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# Agricultural Contracting Update, 2005

**James MacDonald and Penni Korb**

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**James MacDonald and Penni Korb**

## Abstract

More than half of all transactions for U.S. agricultural products are still conducted through spot market exchanges, in which commodities are bought and sold in open market transactions for immediate delivery. But a growing share of U.S. farm production is produced and sold under agricultural contracts. Such 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. The shift of production to contracting coincides with shifts of production to larger farms. Contracts are far more likely to be used on large farms than on small ones. Marketing and production contracts covered 41 percent of the value of U.S. agricultural production in 2005, up from 39 percent in 2003, 36 percent in 2001, and a substantial increase over 28 percent in 1991 and 11 percent in 1969.

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

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## Summary

Most transactions for U.S. agricultural products are conducted through spot market exchanges in which commodities are bought and sold for immediate delivery. But a growing share of U.S. farm production is produced and sold under agricultural contracts. Such 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.

### What Is the Issue?

Contract use is growing. Agricultural contracts covered 41 percent of the value of U.S. agricultural production in 2005, up from 39 percent in 2003, 36 percent in 2001, 28 percent in 1991, and 11 percent in 1969. Use of contracts is closely tied to farm size; large farms are far more likely to use contracts than small farms.

Contracts lower the costs of large-scale commercial agriculture, and hence help to drive production toward larger operations. Contracts are also widely used to guide the production of differentiated agricultural products, such as specialty grains, organic poultry, or heirloom hog breeds. Contract production is expected to continue to expand, as consumer demand for differentiated products grows, and as large family farms encompass growing shares of production.

### What Did the Study Find?

Formal contractual arrangements cover a growing share of U.S. agricultural production. Contracting is closely tied to other features of structural change in agriculture, including:

- Shifts of production to larger farms;
- Greater product differentiation; and
- More onfarm specialization.

Agricultural contracts compete with spot markets. Farm commodities may be traded under contracts when spot markets do not function well, so choices between contract and spot markets reflect spot market performance as well as contract features.

Contracts can be used to manage price risks, smooth the flow of commodities through the marketing system, provide stronger incentives to produce specific product varieties or qualities, or elicit the capital investments necessary to realize economies of scale in production. But contracts can also create new risks for producers, and they can extend a buyer's market power by driving commodity prices below competitive levels.

Contracts cover some commodities much more than others. Taken together, hogs and poultry (including broilers, turkeys, and eggs) account for nearly 40 percent of all contract production. That is nearly double the hog/poultry share of all agricultural production. The pattern is reversed for major field crops (corn, cotton, soybeans, rice, and wheat). The major changes in the

organization of livestock and poultry production in the United States also encompass important shifts to various kinds of contractual relationships.

Hog and poultry production rely heavily on production contracts, but with important distinctions between the two. Hog contract enterprises are usually part of larger, diversified farming businesses, with the hog enterprise providing a relatively small share of the farm income. The farm operators typically have a range of alternative outlets for hog production and for the operators' time. Farm households that engage in contract hog production have relatively high incomes compared with other households—both farm and nonfarm.

In contrast to contract hog operations, contract broiler enterprises are likely to be part of smaller and less diversified farm businesses. Most broiler operations report that they are dependent on a single contractor for broilers. The households that operate broiler farms depend far more, on average, on off-farm employment and income than do households who operate hog enterprises.

As for field crops, most producers do not use contracts. But the corn, cotton, rice, soybean, and wheat producers who do use them tend to be larger producers who use marketing contracts to cover a substantial share of production. While marketing contracts may be used for specific thinly traded products, they also can smooth out price fluctuations and reduce income risks for producers of more widely traded commodities.

Because larger farms tend to earn higher returns than smaller farms, production would be expected to continue to shift to larger operations and to contracts. However, contracting is not driven only by expanding farm sizes, but often results from market developments that alter farmers' marketing risks. For example, contract production in peanuts and tobacco increased sharply after Federal marketing quotas for those commodities were terminated, increasing the likelihood of sharp market price fluctuations that would increase price risks. By contrast, spot market transactions for cattle increased at the expense of contract transactions after mandatory price reporting improved spot markets by providing deeper information. Thus, farmers' use of contracts also depends on the efficacy of spot markets in handling risks and providing incentives to produce specific products at desired times.

## **How Was the Study Conducted?**

The analysis primarily draws upon data from the Agricultural Resource Management Survey (ARMS), which is USDA's primary source of information on the financial condition, production practices, and resource use of farms, and the 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 USDA's National Agricultural Statistics Service (NASS), provides contract data back to 1969.



## Introduction

Formal contractual arrangements cover a growing share of U.S. agricultural production. Contracting is closely tied to other features of ongoing structural change in agriculture, including shifts of production to larger farms, increased farm specialization, and greater product differentiation. USDA's Economic Research Service (ERS) analyzes the use of contracting and related developments in agriculture. This bulletin extends two earlier ERS reports that tracked agricultural contracting through 2003.<sup>1</sup> It uses data gathered in USDA's Agricultural Resource Management Survey (ARMS) to update information in the previous reports to 2005. It also explores three new topics on contracting in specific commodities: the expansion of contracting in peanuts and tobacco following changes in agricultural policy; contrasts in the use of production contracts in hog and broiler production; and the use of marketing contracts for major field crops.

This report distinguishes 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 at the time ownership is transferred off the farm, with prices based on prevailing market prices at the time of sale, under agreements reached at or after harvest. Buyers may pay premiums for products of superior 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 users of a commodity under single ownership. One example is farmers' collectively owning a cooperative that purchases and provides agricultural inputs, or that markets and sometimes processes agricultural commodities. According to ARMS, about 16 percent of U.S. farms received cooperative refunds or dividends in 2005, and those farms accounted for 36 percent of the value of agricultural production (not all of their production was marketed through their co-ops, of course, and the production that was so marketed could have been transferred through spot market transactions or through contracts). But this report focuses on another type of vertical integration—private ownership that links farms and buying entities. For example, a winery may own and operate vineyards, while citrus processors may own and operate orange groves. Vertically integrated meatpackers own hog farms and cattle feedlots, and dairy farmers may choose to purchase feed or integrate the production of feed onfarm. Under vertically integrated product transfers, markets do not determine commodity prices, and internal decisions affect product transfer. Vertical integration that links farms with processors or retailers is still relatively uncommon.<sup>2</sup>

<sup>1</sup>MacDonald et al. (November 2004), and MacDonald and Korb (January 2006).

<sup>2</sup>The 2005 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 0.9 percent of U.S. farms and 5 percent of the value of production in agriculture. The latter statistic overstates the extent of vertical integration between farm production and processing, since farms that are owned by processors do not necessarily send all production to the commonly owned processing plants.

3. **Agricultural contracts.** More and more, 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. ERS distinguishes two types of agricultural contracts—production and marketing contracts.<sup>3</sup>
- a. *Production contracts* specify services that the farmer provides for the the contractor, who owns the commodity while it is being produced. The contract specifies: (1) the services to be provided by the farmer, (2) the manner in which the farmer is to be compensated for the services, and (3) specific contractor responsibilities for provision of inputs. For example, farmers provide labor, housing, and equipment under livestock and poultry production contracts, while contractors provide other inputs such as feed, veterinary and livestock transportation services, and young animals. The farmer’s payment usually 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. The 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 of decisionmaking than is available under production contracts.

<sup>3</sup>While there can be significant differences among contracts within each type, pragmatic considerations of survey design limit us to two broad types. ARMS questions must be understood by a broad cross-section of producers, and must do so in a limited space. However, we believe that the production-marketing distinction is a powerful one, and so far have not found another 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.



