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Agricultural Contracting Update

Contracts in 2003

James M. MacDonald
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Agricultural Contracting Update: Contracts in 2003

James M. MacDonald
Penni Korb

Abstract

Marketing and production contracts covered 39 percent of the value of U.S. agricultural production in 2003, up from 36 percent in 2001 and a substantial increase over estimated values of 28 percent for 1991 and 11 percent in 1969. Large farms are far more likely to contract than small farms; in fact, contracts cover over half of the value of production from farms with at least $1 million in sales. Although use of both production and marketing contracts has grown over time, growth is more rapid for production contracts, which are largely used for livestock.

Keywords: contracts, contracting, marketing contracts, production contracts, vertical integration, vertical coordination, market structure, risk analysis, price signals

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Summary

Spot market exchanges in which commodities are bought and sold for immediate delivery continue to govern most transactions for U.S. agricultural products. But a growing share of farm product transactions are organized through agricultural contracts, agreements between farmers and their buyers that are reached prior to harvest (or before the completion of a production stage in the case of livestock) and which govern the terms under which products are transferred from the farm. Contracts provide much closer links between farmers and specific buyers and may give the contractor/buyer greater control over agricultural production decisions.

Increased reliance on contracting is one important feature of ongoing structural change in U.S. agriculture and is closely tied to other features of structural change, including shifts of production to larger farms, increased specialization on farms, and greater product differentiation. Contracts can ease the production and marketing of more specialized product varieties, and can help create lower costs and increased efficiency throughout the food marketing system. They may also reduce risks for farmers and ease access to credit. But contracts reduce farmers' autonomy, and they may harm the efficacy of some spot market institutions that are used for both spot market and contract transactions.

What is the issue?

Contract usage features prominently in several policy issues, including the survival of family farms, the effects of processor concentration on farm financial performance, and the regulation of excess nutrients from large livestock operations. Despite this prominent role, little is known about basic issues related to agricultural contracting, such as who uses contracts, how usage has changed over time, what prices are received under contract production, or how features of specific contracts have evolved.

What did the study find?

Contracts covered 39 percent of the value of U.S. agricultural production in 2003, up from 36 percent in 2001. Over the long term, contracting shows a strong upward trend—contracting covered 11 percent of the value of production in 1969 and 28 percent in 1991. While contracting appears to be growing steadily in the aggregate, growth varies within regions and among certain commodities. Recent increases in contracting are concentrated in hog, tobacco, cotton, and rice production.

Contracting is closely tied to farm size. Contracts covered just one-fifth of production among farms with less than $250,000 in sales, and over half (53 percent) of production on the largest farms, those with over $1 million in sales. Moreover, contracting increased among the largest farms between 2001 and 2003, but held steady or declined among smaller farms. Increases in contracting mirror increased volumes of production among large farms.

Our data distinguish between *marketing contracts*, which are used to set prices and determine market outlets for commodities produced under a

farmer's direct control, and *production contracts*, which compensate farmers for the service of producing commodities for a contractor, with many inputs provided by the contractor.

Mean prices received by farmers with marketing contracts exceeded mean prices received by noncontract farmers for corn (3 percent), cotton (19 percent) and rice (62 percent) and matched mean noncontract prices for soybeans and wheat. Some of the price advantage to contracts may reflect price premia paid for specialized varieties, and some may reflect timely marketing decisions. In cotton and rice production, the data show a shift toward greater reliance on marketing pools, in which the contractor assumes responsibility for marketing the crop committed by a pool of producers.

Production contracts, which are used most commonly on hog and poultry operations, commit farmers to substantial investments in large-scale production, and tie farmers and contractors together in long-term relationships. Despite the substantial investment, the contracts themselves tend to be of short duration—for example, two-thirds of contract broiler production occurs under contracts with a duration of 1 year or less.

How was the study conducted?

The study relies on data obtained from the 2003 Agricultural Resource and Management Survey (ARMS), USDA's primary source of information on the financial condition, production practices, resource use, and economic well-being of U.S. farm households. Some farms receive a core version of the survey, distributed by mail, while others complete longer versions through personal interviews with trained enumerators. Each version asks farmers about the use of production or marketing contracts and the volume of production, receipts, and unit prices or fees received for each commodity under contract. The longer version includes more detailed questions on contractors, contract terms, and alternatives available to farmers. The survey also includes questions about the farm business and the farm operator's household, which allows for a comparison of different types of farms.

This bulletin follows a more comprehensive ERS report that relied on data through 2001: *Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities* (Agricultural Economic Report No. 837, November 2004). The current study updates the information in that report with 2003 ARMS data and also exploits survey questions to explore recent developments in contract terms.

What Are Agricultural Contracts?

Formal contractual arrangements cover a growing share of U.S. agricultural production and are increasingly employed on large commercial farms. Increased reliance on contracting is closely tied to other features of ongoing structural change in agriculture, including shifts of production to larger farms, increased specialization on farms, and greater product differentiation. USDA's Economic Research Service (ERS) analyzes the use of contracting and related developments in agriculture. This bulletin follows a more comprehensive ERS report on agricultural contracting that relied on data through 2001.[1] It uses data gathered in USDA's 2003 Agricultural Resource Management Survey (ARMS) to update information in the previous report and exploits new survey questions to explore recent developments in contract terms.

[1]MacDonald et al. (November 2004).

Economists commonly distinguish three broad methods for organizing the transfer of commodities from farms to the next stages of food production: spot markets, vertical integration, and contracts. *Spot (or cash) markets* provide the traditional means of transferring products and determining prices in agriculture. 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 participating in spot markets 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 (often in concert with their bankers) and arrange for selling their products, including finding a seller, determining a price, and delivering the product. Spot market exchanges continue to govern most transactions for farm products.

Product transfers could also be organized through *vertical integration*, which combines the farm and downstream users of a commodity under single ownership. For example, many wineries own and operate vineyards, while citrus processors may own and operate orange groves. Meatpackers may own hog farms or cattle feedlots, and dairy farmers may choose to purchase feed or integrate the production of feed onfarm. Under vertical integration, markets do not determine commodity prices, and internal decisions drive product transfer. Farm operators in vertically integrated firms are employees of much larger organizations. Vertical integration that links farms with processors or retailers is still relatively uncommon.

More and more, farm product transactions are organized through agricultural contracts, 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 which govern the terms under which products are transferred from the farm. Contracts provide for much closer linkages between farmers and specific buyers than other methods of transfer and may provide the contractor/buyer with greater control of agricultural production decisions.

