

Current Issues in Agricultural Contracts

Michael Vassalos

JEL Classifications: L23, L14, Q1

Keywords: Agricultural Contracts, Contract Farming, Marketing and Production Organization

The importance of contractual agreements, a strategy to organize the marketing and production activities of a farm, has increased in the last decades. The objective of this article is to introduce a series of essays that discuss issues related to contractual arrangements such as: market power, legislation, and why farmers adopt contracts.

The term “agricultural contracts” generally refers to agreements between a buyer and a grower that establish the rules for the production and marketing of agricultural products. These agreements are finalized prior to the harvesting period, or before the completion of a production stage in the case of livestock products (MacDonald et al., 2004).

The adoption of contractual agreements—a strategy to organize the marketing and production activities of a farm—is not a recent development. However, the importance of contract farming has substantially increased, especially in the last decades. For instance, the contractual agreements accounted for 40% of the value of U.S. agricultural production in 2011, compared to 28% in 1991, and 12% in 1969 (Hoppe, 2014; MacDonald et al., 2004). Similar trends are observed in developing countries (Simmons et al., 2005; Bellemare, 2011).

The aforementioned increased utilization of contractual agreements has revitalized the interest of scholars and policy makers regarding the consequences of contract use and the potential impacts of government regulation. The present series of articles addresses several of these issues including: market power and growers’ protection legislation, the welfare impact of contractual agreements, data collection issues, and growers’ incentives to contract.

Articles in this Theme:

Trends in Agricultural Contracts

Economics of Agricultural Contract Grower Protection Legislation

Risk and the Use of Contracts by Vegetable Growers

Contract Farming: What’s in it for Farmers in Developing Countries?

The first article, by James MacDonald, summarizes what the U.S. Department of Agriculture’s (USDA) Agricultural Management Survey (ARMS) tells us about the use of contracting in U.S. agriculture today. Furthermore, the author discusses how contracting has changed over time, and identifies those markets where contracts and market power interact.

In the second article, Steven Y. Wu and James MacDonald, outline how potential market imperfections and relationship-specific investments interact with imperfect competition in agricultural contracting environments. Subsequently, the authors discuss recent grower protection legislation. They argue that recent attempts by the USDA Grain Inspection, and Stockyard Administration (GIPSA) to decouple competition issues from issues related to fraud or “unfair” practices in the Packers and Stockyard Act, might

make economic sense in contracting environments that involve multiple market imperfections.

Jack Schieffer and Michael Vassalos examine fresh tomato producers' incentives to participate in contractual agreements in the next article. Their findings indicate that growers view contractual arrangements as a risk management tool. However, growers risk aversion levels had little or no effect on the selection of contracts. Based on these results, the authors conclude that, for the examined scenario, contracts should be viewed more broadly than just a risk-management mechanism.

The final article, by Marc Bellemare, examines the reasons why smallholder farmers might want to participate in contract farming, and whether contract farming makes these farmers better off. The author concludes that participating in contract farming tends to improve growers' welfare. However, we should be cautious when generalizing these results due to a number of technical statistical limitations. The same issues should be taken under consideration when examining potential policy implications of contract farming.

For more information:

Bellemare, M. 2011. "As You Sow, So Shall You Reap: The Welfare Impacts of Contract Farming." *World Development* 40(7): 1418 – 1434.

Hoppe, R. 2014. Structure and Finances of U.S. Farms: Family Farm Report 2014 Edition. USDA, Economic Research Service, EIB 132. Available online: <http://www.ers.usda.gov/media/1728096/eib-132.pdf>

MacDonald, J., J. Perry, M. Ahearn, D. Banker, W. Chambers, C. Dimitri, N. Key, K. Nelson, and L. Southard. 2004. "Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities", USDA, Economic Research Service, AER 837, Available online: <http://www.ers.usda.gov/publications/aer837/>.

Simmons, P., P. Winters, and I. Patrick. 2005. "An Analysis of Contract Farming in East Java, Bali, and Lombok, Indonesia." *Agricultural Economics* 33: 513-525.

Michael Vassalos (mvassal@clemson.edu) is Assistant Professor in the Department of Agricultural & Environmental Sciences at Clemson University, Clemson SC.

Trends in Agricultural Contracts

James M. MacDonald

JEL Classifications: L14, L23, Q12, Q13, Q18

Keywords: Agricultural Contracts, Agricultural Resource Management Survey, Market Power, Marketing Contract, Production Contract

Contracts are widely used to govern the production and marketing of agricultural commodities. They can be an essential tool for managing risks; contracts provide incentives for farmers to invest in specialized equipment and skills and to produce products with desirable attributes; and they can allow processors to realize economies of scale and throughput in production, thus realizing lower costs. These are all offered as attributes of contracts when compared to one alternative, a spot market. Compared to another alternative—vertical integration—contract production retains greater profit incentives for grower effort, on-farm diversification, and the use of localized knowledge.

Measuring Contract Production in Agriculture

The U.S. Department of Agriculture’s (USDA) Agricultural Resource Management Survey (ARMS), is a widely used source of data on contracts. The ARMS, which is jointly administered by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS), is a comprehensive multi-purpose annual survey of farms. It features a large sample, selected anew each year, designed to be representative of all farms in the 48 contiguous states. The multi-purpose nature of the ARMS affects the way contract agriculture data are collected. ERS reports summary statistics on contracting on the agency website and in a series of reports (MacDonald and Korb, 2011).

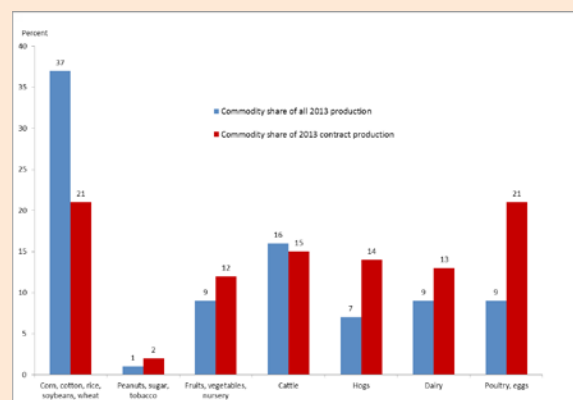
Contract production complicates data collection of farm finances. Contract growers often bear only part of production expenses, while contractors may reimburse growers for some expenses and may provide growers with some inputs. Similarly, contract growers may own fewer

assets, per dollar of production, because contractors own some of the assets. Contract growers may receive only part of the market value of a commodity in fees, with contractors receiving the rest. Contract growers may also produce specialty varieties of commodities, with different revenue and expense profiles. For all of those reasons, the survey questionnaire breaks out contract production. See Box for more information on how the ARMS collects information on agricultural contracts.

Contract Agriculture is Different

The use of contracting varies widely across commodities (Figure 1). For example, contracting is far less common

Figure 1: Contract Agriculture Covers a Different Mix of Commodities



Source: USDA Agricultural Resource Management Survey, 2013.

Collecting Data on Production and Marketing Contracts

ARMS questionnaires are initially mailed out to respondents, who need clear, precise, and concise instructions. Agricultural contracts are defined in the ARMS as agreements reached before harvest, or before the end of a production cycle for livestock, that specify a commodity, a compensation scheme, and a buyer. The timing matters for measurement, because farmers may often put a harvested commodity into storage, and then reach a sale agreement with a buyer. In ARMS, that is a cash sale, because the agreement was reached after harvest.

Two types of contracts, marketing and production, are defined in the questionnaire. Production contracts specify

The broiler industry—where almost all birds are produced under production contracts—provides a prototypical example of the arrangement. Growers invest in specialized housing and equipment, and provide labor. Contractors—poultry processing companies like Tysons or Perdue—provide chicks, feed, veterinary services, and guidance. The chicks are delivered from contractor hatcheries, and the birds are delivered to contractor-owned processing plants. Grower compensation is based not on broiler prices, but on their performance in transforming chicks and feed into broiler meat.



Ranchers review the cow-calf contracting questions on the Farm Costs and Returns Survey, predecessor of ARMS, Pilot Rock, OR, September 1989. Photo by Mary Ahearn

Production contracts are widely used in poultry, hogs, fed cattle, and dairy heifers. They are used in horticulture, where growers raise seedlings for integrators for delivery to retailers; in some vegetables, where growers raise crops for processors; and in seeds for field crops. The specific services that growers provide may differ across commodities: livestock producers usually provide labor and housing, while contractors perform most field operations for processing vegetables. But in each case, contracts will specify: 1) the specific services to be provided by each party; 2) the manner in which the grower is to be compensated for services provided; and 3) specific contractor responsibilities for provision of inputs. Because the services provided by contract growers are often supported by long-lived and specialized capital investments, production contracts frequently link growers to a specific integrator and to a long term commitment to the activity.

Marketing contracts focus on the commodity as it is delivered to the contractor, rather than specify the services to be provided by the farmer. Unlike production contracts, marketing contracts do not specify on-farm capital or production practices. They set a commodity's price or a mechanism for determining the price, a delivery outlet, and a quantity to be delivered. Forward contracts, with a specific price set at the time of agreement, are one type of marketing contract. But other types of marketing contracts, often of longer duration, specify a method or formula for determining prices, rather than a specific price, at the time of agreement. The pricing mechanisms may limit a farmer's exposure to the market price risks. They usually specify minimum acceptable levels of various product attributes, and they often specify price premiums to be paid for desired levels of attributes—such as oil content in corn—thereby providing incentives to produce higher-cost but desirable product varieties.