## Why Use Contracts?

For farmers, contracts offer several advantages. Contracting reduces the income risks that arise from commodity price and yield fluctuations. Farmers can use contracts to ensure outlets for their commodities in thin markets, and thus ensure a better return on investments in physical capital and time. Contracts can also tie prices more closely to product attributes.<sup>4</sup>

Production and price fluctuations provide two major sources of income risk. Production risks for crops result from unpredictable events such as drought, frost, hail, and insect infestations, while livestock production risks arise from disease, feed supply shortages, extreme temperatures, or machinery malfunctions. Price risks arise from unanticipated changes in output or input prices, which occur commonly because of unexpected changes in production or demand. Farmers may dislike risk, and risk can also impose costs if farmers cannot meet recurring financial obligations or make long-term production and investment decisions.

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 comprise most operating expenses. Marketing contracts can substantially reduce a farmer's output price risks. The "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.

Contracts can also be used to provide assurance that specialized capital investment can be recouped. 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, sugarbeet production requires highly specialized harvesting equipment and extensive prior investment in seed beds. But once producers make those costly investments, they face a risk of holdup by a processor. Chickens cannot be shipped far before losing value, due both to direct costs of transport or extra feed and indirect costs from the birds' losing value due to stress, weight loss, or death during transport, or to aging during additional feeding. Therefore, the grower must produce for nearby buyers, and there may be very few of them. Similarly, sugarbeets lose value quickly and transport costs are still quite significant, leaving producers dependent on a few local buyers.

Under such circumstances, a spot-market buyer could force very low prices on the farmer, knowing that the farmers had few or no alternative outlets. In this case the processor would "hold up" the farmer for a lower price.<sup>5</sup> However, the possibility of holdup can also harm the processor, because farmers may respond to holdup risks by not making farm investments, in equipment or structures, which would leave the farmer dependent on the

<sup>4</sup>For a more complete discussion, with references, see MacDonald et al., 2004.

<sup>5</sup>A product's perishability may also affect the likelihood of holdup. Farmers with commodities that can be stored for long periods, like grains, can use storage while searching for more marketing options. A producer with a perishable product does not have that luxury.

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.

Contracts benefit farmers and processors, in this instance, by specifying a compensation scheme with the processor before the investment is made, thus eliminating the risk of holdup. By offering contracts, the processor can obtain investment commitments from farmers and ensure the commodity supply needed to support an expensive investment in processing facilities.

Contracts can also improve 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 ensured 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.<sup>6</sup> The contract ensures 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 ensure compliance with identity-preserved standards by controlling production and harvesting practices and by requiring investments in information and measurement at key production stages. Again, attribute certification is met through contractual control and onsite inspection of practices, rather than through information, tests, and warranties from producers.

Agricultural contracts can positively affect production and efficiency throughout the supply chain for products by providing incentives to deliver products that consumers want and by producing 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. Although forward marketing contracts can limit price risk, they 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

<sup>6</sup>Such contracts, which tie input purchases to commodity sales by setting price and delivery schedules for specified seed and chemical inputs as well as for harvested crops, are quite common. In 2005, about 11 percent of the value of contract crop production was covered by such contracts, according to ARMS data.

of the capital, then the farmer may face the holdup risk that the contractor will 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 create some of their own risks, contract adoption depends not only on contract design, but also on the performance of the primary alternatives—spot markets and vertical integration. 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 contracts may be preferred. 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

Conducted annually, the Agricultural Resource Management Survey (ARMS) collects information from a stratified random sample of all U.S. farms and 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. ARMS consists of three phases:

1. **Phase I**, conducted during the summer of the reference year, screens those 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**, data on farm and farm household finances and farm production and marketing decisions are collected during the following winter and spring (just after the end of the reference year).

Contracting information is drawn from Phase III, which contains multiple questionnaire versions (five in 2005). 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 others, which are conducted through personal interviews. Version 1 is directed to all types of farms and includes more detailed questions on contractors, contract terms, and alternatives available to farmers. Remaining versions are directed to producers of specific commodities, and they typically include additional questions focused on contracts for that commodity. The appendix contains the ARMS questions directed to contracts. Additional survey information can be found at [www.ers.usda.gov/Briefing/ARMS/](http://www.ers.usda.gov/Briefing/ARMS/).

In 2005, the full Phase III sample consisted of 34,000 farm operations, from whom 22,843 useable surveys were obtained.<sup>7</sup> The responses contained information on quantities and revenues, by commodity, for 8,920 marketing contracts and 2,238 production contracts. Additional contract information was obtained from the 3,124 marketing contracts and 865 production contracts reported in Version 1 surveys.

Two important features distinguish ARMS contracting estimates from those drawn from other surveys (see box, "Other Sources for Data on Agricultural Contracts"). First, farms are surveyed, so the questions must focus on commodities produced on farms. Other surveys may cover processors, and hence focus on purchases of commodities by processors. Second, the survey 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.

<sup>7</sup>Phase III was reorganized and expanded in 2003, with the introduction of the core version. Since then, Phase III response rates have risen from 62.8 percent, in 2003, to 67.7 percent in 2004 and 72 percent in 2006.

## Other Sources for Data on Agricultural Contracts

This report relied primarily on the Agricultural Resource Management Survey, an annual survey of farm operators, for contract information. Other contract sources exist, and because they survey different market participants at different temporal frequencies, they can offer perspectives on other features of contract production.

USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA) provides annual data on packer procurement methods for fed cattle, hogs, and lambs through its annual *Statistical Reports* and through industry studies ([www.usda.gov/gipsa/](http://www.usda.gov/gipsa/)). These data are based on surveys of packers, and track the types of contracts that livestock sellers have with packers. Not all sellers are farmers; instead some livestock owner/sellers may contract with farmers to grow the animals and may contract with packers to sell them. Such practices are common in hog and cattle industries.

USDA's Agricultural Marketing Service provides data on the characteristics of livestock transactions between producers and packers, organized by transaction type and on daily, weekly, monthly, and annual bases. The data are derived from the agency's Price Reporting program and are reported at <http://mpr.datamart.ams.usda.gov/menu.do>. For livestock, the price reporting program surveys packing plants and records information on their transactions with sellers.

USDA's National Agricultural Statistics Service (NASS), which administers the ARMS program in partnership with ERS, also reports data on production contract use, by commodity, in the quinquennial Census of Agriculture (<http://www.nass.usda.gov/census/>). As in ARMS, census respondents are farm operators. Thus, the census and ARMS cover the contractual relationships between farm operators and contractors, be they processors or distributors of the commodity.

There are also some private sector contract surveys. For example, John Lawrence and Glenn Grimes have surveyed hog industry participants several times over the years (Lawrence and Grimes, 2007). They focus separately on packers and on hog owners (hence the focus is on buyers and sellers in market hog transactions, not on places where hogs are produced, as in ARMS and Census). They ask hog owners about production arrangements for their hogs, and hence gain additional indirect information about the hog operations targeted in ARMS.

# The Continued Expansion of Contracting

ERS researchers used data from ARMS and from USDA's Census of Agriculture to trace the growth of contracting in agriculture and to show how that growth varies among commodities, regions, contract types, and farm types.<sup>8</sup> In tracing contracting's expansion, we distinguish between the proportion of farms that use contracts and the proportion of agricultural production that comes under contract. This distinction matters because farms are so heterogeneous. USDA defines a farm as any place that produces, or would normally produce, \$1,000 or more of agricultural commodities in a year. Under that definition, more than half of the 2.1 million farms in the United States have sales of less than \$10,000 (and nearly half of those have no sales). Those very small farms collectively account for less than 2 percent of total U.S. agricultural production. At the other extreme, about 3,400 farms with at least \$5 million in sales account for nearly one quarter of all agricultural production (Hoppe et al., 2007).

## Contracts Cover a Growing Volume of Production

Only 11 percent of U.S. farms had contracts in 2005, but contracts covered 40.7 percent of the value of agricultural production, up from 36.4 percent in 2001 (table 1). Over short periods covering a few years, this share may fluctuate.<sup>9</sup> But over longer periods, contracting shows a strong upward trend—contracts covered 28 percent of the value of production in 1991 and 11 percent in 1969 (fig. 1).

