

## **Market or Hybrid? Determinants of Agribusiness Actors' Decision Behaviour in the Agrifood Supply Chain**

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### **Abstract**

Market, hybrid or hierarchy has been in place and widely used by agribusiness firms to acquire farm products and these coordination mechanisms help smallholders to link to the global food chain. With the transaction cost economics framework, however, this paper analyses the determinants for agribusiness firms' choice of market or hybrids to acquire farm produce in the local food supply chain context. This paper aims at examining the key drivers for choosing contract or spot market mechanisms by agribusinesses in Northern Ethiopia. Structured questionnaires were administered to 247 traders in 10 towns of Tigray. Once conducting the Chow test, the pooled data was considered for the probit model and the results of the empirical model has indicated that product characteristics (quality adulteration and perishability), market information and firm characteristics were significantly driving agribusinesses to contract base transactions. Besides, the desire to postpone payments (credit based payment) appears to be a determinant factor for agribusinesses contract engagement. Based on the findings of the study, improving the capacity of dairy farmers and agribusinesses, strengthening of quality assurance mechanisms, collective action of farmers to consolidate supply, information providing institutions, and financing mechanism/credit facilities are recommended as interventions to improve the integration of agribusinesses and smallholders in the study area.

**Key words:**Market, hybrid, agribusiness, Probit model

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## Introduction

Market actors in agribusiness employ several coordination mechanisms to acquire a variety of agricultural produce. These coordination mechanisms consist of markets, hybrids and hierarchy and they vary in terms of degree of integration between actors (Williamson 1975; Chaddad 2009). Prices manage relationship among actors in market based transactions whereas predetermined agreements in quality, quantity and price terms guide relationships in hybrids. The vertical coordination (VC) among actors in agribusiness creates market linkages between buyers and smallholders who are hurt by market failures in many developing countries (Trienekens, 2011).

Contracts enable traders and supermarket chains to acquire agrifood products for processing or reselling. Due to the perishable nature of agricultural products, intermediation of traders and processors is necessary to get these products to consumers' tables. The existence of traders and processors in the channel facilitates investment in processing and preservation technologies which many of the rural producers do not have due to their poor financial circumstances. Traders in the chain have taken the risk and invest in the technologies, and fill the gap in both technology and financial constraints prevailing in the rural areas (Dries et al. 2009).

VC is a set of governance structures that involves the synchronization of production and marketing activities to reduce transaction costs and risk, and to have control on assets and decisions. Martinez (2002:2) defined VC as "synchronization of successive stages of production and marketing with respect to quality, quantity and timing of product flows." It can be viewed as a continuum ranging from market to hierarchy with transitional stage such as hybrids like contracts and cooperatives (Williamson, 1991; Ménard, 2007; Chaddad, 2009).

Both market based- and hierarchy-based institutional organizations are two extremes of coordination that may involve little coordination in the market versus full coordination in the hierarchy mode of transactional organization (Williamson, 1991). The degree of control and coordination in the spectrum of VC (from market to hierarchy) increases along the continuum (Peterson et al., 2001). Self-interest, short term relationship, limited information, flexibility and independence are main features of spot markets. In contrast, mutual trust, long term relationship, shared benefit, open information sharing, stability and interdependence are the main features for hierarchy (Peterson et al., 2001). Hybrid institutional arrangements share the features of both market and hierarchy involving independent control of assets and common control of production decisions or processing equipment (Chaddad, 2009).

Spot markets are traditional methods of business relationships that involve a large number of buyers and sellers who meet at a certain time and place. Spot market transactions offer independence to actors in making decisions. Actors who engage in spot markets have the power to make their own decision. Spot markets may be efficient for acquiring homogenous and standardized commodities. However, when goods are differentiated due to variations in consumer preferences or specific processor standards, spot markets may not work well requiring firms participation in the production and input use decisions via contracts (Jang and Olson 2010). Spot markets involve limited information exchange which may fail to guarantee quality and safety of products exposing agribusinesses to opportunistic suppliers (Peterson et al., 2001).