ERS distinguishes between two types of agricultural contracts—production contracts and marketing contracts. Under a *production contract,* the farmer provides a set of services to the contractor, who usually owns the commodity while it is being produced. The contract specifies the services to be provided by the farmer, the manner in which the farmer is to be compensated for the services, and specific contractor responsibilities for provision of inputs. For example, the farmer provides labor, equipment, and housing under many livestock production contracts, while the contractor provides other inputs, such as feed, veterinary and livestock transportation services, and young animals. The farmer's payment is based on the costs of farmer-provided inputs, the quantity of production, or both, and usually resembles a fee paid for the specific services provided by the farmer, instead of a payment for the market value of the product (because the 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). Under such contracts, farmers often cede substantial control over production decisions to contractors. Because of the nature of the agreement, farmers and contractors agree upon the terms of production contracts before production begins.

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 removal. 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).[2] 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.

[2]Some crop marketing contracts tie input purchases and commodity delivery by setting price and delivery schedules for specified seed and chemical inputs, as well as prices and outlets for harvested crops.

Data on Contracting

For this study, ERS relied on data from the 2003 Agricultural Resource and Management Survey (ARMS). Conducted annually, ARMS provides information on a stratified random sample of U.S. farms and is USDA's primary source of information on the financial condition, production practices, resource use, and economic well-being of U.S. farm households. Some farms complete a core version of the survey, distributed and returned by mail, while others complete longer versions through personal interviews with trained enumerators. Each version asks farmers about the use of production or marketing contracts, and the volume of production, receipts, and unit prices or fees received for each commodity under contract.[3] The longer version includes more detailed questions on contractors, contract terms, and alternatives available to farmers. The detailed questions, and the short versions of those questions used in some of the tables in this report, are provided in the appendix. The annual nature of ARMS enables ERS to compare survey data across years, as well as against data provided in the predecessor to ARMS, the Farm Costs and Returns Survey (FCRS), which provides contracting information from 1991 to 1995. For a longer term view, ERS drew upon information gathered in the 1970 Census of Agriculture. Further information on ARMS, including downloadable questionnaires, can be found at www.ers.usda.gov/Briefing/ARMS/.

Other USDA sources for data on agricultural contracts

USDA's Grain Inspection, Packers and Stockyards Administration 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/). 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 (http://www.ams.usda.gov/LSMNpubs/index.htm and http://mpr.datamart.ams.usda.gov/menu.do). Finally, 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/).

[3]The decision to specify only two types of contracts is influenced by pragmatic considerations of survey design—how to ask questions that a broad cross-section of producers will understand, and that conform to other USDA surveys, 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, or any third general category, to be a compelling alternative.

How Contracting Has Grown

ERS used data from ARMS and the Census of Agriculture to trace the growth of contracting, to show how the use of contracts varies among commodities and regions, and to show the types of farms that use contracts.[4]

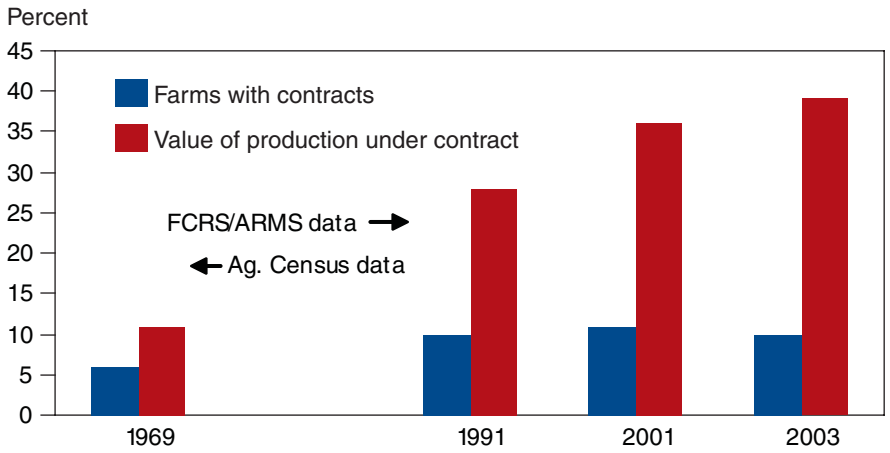
Contracts cover a growing volume of production

Agricultural contracts covered 39 percent of the value of agricultural production in 2003, up from 36 percent in 2001 (fig. 1). Over short periods covering a few years, this share may fluctuate.[5] But over longer periods, contracting shows a strong upward trend—contracting covered 28 percent of the value of production in 1991 and 11 percent in 1969.

A simple three-way classification of commercial, intermediate, and rural residence farms helps show how the use of contracts varies among different farm types. *Commercial farms* include family-operated farms with gross sales in excess of $250,000 and all nonfamily farms, which can be cooperatives, nonfamily 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, but the category excludes limited-resource farms.[6] Most farms in the United States are *rural residence farms*—family-operated farms with sales below $250,000 whose operators report that they are retired or that their primary occupation is not farming, as well as limited resource farms.

Commercial farms exhibited most of the growth in contracting from 2001 to 2003. Contract sales accounted for almost 47 percent of the total value of production on commercial farms in 2003, and commercial farms, in turn, handled almost 87 percent of the total U.S. value of production under contract (table 1). More commercial farms held contracts in 2003 than in 2001, and the share of their production under contract rose as well, by over 4 percentage points (we define farm sales classes in constant 2003 dollars,

Figure 1
Expansion of agricultural contracting, 1969-2003



Source: Compiled by USDA's Economic Research Service using data from the 1991 Farm Costs and Returns Survey, the 2001 and 2003 Agricultural Resource Management Survey, and the Census of Agriculture.

[4]Because this bulletin 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.

[5]Contracting is more prevalent in some commodities, like sugar beets and hogs, than in others, like corn and wheat. In years of relatively high corn and wheat production and relatively low sugar beet and poultry production, contracting's share of total production falls. In addition, our ARMS data are drawn from random samples of farms, and hence contain sampling errors in estimates of contracting's share.

[6]Limited-resource farms had gross farm sales of less than $100,000 in 2003 and total operator household income that fell below specified thresholds in 2003 and 2002.

and adjust for inflation using the USDA/NASS index of prices received for farm products). In contrast, fewer rural residence and intermediate farms contracted in 2003 than in 2001, and the share of their value of production under contract also fell.

Contracting is closely tied to farm size (table 2). Nearly two-thirds of the largest farms (those with at least $1 million in sales) used contracts in 2003, while considerably fewer small farms used them. Contracts covered just one-fifth of production among small farms (those with less than $250,000 in sales) and over half of production on the largest farms. Moreover, contracting increased among the largest farms between 2001 and 2003, but held steady or declined among smaller farms.