Table 1

### Share of farms using contracts and share of value produced under contract, by farm type, 2001-05

Item	Farm type			All farms
	Rural residence	Intermediate	Commercial	
<i>Shares of contracts within each farm type (percent)</i>				
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
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
<i>Share of each farm type in all contracts (percent)</i>				
Farms with contracts				
2001	19.6	44.6	35.8	100.0
2003	23.8	33.3	42.9	100.0
2005	25.0	32.6	42.4	100.0
Production under contract				
2001	2.4	14.4	83.2	100.0
2003	2.4	10.9	86.7	100.0
2005	2.4	7.4	90.2	100.0

Note: Row sums have been rounded.

Source: USDA, Agricultural Resource Management Survey, 2001, 2003, and 2005 (all versions)

<sup>8</sup>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.

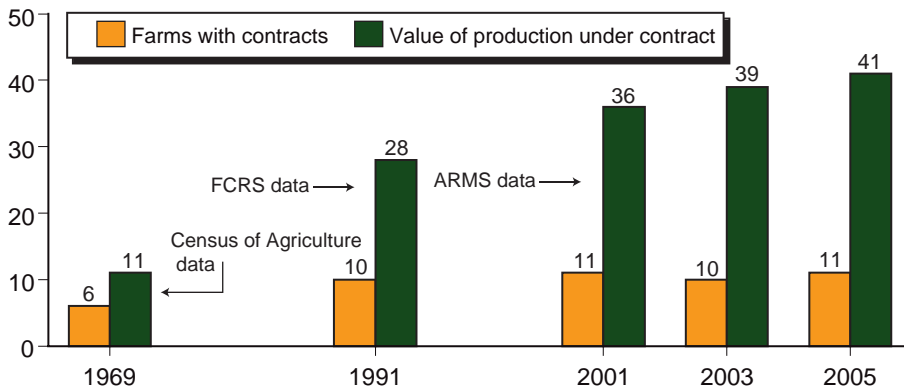
<sup>9</sup>Contracting is much more important in some commodities than in others. In years in which grain prices and production are high, grains will account for a larger share of agriculture's total value of production, and the share of contracts in the value of production will fall because grain farmers are less likely to use contracts. Conversely, contracting's share will rise in years in which heavily contracted commodities account for a larger share of agricultural production. Estimates of contract production will also vary from year to year because the data are drawn from random samples of farms, and hence contain sampling error.



Figure 1

### The growth of agricultural contracting, 1969-2005

Percent



Sources: USDA: Census of Agriculture; Farm Costs and Returns Survey; and Agricultural Resource Management Survey.

A simple three-way classification 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 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 sales below \$250,000 and operators who report farming as their major occupation. Most farms in the United States are rural residence farms—family-operated farms with sales below \$250,000, with operators reporting that they are retired or that their primary occupation is not farming.

Commercial farms account for most contract production—90 percent in 2005 (table 1). In turn, contract coverage is growing among commercial farms, from 42 percent of their production in 2001 to 47 percent in 2003 and 48 percent in 2005 (farm sales classes are defined in constant 2003 dollars and are adjusted for inflation using the USDA/NASS index of prices received for farm products).

Contracting is closely tied to farm size (table 2). Over two-thirds of the largest farms (those with at least \$1 million in sales) used contracts in 2005, while only 7 percent of small farms used them. Contracts covered a sixth of production among small farms (those with less than \$250,000 in sales) and over half of production on the largest farms.

ERS also examined marketing and production contracts separately, combining earlier years in order to expand sample sizes and smooth out some random fluctuations (table 3).<sup>10</sup> In 2005, more farms used marketing contracts, and marketing contracts covered a greater share of agricultural output. However, production contract coverage has increased substantially since 1991-93, a development that primarily reflects the growth of poultry production, where production contracts are the typical form of governance, as well as the rapid expansion of production contracting in the hog sector. Production contracts are rarely used in crops, outside of some seed and horticultural production; 95 percent of all production covered by production

<sup>10</sup>Expanded funding allowed for increased sample sizes after 2002.

Table 2

**Contracting by commercial farms, 2001-05**

Year	Farms sales class			
	<\$250,000	\$250,000-499,999	\$500,000-999,999	\$1 million or more
<i>Share of farms with contracts (percent)</i>				
2001	7.5	42.6	58.3	65.0
2003	6.1	40.6	57.9	62.2
2005	7.1	47.3	63.4	67.5
<i>Share of value of production under contract (percent)</i>				
2001	18.6	26.8	44.0	51.0
2003	19.4	29.5	42.5	52.2
2005	16.4	29.5	43.7	54.3

Source: USDA, Agricultural Resource Management Survey, 2001, 2003, and 2005 (all versions).

Table 3

**Contracts by type and year, 1991-2005**

Item	1991-93	1996-97	2001-02	2005
<i>Percent</i>				
Share of farms with contracts				
Any contracts	10.1	12.1	11.2	11.1
Marketing contracts	8.2	10.2	9.0	9.3
Crops	6.6	8.3	7.4	7.6
Livestock	1.6	2.0	1.6	1.9
Production contracts	2.1	2.2	2.6	2.1
Crops	0.6	0.6	0.5	0.4
Livestock	1.6	1.6	2.1	1.7
Share of production under contract				
Any contracts	28.9	32.1	37.8	40.7
Marketing contracts	17.0	21.5	19.7	22.0
Crops	11.0	12.1	12.7	13.1
Livestock	6.0	9.2	7.1	8.9
Production contracts	11.8	10.6	18.0	18.7
Crops	0.9	1.0	1.6	0.8
Livestock	10.9	9.6	16.5	17.8

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.

Source: USDA, Agricultural Resource Management Survey, 1996-2005 (all versions); and USDA, Farm Costs and Returns Survey, 1991-93.

contracts occurs in livestock. While marketing contracts are also used in livestock, they are the dominant contract type in crops—94 percent of contract production in crops utilizes marketing contracts.

**Contract Coverage of Commodities**

When compared with all of agricultural commodity marketing, in which crops accounted for 48 percent of the value of all agricultural production in 2005 and livestock and livestock products accounted for 52 percent, contracts are weighted to livestock. In particular, livestock accounted for 66 percent of the value of production under contract in 2005, compared to 34

percent for crops. Moreover, that gap is widening, as livestock accounts for a growing share of contract production (table 4).

Livestock production has been shifting toward a greater reliance on large and specialized confinement feeding operations, and these operations often have extensive contractual relationships. Large cattle feedlots are likely to hold production contracts with cattle owners and marketing contracts with meatpackers. Large dairy farms make greater 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 the sector. Small producers of organic poultry or milk

Table 4

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

	1991-93	1996-97	2001-02	2005
<i>Percent of production under contract</i>				
<b>By commodity</b>				
All commodities	100.0	100.0	100.0	100.0
Crops	41.5	41.3	37.7	34.3
Corn	3.5	5.1	3.5	4.2
Soybeans	2.6	4.0	1.8	3.5
Fruit	11.6	10.5	9.3	9.8
Vegetables	9.8	8.1	6.5	7.6
All other crops	14.0	13.6	16.6	9.2
Livestock	58.5	58.7	62.3	65.7
Cattle	18.6	7.5	10.2	9.5
Hogs	2.8	5.0	10.9	13.3
Poultry and egg	20.4	21.3	25.7	24.9
Dairy	16.6	24.6	15.2	17.9
All other livestock	0.1	0.3	0.3	0.1
<b>By contract type and commodity</b>				
Both contract types	100.0	100.0	100.0	100.0
Marketing contracts	59.1	66.9	52.2	54.1
Crops	38.3	38.1	33.5	32.2
Corn	3.1	5.1	3.4	4.1
Soybeans	2.5	3.9	1.7	3.4
Fruit	11.2	10.1	9.0	9.8
Vegetables	8.3	6.8	4.9	6.3
All other crops	13.2	12.1	14.5	8.6
Livestock	20.8	28.8	18.7	21.9
Dairy	16.5	24.5	15.0	17.9
All other livestock	4.3	4.3	3.7	4.0
Production contracts	40.9	33.1	47.8	45.8
Crops	3.2	3.2	4.2	2.0
Vegetables	1.5	1.3	1.6	1.3
All other crops	1.7	1.9	2.6	0.7
Livestock	37.8	29.9	43.6	43.9
Cattle	16.1	4.9	8.9	7.8
Hogs	2.4	4.6	9.8	11.3
Poultry and eggs	19.0	20.3	24.5	24.7
All other livestock	0.3	0.1	0.4	0.1

Source: USDA, Agricultural Resource Management Survey, 1996-2005 (all versions); and USDA, Farm Costs and Returns Survey, 1991-93.

rely on contracts to ensure outlets for their products and to realize the price premiums that such products can bring.

