 3,091 | 1,041,569 | 457,730 | 351 | 0.0 | 21.6 |
| Soybeans | | | | | | |
| Contract | 98,274 | 561,264 | 157,716 | 375 | 54.1 | 39.1 |
| Noncontract | 190,958 | 335,008 | 78,906 | 192 | 0.0 | 5.3 |
| Wheat | | | | | | |
| Contract | 44,861 | 719,848 | 176,803 | 480 | 56.2 | 37.4 |
| Noncontract | 143,081 | 394,486 | 68,712 | 232 | 0.0 | 10.4 |

Note: The sample includes 3,218 corn contracts, 319 cotton contracts, 165 rice contracts, 244 peanut contracts, 2,800 soybean contracts, and 1,444 wheat contracts.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

Table 12
**Distribution of U.S. contracting farms by share of production under contract, 2008**

| Commodity | 1-20 | 21-40 | 41-60 | 61-80 | 81-100 | 1-100 |
|---|---|---|---|---|---|---|
| | *Share of commodity production under contract (percent)* | | | | | |
| | *Share of farms with contracts in the commodity (percent)* | | | | | |
| Corn | 20.1 | 27.5 | 24.6 | 11.6 | 16.2 | 100.0 |
| Cotton | 5.4 | 7.1 | 3.9 | 5.1 | 78.5 | 100.0 |
| Rice | 4.5 | 18.1 | 9.8 | 28.7 | 38.9 | 100.0 |
| Soybeans | 13.4 | 25.5 | 24.0 | 16.1 | 21.0 | 100.0 |
| Wheat | 12.6 | 26.2 | 20.5 | 17.1 | 23.6 | 100.0 |

Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

Marketing contracts form part of a portfolio of risk management tools. Farmers also use financial hedges in futures and options markets to manage risks. They may invest in onfarm storage capacity, which can give them greater flexibility to hold crops in storage when they expect prices to rise in the future. Producer cooperatives may provide some marketing expertise for their members, who can then realize payments for crops delivered to the cooperative as well as any cooperative patronage dividends earned on the cooperative's marketing efforts.[20]

Farms that use contracts also use these other marketing strategies, and they are more likely to use them than farms that do not use contracts (table 13).[21] Among the producers of each commodity, farms that use contracts are substantially more likely to also use financial hedging strategies, onfarm storage, or cooperative marketing than farms that do not use contracts.

Just over half of corn, soybean, and wheat producers do not make any use of marketing contracts, financial hedges, or producer cooperatives. These farms are relatively small operations and, together, account for 20 percent of all wheat and soybean production and 24 percent of corn production. About 10 percent of these farms feed their corn and wheat production to livestock and, hence, do not market their crops, but most sell their grain and rely exclusively on cash sales. However, by 2008, most corn, soybeans, and wheat were produced on farms that used a variety of risk management tools and that used marketing contracts as a primary tool.[22]

[20]A farmer may have a marketing contract with a cooperative, but other farmers may simply make a cash sale to the cooperative with the expectation that they may earn dividends from the cooperative's later marketing actions.

[21] The data in table 15 are drawn from questions asked on version 1 of ARMS, and we did not have enough contracts for cotton, peanuts, and rice in version 1 to provide us with reliable data.

[22]Our findings differ in some respects from the conclusions of Cole and Kirwan (2009), who rely on ARMS data on marketing contract usage to argue that "…relatively little agricultural risk is hedged. Few farmers sell product forward or trade in futures or options markets; moreover, even when farms do participate in these markets they hedge only a small fraction of their output." Cole and Kirwan used ARMS data for 1999-2006, when marketing contracts covered much less production. They focus primarily on individual farms rather than production, and on marketing contracts alone as a hedging tool.