Table 1
Share of farms using contracts and share of value produced under contract by typology, 2001 and 2003

Item	Farm typology			48-State total
	Rural residence farms	Intermediate farms	Commercial farms	
	Contract share within each category (percent)			
Farms with contracts, 2001	3.6	16.0	41.7	11.0
Farms with contracts, 2003	3.4	13.5	46.7	9.6
Production value under contract, 2001	13.3	24.2	42.2	36.4
Production value under contract, 2003	11.6	22.5	46.6	39.1
	Share of each category in all contracts (percent)			
Farms with contracts, 2001	19.6	44.6	35.8	100.0
Farms with contracts, 2003	23.9	33.3	42.9	100.0
Production value under contract, 2001	2.3	14.4	83.2	100.0
Production value under contract, 2003	2.4	10.9	86.7	100.0

Source: Compiled by USDA's Economic Research Service, using data from the 2001 and 2003 USDA Agricultural Resource Management Survey.

Table 2
Contracting among commercial farms, 2001 and 2003

Farm size (gross sales)	Farms with contracts		Value of production under contract	
	2001	2003	2001	2003
	Percent			
Less than $250,000	7.7	6.2	19.1	19.9
$250,000-$499,999	47.9	43.5	31.2	31.3
$500,000-$999,999	60.9	59.1	45.7	42.6
$1 million or more	61.5	64.2	46.6	53.4

Note: All farm size class cutoffs are adjusted for inflation (in 2003 dollars) using the USDA/NASS index of prices received by farmers.

Source: Compiled by USDA's Economic Research Service using data from the 2001 and 2003 USDA Agricultural Resource Management Survey.

ERS also examined marketing and production contracts separately, combining earlier years to expand sample sizes and smooth out some random fluctuations (table 3).[7] In 2003, more farms used marketing contracts than production contracts, and marketing contracts covered a greater share of agricultural output. However, coverage by production contracts has increased significantly since 1991-93, and this shift was driven by expansion at commercial farms with at least $500,000 in sales. The growth in use of production contracts primarily reflects the expansion of poultry production (where production contracts are the typical form of governance) and the expansion of production contracting in the hog sector.

[7]As a result of expanded funding, the 2003 ARMS has a much larger sample than earlier surveys.

Table 3

Share of farms using contracts and share of value produced under contract, 1991-2003

Item	1991-93	1994-95	1996-97	1998-2000	2001-02	2003
			Percent			
Share of farms with contracts:						
Any contracts	10.1	13.0	12.1	10.6	11.2	9.6
Marketing contracts	8.2	10.8	10.2	8.4	9.0	7.8
Crop	6.6	8.0	8.3	6.5	7.4	6.2
Livestock	1.6	3.0	2.0	2.0	1.6	1.6
Production contracts	2.1	2.4	2.2	2.5	2.6	2.1
Crop	0.6	0.7	0.6	0.6	0.5	0.4
Livestock	1.6	1.7	1.6	1.9	2.1	1.7
Share of production under contract:						
Any contracts	28.9	34.2	32.1	37.3	37.8	39.1
Marketing contracts	17.0	21.2	21.5	20.4	19.7	21.7
Crop	11.0	12.2	12.2	11.3	12.7	14.8
Livestock	6.0	8.9	9.2	9.1	7.1	6.9
Production contracts	11.8	13.0	10.6	16.9	18.0	17.5
Crop	0.9	1.0	1.0	2.1	1.6	0.6
Livestock	10.9	12.1	9.6	14.7	16.5	16.9
Share of farms in class with production contracts:						
$249,999 or less	1.2	1.5	1.2	1.1	1.0	0.8
$250,000 to $499,999	14.2	10.1	11.5	11.9	12.0	11.8
$500,000 to $999,999	21.9	20.8	20.9	27.6	31.3	23.6
$1 million or more	17.7	27.6	23.0	31.0	34.9	31.1
Share of production value under production contract in class:						
$249,999 or less	2.8	3.5	2.4	3.0	2.6	2.2
$250,000 to $499,999	11.7	8.6	8.4	8.7	10.1	9.8
$500,000 to $999,999	18.9	18.3	16.6	23.9	28.3	20.7
$1 million or more	22.8	25.4	19.2	28.3	27.6	29.1
Share of farms in class with marketing contracts:						
$249,999 or less	6.6	8.9	7.8	6.0	6.8	5.5
$250,000 to $499,999	29.1	36.6	39.3	35.2	34.1	33.2
$500,000 to $999,999	34.8	40.7	45.5	37.4	33.8	38.4
$1 million or more	40.0	38.2	48.0	39.8	35.2	37.7
Share of production value under marketing contract in class:						
$249,999 or less	11.8	15.2	16.0	13.0	16.2	17.7
$250,000 to $499,999	15.9	19.8	17.0	20.5	18.0	21.5
$500,000 to $999,999	19.6	25.7	25.4	21.5	18.6	21.9
$1 million or more	24.9	27.5	29.1	25.8	23.2	24.2

Note: All farm size class cutoffs are adjusted for inflation (in 2003 dollars) using the USDA/NASS index of prices received by farmers.
Source: Compiled by USDA's Economic Research Service using data from the 1991, 1994, 1996, 1998, 2001, and 2003 USDA Farm Costs and Returns Survey/Agricultural Resource Management Survey.

Contracts and commodities

Contract use varies widely across commodities. In the aggregate, contracts in 2003 covered 47 percent of livestock production, up from 33 percent in 1991-93, and 31 percent of crop production, up from 25 percent in 1991-93 (table 4). Among livestock commodities, contracts cover nearly 90 percent of poultry and egg production (and vertical integration likely covers most of the rest), as well as more than half of dairy and hog production. Since 1991-93, contract coverage grew sharply in hog production and showed some modest growth in cattle production (driven by sharper increases in the fed cattle part of the cattle sector).

Among crop commodities, contract coverage in 2003 ranges from only 8 percent of wheat production and 14 percent of corn and soybean production, to over half of rice, peanut, tobacco, and cotton production, to nearly all of sugar beet production. Over the long term, the increase in contract coverage for all crop production between 1991-93 and 2003 reflects sharp increases in contract share for cotton, rice, tobacco, and "other crops," with very little change in share for fruits, vegetables, peanuts, sugar beets, corn, soybeans, and wheat.[8]

In crop production, marketing contracts are far more prevalent than production contracts—marketing contracts covered 30 percent of crop production in 2003, while production contracts covered only 1 percent (table 5). Production contracts show significant coverage only in vegetable production, though marketing contracts still dominate that category with 85 percent of contract production.