Among commodity groups, poultry, hogs, and dairy occupy a much larger role in contract agriculture than their share in all U.S. agriculture (fig. 2). Taken together, hogs and poultry (including broilers, turkeys, and eggs) account for nearly 40 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 much smaller shares of contract agriculture than their share in all U.S. agriculture. Together, those field crops accounted for over 21 percent of all cash receipts in agriculture in 2005, but made up only 11 percent of the value of contract production.

The commodity mix in contract agriculture differs because contract coverage varies widely across commodities. Contracts covered half of all livestock production in 2005, up from a third in 1991-93, and 30 percent of all crop production, up from 25 percent in 1991-93 (table 5). But, contracts covered over 90 percent of poultry and egg production in 2005, as well as 76 percent of hog production and nearly 60 percent of dairy production.<sup>11</sup> Since the early 1990s, contracting has expanded sharply in the hog sector. Contracting in the fed cattle component of the beef cattle industry rose and then fell off after 2000, accounting for the shifts seen in the aggregate cattle numbers.

### Institutional Change and Contracting Shifts

Some commodities show sharp changes in contracting in short periods of time. Such sharp and sudden changes may be linked to institutional changes in the industries, deriving from changes in government policy, in information flows, or in buyer organization.

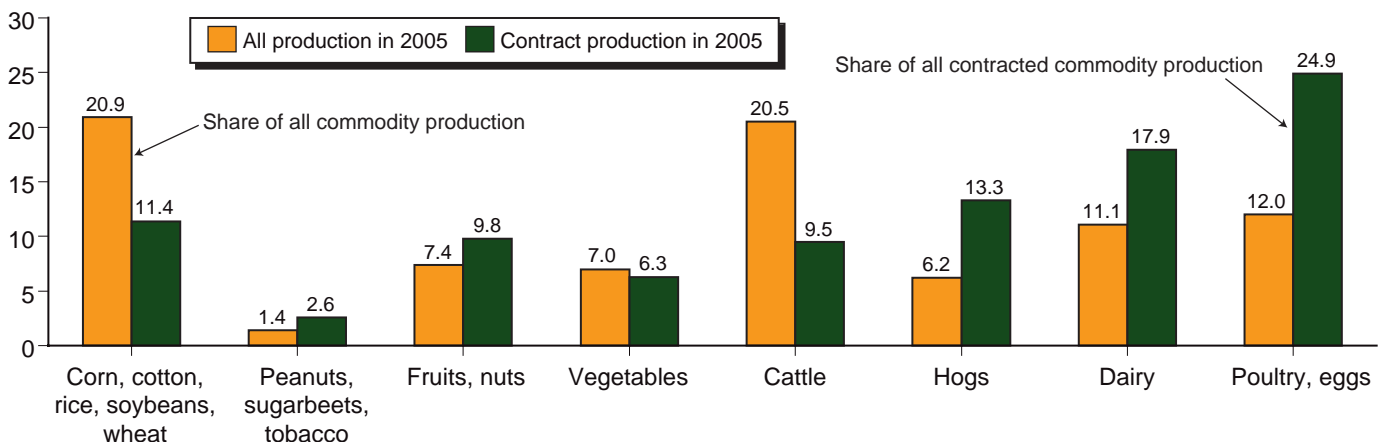
Contract coverage of peanuts expanded sharply after the 2002 elimination of the peanut marketing quota system (fig. 3). Marketing quotas were used

<sup>11</sup>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 own a share of the cattle that they are feeding, are also becoming more important in cattle.

Figure 2

### Hogs, poultry, and dairy play larger roles in contract production than in overall production

Percent, by commodity



Sources: USDA, Agricultural Resource Management Survey 2005, all versions.

Table 5

**Production under contract, by commodity, 1991-2005**

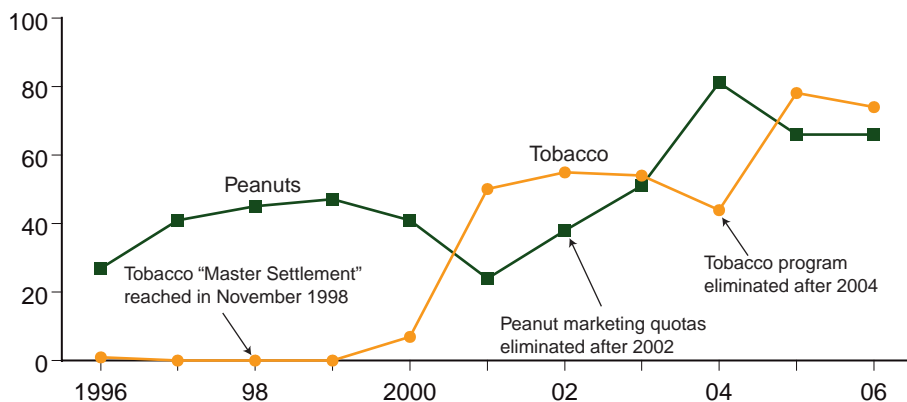
Commodity	1991-93	1996-97	2001-02	2005
	<i>Percent of production under contract</i>			
All commodities	28.9	32.1	37.8	40.7
Crops	24.7	22.9	27.8	29.9
Corn	11.4	13.0	14.8	19.6
Wheat	5.9	9.1	6.5	7.5
Soybeans	10.1	13.5	9.6	18.4
Sugarbeets	91.1	75.1	96.7	82.1
Rice	19.7	25.8	38.7	26.7
Peanuts	47.5	34.2	27.9	65.3
Tobacco	0.3	0.3	52.6	77.9
Cotton	30.4	33.8	52.6	45.0
Fruit	na	56.8	62.2	63.6
Vegetables	na	38.5	42.1	54.3
Livestock	32.8	44.8	48.3	50.1
Cattle	na	17.0	21.1	17.6
Hogs	na	34.2	62.6	76.2
Poultry and egg	88.7	84.1	92.3	94.2
Dairy	36.8	58.2	48.7	59.2

Source: USDA, Agricultural Resource Management Survey, 1996-2005 (all versions); and USDA, Farm Costs and Returns Survey, 1991-93.

Figure 3

**Contracting expanded after policy changes in peanuts and tobacco**

Production under contract (percent)



Source: USDA, Agricultural Resource Management Survey, all versions.

to control domestic peanut supplies, which in turn allowed for stable and relatively high spot-market prices (Dohlman and Livezey, 2005). 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 a quarter to nearly a half of production in each year between 1996 and 2002. But after elimination of the U.S. peanut marketing quota program, marketing contracts provided a way to manage increased price risks, and contract coverage jumped to 80 percent of

production in 2004. The 2004 ARMS contained a peanut version, which asked whether the elimination of Federal marketing quotas led respondents to rely more on contracts, and 66 percent of producers responded that it did. Producers continued to seek other institutional methods for managing price risks, and contract coverage declined after 2004, but still remained at 66 percent of production in 2005 and 2006.

Contract coverage also spread widely in the U.S. tobacco sector. 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. However, 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.

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, production did shift sharply to marketing contracts. Contracts covered about 50 percent of production between 2000 and 2004 (fig. 3). In that year, the Federal tobacco program, including marketing quotas, was eliminated, and contracting expanded again to cover 78 percent of production in 2005 and 74 percent in 2006.