Table 13
**Use of alternative marketing strategies by U.S. corn, soybean, and wheat producers, 2008**

| Commodity and contract status | Options | Futures | Onfarm storage | Farmer-owned cooperative | Spot markets only |
|---|---|---|---|---|---|
| | *Share of farms using strategy (percent)* | | | | |
| Corn | | | | | |
| Contract | 15.1 | 29.2 | 64.1 | 61.9 | 0.0 |
| Noncontract | 6.3 | 9.1 | 54.5 | 39.9 | 55.2 |
| Soybeans | | | | | |
| Contract | 13.8 | 28.5 | 63.2 | 54.8 | 0.0 |
| Noncontract | 7.1 | 9.1 | 51.1 | 43.1 | 52.6 |
| Wheat | | | | | |
| Contract | 13.3 | 29.2 | 56.9 | 55.1 | 0.0 |
| Noncontract | 6.6 | 11.3 | 48.7 | 42.9 | 51.1 |

Note: "Spot markets only" is defined as farms that do not use marketing contracts, options, futures, or farmer-owned cooperatives.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, version 1.

## Expansion of Contracting for Corn, Soybeans, and Wheat

Contract coverage for the three largest U.S. field crops—corn, soybeans, and wheat—grew in recent years, with a sharp acceleration between 2005 and 2008.[23] Marketing contracts covered 27 percent of corn production in 2008, up from 19 percent just 3 years before (table 14). Soybeans and wheat showed greater increases over the same period (12 and 18 percentage points, respectively).

Increased ethanol production could account for the growing use of corn contracts because ethanol plants often contract for corn supplies to ensure steady flows through processing. Ethanol accounted for 30 percent of U.S. corn production by 2008; however, ethanol plants typically procure corn from elevators rather than directly from farmers, so expanded ethanol production should not necessarily imply expanded contracting by corn producers.[24]

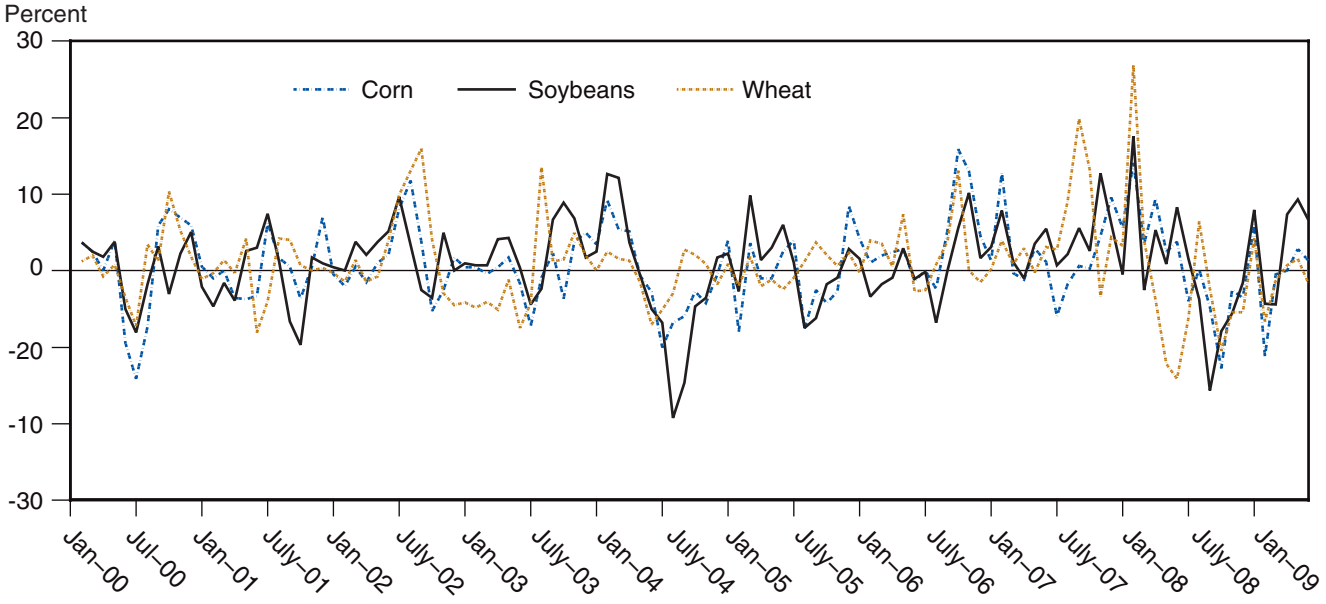
Commodity prices fluctuated sharply during the period of accelerated contracting (fig. 4). Prices began to rise in late 2006 and peaked in 2008, with corn at $5.47 per bushel in June, soybeans at $13.30 per bushel in July, and wheat at $10.50 per bushel in March—each more than double its value in late 2005. Prices then fell substantially from their peaks during late 2008 and 2009. The wide swings in prices and the consequent uncertainty provided farm operators with a strong incentive to seek greater protection through marketing contracts.