Marketing contracts are widely used in hogs and fed cattle, to govern livestock sales to meatpackers, and the same hogs or cattle may be sold under a marketing contract but raised under a production contract. Marketing contracts are frequently used for field crops, although they are more likely to be used for specialized varieties that may have few buyers.

Contract production is not the reciprocal of spot market production because there is some vertical integration in agriculture. For example, some cattle feedlots are owned by meatpackers; hatcheries and sow operations are often owned by poultry or hog processors; and some cane sugar operations are owned in common with processing plants. Production from those farms that is shipped to integrated processing plants or to other contract growers would not be defined as contract production in the ARMS.

Survey instruments are available from the ERS website (USDA, ERS, 2015.)

in major field crops than in other parts of agriculture: while five major field crops accounted for 37% of the value of commodity production in 2013, they accounted for only 21% of the value of production under contract. Contract production leans more heavily toward specialty crops, hogs, and poultry, which together accounted for 48% of the value of contract production, but only 26% of the value of all production.

Farms that use contracts are different. Contracting farms are larger, whether measured in terms of whole farm production or a specific contracted commodity, than farms that produce the same commodities without contracts. Those farms that contract for one commodity usually do it extensively, using contracts for their other commodities (MacDonald, Korb, and Hoppe, 2013).

In every commodity class, there are farms that use contracts and farms that don't. Farms that use contracts usually commit most production to the contract. For example, contracts accounted for 32% of the value of all cattle production in 2013, which includes production at cow-calf, stocker, and feeding stages (Table 1). However, contracts accounted for 92% of the value of cattle production on farms that used contracts

While contracts covered less than 20% of corn, soybean, and wheat production in 2013, farms that used contracts placed 49, 60, and 61% of their corn, soybean, and wheat production, respectively, under contract in 2013; they combine cash sales, contracting, and storage as part of their risk management strategy. Contracting farms in other commodity categories—livestock, specialty field

crops, fruits, and vegetables—place nearly all production of the contracted commodity under contract.

Changes in Contract Use

Contract use spread widely between 1969 and the turn of the century (Figure 2). The 1969 Census of Agriculture asked about contract use, with definitions that were consistent with ARMS categories (MacDonald et al, 2004). In that year, 5% of farms had contracts, which covered 11% of the value of commodity production. The Farm Costs and Returns Survey, USDA's predecessor to the financial component of ARMS, generated an estimate of 10% of farms, covering 28% of production, in 1991. The ARMS was introduced in 1996, when 13% of farms had contracts, covering 33% of production.

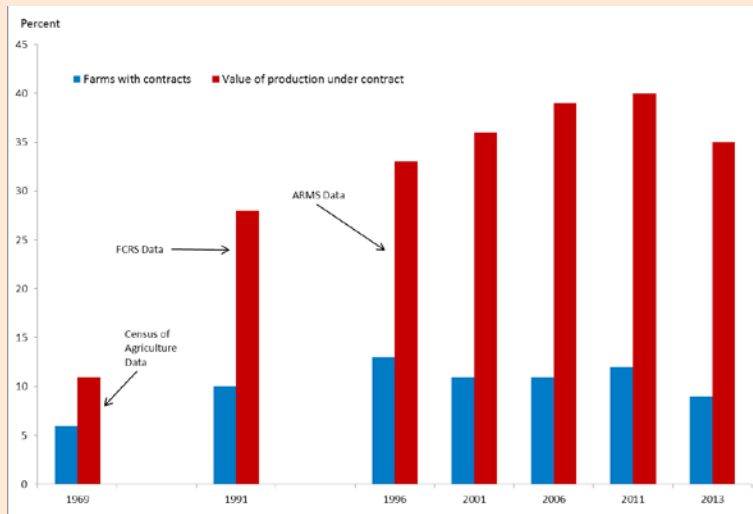
The share of farms with contracts peaked in 1996, but the later decline reflects the definition of farms used in USDA surveys. Under a definition set by Congress in 1976, a farm is any place that produces, or normally could produce, at least \$1,000 of agricultural commodities in a year. The definition is not adjusted for inflation, and with rising farm commodity prices—about 60% between 1996 and 2011—more small places will be defined as farms. The census of agriculture counted 1.19 million farms with sales below \$10,000 in 2012, compared to 964,926 in 1997. Few—0.3% in 2013—farms in that size category use contracts, and their expansion in the farm population reduces the share of all farms with contracts.

In contrast to the share of farms with contracts, the share of production covered by contracts continued to grow, albeit slowly and unsteadily, until 2011, when 40% of production was covered. However, in 2013 the share of agricultural production under contract fell sharply, by five percentage points over 2011.

Table 1: Contract Production Shares by Commodity and Producer Type

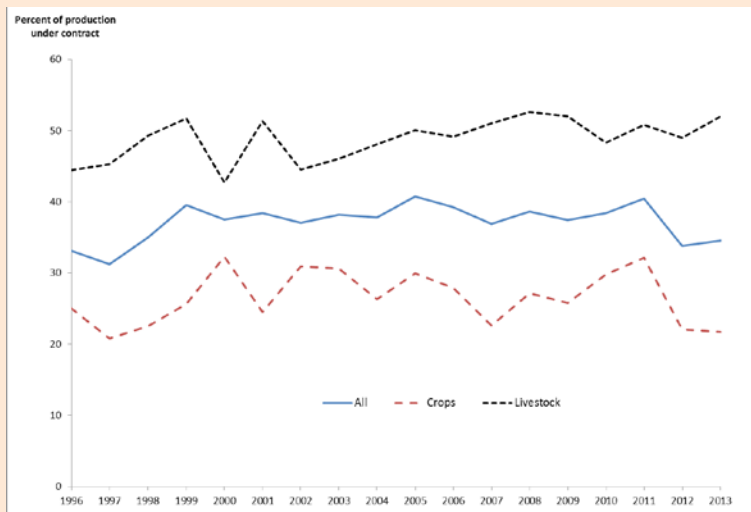
	Share of Production Under Contract	
	Commodity	Farms with Contracts
Cattle	32	92
Dairy	47	98
Hogs	74	98
Poultry	84	100
All livestock	52	94
Corn	17	49
Cotton	46	94
Fruits, Nuts, Berries	50	94
Peanuts	57	95
Rice	51	100
Soybeans	19	60
Vegetable & Melons	29	88
Wheat	13	61
All crops	22	54
All commodities	35	69
Notes: The table reports, for each commodity, the value of commodity production under contract as a share of the total value of commodity production. The right column provides the same measure, but only for farms that produce the commodity under contract.		
Source: USDA Agricultural Resource Management Survey, 2013		

Figure 2: The Growth of Agricultural Contracting Since 1969



Sources: U.S. Census Bureau, Census of Agriculture (1969); USDA Farm Costs and Returns Survey, (1991); USDA Agricultural Resource Management Survey (1996-2013).

Figure 3: Contracting Trends for Crops, Livestock and All Commodities, 1996-2013



Source: USDA Agricultural Resource Management Survey

One could look at the growth of contracting between 1969 and 1996, or even 2006, and conclude that it was a broad trend across all of agriculture. But aggregate developments in the 2000s appear to be driven by episodic major shifts in specific commodity areas and changes in the commodity composition of agricultural

production, and not by any broad overall trend.

Because contract use varies widely across commodities, composition effects matter when examining aggregate changes. Contracting accounts for a higher share of livestock than of crop production (Figure 3). In

recent years, changes in relative prices led to a substantial increase in the crop share of the total value of production—crops reached 58% of the value of production in 2013, up two percentage points from 2011 and ten percentage points from 2006.

With less contracting in crops, increases in the share of crops in the overall value of production will reduce the share of production covered by contracts. However, the share of crops produced under contract also fell quite sharply between 2011 and 2013—by ten percentage points (Figure 3). In part, that decline also represents a composition effect, as major field crops—corn, soybeans, and wheat—which are less prone to contracting, also accounted for a growing share of the value of crop production, through increases in relative prices.

However, the incidence of contracting also declined in the three major field crops, after expanding sharply during the period of commodity price increases (Table 2). In 2003, contracts accounted for 14% of corn and soybean production and 8% of wheat production. By 2008, contract shares rose to 26%, 25%, and 24% for corn, soybeans, and wheat, respectively—below average for the rest of agriculture, but much higher than previous estimates for these crops. Contract shares then fell sharply in 2012 and 2013, reaching 17% for corn, 19% for soybeans, and 13% for wheat.

One can't help but wonder if the changes observed in the three major field crops were in turn driven by changes in price risks and their management. Prices rose and displayed greater month-to-month volatility after 2003, as more corn, soybean, and wheat production was placed under contract. More farmers used marketing contracts for their crops, and they placed greater shares of production under contract. Contracts offered one channel for managing price risks, and farmers that used contracts were

also more likely to hedge with futures markets and to use on-farm storage as part of their price risk strategies. However, policy was also changing, toward a much greater reliance on crop insurance aimed at yields and at revenue. By 2013, far fewer farmers were using marketing contracts for corn, soybeans, and wheat, but those that did placed more of their production under contract.

There were important changes in contracts affecting specific commodities. For example, the hog sector underwent a major reorganization during the late 1990s and early 2000s (McBride and Key, 2013). Production shifted to larger operations that specialized in single stages of the production process. Integrators emerged to manage farm production and processing through vertical integration and contracting, with sharp declines in spot market transactions: contracts covered 32% of the value of production in 1996 ARMS data, and 71% in 2013—with vertical integration accounting for much of the rest in 2013. Hogs are shipped to packing plants under marketing contracts and vertical integration, but usually raised

under production contracts.