[8]The category "other crops" includes many commodities; the largest, in terms of production value, include popcorn, field seeds, mushrooms, sunflowers, hops, flax, peppermint, and lentils.

Table 4
Distribution of the contract share of U.S. agricultural production by commodity and year, 1991-2003

Item	1991-93	1994-95	1996-97	1998-2000	2001-02	2003
	Percent of production value under contract					
All commodities	28.9	34.2	32.1	37.3	37.8	39.1
Crops	24.7	25.8	22.9	26.7	27.8	30.8
Corn	11.4	13.9	13.0	12.9	14.8	14.3
Soybeans	10.1	10.0	13.5	10.3	9.6	14.0
Wheat	5.9	6.2	9.1	7.0	6.5	7.6
Sugar beets	91.1	83.7	75.1	89.0	96.7	95.5
Rice	19.7	25.2	25.8	30.5	38.7	51.8
Peanuts	47.5	58.3	34.2	45.0	27.9	53.3
Tobacco	0.3	0.6	0.3	1.9	52.6	54.8
Cotton	30.4	44.5	33.8	42.9	52.6	51.4
Fruit	na	64.2	56.8	65.4	62.2	68.1
Vegetables	na	55.0	38.5	39.7	42.1	42.7
Other crops	7.8	15.9	23.8	33.6	39.1	45.9
Livestock	32.8	42.9	44.8	48.0	48.3	47.4
Cattle	na	19.0	17.0	24.3	21.1	28.9
Hogs	na	31.1	34.2	55.1	62.6	57.3
Poultry and eggs	88.7	84.6	84.1	88.8	92.3	88.2
Dairy	36.8	56.7	58.2	53.6	48.7	50.6
Other livestock	0.2	9.3	4.9	10.9	9.0	7.6

Note: na indicates value is not available due to no observations, an undefined statistic, or reliability concerns.
Source: Compiled by USDA's Economic Research Service using data from the 1991, 1994, 1996, 1998, 2001, and 2003 USDA Farm Costs and Returns Survey/Agricultural Resource Management Survey.

Table 5

Distribution of the contract share of U.S. agricultural production by commodity, contract type, and year, 1991-2003

Item	1991-93	1994-95	1996-97	1998-2000	2001-02	2003
			Percent of production value			
Commodities produced under marketing contract						
All commodities	17.0	21.2	21.5	20.4	19.7	21.7
Crops	22.8	24.0	21.1	22.5	24.7	29.7
Corn	10.2	13.8	12.9	12.6	14.7	13.8
Soybeans	9.6	9.8	13.2	9.7	9.5	13.6
Wheat	5.8	6.2	9.0	6.9	6.4	7.5
Sugar beets	88.5	83.7	74.6	83.1	95.8	95.1
Rice	19.7	25.2	25.8	30.5	38.6	51.8
Peanuts	45.2	58.3	34.2	44.9	27.9	53.3
Tobacco	0.3	0.6	0.3	1.9	52.6	54.8
Cotton	30.4	44.4	33.8	42.9	52.6	50.9
Fruit	na	61.0	54.3	63.3	60.1	67.2
Vegetables	na	45.3	32.3	27.3	31.5	36.4
Other crops	6.3	14.0	18.7	21.2	30.9	44.7
Livestock	11.6	18.2	22.0	18.4	14.5	13.7
Cattle	na	4.3	5.9	4.6	2.7	3.4
Hogs	na	2.4	2.7	9.1	6.1	6.8
Poultry and eggs	5.9	3.4	4.0	3.9	4.2	1.1
Dairy	36.6	56.7	58.0	53.4	48.0	50.5
Other livestock	0.1	6.8	4.9	10.7	3.5	7.4
Commodities produced under production contract						
All commodities	11.8	13.0	10.6	16.9	18.0	17.5
Crops	1.9	1.9	1.8	4.2	3.1	1.1
Vegetables	na	9.7	6.1	12.4	10.6	6.3
Livestock	21.1	24.7	22.9	29.6	33.8	33.7
Cattle	na	14.7	11.1	19.7	18.3	25.4
Hogs	na	28.7	31.5	46.0	56.5	50.4
Poultry and eggs	82.8	81.2	80.1	84.9	88.1	87.2
Dairy	0.2	na	0.1	0.2	0.7	0.1
Other livestock	0.1	2.6	na	na	5.5	na

Note. na indicates value is not available due to no observations, an undefined statistic, or reliability concerns.
Source: Compiled by USDA's Economic Research Service using data from the 1991, 1994, 1996, 1998, 2001, and 2003 USDA Farm Costs and Returns Survey/Agricultural Resource Management Survey.

Production contracts are more prevalent among livestock producers, while dairy farms are the major users of marketing contracts, representing over half of dairy production value in 2003. Hogs and fed cattle are the only sectors that extensively combine marketing and production contracts. In hog production, integrators (who often may themselves be farmers) typically arrange with farmers to grow hogs for them under production contracts, and they may also maintain marketing contracts with packing plants.[9] Independent hog producers may also hold marketing contracts with meatpackers,

[9]"Integrators" coordinate two or more stages of production (the term is used most frequently in hog and poultry production). They contract with farmers to grow market hogs, broilers, or turkeys. They provide feed and young poultry or pigs to those growers from facilities that they operate or with whom they have contracts, and they arrange for processing, again at facilities that they operate or contract.

which likely helps account for the growth in hog marketing contracts.[10] In fed cattle production, feedlots frequently feed cattle under a production contract with cattle owners and may rely on marketing contracts or spot markets to govern sales to meatpackers.[11]

Since 1991-93, the mix of agricultural production under contract has remained steady at about 60 percent livestock and 40 percent crops. Over the same period, however, marketing contracts have fallen as a share of all contract production, from 59 percent in 1991-93 to 55 percent in 2003 (table 6).

The use of contracting can vary sharply across regions (figs. 2 and 3). For example, contracts covered 89 percent of rice production in the Fruitful Rim in 2003, up from 78 percent in 2001-02 and 41 percent 10 years earlier. In contrast, contracts covered a much smaller share (16 percent) of rice production in the Mississippi Portal in 2003, with no clear growth over recent years. Contracting covered 85 percent of tobacco production in the Mississippi Portal in 2003, but only half in the Southern Seaboard. Contract coverage of hog production in the Heartland (41 percent) remains substan-

[10]Unless they also operate farms, integrators are not surveyed by ARMS, and we cannot capture data on their marketing contracts. In addition, some meatpackers operate their own production facilities and organize some hog production through vertical integration.