Farmers who use marketing contracts placed more of their production under contract in 2008 than they had in 2005 (table 14). Contract corn operations placed 48 percent of production under contract in 2008, up from 44

[23]Corn, soybeans, and wheat accounted for 225 million planted acres in 2008—more than half of all U.S. cropland, including that left fallow or used only for pasture, and 70 percent of the total planted to field crops.

[24]The 2008 ARMS bioenergy version contained a section on corn marketing; farms in major production States reported shipping 66 percent of their 2008 corn sales directly to grain elevators and only 13 percent directly to ethanol plants. Other buyers were feed mills (5 percent), other farms (5 percent), and food processing plants (7 percent), with remaining sales covered by nonresponse and "don't know" answers.

Figure 4
**Monthly price changes, corn, wheat, and soybeans, 2000-2009**




Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service monthly prices received.

Table 14
**Increases in contract coverage in U.S. corn, soybeans, and wheat**

| Crop | Share of commodity under contract | | Farms with marketing contracts | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Share of farms | | Share of total production | | Contracting intensity | |
| | 2005 | 2008 | 2005 | 2008 | 2005 | 2008 | 2005 | 2008 |
| | *Percent* | | | | | | | |
| Corn | 19.3 | 27.4 | 22.0 | 36.7 | 44.4 | 56.9 | 43.5 | 48.2 |
| Soybeans | 15.5 | 27.4 | 17.8 | 34.0 | 33.8 | 50.7 | 45.8 | 54.1 |
| Wheat | 7.3 | 25.1 | 9.6 | 23.9 | 15.8 | 44.7 | 46.1 | 56.2 |

Note: Contracting intensity is the average share of production placed under contract by farms with contracts.
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions.

percent in 2005, while contract soybean and wheat operations placed 54 and 56 percent under contract, respectively, in 2008, compared with 46 percent for each in 2005. But the driving force in expanded contracting was sharp increases in the proportion of farms that used contracts. In 2008, 36.7 percent of corn farms used a marketing contract, up from 22 percent in 2005; 34 percent of soybean producers and 24 percent of wheat producers held marketing contracts for those commodities in 2008, up from 18 percent and 10 percent, respectively, in 2005.

## Prices and Quantities in Marketing Contracts for Field Crops

Prices received by U.S. farmers under marketing contracts for corn, cotton, soybeans, and rice consistently exceeded estimates of nationwide average prices received for those commodities in 2008 (table 15). Rice was the exception to this pattern among field crops, with contract prices falling well below average NASS prices received. NASS reports the annual average price received for each commodity, using data for spot and contract prices. Respondents to the ARMS contracting questions report the average price that they received for their contract shipments in 2008.

Table 15
**Prices and quantities in U.S. field crop marketing contracts, 2008**

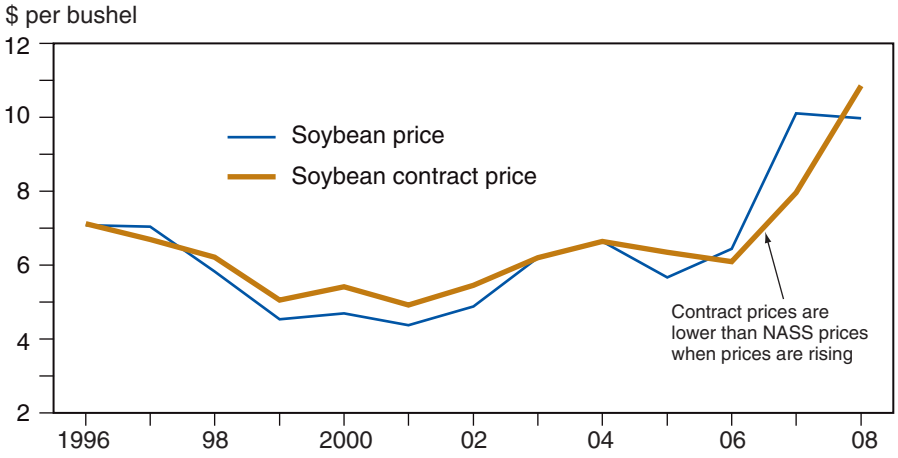
| Item | Commodity | | | | |
|---|---|---|---|---|---|
| | Corn | Soybeans | Wheat | Rice | Cotton |
| Price received per unit ($) | *Per bushel* | | | | *Per pound* |
| USDA/NASS mean, all sales | 4.06 | 9.97 | 6.78 | 7.56 | 0.478 |
| Contract mean | 4.89 | 10.85 | 7.26 | 6.63 | 0.617 |
| Contract 25th percentile | 4.19 | 9.62 | 5.90 | 6.00 | 0.520 |
| Contract 75th percentile | 5.50 | 12.00 | 8.66 | 7.39 | 0.749 |
| Quantity marketed through contract | *Bushel* | | | | *Pounds* |
| Median | 8,000 | 3,000 | 4,300 | 30,000 | 250,000 |
| Mean | 21,154 | 6,580 | 9,573 | 40,816 | 391,966 |
| 25th percentile | 3,300 | 1,200 | 2,000 | 22,000 | 116,400 |
| 75th percentile | 20,000 | 7,000 | 10,000 | 74,800 | 499,100 |