In peanuts and tobacco, contract use expanded sharply after the cessation of Federal marketing quota programs in the early 2000s (MacDonald and Korb, 2011). Marketing quotas provided price stability for producers, and contracts provided a way to manage emerging price risks after the end of the programs, while also tying payments more closely to product attributes. In tobacco, contracts covered virtually all production by 2008, compared to about 25% in 2000. Contracts covered 60-80% of peanut production after 2004, compared to 25-45% in 1996-2002, before the program changes—there are fewer peanut producers in ARMS, and sampling variation is a meaningful source of year to year fluctuations in contract use.

Contracting and Market Power

The discussion concerning major field crops should remind us that: (1) contracting does not always occur in concentrated markets and (2) it does not always tie growers to specific contractors for any significant length of

time. Table 3 indicates that producers of the largest field crops, by acreage, move in and out of contracts easily, and that they combine contracts with other marketing channels. Those growers who use contracts typically rely on multiple contracts with different contractors; moreover, storage options, and changes in crop choices give them further flexibility. Except for specialty varieties, buyer concentration does not play an important role.

Contracts do not account for large shares of corn, soybeans, and wheat production, but those are huge markets, and contract corn, soybean, and wheat production amounts to half of the value of all crop production under contract, and nearly one-fifth of all contract agricultural production.

Production contracts commit contract growers more closely to specific integrators, for longer periods of time, because of the substantial investments in specific assets, such as housing and equipment, that are often required, and because scale economies in processing limit the number of integrators in any one area. In 2013, production contracts covered \$58 billion in agricultural production, 14% of all agricultural production; \$48 billion of that fell in two commodity classes—hogs and poultry. Hog producers with production contracts typically raise finishing hogs for an integrator, and they usually combine contract hog production with field crops—corn and soybeans, most often. In most parts of the country, contract hog growers have more than one integrator to choose from, even if they don't have many, and their farm business are relatively diversified (MacDonald and Korb, 2011).

Contract poultry growers have fewer options. Half of contract broiler producers report that they have only one or two integrators in their area, and integrator concentration appears to result in lower contract fees

Table 2: Changes in Contracting in Corn, Soybeans, and Wheat

Year	All farms	Farms with contracts	
	Production under contract (%)	Farms with contract (%)	Production under contract (%)
Corn			
2013	17.2	18.5	48.7
2008	25.8	36.7	45.3
2003	13.7	14.2	44
Soybeans			
2013	19.2	17.8	59.4
2008	24.7	33.4	48.6
2003	13.4	12.8	54.4
Wheat			
2013	13.1	13.2	61.1
2008	23.9	23.9	47.1
2003	6.3	6.3	52.4

Source: USDA Agricultural Resource Management Survey

(MacDonald and Key, 2012). Contract production creates rents, and contracts may be used to appropriate rents, with damages to some growers that are independent of traditional market power issues, as described elsewhere in this Choices theme (Wu and MacDonald, 2015).

Marketing contracts are widely used in some local and regional procurement markets with few buyers, such as fed cattle, sugar beets, peanuts, and some fruit and vegetable commodities. The contracts may specify payment commitments from buyers in highly concentrated markets, thus eliciting production by growers who would otherwise avoid producing for monopsony markets. However, there are circumstances in which marketing contracts can be designed to deter entry by new competitors and to limit aggressive price competition by existing buyers (Love and Burton, 1999; Sexton and Zhang, 2000). For contracts to facilitate the exercise of market power in these ways, they require highly concentrated buyer markets and a specific set of pricing mechanisms, features which are present but by no means ubiquitous across agricultural markets.

For More Information

- Love, H. A., and D.M. Burton. 1999. "A Strategic Rationale for Captive Supplies." *Journal of Agricultural and Resource Economics*, 24: 1-18.
- McBride, W., and N. Key. 2013. *U.S. Hog Production from 1992 to 2009: Technology, Restructuring, and Productivity Growth*. U.S. Department of Agriculture, Economic Research Service. Economic Research Report No. 158. October.
- MacDonald, J. M., and P. Korb. 2011. *Agricultural Contracting Update: Contracts in 2008*. U.S. Department of Agriculture, Economic Research Service. Economic Information Bulletin No. 72. February.

MacDonald, J. M., and N. Key. 2012. "Market Power in Poultry Production Contracting? Evidence from a Farm Survey." *Journal of Agricultural and Applied Economics* 44: 477-490.

MacDonald, J. M., P. Korb, and R. A. Hoppe. 2013. *Farm Size and the Organization of U.S. Crop Farming*. U.S. Department of Agriculture, Economic Research Service. Economic Research Report No. 152. August.

MacDonald, J., J. Perry, M. Ahearn, D. Banker, W. Chambers, C. Dimitri, N. Key, K. Nelson, and L. Southard. 2004. *Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities*. U.S. Department of Agriculture, Economic Research Service. Agricultural Economic Report 837, Available online: <http://www.ers.usda.gov/publications/aer837/>.

Sexton, R., and M. Zhang. 2000. "Captive Supplies and the Cash Market Price: A Spatial Markets Approach." *Journal of Agricultural and Resource Economics*, 25: 88-108.

U.S. Department of Agriculture, Economic Research Service. 2015. *Agricultural and Resource Management Survey Farm Financial and Crop Production Practices*. Available online: <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/questionnaires-and-manuals.aspx>

Wu, S., and J.M. MacDonald. 2015. "The Economics of Contract Grower Protection Legislation". *Choices: The Magazine of Food, Farm, and Resource Issues*. Forthcoming.

James M. MacDonald (macdonal@ers.usda.gov) is Chief, Structure, Technology, & Productivity Branch at USDA Economic Research Service in Washington, DC.

The views expressed in this paper are those of the author, and not necessarily those of the U.S. Department of Agriculture farmers better off. The author concludes that participating in contract farming tends to improve growers' welfare. However, we should be cautious when generalizing these results due to a number of technical statistical limitations. The same issues should be taken under consideration when examining potential policy implications of contract farming.

Risk and the Use of Contracts by Vegetable Growers

Jack Schieffer and Michael Vassalos

JEL Classifications: Q13, L14

Keywords: Contracts, Risk Preferences, Transaction Costs, Vegetable Growers

Contracts have become an increasingly important tool in agriculture over the last several decades, covering approximately 40% of agricultural production by value in recent years in the United States (MacDonald and Korb, 2011). Contracts are one of several options for organizing agricultural production and often determine which crops and other products will be produced, what kinds of inputs and production methods will be used, and when and where those products be delivered. In terms of coordination between the producer and buyer, contracts occupy a middle ground between spot markets—with little or no coordination—and full vertical integration—in which the producer and the processor or other downstream user share common management and ownership.

The usage of contracts varies widely by agricultural commodity. Some agricultural outputs—such as poultry, hogs, tobacco, and sugar beets—are dominated by contract production. The specific type of contracts used also varies across commodities. For example, poultry and hog production make extensive use of *production contracts*, in which the buyer specifies many aspects of production and often retains ownership of the commodity throughout the process. *Marketing contracts*, on other hand, focus more on the end product, specifying price, schedule, and quantity and quality of the commodity to be delivered.

Understanding the reasons that producers and buyers choose to use contracts, as well as the potential pitfalls of that use, can improve the parties' ability to make effective use of this tool. Such knowledge will also benefit policy makers charged with ensuring the smooth functioning of agricultural markets.

Risk in Agricultural Production

Agricultural producers face several different types of risk. *Production risk* refers to uncertainty in the quantity and quality of output. Growers' yields are affected substantially by factors beyond their control, including fluctuations in weather, pressure from disease or other pests, and varying availability of essential inputs such as irrigation water. Producers may also face uncertainty about production costs, due to fluctuating prices for inputs such as labor or fuel. Market risk refers to uncertainty about the price that producers will receive for their crops or livestock, and also the possibility that no buyer can be found at all, also known as placement risk.

These various risks can be magnified in some types of agricultural production. For example, fresh fruit and vegetables are highly perishable crops for which quality attributes can be especially important. These characteristics may limit a vegetable grower's ability to conduct an extensive search for buyers or better prices, thus rendering the grower more vulnerable to volatile prices at the time of harvest.

Managing Risk and Other Reasons for Using Contracts

Agricultural producers use a range of tools to manage these risks. Contracts are commonly cited as one of these tools, especially for managing market risks. A simple forward contract establishes a price to be paid for a certain quantity of product at some date in the future. From the grower's perspective, this arrangement reduces uncertainty about the price received for the product and the availability of a buyer.

Contracts may also be used to manage production risks. In a production contract, a grower's payment may be directly tied to services provided, rather than the quantity or quality of output, thus shifting risks associated with uncertain yields to the buyer. With a relative performance contract, or tournament contract, a grower's production is compared to that of other growers in the area, with bonuses for outperforming or penalties for under-performing that benchmark. This type of incentive structure, while controversial, can mitigate some aspects of production risk, such as adverse weather that affects all producers in a region.

In economics, traditional contract theory builds from this idea that contracts are used to manage risk by shifting it from a more risk-averse party to a more risk-neutral one (Allen and Lueck, 1999; Hueth and Hennessy, 2001). In this framework, a key issue is balancing the advantages of this risk-management feature against potential problems created by the use of contracts, such as moral hazard—for example, when one party in a transaction knows more information about risks than the party incurring the consequences of a choice—or other misaligned incentives.

However, the empirical evidence that agricultural contracts are used primarily for risk-shifting is mixed (Allen and Lueck, 1995). It may be that producers employ other methods for managing their various risks, and that contracts are used to create other advantages.