A contract involves an agreement between a seller and a buyer which stipulates prices, quantity and quality for a commodity to be delivered at a later time (Chaddad, 2009; Oya 2012). In contract, buyers may agree in making a resource-providing contract, a marketing contract or a production management contract. Actors use marketing contracts to reduce price and supply risks, and control input use. A marketing contract can reduce the cost of gathering and exchanging information about demand/supply, quality, timing and price, thus reducing uncertainty and the concomitant market risks (Katchova and Miranda, 2004; Zhang, & Hu, 2012).

Contract farming – involving agreements between one or more farmer(s) and a contractor for the production and supply of agricultural products under forward agreements – is expanding in developing economies. These agreements largely entail a priori determination of prices, quantity, and time (Singh, 2002). Contract farming agreements enable processors and supermarket chains to acquire standardized products by supplying required inputs and technology to the farmers (Minten et al., 2007). Production management contracts help producers' capacity to achieve quality, timing and least-cost production (Katchova and Miranda, 2004).

The key motivation of actors to engage in VC (markets, hybrids or hierarchy) is to minimize transaction costs (Williamson, 1979). Transaction costs are caused by opportunistic behavior of economic agents implying that opportunism leads partners not to share full market information, specifically in the spot market. Contract agreements improve trust and reduce opportunistic behavior as mutual interest guides relations between actors (Peterson et al., 2001; Zhang, & Hu, 2012). Agribusinesses prefer contracts to markets when suppliers demonstrate a high tendency of self-interest and opportunism (Hobbs and Young, 2000).

Opportunistic behavior depends on transaction characteristics which include the uncertainty about product characteristics such as price, supply (quantity) and quality, the high dependency on specific suppliers due to relation-specific investments, and the frequency of transactions. Transaction characteristics are further affected by product characteristics (Hobbs and Young, 2000), market characteristics, and actor characteristics (Abdulai and Birachi, 2009). The degree of quality uncertainty is affected by product characteristics. These may drive firms to set long term relations with suppliers instead of relying on spot markets (Hobbs and Young, 2000). Investments in specific assets (human and equipment) may expose firms to opportunistic actors driving them to transact in close ties with actors to assure the occurrence of transactions. The frequency of transactions is also an important aspect of TCE implying that frequent transactions allow better information exchange, buildup of trust, and lower costs of non-compliance (Williamson, 1979; Zhang, & Hu, 2012).

Analyzing actors' behavior and the performance of markets has been performed using the structure-conduct-performance (SCP) framework. The framework is the logical extension of the neo-classical analysis of markets which argues that the efficiency of markets (performance) depends on the conduct of firms (described in terms of competition - perfect competition, oligopoly, and monopoly) which in turn is determined by the structure of the sector - buyer/seller concentration (Bain, 1968; Panagiotou, 2006). Bain (1968) explained the market structure in terms of buyer/seller concentration, the degree of product differentiation and the presence of entry barriers to the market. The conduct of the market is in association with price and the mechanism of interaction and performance to include the relative technical efficiency of production, profit margins and the rate of growth.

As the SCP framework is based on neo-classical economics, which embodies assumptions about the absence of transaction costs, the availability of full information to all market actors and the price-taking behaviour of actors in the market; these assumptions hardly ever match with reality, particularly in developing countries. High transaction costs, information asymmetries, resource constrained actors and poor infrastructure characterize the agricultural market in developing countries (Boger, 2001; Chowdhury, 2004; Gebremedhin et al., 2009; Trienekens, 2011).

The transaction cost economics (TCE) framework is different from neoclassical economics in that it considers transactions as opposed to goods and

services as unit of analysis and considers firms as governance structure. In TCE, the choice of coordination mechanisms (markets, hybrids or hierarchies) depends on transaction costs (Williamson, 1979). In TCE, transaction costs have an important role in the organization of firms and contracts, and are critical determinants of economic performance (Williamson, 1979).