Sources: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, all versions (contract prices and quantities); and USDA's National Agricultural Statistics Service (NASS), annual prices received (USDA/NASS prices).

Producers are more likely to choose marketing contracts than rely on spot markets for thinly traded, high-value varieties of a commodity. High-oil corn and low-linoleic soybeans carry price premiums, and each is likely to be produced under contract. If these varieties signal quality differences that are valued in the market, then contract prices should exceed cash prices at most times. But contract prices may also differ from season average prices if prices are changing sharply during the year. Contract prices tend to fluctuate less than cash prices and thus lag behind cash price changes (i.e., cash prices often exceed contract prices when prices are rising and fall below them when prices are falling).

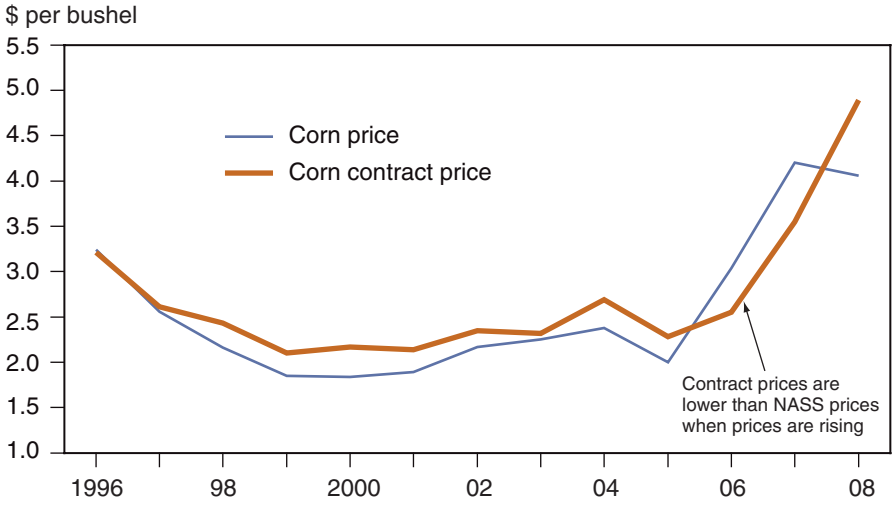
Figures 5 and 6 illustrate the time pattern of prices for corn and soybeans from 1996 to 2008, using annual average contract prices (drawn from ARMS) and NASS annual average prices received. Some caution should

Figure 5
**Soybean contract prices lag NASS prices**




Sources: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 1996-2008; and USDA, National Agricultural Statistics Service monthly prices received.

Figure 6
**Corn contract prices lag NASS prices**




Sources: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 1996-2008; and USDA, National Agricultural Statistics Service monthly prices received.

be exercised in making inferences from these comparisons. NASS reports monthly prices received, whereas the ARMS contract data are available on an annual basis only. NASS prices cover all grades and qualities, while contract prices are likely to cover standard grades and qualities. Contract respondents may cover a different spread than NASS respondents.