Producers have access to a range of tools for managing risk, in addition to contracts, with downstream users of agricultural commodities. Growers may be able to purchase crop insurance or participate in programs designed to stabilize agricultural revenues. For many commodities, price risks can be hedged in financial markets. For example, Mark et al. (2008) discuss some options, other

than forward contracts with intermediaries, that grain growers use for managing price risk. Membership in a marketing cooperative can help to smooth price volatility for growers in a region. To deal with production risks, growers can choose different management strategies, such as using drought- or pest-resistant crop varieties or diversifying production across different commodities.

Contracts can provide benefits other than risk management. They will be chosen over other options—spot markets or vertical integration—if they do a better job of lowering transaction costs or coordinating agricultural production with the needs of the buyers. For example, if a buyer needs a reliable supply of a commodity on a schedule, then contracts may better serve the grower-buyer relationship than do spot markets. Contracts also facilitate the marketing of products with high-value attributes, such as organic, locally grown, or compliance with buyer-driven animal welfare or environmental standards. When such attributes are hard to verify by inspection of the physical output or cannot be monitored via third-party certification, contracts help to assure buyers that the products meet their requirements and ensure that growers are compensated for those efforts. Contracts can also provide incentives for growers to invest in equipment and capital that will improve the quantity or quality of production, especially in terms of meeting buyer-specific requirements (MacDonald et al., 2004), and may facilitate credit financing of such investments.

Although contracts can provide certain benefits, they can also create problems in some cases. For example, when production is coordinated primarily by contracts, spot markets become “thin” and a lack of good price information can hamper the marketing of agricultural commodities. In addition, the use of contracts

can exacerbate disparities in market power or bargaining skill, often to the detriment of growers (Nagler et al., 2015). These issues and others sometimes spur interest in regulating or restricting the use of contracts in agriculture.

Lessons from Risk Management in Tomato Production

While economics offers a logical framework for considering a grower's choice to use contracting in the abstract, it is especially informative to empirically examine how growers use contracts to manage their risks. Of course, this will vary by the grower and commodity, as well as the regional supply and demand factors at play in the market. Tomato production, for example, is a strong candidate for considering whether risk management is a primary factor in a grower's choice to use contracts rather than rely on spot markets to sell the output.

U.S. growers produce over \$2 billion of tomatoes per year, with approximately 90% of those sold for processing and the remainder sold as fresh (USDA, 2012). These two markets are fairly distinct, using different tomato varieties and harvesting methods. Processing tomatoes are grown primarily in California, with over 90% of production. Processing tomatoes are produced mostly under contract, with such production accounting for as much as 97% of the processing tomato crop in California in the mid-2000s (Goodhue et al., 2010). Fresh tomatoes are grown across the United States, although the majority are produced in Florida and California. Other major sources of production are Virginia, Georgia, Ohio, Tennessee, North Carolina, New Jersey, and Michigan. Fresh tomatoes are sold primarily through spot markets.

The risks faced by fresh produce growers may be magnified by the perishability of their products, and some risk-management options, such

as price- and income-support programs and futures markets, may be less available to these growers (Cook, 2011; Hueth and Ligon, 1999; Ligon, 2001). Vassalos and Li (2014) and Vassalos et al. (2013) investigated the factors that fresh tomato growers in four states— Illinois, Indiana, Kentucky, and Ohio—find important in deciding whether to use marketing contracts for some of their output. Chief among the questions examined was what role risk aversion—preferring a smaller but certain reward to a larger-on-average but uncertain reward—played in whether those growers preferred to use contracts.

Figure 1 reports the most important factors tomato growers in the study thought might encourage them to use contracts. Two ideas related to marketing risk—reduced price risk and secured income—were selected by most growers and ranked very highly in importance. In short, the growers believed that risk management is an important function of marketing contracts.

Economists use a variety of methods for measuring risk aversion, two of which were employed in the tomato study. The first was a straightforward,

self-reported measure following the approach of Pennings and Garcia (2001). The second method follows the approach of Binswanger (1980, 1981). Each participant was asked to make a hypothetical selection from among several tomato varieties with varying susceptibility to disease. The growers' choices indicate their trade-offs between disease risk and payouts. In other words, the participant's choice implied a numerical estimate of his risk aversion level. Once risk aversion is measured, it can be used to test its relationship with tomato contract terms, such as a higher base price in exchange for accepting a provision that penalizes growers for failing to meet volume requirements.

The key result of this analysis was that risk aversion had little or no effect—after controlling for the terms of the contract, such as price, quantity requirements, and delivery schedule—on whether growers chose to use contracts for a portion of their tomato production. This finding casts some doubt on the idea that contracts are chosen primarily for their risk management features, at least for this particular region and agricultural commodity.

These results for tomato contracting are consistent with the mixed evidence found by other researchers for risk management as a primary function of contracts. For example, Allen and Lueck (1999) present evidence that risk-sharing is not an important motivation in agricultural land contracts in the United States. Hudson and Lusk (2004) use a choice experiment and find that the use of contracts is related to both risk management and the reduction of transaction costs. Dubois and Vukina (2004) present evidence that risk aversion among producers does affect the terms of production contracts in hog production. For example, producers with lower levels of risk aversion were assigned larger numbers of hogs to raise.

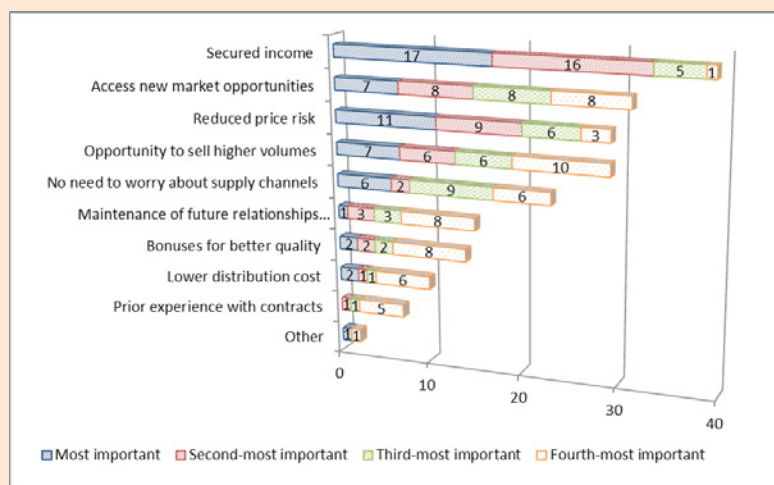
Overemphasizing Risk Management?

If the risk-management function of contracts may not be as dominant as is commonly believed, then what are the implications, for both the private parties and policy makers? Contracts should be viewed more broadly as a tool for coordinating activity and managing the relationship between the producer and buyer, rather than merely a risk-management mechanism. Both private parties and policy makers should pay attention to the other functions and benefits provided by contracts, as well as considering other mechanisms for managing agricultural production and marketing risk. In addition, as Hueth and Hennessy (2001) discuss, it may be optimal for agricultural producers to bear some of the risks associated with production, and be rewarded for doing so, rather than pursuing a wage-like “fee for service” arrangement.

For More Information

Allen, D. W. and D. Lueck. 1999. “The Role of Risk in Contract Choice.” *Journal of Law Economics and Organization* 15(3): 704-736.

Figure 1: Most Important Reasons Tomato Growers Reported for Using Contracts



Source: Vassalos, et al. (2013)

- Allen, D. W. and D. Lueck. 1995. "Risk Preferences and the Economics of Contracts." *American Economic Review* 85(2):447-451.
- Binswanger, H.P. 1981. "Attitudes Toward Risk: Theoretical Implications of an Experiment in Rural India." *Economic Journal* 91(364): 867-890.
- Binswanger, H.P. 1980. "Attitudes Toward Risk: Experimental Measurement in Rural India." *American Journal of Agricultural Economics* 62 (3): 395-407.
- Cook, R. 2011. "Fundamental Forces Affecting U.S. Fresh Produce Growers and Marketers." *Choices* 26(4): 4th Quarter. Available online: <http://www.choices-magazine.org/choices-magazine/submitted-articles/fundamental-forces-affecting-us-fresh-produce-growers-and-marketers>
- Dubois, P., and T. Vukina. 2004. "Grower Risk Aversion and the Cost of Moral Hazard in Livestock Production Contracts." *American Journal of Agricultural Economics* 86(3): 835-841.
- Goodhue, R.E., S. Mohapatra, and G.C. Rausser. 2010. "Interactions between Incentive Instruments: Contracts and Quality in Processing Tomatoes," *American Journal of Agricultural Economics* 92(5): 1283-1293.
- Hudson, D., and J. Lusk. 2004. "Risk and Transactions Cost in Contracting: Results from a Choice Based Experiment." *Journal of Agricultural & Food Industrial Organization* 2 (1): Article 2, 1-19.
- Hueth, B., and D. A. Hennessy. 2001. "Contracts and Risk in Agriculture: Conceptual and Empirical Foundations." Paper prepared for presentation at the SER-IEG-31 meetings on "A Comprehensive Assessment of the Role of Risk in Agriculture," Gulf Shores, AL, March 22-24, Available online: <http://www.aae.wisc.edu/hueth/papers/foundations.pdf>
- Hueth, B., and E. Ligon. 1999. "Producer Price Risk and Quality Measurement." *American Journal of Agricultural Economics* 81(3): 512-524.
- Ligon, E. 2001. "Contractual Arrangements for Fresh Produce in California." *Agricultural and Resource Economics Update* 5(2): 1-2, 10.
- MacDonald, J., and P. Korb. 2011. *Agricultural Contracting Update: Contracts in 2008*. Washington D.C.: USDA, Economic Research Service, EIB 72, Available online: <http://www.ers.usda.gov/media/104365/eib72.pdf>
- MacDonald, J., J. Perry, M. Ahearn, D. Banker, W. Chambers, C. Dimitri, N. Key, K. Nelson, and L. Southard. 2004. "Contracts, Markets, and Prices: Organizing the Production and Use of Agricultural Commodities", USDA, Economic Research Service, AER 837, Available online: <http://www.ers.usda.gov/publications/aer837/>.
- Mark, D.R., B. W. Brorsen, K. B. Anderson, and R. M. Small. 2008. "Price Risk Management Alternatives for Farmers in the Absence of Forward Contracts with Grain Merchants." *Choices* 23(2): 2nd Quarter, Available online: http://www.choicesmagazine.org/magazine/pdf/article_27.pdf
- Nagler, A. M., C. T. Bastian, D. J. Menkhous, and B. Feuz. 2015. "Managing Marketing and Pricing Risk in Evolving Agricultural Markets." *Choices* 30(1): 1st Quarter. Available online: <http://www.choicesmagazine.org/choices-magazine/submitted-articles/managing-marketing-and-pricing-risks-in-evolving-agricultural-markets>
- Pennings, J.M.E. and P. Garcia. 2001. "Measuring Producers Risk Preferences: A Global Risk-Attitude Construct." *American Journal of Agricultural Economics* 83 (4), 993-1009.
- United States Department of Agriculture (USDA). 2012. "Vegetables & Pulses: Tomatoes." USDA, Economic Research Service, Available online: <http://www.ers.usda.gov/topics/crops/vegetables-pulses/tomatoes.aspx>
- Vavra, P. 2009. "Role, Usage and Motivation for Contracting in Agriculture", OECD Food, Agriculture and Fisheries Working Papers, No. 16, OECD Publishing. doi: 10.1787/225036745705
- Vassalos, M., and Y. Li. 2014. "Assessing the Impact of Fresh Vegetable Growers' Risk Aversion Levels and Risk Perception on the Probability of Adopting Marketing Contracts: A Bayesian Approach." Paper presented at AAEA Annual Meeting, Minneapolis, MN, 27-29, July.
- Vassalos, M., W. Hu, T. A. Woods, J. Schieffer, and C. R. Dillon. 2013. "Fresh Vegetable Growers' Risk Perception, Risk Preference and Choice of Marketing Contract: A Choice Experiment." Paper presented at SAEA annual meeting, Orlando, FL, 2-5 February.