In peanuts and tobacco, cessation of government programs that limited spot-price risks led to an expanded reliance on contracts. In fed cattle, a government program that increased the amount of market information available may have improved spot-market performance and led to a shift away from contracts and toward greater reliance on spot markets. During the late 1990s, fed cattle transactions began shifting sharply away from spot markets and toward marketing contracts, in part because of perceived declines in the quality of market price reporting in the industry (Perry et al., 2005). The share of fed cattle moving to packers through spot market transactions fell steadily in each year, from 80 percent in 1997 to 56 percent in 2002.

Congress passed the Mandatory Livestock Reporting Act, which imposed greater price reporting demands upon packers in 1999, and the expanded mandatory reporting system was fully in place by late 2001, with further adjustments made in 2003 and 2004. After implementation, the spot market share stabilized and began to grow, from 56 percent in 2002 to 64 percent in 2005.<sup>12</sup>

Private-sector institutional changes can also affect contracting. Contract coverage in corn showed no trend for several years, covering 13 to 15 percent of production between 1996 and 2003, before expanding to 20 percent in 2005 and 25 percent in 2006 data. The expansion likely reflects the growing importance of ethanol production, where processors often use marketing contracts to ensure steady and timely corn deliveries.

<sup>12</sup>Fed cattle data come from the annual Packers and Stockyards Statistical Reports of USDA's Grain Inspection, Packers and Stockyards Administration. The shifts occurred during periods of sharp general price increases for beef, and these may also have affected contracting choices.



## The Use of Contracts in Selected Major Commodities

Because of the large sample size of ARMS, contracts can be assessed in several major commodities. Producers of broilers and hogs are major users of production contracts. Many large producers of major field crops use marketing contracts that cover substantial parts of their production.<sup>13</sup>

### Market Organization in Broilers and Hogs

Production contracts are most widely used in the production of hogs and broilers. By 2005, contract poultry and hog production accounted for 15.6 percent of the value of all U.S. agricultural production, 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.

Production contracts can be controversial. They link farmers, who make substantial long-term investments, to specific buyers, relationships that can lead to commercial disputes. Each industry is concentrated, with a few firms dominating slaughter and processing. There have been several congressional proposals to regulate production contracts, and continuing legislative interest (Becker, 2007; U.S. Department of Agriculture, 2007; MacDonald, 2006).

Each industry relies on the extensive use of contracts and vertical integration to manage production, processing, and distribution. Nevertheless, there are sectoral differences in the design and use of production contracts.

The broiler industry has a high degree of vertical integration (Ollinger, MacDonald, and Madison, 2005). Broiler companies (integrators) own their own slaughter and processing plants from which they ship branded consumer products. They usually own hatcheries and feed mills as well. Hatchery chicks are shipped to contract growers, who have production contracts with the integrators. The integrators also provide growers with feed and veterinary services along with the chicks. Growers provide labor and utilities, along with structures and equipment that are usually designed to the integrator's specifications. Some contract growers produce replacement (breeder) broilers, but most grow broilers for meat. Producers differ in the size of the broilers that they are growing. Those producing smaller birds for foodservice channels have shorter turnaround times for flocks before the birds are sent to slaughter.

Because feed is costly to ship, and because chicks and live chickens cannot travel very far without unacceptable mortality losses, contract growers and integrator-owned facilities are located within 100 miles of the integrator's complex. Compensation of contract growers is almost always based on their relative performance. That is, growers receive a base payment after a flock is delivered for processing, and 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.

<sup>13</sup>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 and Goodhue et al. (2003) for wine grapes.

While production contracts and vertical integration have spread widely through the hog sector, it is still not as tightly coordinated as broiler production (McBride and Key, 2007). Some 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 removed to the integrator's slaughter plant. But there are many other models. Some integrators 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.

There is also a significant number of remaining traditional operations that 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, spot markets and a variety of contracting modes still exist.

## **Production Contracting for Broilers and Hogs**

It is possible to assess production contracts in these two sectors with ARMS data on contract producers of market hogs and of broilers. Specifically, the 2004 survey had a hog version. With the added sample of hog producers who responded to the survey, data were available on 332 producers who had production contracts for market hogs. There are many commercial producers of broilers, and almost all of them have production contracts, so Version 1 of the 2004 ARMS generated 545 observations on broiler producers.

The organizational distinctions show up clearly in the data. Nearly 60 percent of contracts for market hogs were with integrators who did not own processing plants, compared with only 6 percent of broiler contracts (table 6).<sup>14</sup> Broiler growers are also closely tied to a single integrator. Fifty-nine percent of growers with broiler production contracts responded that they had no marketing option other than their current integrator for the commodity. By contrast, 23 percent of hog producers had no alternative marketing options; 76 percent viewed other contractors as alternatives (“cash sales only,” plus “cash sales and other contractors”), and 31 percent could access cash markets. Broiler growers tended to have long-term relationships with their integrators. When asked how long they had contracted with their current integrator, the median response was 10 years (table 7).

It is striking to find that so many broiler respondents report no marketing alternatives. To explore the issue, data from a 2006 ARMS Phase III version targeted at broiler producers were used with a sample size of over 1,500 production contract operations. In that version, we asked how many integrators operated in the producer's area. A quarter of contract broiler operations had only a single integrator in the area, while another 29 percent reported

<sup>14</sup>The calculation sums the contractor types “input provider” and “other,” and assumes that “cooperatives” listed in table 6 also own processing plants.

Table 6

**Contractors in broiler and hog production contracts in 2004**

Item	Broilers	Market hogs
	<i>Percent of growers</i>	
Contractor type		
Cooperative that grower belongs to	8	4
Input provider	4	52
Processor	41	19
Input provider and processor	45	18
Other	2	7
Other commodity marketing options		
None	59	23
Cash sales and other contractors	1	30
Cash sales only	1	1
Other contractors only	39	46
	<i>Median years</i>	
Experience with contractor	10	6

Note: 545 broiler contract producers and 332 market hog contract producers.

Source: USDA, Agricultural Resource Management Survey, 2004, version 1 for broilers and version 4 for hogs.

Table 7

**Characteristics of production contracts for hogs and broilers in 2004**

Item	Broilers	Market hogs
	<i>Head</i>	
Annual quantity removed		
Mean	439,728	7,387
Median	376,085	5,500
25 <sup>th</sup> percentile	221,661	1,730
75 <sup>th</sup> percentile	540,000	9,900
	<i>Dollars per head</i>	
Fee received		
Mean	0.26	13.89
Median	0.24	11.50
25 <sup>th</sup> percentile	0.20	10.00
75 <sup>th</sup> percentile	0.30	13.25
	<i>Percent of growers</i>	
Contract features		
Fee determined by formula	91	52
Fee linked to performance	95	37
Land required for manure disposal	19	33
Required capital investment in 2004	49	61
Mean capital expense, if required	\$49,037	\$8,721
Mean acreage required for manure	69 acres	126 acres
	<i>Months</i>	
Length of contract		
Median, if length is specified	12	12
75 <sup>th</sup> percentile, if length specified	12	36
Percent with no length specified	26	41

Note: 545 broiler contract producers and 332 market hog contract producers.

Source: USDA, Agricultural Resource Management Survey, 2004, version 1 for broilers and version 4 for hogs.

two integrators and 22 percent reported three. A given integrator may not be taking on new growers, and as a result it is quite possible for a grower to report that there are two or three companies in the area, but still report that he/she has no alternatives to his/her present contractor.

In 2004, the median quantity removed under production contracts amounted to 376,000 broilers and 5,500 hogs (table 7).<sup>15</sup> For broiler producers, contract fees vary with grower performance and with the size of the bird (larger birds spend more time at the operation) and range from 20 cents a head at the 25<sup>th</sup> percentile to 30 cents at the 75<sup>th</sup> (on a per-pound basis, from 4.5 to 5.5 cents per pound). Fees vary less widely among hog producers, from \$10 per head at the 25<sup>th</sup> percentile to \$13.25 at the 75<sup>th</sup>.<sup>16</sup>

Broiler contracts usually base compensation on a formula. Ninety-five percent of respondents report that their compensation depends on their performance, compared with other growers. Relative performance contracts are rarely used in contract hog production. Payment may be based on a fixed fee per hog, but more often is based directly on formulas that account for a grower's feed efficiency and mortality performance.