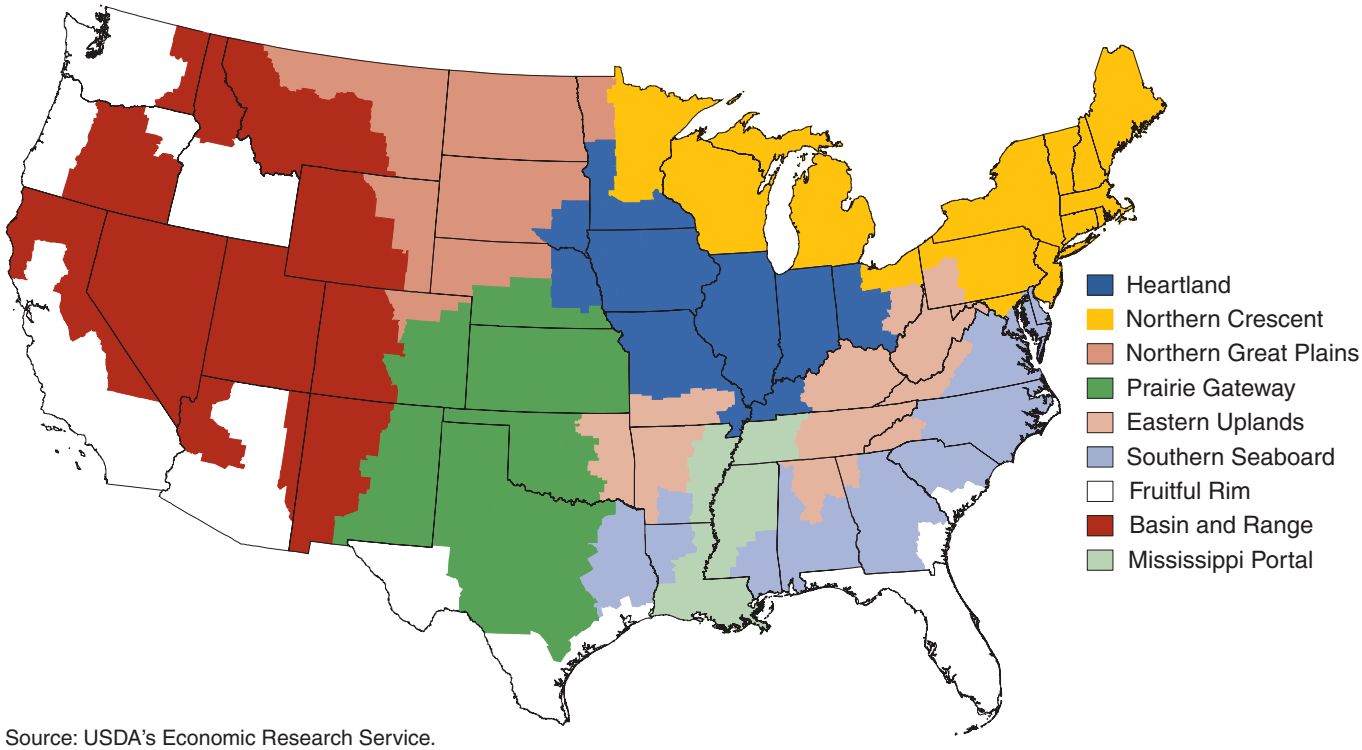
[11]At the cattle feeding stage, the "cattle owners" who hold production contracts constitute a diverse group, and they may include farmers and ranchers, meatpackers, and many other firms and individuals.

Table 6
Share of total contract value by commodity and contract type, 1991-2003

Item	1991-93	1994-95	1996-97	1998-2000	2001-02	2003
			Percent of contract value			
All contracts:						
All commodities	100.0	100.0	100.0	100.0	100.0	100.0
Crops	41.5	38.5	41.3	36.0	37.7	39.2
Corn	3.5	3.9	5.1	3.1	3.5	3.8
Soybeans	2.6	2.3	4.0	2.1	1.8	2.8
Fruit	11.6	10.8	10.5	10.3	9.3	12.3
Vegetables	9.8	10.0	8.1	5.6	6.5	5.9
Livestock	58.5	61.5	58.7	64.0	62.3	60.8
Cattle	18.6	10.2	7.5	12.2	10.2	16.2
Hogs	2.8	5.7	5.0	7.7	10.9	8.4
Poultry and eggs	20.4	23.0	21.3	24.1	25.7	21.8
Dairy	16.6	22.1	24.6	19.3	15.2	14.0
Marketing contracts:						
All commodities	59.1	61.9	66.9	54.8	52.2	55.3
Crops	38.3	35.8	38.1	30.3	33.5	37.8
Corn	3.1	3.9	5.1	3.0	3.4	3.6
Soybeans	2.5	2.3	3.9	2.0	1.7	2.7
Fruit	11.2	10.2	10.1	9.9	9.0	12.1
Vegetables	8.3	8.2	6.8	3.9	4.9	5.0
Livestock	20.8	26.1	28.8	24.5	18.7	17.5
Dairy	16.5	22.1	24.5	19.3	15.0	13.9
Production contracts:						
All commodities	40.9	38.1	33.1	45.2	47.8	44.7
Crops	3.2	2.8	3.2	5.7	4.2	1.4
Vegetables	1.5	1.8	1.3	1.8	1.6	0.9
Livestock	37.8	35.4	29.9	39.5	43.6	43.2
Cattle	16.1	7.9	4.9	9.9	8.9	14.3
Hogs	2.4	5.2	4.6	6.4	9.8	7.4
Poultry and eggs	19.0	22.1	20.3	23.1	24.5	21.5