Jack Schieffer (jack.schieffer@uky.edu) is Assistant Professor, Department of Agricultural Economics, University of Kentucky, Lexington, KY.

Michael Vassalos (mvassal@clemsun.edu) is Assistant Professor, Department of Agricultural & Environmental Sciences, Clemson, SC.

Economics of Agricultural Contract Grower Protection Legislation

Steven Y. Wu and James MacDonald

JEL Codes: D02, D23, D86, L11, Q18

Keywords: Agricultural Contracts, Production Contracts, Grower Protection Legislation, Packers and Stockyard Act

Contract production has been controversial in the livestock, meat, and poultry sectors, with many farm activists alleging that the market power held by large processors combined with the use of contracts can be exploitive of growers. For example, The Rural Advancement Foundation (RAFI) website states that the production contracts is "...the mechanism for exploitation" used by large concentrated integrators.

A 2013 Pew Charitable Trust report focusing on the broiler sector, which is a sector that is nearly 100% vertically coordinated by contracts, highlights a number of issues with broiler production contracting (The Pew Charitable Trusts, 2013):

- Few growers are able to live solely on their income from the broiler business.
- Poultry contracts often stipulate with detail and precision the obligations of growers but leave the company with the discretion to change quantity commitments and grower equipment upgrade requirements.
- Growers are in heavy debt due to the need to finance equipment and buildings that meet the company's specifications.
- Regional concentration by a small number of buyers can be leveraged to lower prices paid to growers.

The concerns about concentration are not without merit. USDA's farm-level data suggest that a significant number of growers cannot contract with more than a single integrator even when more than one integrator operates in their area and that fees received by growers tend to be lower for growers in markets with fewer integrators (MacDonald,

2014). This is not surprising as markets can be highly localized, particularly for poultry where economies of scale in processing is important, birds cannot travel far, and environmental concerns limit the density of production to a geographic location.

At the same time, greater concentration has also led to unprecedented efficiency gains. Larger processing plants are able to leverage economies of scale, though the benefits of scale can be realized only if there is consistent flow of animals and birds into the plants (MacDonald and McBride, 2009). Thus, vertical coordination via the use of contracts complement large plants by ensuring a consistent flow of uniform animals into the plants. Consequently, the same system that has been seen as unfair to growers has led to lower production costs, which has likely benefited consumers in the form of lower prices, consistent quality, and abundance.

How do we reconcile these issues and how should we go about evaluating recent policy proposals to regulate the contracting process?

Economic Concepts and the Packers and Stockyard Act

The Packers and Stockyard Act of 1921 (PSA) is the primary legislation for regulating competition and trade practices in the livestock, meat, and poultry industries. Sections 202(a) and (b) of the PSA include provisions that are meant to discourage actions that can be considered unfair, deceptive or fraudulent, while Sections 202(c)-(e) are antitrust-like limits on behaviors that are monopolistic in nature and can restrict competition in the marketplace.

The provisions related to “unfair, deceptive or fraudulent” behavior refers to actions that are not necessarily anticompetitive but can cause harm to specific parties. Examples include practices such as falsifying measurements or weighing of birds or inputs, misleading promises about income prospects, false record keeping, discriminating or providing unfair advantages to any person without business justification.

On the other hand, the antitrust provisions refer to monopolistic—large seller—or monopsonistic—large buyer—actions that can harm an entire industry by restraining commerce. To understand this point, consider the classic monopsony model used by economists, which is a standard imperfect competition model that conceptualizes the behavior of a large buyer. Because the large buyers have a large market share, they drive up the market price when it purchases a high volume so it will restrict volume to keep prices low. Therefore, commerce is restrained relative to the counterfactual of perfect competition. The restraint of commerce is the key inefficiency created by imperfect competition and is a crucial aspect of the injury to competition element of antitrust policy. Thus, antitrust language often includes references to the “restraint of commerce.” The monopsony model also predicts that a large buyer can hurt suppliers by purchasing less and paying less than what would occur in a competitive situation.

An important point to note is that imperfect competition is considered a market imperfection by economists. This is because the firm’s objective of maximizing profit is no longer aligned with the economic goals of society, which is to create the most value-added. In this situation, the monopsonist will restrict output to maximize profit even when expanding output would create more economic value for society.

From a policy perspective, if imperfect competition was the only market imperfection, then policy prescriptions should focus on enhancing competition; then the implications would be clear cut. However, market imperfections often do not exist in isolation and when other imperfections also exist, then economic analysis of policy interventions can become substantially more complicated. It is well known among economists that, when there is more than one market imperfection, it becomes difficult to anticipate the consequences of policy interventions.

Agency Problems, Incomplete Contracts, and Relationship-Specific Investments

Agency problems is an economic term used to describe the situation when one party produces or works on behalf of another party but the two parties have some conflicts of interest. In agricultural contracting there is potential for agency problems because the company may want high quality and high volume at the lowest prices, whereas producing high quality and volume is expensive for growers so they want higher prices.

Typically, when everything is transparent, there is not a problem since parties can agree to exchange the desired quality and quantity at prices that reflect the value of the good, which is typical of well-functioning markets. This transparency ensures that buyers get what they pay for and sellers are compensated for producing higher volume or quality.

However, when some important aspects of trade is unobservable or cannot be verified by a third-party, agency problems can arise. For example, if a buyer does not know the quality of the product that she is purchasing, then she may be reluctant to purchase the product unless it is dramatically discounted. On the other hand, sellers of high quality goods

would not sell at discounted prices, hence, either trade is substantially reduced or only low quality products are traded.

Similarly, if trade takes time to complete—which is the case in agriculture due to biological cycles—and the quality of the product will depend on the efforts and investments made by growers throughout the production cycle, then incentives must be provided to growers to make the investments to assure quality. In addition, growers have to trust that the integrator company will not renege on their promises regarding compensation or other expectations of growers. If not, growers will either reject the contract or will not undertake expensive investments to enhance quality or assure adequate supply. Agency problems have similar effects as imperfect competition since it can restrain the quality and quantity of trade.

Contracts are mechanisms for preventing agency problems since a well-designed contract includes incentive pay or other rewards and punishments to align interests between processors and growers. For instance, production contracts include bonuses and deducts based on settlement costs. Processing tomato contracts include quality and seasonal premiums. Ideally, all promises, obligations, and contingencies relevant to the transaction should be contained in the contract and verifiable by a third-party. Then all provisions in a contract are legally enforceable. These are referred to as complete contracts. Complete contracts are treated as benchmarks by economists as they can minimize the damaging effects of agency problems.

In practice, most contracts are not complete as it is often prohibitively expensive and complex to include all relevant provisions and ensure that they are third-party verifiable. Incomplete contracts arise when terms are omitted or included but are difficult to enforce legally due to

verifiability problems. In either case, at least one party will have discretionary latitude to deviate from expectations in the course of the contracting relationship. For example, many agricultural contracts do not specify the exact volume or delivery schedule over the course of the harvest season. Production contracts often do not guarantee the number of flocks that a grower will receive even with long-term contracts (MacDonald, 2014). The type and frequency of upgrades to existing equipment and animal housing facilities are often left to the discretion of the processor.

Even when contracts are incomplete, contracts can still be self-enforcing. That is, the contracting parties can form handshake agreements which are “enforced” by the prospect of repeat business relationships. These types of informal agreements are known as relational contracts. Most contracts in practice are a hybrid of legalistic formal contracts combined with relational elements that are self-enforced through repeat transactions. However, it should be noted that self-enforcing contracts are theoretically not as effective as complete contracts for mitigating agency problems and thus incomplete contracts can be viewed as a form of imperfection in the contracting process.