Still, notable and persistent patterns are revealed in the price comparisons. Contract prices remain above NASS prices when NASS prices are stable or falling, and they fall below them when NASS prices are rising. As NASS prices rose sharply in 2007, they also rose above contract prices; but contract prices received a premium in 2008 as NASS prices fell late in the year.[25]

[25]This pattern also accounts for the exception in table 17—where contract prices for rice are well below NASS prices in 2008. While monthly NASS prices for corn, cotton, soybeans, and wheat peaked early in 2008 and then fell off sharply later in the year, rice prices continued to rise, peaking in November 2008 and falling in 2009. We would therefore expect contract prices to exceed NASS prices during 2009.

Quantities of commodities marketed through contracts range widely among farms, with the 75th percentile quantity being three to five times larger than the 25th percentile quantity for each commodity (see table 15). Farms that do not use contracts are unlikely to be deterred from doing so by quantity commitments because the quantities themselves are not very large. At average 2008 yields, the median contract corn quantity (8,000 bushels) could be met with 52 acres and the interquartile range could be met with 21 (the 25th percentile) to 130 acres. Similarly modest acreages are needed, at average yields, to meet the median soybean and wheat contracts—75 and 96 acres, respectively—while the 25th quartile quantities could be met with 30 and 40 acres, respectively.[26] Corn, soybean and wheat producers usually commit only about half of their production to contracts (see table 11), and they may use several contracts.

[26]The acreage required to fulfill median rice and cotton contracts was considerably larger, at 200 and 307 acres, respectively, with average yields.

Marketing contracts for specialized varieties of field crops provide assured marketing outlets and prices tied to desired attributes that may be more costly to produce. But the growth in contracting has occurred among standard varieties and likely reflects increased price risks in recent years. Such contracts are simpler than production contracts and, while they introduce new risks in the form of contract volume commitments, they do not govern the same capital commitment envisioned in livestock production contracts. With fluctuations in prices likely to continue, more producers can be expected to use marketing contracts as a tool for risk management.

## Institutional Change and Contracting Shifts: Peanuts and Tobacco

Some commodities show sharp changes in contracting in short periods of time. Such changes may be linked to institutional changes in the industries, deriving from changes in Government policy, in information flows, or in buyer organization. Peanuts and tobacco offer two such examples: each displayed sharp increases in contract usage after changes in Federal policy.

Contract coverage spread widely in the U.S. tobacco sector after major structural and policy changes. Marketing contracts were rarely used in tobacco prior to 1998. Until then, a system of marketing quotas controlled supply and limited spot market price risks, so producers had little interest in other risk-management methods. Most tobacco was sold through spot markets in local auction houses.

Tobacco quality can vary widely across lots available for sale, and processors had long sought an expanded use of marketing contracts as a way to better link prices to qualities. Moreover, increasing international competition (both imports and exports) undermined the effectiveness of marketing quotas as a tool of price management. Production did start to shift to marketing contracts, after 1998, when the States and the tobacco industry reached an agreement called the "master settlement," resolving lawsuits brought by the States against tobacco processors. The traditional tobacco program of marketing quotas and price supports was eliminated after 2004.

Respondents to a 2008 ARMS tobacco version were asked about their use of contracts in 2008, 2004, and 2000. Contracts covered 25 percent of respondents' production in 2000 and 99 percent by 2008 (table 16). The traditional auction house system nearly disappeared in that short period—respondents reported that they could access 3.2 auction houses, on average, in 2000, but most had no auction houses available by 2008.

Marketing contracts for tobacco contain features aimed at product quality (fig. 7). Most contracts require bales of tobacco to contain leaves from only a single stalk position (quality and use varies with position). Most also set maximum allowable moisture levels and restrictions on chemical use in production.

Contract coverage of peanuts expanded sharply after the 2002 elimination of the peanut marketing quota system (fig. 8). Marketing quotas were used to control domestic peanut supplies, which in turn allowed for stable and relatively high spot market prices (Dohlman et al., 2009). The elimination of marketing quotas loosened supply controls and thus created greater market price risks. In addition, timely market price information, which might have allowed producers to manage their risks, was not widely available.