Contract growers make significant long-term investments in housing. One of the striking features of production contracts is that, although growers and integrators typically have long-term relationships, contracts are usually written for short durations. A quarter of broiler contracts specify no duration, but instead cover only a single flock (a few months). Most of those that report a duration specify a single year (12 months). Hog contracts vary more widely. While most resemble broiler contracts, a significant number specify lengths of 3, 5, or 10 years (longer durations usually apply to larger operations).

Growers and integrators maintain long-term relationships with short-term contracts by renewing contracts annually. Contract renewal, however, often requires a significant new capital investment by growers. Forty-nine percent of broiler growers reported that they were required to make a capital investment in 2004. Among those growers, the mean new 2004 capital expenditure was about \$49,000.

## **How Production Contract Operations Link to the Farm and the Household**

Most commercial farms are diversified with several commodity enterprises. In addition, farm operator households may have diversified sources of income—including business earnings from the farming operation, earnings from other businesses operated by the household, income from off-farm jobs held by household members, and income from savings, pensions, and other financial assets.

Contracting broiler and hog operations differ in this regard as well. Farms that raise contract hogs are much more diversified than farms that raise contract broilers. On average, broiler contract fees account for nearly 80 percent of gross cash income on broiler farms, while hog contract fees account for just 27 percent of gross cash income on hog farms (table 8). Contract market hog operations usually maintain substantial crop enterprises because they can use the manure from the hog enterprise as fertilizer for their

<sup>15</sup>We focus on hog finishing operations, which receive pigs and raise them to market weight, in this analysis. Sow operations are often much larger and more specialized.

<sup>16</sup>The median is the 50<sup>th</sup> percentile; half of all households earn more than the median and half earn less. The 75<sup>th</sup> percentile income is that at which 25 percent of households earn more and 75 percent earn less, while 25<sup>th</sup> percentile income is that at which 25 percent earn less and 75 percent earn more.

Table 8

### How production contracts fit into the farming operation and farm household in 2004

Item	Broilers	Market hogs
	<i>Dollars</i>	
Farm business revenues (mean)		
Contract fees received	112,499	85,011
Gross cash farm income	142,165	316,828
Operator household income (mean)		
From off-farm sources	56,344	41,038
From farming operations	35,918	67,519
From all sources	92,262	108,557

Notes: Operator household income from farming operations is net of farm expenses and of payments to landlords, partners, or contractors. 545 broiler contract producers and 332 market hog contract producers.

Source: USDA, Agricultural Resource Management Survey, 2004, version 1 for broilers and version 4 for hogs.

crops. Contract hog farms also tend to be substantially larger than contract broiler producers, as measured by gross cash income (more than double, on average) or acreage.

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 income. Mean household income from farming operations amounts to \$35,918 on broiler operations, compared with mean off-farm income of \$56,344. The ratio of farm to off-farm income is reversed in households that operate contract hog operations, where farming provides 62 percent of the household’s income.

Contract growers are not, in general, low-income households. In 2004, mean household income among all U.S. households was \$60,528. Among contract broiler producers, the mean household income, when measured on a comparable basis using the net income flowing from the farm business, was 50 percent higher at \$92,262, while the mean household income for contract hog producers was even higher at \$108,557.<sup>17</sup>

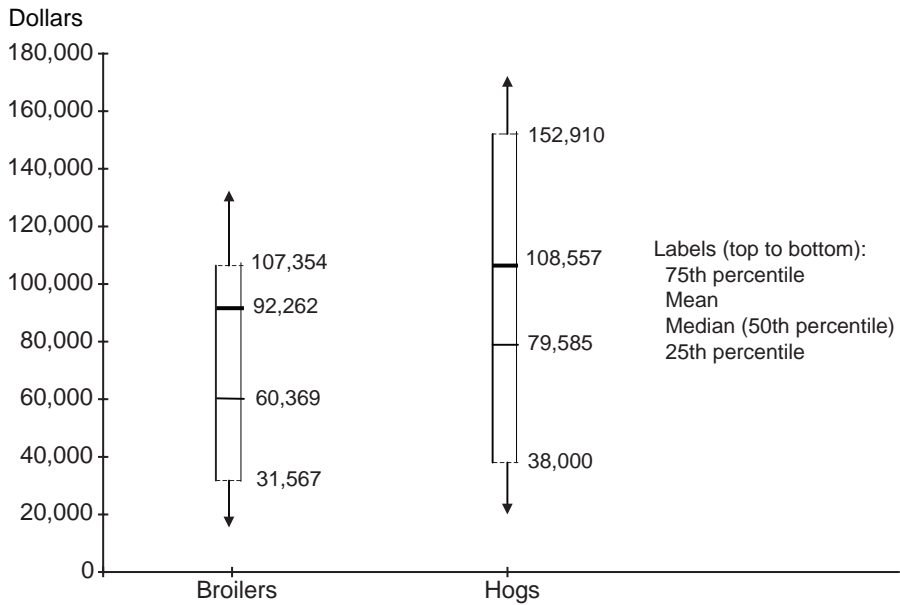
Incomes among farm households are skewed, as are incomes among all households, by the fact that some households earn very high incomes, thus raising the mean above the amounts earned by most. For that reason, it is important to look at median household incomes and the range of income earned by looking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

Households with contract hog operations offer a good example (fig. 4). A quarter of those households had incomes above \$152,910 (the 75<sup>th</sup> percentile). Those incomes raised the mean substantially. The median income was \$79,585, well below the mean, while another quarter earned incomes below \$38,000.

<sup>17</sup>Among all households of primary farm operators, mean household income was \$81,596.

Figure 4

**Comparing household incomes for broiler and hog contract producers in 2004**



Source: USDA, Agricultural Resource Management Survey 2004, versions 1 and 4.

The median household income among broiler farms was \$60,389, also well below the mean. A quarter of those households earned incomes above \$107,354, while a quarter earned incomes below \$31,567. The medians still compare quite favorably to nationwide estimates—median income among all U.S. households amounted to \$44,400, far below the medians for broiler or for hog households.

Broiler producers are closely tied to a single integrator. Their household incomes from farming tend to be lower than that of hog producers and more closely tied to the returns from contract production. These patterns may help to explain why broiler contract relationships attract legislative interest and regulatory proposals (Doby, 2007; Philippi, 2007; Lawrence and Grimes, 2007).

**Marketing Contracts in Major Field Crops**

Contract coverage varies greatly among major field crops, from less than a tenth of wheat production to nearly half of cotton. Contract coverage varies widely among producers of specific field crops. Most use no contracts, while those who do contract substantial shares of production. Farms that contract differ in important ways from those that do not.

Most field crop operations do no contracting, while those that do use contracts extensively (table 9). In 2005, 61,477 corn producers used a contract, while 217,355 did not—78 percent of the total. Similarly, 82 percent of soybean producers and 90 percent of wheat producers used no contracts. Even in commodities with higher levels of contract coverage, most do not contract. About 60 percent of cotton producers and 70 percent of rice producers rely wholly on spot markets.



Table 9

**Comparing contract and noncontract field crop producers in 2005**

Commodity and farm type	Farms	Value of production		Percent of commodity production		
		Whole farm	Commodity enterprise	Under contract	Onfarm and landlord use	Storage and spot market
	<i>Number</i>	<i>Dollars per farm</i>		<i>Percent</i>		
<b>Corn</b>						
Contract	61,477	357,811	136,485	43.5	11.2	45.3
Noncontract	217,355	185,022	48,219	0	11.6	88.4
<b>Cotton</b>						
Contract	10,633	503,967	231,314	86.5	10.0	3.5
Noncontract	13,368	353,685	169,681	0	7.5	92.5
<b>Rice</b>						
Contract	1,595	478,983	222,412	78.2	11.4	10.4
Noncontract	4,177	383,620	165,385	0	10.8	89.2
<b>Soybeans</b>						
Contract	64,923	331,313	101,078	45.8	10.2	44.0
Noncontract	299,905	175,331	42,861	0	9.0	91.0
<b>Wheat</b>						
Contract	15,016	499,225	67,241	46.1	14.9	39.0
Noncontract	141,297	228,447	38,085	0	12.8	87.2

Note: The sample includes 1,589 corn contracts, 393 cotton contracts, 87 rice contracts, 1,522 soybean contracts, and 459 wheat contracts.