Aside from incomplete contracts, there is another type of market imperfection created by relationship-specific investments. If a party has to make expensive investments that have more value within the relationship than outside the relationship, then the party risks being “held-up” later. This means that the non-investing party, knowing that it is costly for the investing party to switch to a different contracting partner after investing, will attempt to renegotiate the terms of the agreement in their favor. In other words, the relationship specific investments confer ex post market power to the non-investing party.

The idea that relationship-specific

investments can create ex post market power is useful for understanding the ability of relational contracts to mitigate agency problems. A key to making relational contracts self-enforcing is that the contracting parties have to have relationship-specific gains from trade with each other. In other words, they must benefit from contracting with each other above and beyond what they can gain if they switched contracting partners. Relationship-specific gains from trade is what motivates the contracting parties to honor informal handshake agreements.

It should be clear that relationship-specific investments facilitate relational contracts by “locking-in” the investing party into the relationship. Once investments are made, the investing party has fewer options and therefore is less willing to renege on informal agreements. Hence, relationship-specific investments improve the power of relational contracts to mitigate agency problems in repeat trading environment. At the same time, relationship-specific investments can lead to very uneven distributional effects for growers which can be a major source of tension.

Putting it All Together

The combination of imperfect competition, agency problems, incomplete contracts, and ex post market power due to relationship-specific investments means that there are multiple trading imperfections. While each imperfection in isolation would negatively impact trading outcomes, it is possible that inefficiency will largely be mitigated, if not increased, when all of the imperfections are combined.

First, consider how the combination of agency problems and imperfect competition can mitigate the commerce restraining effects of monopsony power. Volume suppression under the standard monopsony model relies on the assumption that the monopsonist pay only a single

uniform price. However, Vickers (1996) points out that firms with market power can engage in a variety of two-part pricing schemes. In fact, in order to resolve agency problems, incentives must be provided via two-part pricing schemes consisting of a base price and a bonus or deduct. Because resolving agency problems requires a non-uniform pricing scheme, it is quite possible for inefficiency to be smaller than what the standard monopsony model predicts.

Adding relationship-specific investments that create ex post market power may mitigate inefficiencies even further. As mentioned earlier, ex post market power, which increases relationship specific gains from trade, enhances the power of relational contracts to resolve agency problems.

Taken together, the multiple market imperfections can actually complement each other and the net effects may depart considerably from simple imperfect competition models of uniform pricing. Thus, tools based on the simple models of single market imperfections may be ineffective at detecting market power in agricultural contracting environments. This may explain the conclusion of a recent U.S. General Accounting Office (2009) report that economic studies have largely found little evidence of the exercise of market power in agricultural contracting environments. Thus, even in the presence of market power, it would be extremely difficult for researchers to detect “competitive harm.”

Distributional Concerns

Even though agency problems and relationship-specific investments can complement imperfect competition in terms of incentive efficiency, the distribution of economic gains may not be favorable to growers. The reasoning is straightforward. In standard contract theory, there are usually two constraints that a contract designer must satisfy: (1) the participation

constraint to get growers to sign the contract and (2) the incentive compatibility constraint to provide growers with incentives to produce what the processor wants.

Typically, these two constraints conflict since providing stronger incentives reduces the attractiveness of the contract so that growers would be more reluctant to sign. This is because stronger incentives increase risk to growers and so compensation has to be raised. However, the combination of imperfect competition and relationship-specific investments can serve to relax both the incentive compatibility and participation constraints by lowering growers' outside options both before and after relationship-specific investments are made. In practice, this would imply that growers would be willing to settle for contracts that while highly efficient in terms of incentive provision, tend to be more risky and offer lower compensation.

The above logic can potentially explain some of the controversies in the poultry industry. Imperfect competition typically leads to lower compensation for suppliers which is consistent with complaints that growers are not able to live solely on their income from the broiler business. Relationship-specific investments also increase ex post market power for integrators which may explain the finding reported in MacDonald (2014) that integrators in concentrated markets appear to be making firmer commitments on duration, quantity or flock placements, and pay to new growers but not to existing growers.

This raises the question of why not all poultry contracts contain firm commitment regarding flock placements, future pay adjustments, and equipment and housing upgrade requirements. Within the context of incomplete contracts, Bernheim and Whinston (1998) have shown that one way to provide incentives is to leave oneself with discretionary

flexibility rather than make upfront guarantees to the other party. In other words, if the integrator leaves itself with flexibility, the flexibility can be used to reward high performance or punish low performance. High levels of discretionary flexibility, however, are a double edged sword because the discretion can also be used to renege on promises. Thus, strong incentives also expose growers to counter-party risk. In principle, growers can demand either higher compensation to offset the risk, or more assurance of continued future business commitments—for example, guarantees of future flock placements. However, these demands are only credible when the grower has attractive options. Typically, new growers who have not made relationship-specific investments have more attractive options than existing growers.

Recent Attempts at Reform to Protect Growers

Apart from the PSA, in 2000, attorney generals from 16 states proposed a model legislation called the Producer Protection Act. This proposed legislation included a number of provisions including the requirement that contracts be written in plain language with clear disclosure of risks, allow producers three days of review, limit confidentiality provisions, provide growers with a priority lien for contract payments, and provide protections against early termination of contracts. In addition, there was a section that prohibits a list of “unfair practices” including coercing, retaliating or discriminating against growers who join producer associations, to provide false information to growers about their rights, to refuse to provide information about how grower compensation was determined, and to ban the use of tournament contracts.

With the exception of a few clauses, most of the provisions in the Producer Protection Act were never implemented. However, concerns

about livestock industry concentration continued and the 2008 farm bill included stipulations to amend the PSA to offer greater protection to growers.

In accordance with the farm bill, the USDA Grain Inspection, Packers, and Stockyard Administration (GIPSA) published rules to amend the PSA in June 2010 (Federal Register, 2010). A central theme of the published GIPSA rules is that “unfair, unjustly discriminatory, or deceptive” practices covered by Sections 202(a) and (b) in the PSA, need not be tied to the anti-trust issues of competitive harm or injury in Sections 202(c)-(e).

This contrasts earlier interpretations by courts that violations of Sections 202(a) and (b) do not constitute violations of the Act without proof of competitive harm. The GIPSA rule also provides a number of examples that would constitute violations of Sections 202(a) and (b) many of which are not dissimilar to the protections proposed in the original producer protection act. The practical implication of the GIPSA rule is that it would ease the burden of proof for both growers and regulators when attempting to show violations of the PSA. This would facilitate the ability of the USDA to use the PSA to enforce a broad range of issues related to agricultural contracting.

Greene (2015) points out that the GIPSA rules encountered substantial opposition as opponents felt that the rules went beyond what Congress intended in the formulation of the 2008 farm bill. Thus, the final rule that the USDA issued in December 2012 did not include some of the most controversial provisions, such as the decoupling of competitive harm from personal harm to growers. The controversial provisions were omitted either because the USDA chose not to include them after reviewing public comments or because of prohibitions in Congressional appropriation acts passed in 2012, 2013, 2014,

and 2015 (Greene, 2015). However, the final rule that did go into effect in February 2012 includes stipulations that poultry companies provide growers with a 90-day notice before suspending the delivery of birds, that there be limits on whether growers would be required to upgrade equipment, that growers be given an opportunity to remedy a breach of contract, and that growers be given the right to decline arbitration provisions in contracts.

Policy Challenges

Current antitrust policy leans heavily on the efficiency criteria for good reason. Economic models of monopoly predict that elevated prices to consumers come with a decrease in volume of output and services, while monopsony models predict that lower prices to suppliers often come with a reduction in sales. As such, pro-efficiency policies that increase volume of trade also reduce the extraction of economic gains from consumers and suppliers. Thus, competition policy that promotes efficiency is implicitly compatible with issues of “fairness.”

But what happens when business strategies that increase efficiency also result in more unbalanced distribution of economic rents? Much of our economic synthesis in the earlier sections suggests that this is a likely outcome in the poultry sector. In this situation, there are potential harms in contracting that cannot be addressed under antitrust “injury to competition” standards, and thus, GIPSA’s attempt to separate Sections 202(a) and (b)—issues related to fairness and personal harm—of the PSA from Sections 202(c)-(e)—issues related to competition—might make some economic sense.

If indeed efficiency and more balanced distribution of economic gains are competing rather than complementary, then policy makers may also be forced to choose between efficiency and more equitable distribution.

Unfortunately, economic theory offers little help on how exactly to quantify the tradeoff. While the economic concept known as the Pareto principle provides normative efficiency guidance, there is very little economic guidance about how society should distribute resources. There is an emerging economic theory of fairness in the behavioral economics literature, but this literature is still highly abstract and somewhat limited in practical applicability.

The current situation appears to be one where policy makers may have to impose value judgements when weighing the tradeoff between efficiency and distribution or rely on past precedence. With regard to precedence, Hovenkamp (2011), a leading antitrust legal scholar, points out that 5 sections of the Federal Trade Commission Act, which was passed several years earlier than the PSA, “...separately recognizes concerns of competitive harm and the harms caused by fraud, deception, or unfair practices where no monopoly or cartel is in contemplation.” In addition, Hovenkamp’s interpretation of the PSA is that Sections 202(a) and (b) are “tort-like” provisions that are meant to address concerns of unfair practices and discrimination in business practices rather than issues of monopoly or anti-trust.