The market imperfection makes firms incur costs when they attempt to exchange (buy or sell goods or services). For instance, lack of information about potential suppliers may lead firms to buy at higher prices as in the case of many developing countries' markets. In TCE, it is argued that firms want to minimize total costs that are made up of both production and transaction costs. Under some circumstances transaction costs may be lower if the transaction takes place in spot market, whereas in other situations costs may be lower under contracts (Williamson, 1979; MacDonald and Korb, 2011).

In the context of substantial market imperfections, additional drivers such as access to credit and barriers such as actor characteristics (as gender, age, education, experience and the wealth situation of actors) exist, influencing the propensity to contract (Singh, 2002; Davis and Gillespie, 2007; Abdulai and Birachi, 2009; Franken et al., 2009).

Agricultural marketing situations in Ethiopia are also characterized by high transaction costs affecting agribusiness firms' access to quality and standardized produce. The weak or absent closer coordination between producers and agribusiness firms affects both smallholders and buyers. Smallholders' market participation is limited, produce predominantly at subsistence level and they retain produce at home. It has also been a disincentive to improve production and productivity. Ethiopia has a huge potential in the production of several agrifood products. Agribusinesses, on the other hand, fail to get standardized products and consistent supply of the agrifood products though Ethiopia has good potential for dairy, honey and fruit products. Ethiopia has large livestock population and 80% of the rural population possesses livestock (FAO 2012). However, its contribution to the nation's economy is limited as the number of livestock is generally regarded as a sign of wealth, rather than as an asset for generating income. As a result, most livestock products are not channeled to the market system (Bennet et al., 2006). And in case they are marketed, they rarely meet minimum quality and safety standards due to adulteration, poor storage and processing conditions.

The practice of beekeeping in Ethiopia is integrated with crop farming and animal husbandry. Beekeeping is considered an important additional income-generating activity for farmers, next to cropping and livestock rearing (Gidey and Kibrom, 2010; Legesse, 2014). According to CSA (2013), there were nearly 5.21 million beehives in Ethiopia, producing 45,100 tons of honey, of which 38.31 percent was for household consumption, 58.49 percent was for the market and the rest was used as wage payment. Honey production is increasing from year to year: from 24,000 tons in 1993 to 45,100 tons in 2012 (CSA, 2013). In terms of honey production, the country is ranked 9<sup>th</sup> in the world which may offer an advantage to capitalize on the subsector (FAO, 2012). Honey export has increased from 1.5 tons in 2000, 275 tons in 2010 and more than 730 tons in 2012 (Legesse, 2014).

Ethiopia's diverse agro-ecology can support production of temperate, subtropical and tropical fruits. Fruit production is in the hands of smallholders who perform subsistence agriculture. Among the total fruit produced in the country, only 1.68% was exported in 2003 (Kahsay et al., 2008). More than 47 thousand hectares of land was under fruit crops cultivation and 350,000 tons were produced (CSA, 2008). The production and the marketing performance of fruit have been weak due to the poor coordination in the supply chain where the government solely holds the input distribution. Lack of private sector participation in the processing and distribution of inputs contributes to the poor production and market performance of fruit in Ethiopia (Kahsay et al., 2008).

In Ethiopia the market is imperfect due to poor infrastructure, high transaction costs and weak institutions and weak private sector and trader involvement (Gebremedhin et al., 2009). Traders conduct personalized trade and rarely use contracts to obtain required supply of agricultural products. Cooperatives as a supply source are also employed (Abebaw and Haile, 2013). However, no rigorous study has been made on the determinants for agribusinesses choice of a particular coordination mechanism. This study, therefore, aims identify the key determinants for dairy, honey and fruit traders in Ethiopia and assess its effect on the wealth of traders.

The rest of the paper is organized as follows: the next section briefly reviews the methodology; the third section presents the results and discussion. The last section sums up the paper with conclusions and policy implications.