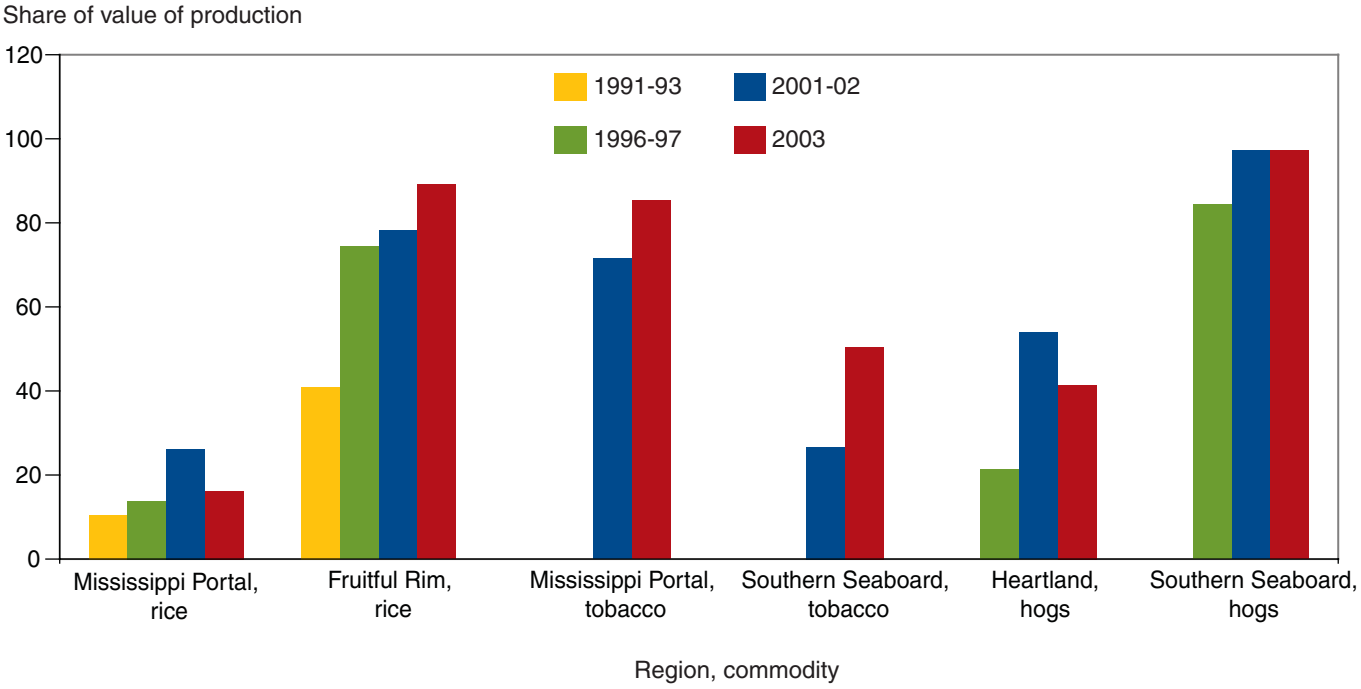
Source: Compiled by USDA's Economic Research Service using data from the 1991, 1994, 1996, 1998, 2001, and 2003 USDA Farm Costs and Returns Survey/Agricultural Resource Management Survey.

Figure 2
U.S. farm resource regions



Source: USDA's Economic Research Service.

Figure 3
Regional differences in contracting



Source: Compiled by USDA's Economic Research Service using data from the 1991 Farm Costs and Returns Survey, the 2001 and 2003 Agricultural Resource Management Survey, and the Census of Agriculture.

tially below that in the Southern Seaboard (97 percent). While differences in specific commodity characteristics may account for some of the regional differences, it is also likely that regional differences in the number of buyers and in the design of specific institutions affect contracting. For example, the Heartland has more packers available to purchase hogs, along with a set of reporting and marketing institutions to support a spot market, while the Southern Seaboard has fewer buyers and as a newer production region, a more limited set of existing institutions. Thus, contracting may have facilitated the expansion of hog production in the Southern Seaboard.

In summary, contracting covers a growing share of U.S. agricultural production, with that share (39 percent) increasing over the long term. Contracting is concentrated among the largest enterprises, which account for a growing share of production. While contracting appears to be growing steadily in the aggregate, sharp jumps are evident within regions and among certain commodities.

Prices, Fees, and Terms in Agricultural Contracts

The 2003 ARMS included questions on the prices and fees farmers received under contracts, the process used to determine prices and fees, and contract terms—the length of time covered under a contract, as well as the quantities and the set of production tasks farmers commit to under contract.[12] The appendix lists specific questions included in the 2003 survey.

Marketing contracts for field crops

Table 7 summarizes some fundamental characteristics of marketing contracts and allows for a comparison of contract prices with average USDA/NASS marketing prices.[13] Each of the five selected field crops represented in the table—corn, cotton, rice, soybeans, and wheat—had significant volumes produced under spot markets and under contract. In 2001, mean contract prices were above mean USDA/NASS prices for each commodity, by 6-8 percent for wheat and cotton, 10-12 percent for corn and soybeans, and 26 percent for rice (MacDonald et al., 2004).

[12]Producers receive prices for their commodities transferred under marketing contracts, while they receive fees for the services that they provide under production contracts.

[13]Average USDA/NASS prices should reflect mean prices across contract and spot market sales.

Table 7
Characteristics of marketing contracts for selected field crops, 2003

	Commodity				
Item	Corn	Cotton	Rice	Soybeans	Wheat
Total number of farms	44,212	11,353	3,402	44,674	9,692
			Dollars		
Price received per unit:					
USDA/NASS mean, all sales	2.25	0.52	2.60	6.19	3.27
Mean	2.32	0.62	4.22	6.19	3.27
25th percentile	2.17	0.56	3.60	5.50	3.01
75th percentile	2.44	0.68	4.95	6.80	3.50
	Bu.	*Lb.*	*Bu.*	*Bu.*	*Bu.*
Quantity marketed through contract:					
Median	10,000	180,000	na	3,000	6,375
25th percentile	5,000	76,000	na	1,500	3,000
75th percentile	26,000	402,500	na	9,000	16,220
Contract terms:					
Median years with contractor	1	3	12	5	2
Median length of contract (months)	4	12	12	4	4
			Percent		
Share of contracts with the following attributes:					
Price received based on single price	69.2	12.1	16.1	72.9	69.2
Price received based on formula	23.5	53.1	30.5	8.1	6.5
Price received was negotiated	3.6	34.8	43.5	3.3	12.2
Price received other	3.7	0.0	10.0	15.8	12.0
Delivery has no quantity specified	19.2	64.1	71.6	23.5	39.4
Delivery has a specified quantity or range	79.5	15.0	10.6	73.6	59.2
Delivery harvest from specified acreage	0.8	20.7	17.0	1.9	0.9
No contract length reported	29.9	22.9	16.4	23.4	29.2
Another contractor for this commodity in area	90.3	83.9	79.7	90.6	85.9

Note: na indicates value is not available due to no observations, an undefined statistic, or reliability concerns.
Source: Compiled by USDA's Economic Research Service using data from the 2003 USDA Agricultural Resource Management Survey.