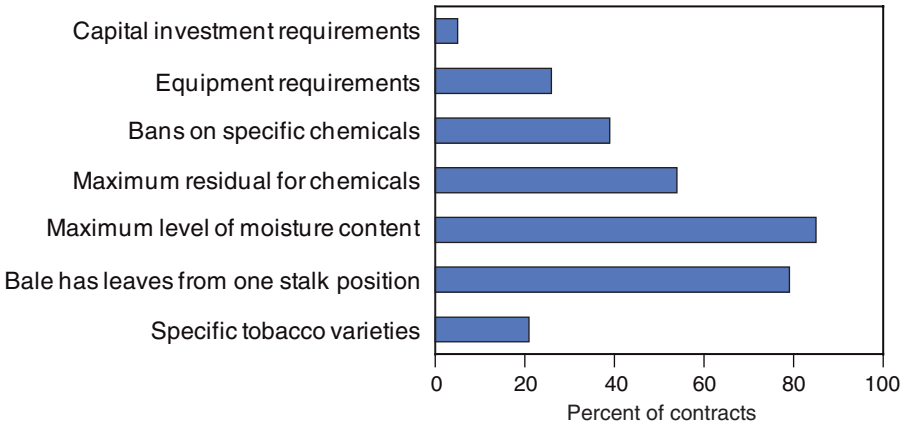
Marketing contracts were an important element of peanut production before the policy change—they covered 24-47 percent of production in each year between 1996 and 2002. But after elimination of the marketing quota

Table 16
**Changes in U.S. tobacco marketing**

| Item | 2008 | 2004 | 2000 |
|---|---|---|---|
| Marketing channel | *Share of production (percent)* | | |
| Marketing contract with tobacco company | 97.2 | 78.0 | 23.4 |
| Marketing contract with cooperative | 2.1 | 5.1 | 1.4 |
| Auction house(s) | 0.4 | 15.4 | 72.5 |
| Other, including production contract | 0.3 | 1.6 | 2.7 |
| Marketing options | *Mean number available* | | |
| Tobacco companies | 1.5 | 1.5 | 0.9 |
| Cooperatives | 0.2 | 0.2 | 0.2 |
| Auction houses | 0.3 | 1.6 | 3.2 |

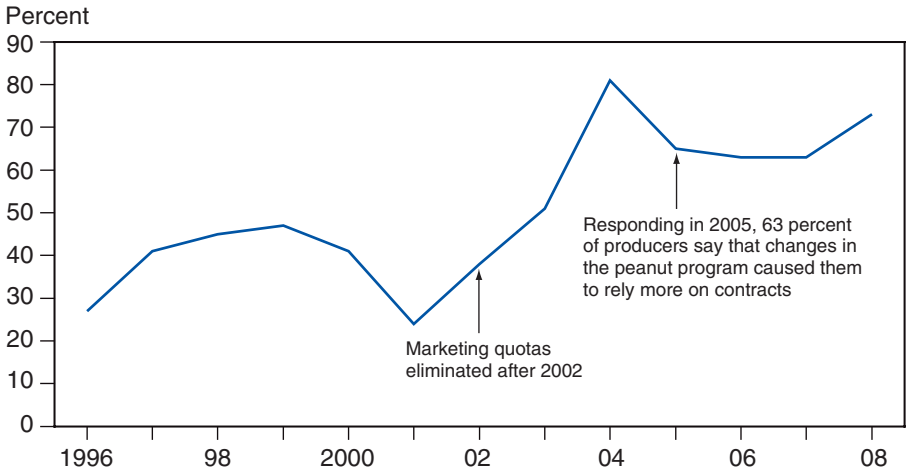
Source: USDA, Economic Research Service using data from USDA's Agricultural Resource Management Survey, 2008, version 4.

Figure 7
**Features of tobacco marketing contracts**




Source: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 2008, version 2.

Figure 8
**Share of peanut production under marketing contracts**




Source: USDA, Economic Research Service using USDA's Agricultural Resource Management Survey, 1996-2008, all versions, and 2004, version 2.

program, contracts provided a way to manage increased price risks, and contract coverage expanded sharply. Since 2004, contracts have covered 63-83 percent of production, a substantial increase over 1996-2002 (fig. 8). Peanut producers also perceive a shift toward the use of marketing contracts. The 2004 ARMS contained a peanut version, which went into the field in 2005. Respondents were asked whether changes in the peanut program led them to rely more on contracts for peanut marketing, and 62.5 percent responded that it did.