## Research Methodology

### *Description of the study area*

The study was conducted in Tigray, Northern Ethiopia, which has an estimated population of more than 4.3 million; of which 19.5 per cent is urban inhabitants and the rest are employed in agriculture (CSA, 2008). Agrifood traders' survey was administered in 10 towns out of 42 towns of the region that are dominated in the production of milk, honey and fruits. Dairy, honey and fruit traders in the ten towns were selected and data were collected using structured questionnaire which was administered in May 2010. A sample of 247 dairy, honey and fruit traders (i.e., 90 dairy traders, 103 honey traders, and 54 fruit traders) was nominated using a systematic random sampling technique. Sample observations were drawn from the 2007 business census of the Region's Trade and Industry Bureau. As the towns included in the survey possess agribusiness who acquires products from domestic suppliers, the data well represent the circumstances in the region and the country at large.

### *The Empirical Model*

The decision to contract is a discrete choice, and agents prefer contract to spot markets if the net cost of making transactions is lower in contracts than spot markets (Key and McBride, 2003). Following Masten and Saussier (2002), we consider the choice of actors to select a coordination mechanism as a discrete choice based on the relative net benefits of the available coordination mechanism. Formally,

$$\begin{aligned}
 C^* &= C_i^v \text{ if } B_i^v > \\
 &B_i^s \text{ or } \dots\dots\dots(1) \\
 &= C_i^s \text{ if } B_i^v \leq B_i^s
 \end{aligned}$$

where  $C^*$  is the coordination mechanism to be chosen and  $B_i^v$  is the benefit from contracting  $v$  and  $B_i^s$  is the benefit from spot market channel  $s$ .

Net benefits for traders may be reduction in cost because of ease of access to information, reduction in quality uncertainty, and reliable source of supply that may in turn result in higher returns from contracting operations. Net benefits may depend on product characteristics (e.g., perishability, adulteration) and market characteristics (e.g., availability of information, market size). In addition, traders may be resource

constrained; i.e., access to a particular channel may be hindered by lack of resources such as capital and experience. However, the benefits from the selected channel may be difficult to observe but it is a function of the sets of characteristics  $X$  and formally specified as:

$$B^v = \beta x + u \dots\dots\dots (2)$$

To operationalize equation (2), we will estimate decision processes for traders, in which the choice of contract is a function of  $X$  composed of product characteristics; market characteristics; and actor-specific characteristics - the socio-economic variables of the actor. The choice of contract versus spot market can then be estimated using the following Probit regression:

$$\Pr(Y = 1/ X) = \Phi(X' \beta) \dots\dots\dots \dots\dots (3)$$

where ' $\beta$ ' is the coefficient of the unknown parameter and  $X$  is a vector of explanatory variables such as market characteristics (information access and market size), actor characteristics (capital, specialization and credit access) and product characteristics.  $\Phi(\cdot)$  represents the standard normal distribution function. Maximum likelihood estimation is used to estimate parameters. Therefore, we can develop the following a priori expectations on the magnitude and direction of the explanatory variables on one's choice of contract (Table 1).

Table 1. Summary of independent variables and the expected signs

Variable	Traders' propensity to contract
Market characteristics	
Ease of accessing market information	-
Market size	+
Actor characteristics	
Gender	-
Firm size (sales volume, capital)	+
Specialization	+
Human capital	+/-
Product characteristics	
Dairy	+
Honey	+
Fruit	-



Access to market information affects a firm's choice of contract and if market information is easy to access, traders may prefer markets. The size of the market determines traders' move to contract as they look for certain and consistent supply. The size of the firm is a continuous variable and the larger the firm the more sustainable and certain the supply will be. The business experience of the traders is a continuous variable and the more experienced the trader is the less vulnerable to opportunistic behavior. The gender of the trader is a binary variable equal to 1 if the trader is male and 0 if female. Education of the trader refers to the number of years the trader attended school. Traders favor contract to postpone payment as it helps them to get relief from financial stress. Product characteristics are to capture perishability, quality uncertainty and ease of adulteration. The degree of perishability, quality uncertainty and adulteration is highest for dairy.