Crop prices were relatively low in 2001, and the risk-reduction features of many marketing contracts may have insulated producers against some of the price decline, leaving contract producers with higher average prices than noncontract producers. Crop prices rose substantially by 2003; if contracts serve primarily to limit price swings for farmers, then contract prices should have fallen below USDA/NASS mean prices in 2003. Instead, mean contract prices matched average USDA/NASS prices for soybean and wheat producers and exceeded the average USDA/NASS marketing-year average prices for corn (3 percent), cotton (19 percent), and rice (62 percent). Indeed, contract cotton and rice producers with relatively low contract prices (25^{th} percentile) still received prices above mean USDA/NASS prices.[14]

In the case of rice, several factors may have affected prices received by farmers. First, the NASS monthly prices for 2003 trended sharply upward toward the end of the calendar year, from a low of $1.90 at the beginning of the year. If contract products were delivered toward the end of the year, the trend alone might suggest higher prices. Second, most of the farmers who reported rice contracts reported that they used a contracting agent or cooperative to negotiate a price for their contracts. Under such an arrangement, often called a marketing pool, producers commit production to an agent who negotiates with buyers on their behalf. These agents or co-ops may have been more effective in securing higher prices for their commodities than did most farm operators on their own.

Marketing contracts for field crops do not tie contractors and farmers together in long-term relations—instead, farmers contract only parts of their crop and often review contracts and contractors on an annual basis (see table 7). The median quantity in a corn contract was 10,000 bushels in 2003, with the interquartile range extending from 5,000 to 26,000 bushels.[15] At yields of 142 bushels per acre (the national average in 2003), a farmer would have to commit just 70 corn acres to meet the typical contract, with 35-185 acres enough to meet the interquartile range of contract quantities.[16] Farmers commit to small contract quantities for several reasons. Many producers combine marketing contracts with spot market sales, storage, and hedging as part of an overall marketing strategy. Also, marketing contracts for field crops sometimes are designed to cover specialized varieties of a commodity, such as high-oil corn or food-grade soybeans, that are only a part of a farm's production.

Many crop contracts do not specify a duration, and of those that do, the median length ranges from 4 months (corn) to 12 months (cotton); that is, contracts typically cover part of one harvest's production. While rice farmers typically deal with the same contractor for many years (half of contract respondents had stayed with the same contractor for at least 12 years), producers of other crops do not. Half of the corn producers responding to the survey had dealt with their current contractor for 1 year or less. Among respondents who produce cotton or wheat, half had dealt with their current contractor for less than 3 years and less than 2 years, respectively.

As shown in the table, contract terms can exhibit striking differences across commodities. ARMS respondents report that about 70 percent of corn, wheat, and soybean contracts specify a single price in the contract.[17] In

[14]The 25th percentile of a distribution is the point at which 25 percent of observations have lower values and 75 percent have higher. With the 25th percentile value exceeding the mean NASS price for cotton and rice, at least 75 percent of sample cotton and rice contract producers received 2003 prices above the overall USDA/NASS mean.

[15]The interquartile range is a measure of the spread of values in a distribution, and is the difference between the values at the 25th and 75th percentiles.

[16]Similarly, at national average yields, it would take 45 acres of soybeans, 64 of wheat, and 105 of cotton to fulfill the median contract quantities.

[17]Typically, rather than specify an actual price, the contract will state that the base price to be paid will be a posted spot or futures market price, with premiums or discounts from that price tied to commodity characteristics.

contrast, cotton and rice contracts frequently do not specify any price at all; instead, the contract calls for the contractor to negotiate for a price on the producer's behalf ("price received was negotiated"), which is typical of marketing pools. Similarly, cotton and rice contracts usually either do not specify a quantity or specify that the contract is to cover the harvest from a particular acreage. Corn, soybean, and wheat contracts are more likely to specify a precise quantity or a range of quantities. Finally, most producers reported having another contractor for a particular commodity in their area. The share of respondents reporting no other contractor available ranged from 10 percent of corn and soybean producers to 20 percent of rice producers.

Production contracts for broilers and hogs

ARMS data include large samples of production contracts for two commodities, broilers and market hogs (table 8). In each case, the fees received by farm operators ranged widely, with interquartile ranges of 19 to 29 cents a head for broilers and $10 to $12 a head for hogs.[18]

During 2003, the average price for hogs was $39.75 a hundredweight, or $107.33 for a 270-pound hog. Fees for hog producers thus ranged from 10 to 12 percent of market value; similarly, at a market value of 30 cents a pound for broilers, average fees for broiler producers would amount to 16 percent of the market value of a 5-pound broiler. As stated earlier, contractors usually provide feed, chicks or feeder pigs, veterinary services, and

[18]The range could reflect differences in products (for example, larger birds increase farmer costs) and could also reflect differences in markets for growers.

Table 8
Characteristics of production contracts by commodity, 2003

Item	Commodity	
	Broilers	Market hogs
Total number of farms	17,467	4,945
	Dollars per head	
Prices:		
Mean	0.24	12.04
25th percentile	0.19	10.00
75th percentile	0.29	12.00
	Number of head	
Contract quantiles:		
Median	345,000	4,555
25th percentile	210,000	1,689
75th percentile	582,000	9,600
Median years with contractor	10	4
Median length of contract (months)	12	12
	Percent of contracts	
Contract term characteristics:		
Fee is determined by a formula	91.6	54.3
Fee is linked to performance	98.3	na
Premium tied to attributes of delivered commodity	71.3	20.4
Requires use of specific equipment or structure	91.9	57.0
Manure management responsibilities	96.5	86.7
Specifies amount of land for manure distribution	34.9	53.8
Another contractor for this commodity in area	68.7	81.7

Note: na indicates value is not available due to no observations, an undefined statistic, or reliability concerns.
Source: Compiled by USDA's Economic Research Service using data from the 2003 USDA Agricultural Resource Management Survey.

transport services, and the services that producers provide (labor, housing, energy, and equipment) usually account for only a small share of the commodity's total cost. Table 9 details operating expenses for farms with broiler and market hog production contracts. Contractors pay for 80 percent of estimated operating expenses at farms with broiler production contracts, and 71 percent at farms with hog production contracts. Feed accounts for the largest share of operating expenses on each type of farm, and contractors pay for 96 percent of total feed expenses. Contractors also handle large shares of livestock and poultry purchases, medical expenses, and custom work, while the operators pay for labor and energy expenses, in addition to providing capital and operator household labor.

Production contracts typically commit broiler and hog farmers to large annual production volumes and substantial investments. The median annual quantity in a hog contract is over 4,500 hogs, with an interquartile range of 1,700-9,600 hogs (see table 8). The median and 75th percentile quantities of hogs were 25 percent higher in 2001, suggesting that production contracts may be settling on a narrower range of facility sizes. For broilers, the median contract quantity of 345,000 birds, and the interquartile range of 210,000-582,000 birds, is quite close to the values for 2001 (MacDonald et al., 2004).