Source: USDA, Agricultural Resource Management Survey, 2005, all versions.

Contracting farms are considerably larger, on average, than farms that do not contract, when size is measured either by the whole farm's value of production or by production of the specific field crop.

Contracts form part of a broad marketing strategy for farms that use them. For example, contracting corn operations placed 44 percent of their corn production under contract in 2005. That does not mean that the rest was sold through spot markets, because some production was used on-farm and some went to landlords who held share leases on the land. We estimate that 11 percent of their corn production was diverted to those channels, so 45 percent remained to be sold through spot markets or retained in storage. In that sense, contracting corn farms split about 50-50 between using contracts and spot markets for the corn that they could market. Similar patterns were true of contracting wheat and soybean producers. Once landlord shares and onfarm use were subtracted, those who used contracts moved about half of their 2005 crop through contract, while retaining about half to sell in spot markets or place in storage.<sup>18</sup> 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 contract.

Rice and cotton marketing look distinctly different, with contracts and spot markets being more of an either/or proposition. Producers who used contracts shipped almost all of their marketed crops through contracts, with very little going to the spot market.

Farmers who contract in one crop tend to use contracts for other crops. Producers who use contracts for corn production also use contracts for a third of their soybean production. Those who do not contract for their corn

<sup>18</sup>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).

rarely contract for soybeans, placing only 8 percent of 2005 production under contract.

## Prices and Quantities in Marketing Contracts for Field Crops

Prices received by U.S. farmers for their field crops under marketing contracts in 2005 consistently exceeded estimates of nationwide average 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 2005 (table 10).

Producers are more likely to choose marketing contracts, instead of relying on spot markets for thinly traded, high-value varieties of a commodity. High-oil corn and low-linoleic soybeans each carry price premiums and each are likely to be produced under contract. Contract prices may also differ from season average prices if prices are changing sharply during the year. Rice prices rose sharply throughout 2005. If rice contract prices were based on the highest monthly price, or if most contract rice were priced and shipped at the end of 2005, then average contract prices could be substantially higher than NASS means.

Contract price premiums are not stable over time because contract prices fluctuate less than NASS prices over time. Figure 5 tracks the NASS annual average soybean price from 1996 through 2005 and compares it with the contract premium (the percentage difference between the average contract price and the average NASS price). The premium rises during periods of relatively low NASS prices and falls when soybean prices rise again. Contract soybean prices were below average prices in 1996, when the premium was negative, and matched average NASS prices in 2003 and 2004. The same pattern holds for corn (fig. 6). When corn prices are low, contract prices do not fall as much and the contract premium expands.

Table 10

### Prices and quantities in field crop marketing contracts in 2005

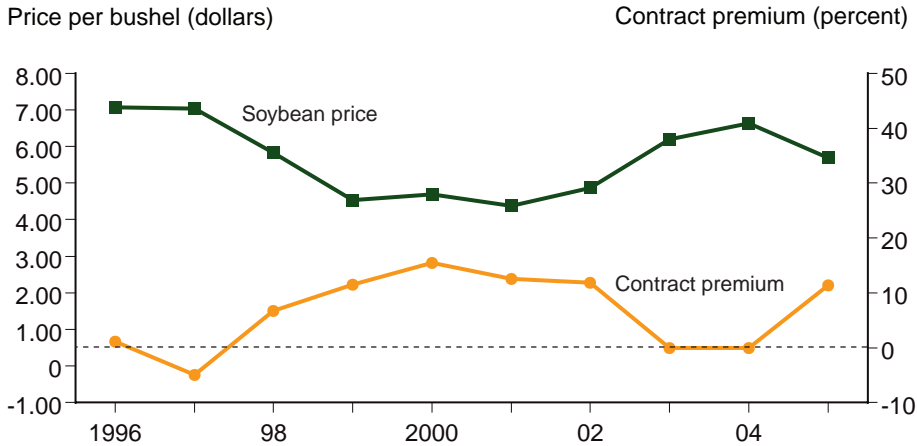
Item	Corn	Soybeans	Wheat	Rice	Cotton
	-----Per bushel-----				Per pound
Price received per unit					
USDA/NASS mean, all sales	1.93	5.69	3.35	3.10	0.43
Contract mean	2.28	6.34	3.41	4.05	0.55
Contract 25 <sup>th</sup> percentile	2.10	5.98	3.10	3.12	0.49
Contract 75 <sup>th</sup> percentile	2.40	6.75	3.63	4.80	0.58
	-----Bushels-----				Pounds
Quantity marketed through contract					
Median	9,000	3,000	3,405	21,000	255,500
Mean	22,800	7,038	8,356	44,400	465,000
25 <sup>th</sup> percentile	4,000	1,000	1,250	19,893	72,000
75 <sup>th</sup> percentile	23,000	6,900	7,350	37,800	600,000

Note: The sample includes 1,589 corn, 393 cotton, 87 rice, 1,522 soybean, and 459 wheat contracts.

Source: USDA, Agricultural Resource Management Survey, 2005, all versions.

Figure 5

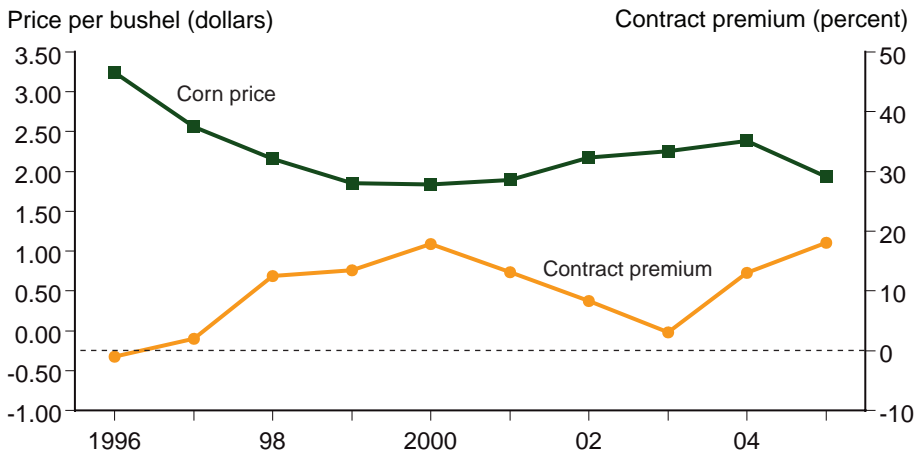
**Soybean prices and the contract premium, 1996-2005**



Source: USDA, Agricultural Resource Management Survey, all versions.

Figure 6

**Corn prices and the contract premium, 1996-2005**



Source: USDA, Agricultural Resource Management Survey, all versions.

Contract quantities range widely—except for rice, the 75<sup>th</sup> percentile quantity is 5-7 times larger than the 25<sup>th</sup> percentile quantity in each commodity (table 10). Moreover, many contract quantities are fairly small. At a yield of 150 bushels per acre, the median corn quantity (9,000 bushels) could be met with 60 acres and the interquartile range could be met with 27 acres (the 25<sup>th</sup> percentile) to 153 acres of corn. Similarly modest acreages are needed, at average yields, to meet the median soybean and wheat contracts—70 and 81 acres, respectively.<sup>19</sup> The size gap between contracting and noncontracting farms cannot be driven by contract quantities because those are rather small; contract producers of these commodities often use several marketing contracts, so the total amount marketed under contract may exceed the quantity in a single contract.