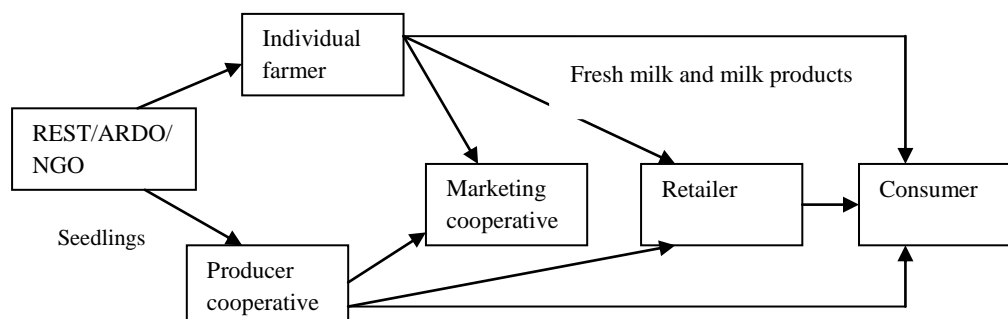
## **Results and Discussion**

### **Supply chain description**

#### *The Dairy Supply Chain*

The survey revealed that traders often got supply of fresh milk from the smallholders producing milk at the household level. Most of the smallholders produced and distributed fresh milk and butter through the open market and contract. Marketing cooperatives also served as a selling point for the smallholders signing contracts with the cooperatives. Producers acquired exotic breed cows mainly from the district Agriculture and Rural Development Office (ARDO). Furthermore, the Relief Society of Tigray (REST) – a local NGO, World Vision-International NGO, religious institutions (Catholic Church and the Ethiopian Orthodox Tewahido church) supplied inputs to cooperatives and individual farmers.

Dairy traders were mainly holders of cafe and snack businesses that sold boiled milk, yoghurt, and butter to consumers. There were also collectors who collected and distributed fresh milk to the cafes' and snack businesses. Dairy marketing cooperatives also distributed to other traders in the chain. Such cooperatives sold several dairy products (fresh milk, yoghurt) to consumers. Consumers could also acquire fresh milk and other dairy products from producers or cooperative shops. Consumers bought boiled milk, yoghurt and others mainly from cafés and snack businesses. Hence, the chain is organized as depicted on



*Figure 1 Dairy supply Chain*

*Source: Authors' own mapping from survey*

The coordination mechanisms employed for dairy products were the spot market, the marketing cooperatives and contracting. Traders of dairy products were collectors, cafés, pastry houses, and snack businesses. These traders got their fresh milk through contracts from suppliers. Marketing cooperatives were used as selling points/collection centers and they were doing better as we found from the responses of the administrators and the cooperative chairs, except for the problem of demand during the fasting periods<sup>1</sup>. The main reason for their performance was their ability to meet buyers' requirement by supplying better quality products as they have quality control mechanism. Moreover, they supply differentiated products and got trust from buyers. Cooperatives also supplied medicine and feed for cattle to their members (smallholder dairy farmers). Dairy traders relied mainly on farmers who meet the requirements with respect to quality and quantity and delivering the products to the place where traders need them. Hence, transportation and transaction costs of traders were minimized.