Compensation arrangements in hog and broiler contracts differ considerably. Over 90 percent of broiler contracts specify a formula for determining a fee, and most of those base the formula on the producer's relative performance, compared with that of a group of other producers. In contrast, just over half of hog contract fees are based on a formula, and few use relative performance features.[19]

Manure management issues are of growing concern on large livestock and poultry operations because of expanded environmental regulation and lawsuits over odors and pollution.[20] Because integrators may be at some risk of liability for events that take place on contractees' operations, some production contracts may contain clauses dealing with issues such as manure management. In nearly all broiler contracts (97 percent), the farm operator is responsible for manure management. In one of seven hog contracts, manure management is assigned to someone else—that is, some

[19]Nearly half of hog contracts specified a single fee in the contract, instead of a formula.

[20]A recent ERS analysis of the issue can be found in Aillery et al. (2005).

Table 9
Expenses among farms holding broiler or market hog production contracts, 2003

	Farms with broiler contracts		Farms with market hog contracts	
Operating expense category	Expenses	Contractor share	Expenses	Contractor share
	Millions($)	*Percent*	*Millions($)*	*Percent*
Total	8,814	80.4	4,134	71.1
Feed	4,879	96.1	1,547	96.3
Livestock	745	100.0	287	89.4
Medical	97	88.7	63	87.4
Custom work	325	94.8	45	62.7
Cash wages	117	18.0	102	1.6
Natural gas	20	8.6	2	3.6
Electricity	90	0.6	12	8.3

Note: Expenses in each category are summed over all farms with broiler or market hog production contracts.
Source: Compiled by USDA's Economic Research Service using data from the 2003 Agricultural Resource Management Survey.

production arrangements now set up separate contracts for hog production and for manure management at the same site. For those hog producers that retain manure management responsibilities, just over half of the contracts also contain explicit terms requiring the producer to have access to a certain amount of land for manure management. With the increased focus on environmental issues, future livestock production contracts are likely to continue to include guidelines on manure management.

In contrast to crop marketing contracts, hog and broiler production contracts generally tie producers and contractors (the integrators) together in long-term relationships. On average, broiler producers have worked with their current contractor for 10 years, while hog producers have worked with their current contractor for 4 years. The endurance of these business relationships may stem in part from the lack of alternative contractors available to hog and broiler producers. According to ARMS data, over 30 percent of broiler producers and almost 20 percent of hog producers report having no other contractor in the area.

Despite long-term working relationships, and in spite of the substantial financial investments that operators make in production contracts, many contracts specify very short durations—the median length of contract is just 12 months for each commodity (thus, broiler producers typically recontract each year with the same contractor). However, specified contract durations vary widely among producers of each commodity (table 10). Over 20 percent of broiler contracts and over 30 percent of market hog contracts do not specify a length.[21] Such contracts typically cover a single flock of broilers or a single group of feeder pigs delivered to the producer. Over half of broiler contracts and over a quarter of hog contracts specify a short-term contract of less than a year. Many producers have contracts with long durations; about 15 percent of broiler producers and about 37 percent of hog producers specify contract durations of 5 years or more. Several sample broiler contracts report 15-year durations.

Moreover, larger producers tend to have longer contracts. While only 37 percent of contract hog producers reported that they had a contract of at least 5 years' duration, those operations accounted for more than half (56

[21]ARMS asked respondents to state the length of their contract, in months, and to report zero for those contracts that did not specify a length.

Table 10
Duration of production contracts for broilers and market hogs, 2003

	Commodity under contract	
Length of contract	Broilers	Market hogs
Total number of farms	17,467	4,945
	Percent of contracts	
No length specified	21.5	30.1
Short term: 12 months or less	55.7	27.9
Medium term: 13-59 months	8.1	5.1
Long term: 60 months or more	14.7	36.9
	Percent of contract production	
No length specified	20.9	19.4
Short term: 12 months or less	46.3	21.1
Medium term: 13-59 months	8.9	3.5
Long term: 60 months or more	23.8	56.0

Source: Compiled by USDA's Economic Research Service using data from the 2003 Agricultural Resource Management Survey.

percent) of contract hog production. Similarly, while one-seventh of contract broiler producers held long-term contracts, those operations accounted for almost a quarter of contract broiler production. Nevertheless, most broiler contracts, covering two-thirds of contract production, are covered by contracts for a single flock or for short specified durations of less than a year. Since each producer makes substantial long-term investments in structures and equipment (note that over 90 percent of poultry contracts have specific equipment investments specified in the contract), the short term specified in many contracts, the wide range of observed durations, and the differences between broiler and hog contracts are quite striking.

Conclusions

By 2003, contracts covered 39 percent of U.S. agricultural production, up from 36 percent in 2001. The increase over the 2-year period continues the steady growth trend extending back to 1969. However, the share of farms that hold contracts shows little growth, in contrast to the share of production that is under contract. The largest farms use contracting far more extensively than other farms, and as production shifts to larger farms, shifts to more contract production will likely follow.

Far 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 sugar beets. Some commodities show sharp jumps in contract coverage in just a few years. Prices and fees received under contracts vary widely across producers of the same commodity, and contract durations also vary widely, particularly among livestock production contracts.

Contract terms are evolving to cover new and often unforeseen developments. Some livestock production contracts include more explicit clauses designed to address environmental concerns, and there is evidence of a greater reliance on simple marketing pools for some commodities. In the future, contracts may change to facilitate greater traceability of products and to allow new forms of risk-sharing and input provision. Designing future surveys to track such shifts would enable policymakers and stakeholders to better understand the determinants and effects of agricultural contracts.

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Appendix: Contract questions in the 2003 Agricultural Resource Management Survey

Survey documentation, including copies of the questionnaire, can be found at www.ers.usda.gov/data/arms/GlobalDocumentation.htm. The exact questions corresponding to the shorter phrases used in tables 7, 8, and 10 are as follows:

Table item	Survey question	Answer choices
Median years with contractor:	For how long have you had contracts for this commodity with this contractor?	Years
Median length of contract:	How long is the length of the contract?	Months; zero if contract does not specify a month
Price received:	How is the final price in the contract determined?	(1) The contract specifies 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 attributes of the commodity; (3) The contract contains no price or pricing formula, but the contractor negotiated for a price on my behalf; (4) Other
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
Another contractor for this commodity in area:	Is there another contractor for this commodity in your area?	Yes-No
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
Requires use of specific equipment or structure:	Does the contract require you to use specific types of equipment or structures?	Yes-No
Manure management responsibilities:	Are you responsible for manure management?	Yes-No
Specifies amount of land for manure management:	Does the contract require you to commit a specified amount of land for manure management?	Yes-No