<sup>19</sup>The acreage required, at average yield, to fulfill the median rice and cotton contracts was considerably larger at 142 and 310 acres, respectively.

**Characteristics for Field Crop Contracts**

Field crop contracts do not tie farmers to specific contractors in the way that livestock and poultry production contracts do (table 11). Most contracts

cover a single growing season, and farmers do not, in general, have particularly longstanding relationships with contractors. Half of corn and soybean contract farms have worked with the current contractor for 4 years or less, figures that rise only modestly with the other crops. Moreover, very few producers saw their current contractor as their only marketing option; most had other contract options and most also had cash market options. The exception in this instance was cotton, where 32 percent of producers had no cash market options (combining those reporting “none” and those reporting “other contractors only”) and 20 percent had no other cash or contract options.

Cotton also differs in the identity of the contractor. Forty-one percent of contract cotton sales were made through marketing pools. This option was far less widely used for other field crops, where contracting operations dealt primarily with cooperatives or with privately owned (noncooperative) processors and elevators.

The terms of corn, soybean, and wheat contracts are similar to one another and distinctly different from rice and cotton contracts (table 11). Most corn, soybean, and wheat contracts specify a quantity, and most specify a single

Table 11  
**Field crop marketing contract characteristics in 2005**

Item	Corn	Soybeans	Wheat	Rice	Cotton
<i>Months in contract, years with contractor</i>					
<b>Durations</b>					
Median length of contract	6	6	4	12	12
Median experience with contractor	4	4	6	7	5
<i>Percent of contract sales for a commodity</i>					
<b>Contractor type</b>					
Cooperative	36	42	38	48	31
Marketing pool	13	10	8	15	41
Private processor, elevator, gin	49	46	51	37	27
Other	2	2	3	0	1
<i>Percent of contracts for a commodity</i>					
<b>Other marketing options</b>					
None	1	2	7	1	20
Cash sales and other contractors	62	57	70	76	47
Cash sales only	36	40	23	8	21
Other contractors only	1	1	1	16	12
<i>Percent of contracts</i>					
<b>Contract quantity specifications</b>					
No quantity specified	25	25	24	67	74
Specified quantity or range	70	70	67	14	15
Quantity from specified acreage	1	2	1	19	8
Percent of grower production	1	1	na	0	3
Other	3	3	na	0	0
<b>Contract pricing specifications</b>					
Single price offered at delivery	77	77	85	19	22
Formula-based price	18	17	11	29	39
Price was negotiated	3	4	3	34	23
Other	2	2	0	18	16

Note: The sample includes 411 corn, 202 cotton, 50 rice, 471 soybean, and 157 wheat contracts.

Source: USDA, Agricultural Resource Management Survey, 2005, version 1.

price, which is related to a base price. The exceptions tend to tie price to commodity attributes for specific varieties of the commodity. By contrast, most of the rice and cotton contracts in the USDA database set an outlet and a pricing formula, but do not specify a quantity in the contract. Moreover, those contracts rarely base price on a market index price, but instead offer a variety of methods for price discovery.

## Conclusions

Contracting in U.S. agriculture continues to grow. By 2005, agricultural contracts covered 41 percent of U.S. agricultural production, up from 39 percent in 2003 and 36 percent in 2001. The increase continues the steady growth trend extending back to 1969. The largest farms use contracting far more extensively than other farms. As more U.S. farm production moves to larger farms, an increase in contract production will likely follow.

More heterogeneity in contracting exists among specific commodities than is apparent in the aggregate data. Contract coverage varies widely across commodities, from less than 10 percent of wheat production to more than 90 percent of sugarbeets. Some commodities show sharp jumps in contract coverage in just a few years. Such jumps are often associated with institutional changes in the industries, such as major changes in government programs, marketing channels, or commodity varieties.

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.

Large operations, which often use contracts extensively, tend to earn significantly higher returns than smaller farm operations. As a result, we expect production to continue to shift to larger operations and contracting's coverage of production to expand. However, contract adoption can also vary with the performance of spot markets. 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. Contract coverage declined in another commodity, fed cattle, after expanding market reporting provided improved information to guide spot market price determination. Measurement and information technologies, as well as government policies, can affect the performance of spot markets and therefore the incentives to adopt contracts.

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. Today more contracts are specifying animal welfare and health standards; some provide for joint financing of utility expenses; and a few allow for contractor ownership of structures. 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 policy-makers and stakeholders to better understand the determinants and effects of agricultural contracts.

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## Appendix table

Contract questions corresponding to the shorter phrases used in tables 6-11

Table item	Survey question	Answer choices
<b><i>Marketing and production contracts</i></b>		
Commodity	What commodities did this operation have marketing contracts for in 2005?	66 livestock and 261 crop codes
Median years with contractor	For how long have you had contracts for this commodity with this contractor?	Years
Contract quantity	What quantity was marketed through this contract?	Annual quantity in one of 15 codes for quantity type (i.e., bushel, cwt, etc.)
Total receipts	What was the total dollar amount received in 2005 from this contract?	Total dollars
Median length of contract	How long is the length of the contract?	Months; zero if contract does not specify a month
Another contractor for this commodity in area	If you had not had this contract, what other marketing options would you have had in your area for marketing this commodity?	1) None; 2) Both cash sales and other contractors; 3) Only cash sales; 4) Only other contractors
<b><i>Marketing contracts only</i></b>		
Contractor type	Who was the marketing contractor?	1) Cooperative that you (the operator) belong to; 2) Marketing pool of agent selling on your (the operator's) behalf; 3) Privately owned (not a cooperative) packer, processor, mill, or gin; 4) Other
Price received	What was the final price received per unit by this operation for the commodity marketed under this contract?	Dollar value in same unit as quantity
Price discovery	How is the final price in the contract determined?	1) The contract contains a single price to be paid for the commodity; 2) The contract contains a formula for determining the price and/or a set of prices to be paid according to the commodity's attributes; 3) The contract contains no price(s) or pricing formulas, but the contractor negotiated for a price on my behalf; 4) Other
Premiums	Does the contract specify premiums or deductions tied to size, quality, or other attributes of the commodity?	Yes-No

*Continued—*

**Appendix table—Continued**

Contract questions corresponding to the shorter phrases used in tables 6-11

Table item	Survey question	Answer choices
<i>Marketing contracts only—continued</i>		
Shared ownership	Does the contractor share ownership of the commodity with you while it is being produced?	Yes-No
Input ties	Does the commodity require you to purchase inputs, such as seeds, fertilizer, or young livestock, from the contractor?	Yes-No
Quantity specified	Does the contract specify a quantity to be delivered to the contractor?	1) No quantity; 2) Specified quantity or range; 3) Harvest from specified acreage; 4) Percent of grower's production; 5) Other
<i>Production contracts only</i>		
Contractor type	Who was the production contractor?	1) Cooperative that you (the operator) belong to; 2) Input provider that is not a cooperative; 3) Processor that is not a cooperative; 4) Input provider and processor, not a cooperative; 5) Other
Fee received	What was the final fee received per unit by this operation for producing this commodity under contract?	Dollar value per unit quantity (in same units as reported quantity)
Fee is determined by formula	Does the contract specify a formula for determining the final fee received?	Yes-No
Fee is linked to performance	Does the contract's formula base the final fee on your performance, relative to other contract growers?	Yes-No
Structures owned by contractor	Does the contractor own any structures used on this operation for production of this commodity?	Yes-No
Equipment owned by contractor	Does the contractor own any equipment used on this operation for production of this commodity?	Yes-No
Specifies amount of land for manure management	How much land does the contract require you to commit for manure distribution?	Acres (leave blank if contract does not require land commitment)

Note: Survey documentation, including copies of the questionnaire, can be found at [www.ers.usda.gov/data/arms/GlobalDocumentation.htm](http://www.ers.usda.gov/data/arms/GlobalDocumentation.htm).

Source: USDA, Agricultural Resource Management Survey, 2005.