On a qualitative basis, our economic synthesis, Hovenkamp’s legal interpretation, and past precedence all suggest that a separation between the tort-like provisions and the antitrust provisions of the PSA might be warranted. However, courts have consistently viewed the PSA as an antitrust statute and therefore have required injury to competition standards when growers have sued for personal harm. As long as courts continue to view the PSA as an antitrust statute, the approach taken in the recent GIPSA-rulemaking to dispense with an injury-to-competition

standard are unlikely to overcome legal challenge. In these circumstances, Congressional action is a more likely path for addressing damages for growers who are harmed by the contracting process.

One other possibility, though more research is needed, is that there is only an ostensible tradeoff between efficiency and distribution. Wu (2003) points out that, while government restraints on private marketing mechanisms usually reduce efficiency, government enforcement of property rights, protection of people from fraud and misinformation, and creation of institutions that enhance transparency and third-party verifiability can facilitate efficient trading by reducing counter-party risk and enhancing time-consistency. If this is the case, then the separation of regulations that are antitrust oriented versus those that are tort-like may facilitate regulatory oversight of policies that enhance transparency, protect property rights, and prohibit misinformation and fraud. This could enhance long-term efficiency in agriculture in the same way that the rule of law and protection from opportunism generally promotes efficient long-run investments.

For More Information

Bernheim, B.D., and M.D. Whinston. 1998. “Incomplete Contracts and Strategic Ambiguity.” *American Economic Review* 88(4):902-932.

Federal Register. 2010. “Implementation of Regulations Required Under Title XI of the Food, Conservation, and Energy Act of 2008: Conduct in Violation of the Act.” Volume 75, No. 119, June 22, pp. 35338-35354.

Greene, J.L. 2015. *USDA’s “GIPSA Rule” on Livestock and Poultry Marketing Practices*. Congressional Research Service, CRS Report for Congress 7-5700, January.

Hovenkamp, H.J. 2011. *Does the Packers and Stockyards Act Require Antitrust Harm?* University of Iowa – College of Law, January.

Available online: <http://ssrn.com/abstract=1737440> or <http://dx.doi.org/10.2139/ssrn.1737440>

MacDonald, J.M. 2014. *Technology, Organization, and Financial Performance in U.S. Broiler Production*. U.S. Department of Agriculture, Economic Research Service, Economic Information Bulletin Number 126, Washington, D.C., June.

MacDonald, J.M., and W.D. McBride. 2009. *The Transformation of U.S. Livestock Agriculture: Scale, Efficiency, and Risks*. U.S. Department of Agriculture, Economic Research Service, Economic Information Bulletin, Washington, D.C., January.

The Pew Charitable Trusts. 2013. *The Business of Broilers: Hidden Costs of Putting a Chicken on Every Grill*. Washington, D.C., December 20. Available online:

<http://www.pewtrusts.org/en/research-and-analysis/reports/2013/12/20/the-business-of-broilers-hidden-costs-of-putting-a-chicken-on-every-grill>

U.S. General Accounting Office (GAO). 2009. *Agricultural Concentration and Agricultural Commodity and Retail Food Prices*, GAO-09-746R, Washington, D.C., April 24.

Vickers, J. 1996. "Market Power and Inefficiency: A Contracts Perspective." *Oxford Review of Economic Policy* 12(4): 11-26.

Wu, S.Y. 2003. "Regulating Agricultural Contracts: What are the Tradeoffs?" *Choices*, First Quarter.

Steven Y. Wu (sywu@purdue.edu) is Associate Professor, Department of Agricultural Economics, Purdue University, West Lafayette, IN.

James MacDonald (macdonal@ers.usda.gov) is Branch Chief of the Structure, Technology, and Productivity Branch of the USDA-Economic Research Service, Washington, D.C.

The views expressed in this paper are those of the authors, and not necessarily those of the U.S. Department of Agriculture. Some of the insights in this article were drawn from research funded by the United States Department of Agriculture Cooperative Agreement No. 58-6000-7-0096 and United States Department of Agriculture-National Institute of Food and Agriculture Award No. 2010-65400-20430.

Contract Farming: What's In It for Smallholder Farmers in Developing Countries?

Marc F. Bellemare

JEL Classification Codes: L23, L24, O13, O14, Q12

As every self-respecting economics major knows by the time he graduates, whether a country benefits from international trade depends in theory on whether that country specializes in its comparative advantage—for example, whether it can specialize in the production of goods or services for which it has a lower opportunity cost. The production of agricultural goods being the comparative advantage of most developing countries, it follows—again, in theory—that those countries should specialize in agriculture.

But what does it mean to specialize in agriculture? For many developing countries, whose agricultural sectors are characterized by relatively primitive production technologies, specializing in agriculture necessarily means modernizing their agricultural sector, a move away from a situation wherein many smallholder farmers each produce several crops, primarily for their subsistence and using a relatively primitive technology, toward a situation where few larger producers each produce one or two crops for the market using modern technology. It also means moving from a situation where the many transactions required to bring agricultural commodities from producers to consumers take place on spot markets to a situation where those same transactions take place within more vertically integrated value chains. In other words, modernization implies that fewer transactions are necessary to bring a commodity from the same producer to the same consumer.

Consequently, policy makers in developing countries and in international organizations have come to see contract farming and agricultural value chains as key areas of policy intervention. But in order for developing countries to tap into their comparative advantage by modernizing

their agricultural sector, it will be necessary for smallholder farmers to actually want to participate in contract farming. So what are the reasons why those smallholders might want to participate in contract farming? And in light of recent evidence, do those reasons actually drive participation in contract farming?

“What's In It for Me?”

Grosh (1994) was the first to lay out the reasons why, in principle, smallholder farmers in developing countries might want to give up the apparent freedom of producing crops for themselves and their families or for selling at market in favor of producing crops—often different ones—for others within the context of highly regimented contracts.

Potential Advantages to Contracting

1. **Risk and Uncertainty:** Producing crops outside of a contract farming arrangement and for sale at market often means that a farmer is unsure of the price he will receive once he gets to market. This is especially so in developing countries, where such price risk and uncertainty is often more important than in developed countries, which can cause serious welfare losses (Bellemare, Barrett, and Just, 2013). In contract farming arrangements, however, it is often the case that the agreement between the grower and the processor specifies a price at which the crop produced under contract will be purchased by the processor from the grower, which eliminates price risk. In Bellemare (2012), for example, contracts almost always specified a fixed price to be paid by the processor to the grower.

2. Imperfect Factor Markets: Economic underdevelopment is often the result of fragmented or missing markets. For example, because of credit rationing due to imperfect information (Stiglitz and Weiss, 1981), a smallholder farmer may not be able to secure a loan which would allow him to make the required investments to adopt a new production technology. In contract farming arrangements, however, it is often the case that the processor advances inputs which would otherwise be difficult or impossible for the grower to obtain, and the contracted crop is used as collateral. In Bellemare (2012), for example, seeds, pesticides, and fertilizer were often provided by the processor to the grower, and the contracted crop was used as collateral.

3. Extension Services: The public provision of extension services is often lacking in developing countries and, as part of contract farming agreements, processors often provide their own private extension services. Those private extension services are often more trusted by farmers than are public extension services. Bellemare (2010) found that yields are positively and significantly related to the number of such private extension visits to the grower by a technical assistant working for the processor.

Potential Disadvantages to Contracting

Yet, contrary to what many economists and policy makers often seem to believe, contract farming arrangements are not a panacea. For one, contract farming is not easy to set in motion in places where it did not emerge organically. Moreover, contract farming is difficult to “make work,” as it often brings its share of problems and is thus unsustainable because one or both parties end up dissatisfied. Contract farming can give rise to the following issues:

1. Monopsony: It is often the case that the crop grown by smallholder

farmers in the context of a contract farming agreement is a crop for which there is little to no local demand. In West Africa, for example, cotton is often produced within agricultural value chains that are entirely owned by the state, who is the sole cotton buyer in the country (Elabed et al., 2013). In such relationships, where there is practically no market for the contract crop outside of the contract, the processor often abuses its monopsony power by renegeing on the terms of the contract, by underpaying growers, by delaying payment, and so on. In an edited volume with the evocative title of *Living under Contract*, Little and Watts (1994) present several cases where contract farming failed to fulfill its promises.

2. Contract Rigidity: Because of the specific quality requirements of consumers and the sanitary requirements of regulators in export markets, contract farming arrangements in developing countries are often much more rigid than production outside for one’s own consumption or for sale at market. Inputs have to be applied in specific quantities and proportions, specific tasks have to be performed at specific times, and specific techniques or implements have to be used. This often comes at great cost to smallholder farmers who are used to being their own bosses and producing according to their own schedules. More commonly, the opportunity cost of following a rigid production contract is the production of staples for one’s subsistence.

3. Leakage, or Side Selling: This is the flipside of monopsony power. In cases where there is a local market for the crop produced under contract, it is not uncommon for the contracted price to be lower than the local market price come harvest time. In such cases, it might be tempting for growers to sell some of the contracted crop on the local market at a higher price, claiming this as a loss. Whereas the exercise of monopsony power is

opportunistic behavior on the part of the processor, side selling—what Fafchamps (2004) refers to as “leakage”—is opportunistic behavior on the part of the growers. Minten, Randrianarison, and Swinnen (2009) relate an anecdote wherein rampant inflation in Madagascar led to mass leakage among the growers they studied.

As You Sow, So Shall You Reap?

The advantages and disadvantages of contract farming just discussed are true in principle. How does contract farming play out in practice? A collection of empirical country studies and reviews of this literature (Bijman, 2008, and Oya, 2012) offer some insights.