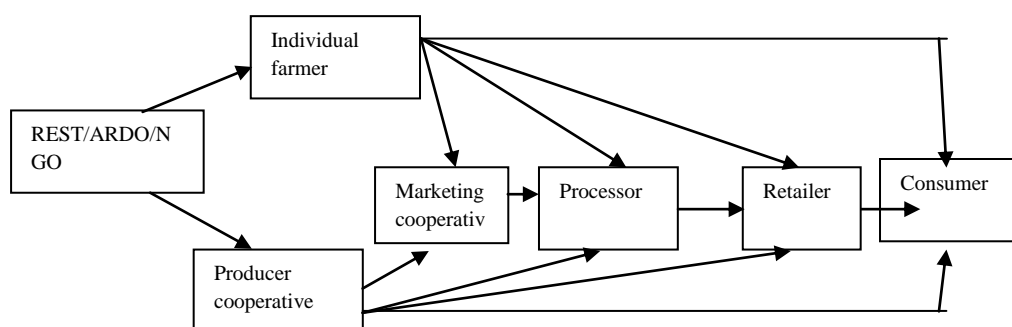
### ***The Honey Supply Chain***

In all the districts covered, honey was supplied from farmers to traders. However, the survey revealed that sources of supply of input and technology were mainly from the Agriculture and Rural Development Offices, REST and other NGOs. The regional and district ARDOs emphasized on increasing production rather than

<sup>1</sup> During the fasting periods, Orthodox Christians in Ethiopia abstain from consuming animal products. More than 95.6 percent of the population in Tigray is Orthodox Christian (CSA 2008).

value added activities and marketing. Traders in the channel rarely supply technology, input and credit to farmers. Dimma Beekeeping and Honey Processing PLC had signed contract with 17 cooperatives in 2007 and provided beehives, honey extractors, protective clothes, and honey containers. However, few of the cooperatives were successful in delivering honey back to Dimma complaining that the price offered (stipulated in the contract) was below the market price.

As depicted in Figure 2, the honey supply chain contains individual farmers receiving inputs from various government and development organizations, produce honey, and sell it to the spot market or collectors, traders, or multipurpose cooperatives. Moreover the chain comprised of producer cooperatives that produced honey and supplied to processing companies or other traders.



*Figure 2 Honey supply chain*

*Source: Authors' own mapping from survey*

### ***Fruit Supply Chain***

The market participation of fruit producers was weak due to the small amount of production, poor preservation technologies, and little support from the development agents and the government. Little participation was observed from the private sector in input and technology distribution and fruit processing in the region. Thus, the fruit supply chain was weak and lacked proper coordination. Production of fruit was not in a position to attract traders, and the traders mainly used wholesalers as the main supply source. The majority of the fruits were supplied from central and Southern parts of the country. Hence, the supply chain comprised of two major sources: the first chain was organized around producers within the region. For this chain, inputs were from development agents (government). Farmers were encouraged to produce fruits, which they sold to the wholesalers, retailers or consumers directly.

The second supply chain was organized through distributors from other regions - wholesalers would transport fruits from surplus producers of other regions and disseminate via retailers and supermarkets and then to consumers. The supply chain for fruit is presented in Figure 3. Hitherto, locally produced fruits have not been in sufficient quantity to meet the demand of traders in the region. As the volume of production is very small and the agricultural extension is at its infant stage, wholesalers and retailers in the region rely on wholesalers from other regions.