Data from ARMS clearly indicate that policy changes, in the form of the elimination of marketing quotas, led to sharp increases in contracting in tobacco and peanuts. Contracts provide a way to manage price risks and assure marketing outlets. But contracts are also used in tobacco to manage product qualities, with contract prices that are more closely tied to product attributes than they were in the auction house system.

## Conclusions

Contracting is a major feature of U.S. agriculture. In 2008, agricultural contracts covered 39 percent of U.S. agricultural production. Data from the Census of Agriculture indicate that contracts covered 11 percent of production in 1969, so expanded contracting is an important feature of structural change in agriculture.

But contract use varies widely across commodities. Contracts cover more than 90 percent of broiler, sugar beet, and tobacco production but less than 30 percent of corn, soybean, and wheat production, where spot markets still predominate.

Because contracting is a substitute for spot markets, producers often shift to contracts because of perceived weaknesses in spot markets. For example, contracts are often used when producers perceive that they have very limited options for marketing their products—that is, when commodity buyers have market power. However, that does not necessarily mean that contracts are instruments of market power. Instead, contracts may serve to insulate farmers from the exercise of market power and induce farmers to invest in the equipment and structures that will reduce costs for producing the contracted commodity.

Contracts may also be used as a risk management tool when spot prices fluctuate widely or when there is limited information for managing price risks in spot markets. For example, ERS data show substantial shifts of corn, soybean, and wheat production to marketing contracts in 2008, a year of historically high, but fluctuating, spot prices. Contract coverage grew sharply in two markets, tobacco and peanuts, when the cessation of Government programs increased income risks in the markets and when alternative means of managing risks were not widely available.

Contracts are evolving to cover new and often unforeseen developments. Standard poultry production contracts are designed so that the integrator provides feed and chicks, while the farm operator provides the onfarm equipment, structures, labor, and utilities. Hog production contracts largely follow suit. Today more production contracts are specifying animal welfare and health standards, while some provide for joint financing of utility expenses. Production contracts are also evolving to handle more complex organizational structures, including third party (nongrower) ownership of housing. Cattle feedlots typically charged clients a fee for providing custom feeding and marketing services for the client's cattle, but some feedlots now offer contracts that share equity ownership (of the cattle) between the feedlot and the client.

Simple crop marketing contracts only set terms for selling a commodity, but others today may tie crop sales, seed purchases, and chemical purchases into a single agreement. Contracts that tie payment to product quality, in crop and livestock commodities, are frequently being redesigned to take account of

changes in consumer preferences or in technologies for measuring quality. We can expect further ongoing changes in contract design to facilitate greater traceability of products and to allow new forms of risk-sharing, input provision, and equity participation in farms and farm products. Designing future surveys to track such shifts would enable policymakers and stakeholders to better understand the determinants and effects of agricultural contracts.

## References


Cole, Shawn, and Barrett Kirwan. 2009. "Between the Corporation and the Household: Commodity Prices, Risk Management, and Agricultural Production in the United States," *American Journal of Agricultural Economics* 91: 1243-1249.

Dimitri, Carolyn. 2001. "Contract Evolution and Institutional Innovation: Marketing Pacific-Apples From 1890 to 1930," *Journal of Economic History* 62: 189-212.

Doby, Kay. 2007. Testimony before the House Committee on Agriculture (Campaign for Contract Agriculture Reform). http://agriculture.house.gov/testimony/110/h70417/Doby.pdf

Dohlman, Erik, Linda Foreman, and Michelle Da Pra. 2009. *The Post-Buyout Experience: Peanut and Tobacco Sectors Adapt to Policy Reform*. Economic Information Bulletin No. 60. USDA, Economic Research Service. www.ers.usda.gov/publications/eib60/

Goodhue, Rachel, Dale M. Heien, Hyunok Lee, and Daniel A. Sumner. 2003. "Contracts and Quality in the California Winegrape Industry," *Review of Industrial Organization* 23(3-4): 267-282.

