

## 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>

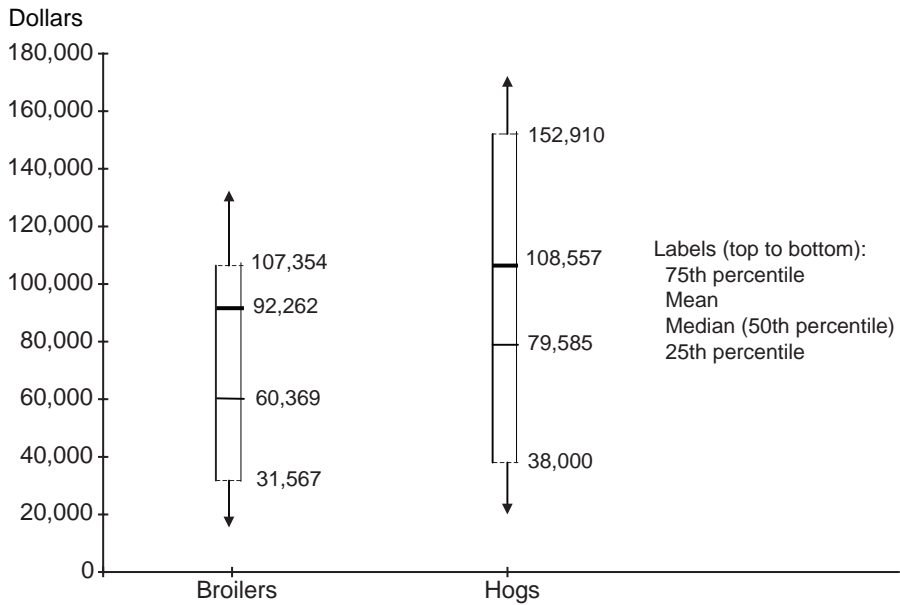
Incomes among farm households are skewed, as are incomes among all households, by the fact that some households earn very high incomes, thus raising the mean above the amounts earned by most. For that reason, it is important to look at median household incomes and the range of income earned by looking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

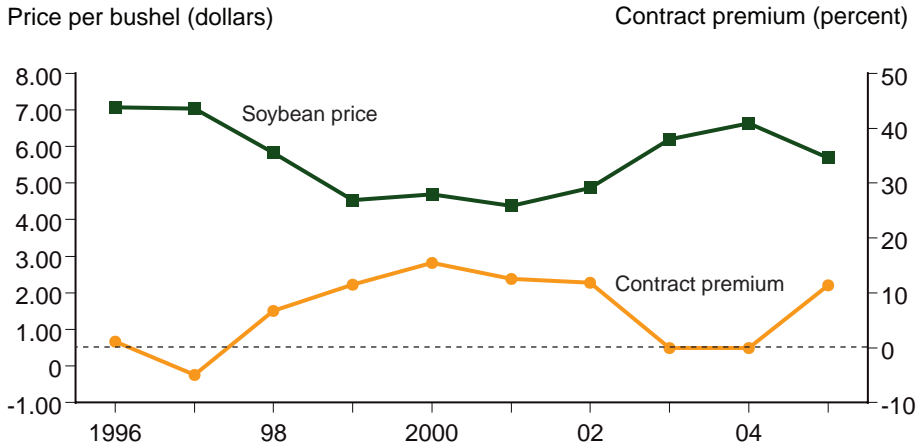
Note: The sample includes 1,589 corn, 393 cotton, 87 rice, 1,522 soybean, and 459 wheat contracts.

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



Figure 5

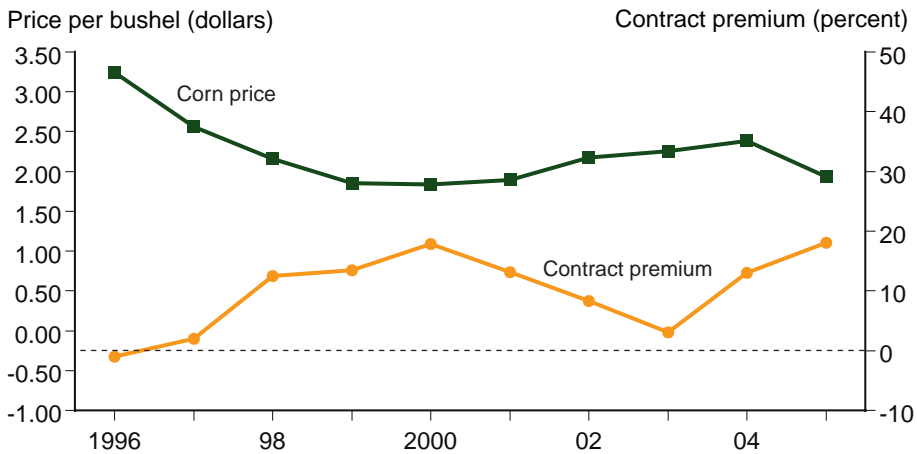
**Soybean prices and the contract premium, 1996-2005**



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.