Does contract farming make smallholder farmers better off? The question is not new, at least not when one looks outside of agricultural and applied economics to consider the social sciences as a whole. Goldsmith (1985) reviews a number of case studies of contract farming in Africa, Asia, and Latin America, and finds that in the majority of cases, the income of growers is greater than that of non-growers. Moreover, he finds that participation in contract farming is associated with the adoption of better production technologies. Singh (2002) also compares contract farming arrangements in the Indian state of Punjab, and he also finds that those smallholder farmers who participate in contract farming have higher incomes.

The issue with both studies by Goldsmith (1985) and Singh (2002), however, is that they ignore the fact that it is entirely possible that those smallholders who elect to participate in contract farming may have already been better off than those smallholders who elect not to participating in contract farming prior to their participation. This is known as the selection problem, and not only does it threaten the internal validity of empirical

findings, it is also challenging to address in practice. Warning and Key (2002) were the first to attempt to deal with the self-selection of growers into contract farming in a study of peanut contract farming in Senegal, and they find that participants in contract farming did, indeed, have significantly higher incomes than nonparticipants.

Another common issue in the literature on contract farming is the lack of external validity. That is, researchers tend to focus on a single crop or on a single region, with little to no implications for other crops or regions. Simmons, Winters, and Patrick (2005) were the first to aim for more external validity by looking at three contracted commodities—maize, poultry, and rice—in three different locations in Indonesia, and they find that those households who participated in contract farming as poultry breeders and maize growers had better returns to capital than nonparticipants. Likewise, Miyata, Minot, and Hu (2007) looked at apple and onion contract farming arrangements in China, and found that participation in contract farming was associated with higher incomes.

Minten, Randrianarison, and Swinnen (2009) looked at contract farming over green vegetables in the capital region of Madagascar. The advantage of their study is that, although they looked at income, they also considered other indicators of welfare, namely income variability and the duration of the hungry season, finding that households who participated in contract farming were better off along all those indicators.

Aiming for external validity, Bellemare (2012) studied contract farming over more than 10 contracted crops across six regions of Madagascar. Using field-experimental methods to deal with the selection problem, he found that contract farming appeared to lead to a 10-percent increase in income. Yet even those

field-experimental methods are not immune from criticism, and they do not guarantee the identification of causal effects from contracting farming. There are many other studies of the welfare impacts of contract farming, including Glover and Kusterer (1990), Porter and Phillips-Howard (1997), Ashraf, Giné, and Karlan (2009), Bolwig, Gibbons, and Jones (2009), Maertens and Swinnen (2009), Rao and Qaim (2011), Michelson, Reardon, and Perez (2012), Dedehouanou, Swinnen, and Maertens (2013), Michelson (2013), Narayanan (2014), and Briones (2015).

The bulk of the evidence suggests that participating in contract farming improves the welfare of those who choose to participate (Wang, Wang, and Delgado, 2014). Yet because the identification problem—correlation is not causation—remains as thorny as ever, one has to keep in mind the distinct possibility that publication bias has molded what we know of the welfare impacts of contract farming. Null findings—in this case, findings that show no association between participation in contract farming and welfare—tend not to get published. Findings that tend to go against the dominant view—in this case, findings that would show a negative association between participation in contract farming and welfare—are perhaps even more difficult to publish than findings of no association. Hence, the publication process might lead to a surfeit of findings showing a positive association between participation in contract farming and welfare.

Policy Implications—or Lack Thereof

Whether policy implications can be derived from the foregoing depends on one's willingness to believe the findings in the literature. If one takes the positive findings discussed above at face value—that is, as having both

internal and external validity—then one should logically argue for policies that facilitate the emergence of or support contract farming. Concretely, this could be as simple as a policy wherein a government subsidizes the expansion of a processing firm's contracting activities to areas where (or groups with whom) it does not already contract, or it could be as complex as a legal reform that provides better legal recourse for both parties to a contract farming agreement in order to make contract farming agreements more likely to be sustained or to emerge at all.

If, given the issues discussed above—limited internal validity, external validity, or potential publication bias—one is more skeptical about the findings of the empirical studies discussed above, then there are few if any policy implications. This is especially the case considering that the literature has so far had little to say about the potential benefits of contract farming for those who did not choose to participate. As a consequence, it might be unwise to encourage the participation in contract farming of households who do not already do so. In that case, it is perhaps best to leave growers and processors alone, without trying to nudge one party or the other in any specific direction, and to invest instead in better evidence and replication studies to better inform future policy options.

For More Information

Ashraf, N., X. Giné, and D. Karlan. 2009. "Finding Missing Markets (and a Disturbing Epilogue): Evidence from an Export Crop Adoption and Marketing Intervention in Kenya," *American Journal of Agricultural Economics* 91(4): 973-990.

- Bellemare, M.F. 2010. "Agricultural Extension and Imperfect Supervision in Contract Farming: Evidence from Madagascar," *Agricultural Economics* 41(2010): 507-517.
- Bellemare, M.F. 2012. "As You Sow, So Shall You Reap: The Welfare Impacts of Contract Farming," *World Development* 40(7): 1418-1434.
- Bellemare, M.F., C.B. Barrett, and D.R. Just. 2013. "The Welfare Impacts of Commodity Price Volatility: Evidence from Rural Ethiopia," *American Journal of Agricultural Economics* 95(4): 877-899.
- Bijman, J. 2008. "Contract Farming in Developing Countries," Working Paper, Wageningen University.
- Bolwig, S., P. Gibbon, and S. Jones. 2009. "The Economics of Smallholder Organic Contract Farming in Sub-Saharan Africa," *World Development* 37(6): 1094-1104.
- Briones, R.M. 2015. "Small Farmers in High-Value Chains: Binding or Relaxing Constraints to Inclusive Growth?," *World Development* 72: 43-52.
- Dedehouanou, S.F.A., J.F.M. Swinnen, and M. Maertens. 2013. "Does Contracting Make Farmers Happy? Evidence from Senegal," *Review of Income and Wealth* 59(S1): S138-S160.
- Elabed, G., M.F. Bellemare, M.R. Carter, and C. Guirkinger. 2012. "Managing Basis Risk with Multiscale Index Insurance," *Agricultural Economics* 44(4-5): 419-431.
- Fafchamps, M. 2004. *Market Institutions in Sub-Saharan Africa*, Cambridge, MA: MIT Press.
- Glover, D.J., and K. Kusterer. 1990. *Small Farmers, Big Business: Contract Farming and Rural Development*, St. Martin's Press, New York.
- Goldsmith, A. 1985. "The Private Sector and Rural Development: Can Agribusiness Help the Small Farmer?," *World Development* 13(10/11): 1125-1138.
- Grosh, B. 1994. "Contract Farming in Africa: An Application of the New Institutional Economics," *Journal of African Economies* 3(2): 231-261.
- Little, P.D., and M. Watts. 1994. *Living Under Contract*, Madison, WI: University of Wisconsin Press.
- Michelson, H.C. 2013. "Small Farmers, NGOs, and a Walmart World: Welfare Effects of Supermarkets Operating in Nicaragua," *American Journal of Agricultural Economics* 95(3): 628-649.
- Michelson, H.C., T. Reardon, and F. Perez 2012. "Small Farmers and Big Retail: Trade-Offs of Supplying Supermarkets in Nicaragua," *World Development* 40(2): 342-354.
- Maertens, M., and J.F.M. Swinnen. 2009. "Trade, Standards, and Poverty: Evidence from Senegal," *World Development* 37(1): 161-178.
- Minten, B., L. Randrianarison, and J.F.M. Swinnen. 2009. "Global Retail Chains and Poor Farmers: Evidence from Madagascar," *World Development* 37(11): 1728-1741.
- Miyata, S., N. Minot, and D. Hu. 2007. "Impact of Contract Farming on Income: Linking Small Farmers, Packers, and Supermarkets in China," *World Development* 37(11): 1781-1790.
- Narayanan, S. 2014. "Profits from Participation in High Value Agriculture: Evidence of Heterogeneous Benefits in Contract Farming Schemes in Southern India," *Food Policy* 44: 142-157.
- Oya, C. 2012. "Contract Farming in Sub-Saharan Africa: A Survey of Approaches, Debates, and Issues," *Journal of Agrarian Change* 12(1): 1-33.
- Porter, G., and K. Phillips-Howard. 1997. "Comparing Contracts: An Evaluation of Contract Farming Schemes in Africa," *World Development* 25(2): 227-238.
- Rao, E.J. O., and M. Qaim. 2011. "Supermarkets, Farm Household, Income, and Poverty: Insights from Kenya," *World Development* 39(5): 784-796.
- Simmons, P., P. Winters, and I. Patrick. 2005. "An analysis of contract farming in East Java, Bali, and Lombok, Indonesia," *Agricultural Economics* 33(s3): 513-525.
- Singh, S. 2002. "Contracting Out Solutions: Political Economy of Contract Farming in the Indian Punjab," *World Development* 30(9): 1621-1638.
- Stiglitz, J.E., and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information," *American Economic Review* 71(3): 393-410.
- Wang, H.H., Y. Wang, and M.S. Delgado. 2014. "The Transition to Modern Agriculture: Contract Farming in Developing Economies," *American Journal of Agricultural Economics* 96(5): 1257-1271.
- Warning, M., and N. Key 2002. "The Social Performance and Distributional Consequences of Contract Farming: An Equilibrium Analysis of the Arachide de Bouche Program in Senegal," *World Development* 30(2): 255-263.

Marc F. Bellemare (mbellema@umn.edu) is Associate Professor and Director, Center for International Food and Agricultural Policy, Department of Applied Economics, University of Minnesota, Saint Paul, MN.