Harwood, Joy, Richard Heifner, Keith Coble, Janet Perry, and Agapi Somwaru. 1999. *Managing Risk in Farming: Concepts, Research and Analysis*. Agricultural Economics Report No. 774. USDA, Economic Research Service. www.ers.usda.gov/publications/aer774/

Hoppe, Robert A., Penni Korb, Erik J. O'Donoghue, and David E. Banker. 2007. *Structure and Finances of U.S. Farms: Family Farm Report, 2007 Edition*. Economic Information Bulletin No. 24, USDA, Economic Research Service. www.ers.usda.gov/publications/eib24/

Hueth, Brent, Ethan Ligon, Steven Wolf, and Steven Wu. 1999. "Incentive Instruments in Fruit and Vegetable Contracts: Input Control, Monitoring, Measuring, and Price Risk," *Review of Agricultural Economics* 21:374-89.

Johnson, Renee, and Geoffrey S. Becker. 2009. *Livestock Marketing and Competition Issues*. Report for Congress, 7-5700, RL33325. Congressional Research Service.

Key, Nigel. 2004. "Agricultural Contracting and the Scale of Production," *Agricultural and Resource Economics Review* 33:255-271.

Key, Nigel. 2010. "Production Contracts and Farm Business Growth and Survival." Paper Presented at the Annual Meeting of the Agricultural and Applied Economics Association, Denver, CO.

Lawrence, John D., and Glenn Grimes. 2007. *Production and Marketing Characteristics of U.S. Pork Producers, 2006*. Working Paper No. 07014. Iowa State University, Department of Economics.

MacDonald, James. 2008. *The Economic Organization of U.S. Broiler Production*. Economic Information Bulletin No. 38. USDA, Economic Research Service. www.ers.usda.gov/publications/eib38/

MacDonald, James, Janet Perry, Mary Ahearn, David Banker, William Chambers, Carolyn Dimitri, Nigel Key, Kenneth Nelson, and Leland Southard. 2004. *Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities*. Agricultural Economics Report No. 837. USDA, Economic Research Service. www.ers.usda.gov/publications/aer837/

MacDonald, James, and Penni Korb. 2006. *Agricultural Contracting Update: Contracts in 2003.* Economic Information Bulletin No. 9. USDA, Economic Research Service. www.ers.usda.gov/publications/eib9/

MacDonald, James, and Penni Korb. 2008. *Agricultural Contracting Update, 2005*. Economic Information Bulletin No. 35. USDA, Economic Research Service. www.ers.usda.gov/publications/eib35/

MacDonald, James M. 2006. "Agricultural Contracting, Competition, and Antitrust," *American Journal of Agricultural Economics* 88:1244-50.

MacDonald, James, and William McBride, 2009. *The Transformation of U.S. Livestock Agriculture: Scale, Efficiency, and Risks*. Economic Information Bulletin No. 43. USDA, Economic Research Service. www.ers.usda.gov/publications/eib43/

McBride, William, and Nigel Key. 2007. *Characteristics and Production Costs of U.S. Hog Farms, 2004*. Economic Information Bulletin No. 32, USDA, Economic Research Service. www.ers.usda.gov/publications/eib32/

Mighell, Ronald L., and Lawrence A. Jones. 1963. *Vertical Coordination in Agriculture*, Agricultural Economics Report No. 19. USDA, Economic Research Service.

Mohapatra, Sandeep, Rachel E. Goodhue, Colin A. Carter, and James A. Chalfant. 2010. "Effects of Forward Sales on Spot Markets: Pre-Commitment Sales and Prices for Fresh Strawberries," *American Journal of Agricultural Economics* 92:152-63.

Perry, Janet, David Banker, Mitch Morehart, and James Johnson. 1996. *Farmers' Use of Marketing and Production Contracts*. Agricultural Economics Report No. 747. USDA, Economic Research Service. www.ers.usda.gov/publications/aer747/

Philippi, Joy. 2007. Testimony before the House Committee on Agriculture (National Pork Producers Council). http://agriculture.house.gov/testimony/110/h70417/Philippi.pdf

RTI International. 2005. *Spot and Alternative Marketing Arrangements in the Livestock and Meat Industries*. Report prepared for USDA, Grain Inspection, Packers and Stockyards Administration.

U.S. Department of Agriculture, Office of Communications. 2010. "USDA Announces Proposed Rule To Increase Fairness in the Marketing of Livestock and Poultry." Release No. 0326.10.