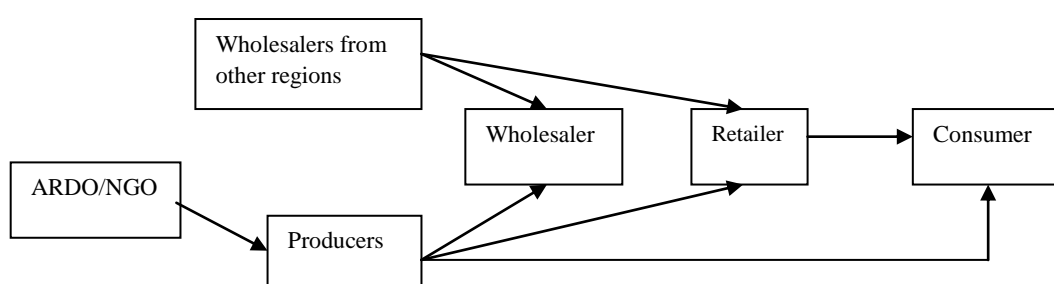


Figure 3. Fruit Supply Chain

Source: Authors' own mapping from survey

### Descriptive statistics

The descriptive statistics indicate that 37% of the respondents used contracts and the rest 63% relied on spot markets. This implies that open markets were the most common coordination mechanism employed by traders in rural Tigray. Male traders account for 51% of the respondents with the remaining 49% being female traders. The average level of education was six years of schooling. The business experience of traders' was on the average eight years of stay in business. The average starting capital was about USD 402.08 (ETB 8246.74)<sup>2</sup>. Traders noted that getting market information was not easy. The average annual volume of sales traders made was 10.851 tones. Nearly 54% of the traders specialized in one product - dairy, honey or fruit. The rest 46 % sold a variety of convenience products together with milk, honey or fruit. Nineteen percent of the traders preferred to make payments on credit. These traders might need suppliers to postpone payment. Regarding the location of traders, 45 % of the traders were located within the provincial towns with fairly large market size whereas the remaining 54% were located within district towns where the market size was small (Table 2).

<sup>2</sup> 1USD=20.51 ETB on April 30, 2015

**Table:2** Statistical summary of variables

Variable	Observation	Mean	Std. Dev.	Min	Max
Contract (Dummy)	241	0.37	0.48	0.00	1.00
Gender (dummy)	241	0.51	0.50	0.00	1.00
Education in years	241	6.41	4.49	0.00	18.00
Starting capital in birr ('000')	241	8.25	16.54	0.02	150.13
Experience in years	241	8.19	9.50	0.14	42.40
Information access (dummy)	241	0.23	0.40	0.00	1.00
Sales volume in tons	241	10.85	60.99	0.002	86.40
Desire to postpone payment	241	0.19	0.39	0.00	1.00
Specialization	241	0.54	0.49	0.0	1.00

Source: Survey 2010

### Model result and discussion

The results from the Probit model are presented in Table 3. We preferred to run regression of the pooled data to capture product characteristics. Moreover, the larger sample size also provides efficient estimation of unknown parameters since Maximum likelihood estimation is used in the Probit model. Furthermore, Chow test was conducted to reconfirm treatment of the pooled data together for the three products. The test indicated that running the pooled data would significantly reduce the residual sum of squares (The F-statistic  $_{(11,216)} = 1.58$  that is less than F-critical  $_{(11,216)} = 2.33$  at 1 % significance level). To minimize potential endogeneity problem of contract on capital, we used beginning capital as lag variable.

Our interpretation of the model results involves several categories. The first category is related to information access; i.e., the perception of traders regarding the difficulty of getting market information. It was found that those who perceived that market information was hard to find favoured contracting from individual farmers or cooperatives and it was statistically significant at 5% level. The volume of sales was taken as an indicator of transaction costs in terms of searching suppliers as the majority of suppliers were smallholder farmers (Abdulai and Birachi, 2009). We anticipated that firms with large volume of sales would face high searching costs to buy huge volume from smallholders if it was made in spot markets. Therefore, large volume of sales pushed traders to contract so as to minimize searching costs. The model result revealed that large volume of sales triggered traders to adopt contract. Moreover, higher capital shows an investment on specific assets that might drive traders to contract. Hence, the model result revealed that those traders with larger capital tend to favour contracting.

The other category is whether contract was driven by credit needs of traders. Model result revealed that traders regarded contracts as sources of finance for their operation. Those who preferred to pay on credit favoured contract and it was statistically significant at 1 % level. Those traders who specialize might need uninterrupted supply to meet client requirements with the specific product (Key and McBride, 2003). Those specializing firms would need to maintain their reputation by

supplying relatively standardized products to their clients. Therefore, firms specializing in particular agrifood produce favoured contract than spot markets which would help them to create long term relationship with the suppliers to safeguard good quality produce. If they bought from spot market, traders would suffer from substandard products with high negotiation costs. The desires of the trader to have sustained supply might trigger contracting compared to those who sporadically buy and sell agrifood produce. The empirical model result revealed that specialized traders favored contract.

Product characteristics affect the choice between contract and spot market since it affects transaction characteristics. Frequency, perishability and ease of product adulteration stimulated traders to contract as market security and warranty of quality (Hobbs 2003). Milk and honey in rural Ethiopia were easily adulterated, forcing traders to find mechanisms to safeguard quality (Tesfaye et al., 2010; Getachew et al., 2004). High negotiation costs, in terms of quality inspection for dairy and honey products might drive traders to rely more on contract than spot markets in contrast to fruit traders.

Furthermore, actor characteristics - gender and experience- were included in the model. The model revealed that women traders favoured contract as coping mechanism against high transaction costs due to limited contact and vulnerability to opportunistic behaviour (Abduli and Birachi 2008). Experience of traders was found to contribute negatively to contract because more experienced traders have better market knowledge that would help them reduce the cost of opportunistic supplier behaviour and hence may favour spot markets (Hobbs and Young 2000; Key and McBride, 2003).

Negative marginal effect of gender, with reference to female traders, would result in a rise in the probability of contract by 20 percent. Similarly, a year increase in the experience of the trader would result in one percent fall in the probability of contract engagement. One percent change in the quantity of sales would result in 2 percent increase in the likelihood of contracting. Similarly, a one percent change in capital would result in 3 percent increase in the likelihood of contracting. If a trader specializes in one product, it would result in 31 per cent increase in the probability of contracting. Financially constrained traders who favour the postponement of payments are found preferring contract-based transactions; the need of the trader to postpone payment would result in 72 percent increase in the likelihood of contracting. If a trader perceived that market information was difficult to acquire, there would be 28 percent increase in the propensity to contract. An entry of a dairy trader would result in 58 per cent increase in the probability to contract but 20 percent decline in the probability to contract by fruit traders.

**Table 3:** Marginal effect (Probability of choosing contract=1)

Independent variables	Parameter	z
<b>Actor characteristics</b>		
Gender	-0.20 (.09)**	-2.28
Education	0.01(.01)	0.72
Experience	-0.01 (.01)**	-2.15
Payment postponement (Credit)	0.72 (.12)***	3.72
Starting capital	0.03 (.03)*	1.88
Sales volume	0.02 (.02)**	2.09
Specialization	0.31(.11)***	2.84
<b>Market characteristics</b>		
Access to information	-0.28(.08)***	-2.88
Market size	0.10(.09)	1.09
<b>Product characteristics</b>		
Dairy	0.58 (.17)***	4.44
Fruit	-0.20(.10)*	-1.73
Honey	Base	
Number of observations	241	
Wald chi2(11)	69.24***	
Pseudo R2	0.55	
Percent correctly Predicted	87.14	

.\*, \*\*, \*\*\*, significant at the 10, 5, and 1 per cent significance levels

Values in brackets are standard errors

## Conclusion and Implications

The actors in the agrifood supply chains composed of a large number of smallholders, cooperatives, traders and consumers. Loose coordination appears to be the main feature of the supply chains. High transaction costs, risk of poor quality, and little input and technology support characterized the supply chains. Spot markets were dominant though contracts are emerging. Contract was used predominantly in the dairy supply chain as it is highly perishable and vulnerable to adulteration. Desire for secured supply source in terms of quality and quantity triggers traders to pursue contract. The study revealed that market-based transactions are popular methods for honey and fruit products. As a mechanism for coping with information asymmetry and to safeguard good quality, traders tend to contract. Therefore, contract would enable traders to reduce opportunistic behaviour and information asymmetry and gives them relief in postponing payments to smallholder suppliers. Traders also tried to assure quality and consistent delivery through contract. Policy makers need to focus on establishing quality assuring institutions and prepare a platform for private businesses for closer trading relationship. We suggest that policy makers need to arrange credit facilities for traders and consider the private sector as development partners to upgrade the value chains that will in turn contribute to the improvement of production and quality of agrifood products.

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