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**CONTRACT DESIGN AND ENFORCEMENT PROBLEMS IN THE HIGH VALUE
VEGETABLE SUPPLY CHAIN IN GHANA**

Cosmos Adjei, Michael Wallace and Diogo M. de Souza Monteiro*
School of Agriculture, Food and Rural Development, Newcastle University

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*Corresponding author: Diogo M. de Souza Monteiro (Diogo.Souza-
Monteiro@newcastle.ac.uk)

Abstract:

In recent times the Ghanaian vegetable sector faces declining export volumes and a ban on major exports from the profitable European Union Markets. One of the main reasons for this ban was poor coordination and quality control between farmers and exporters in the supply chain. We examine the nature of contracting and factors that influence contractual breaches such as side-selling in the supply chain. We find that supply contracts are the main type of arrangements and are mainly governed by seasonal informal (relational) agreements. Contracts mostly specify terms such as quality and quantity of produce to be delivered and type of agrochemicals and seeds to be used in vegetable cultivation. Agronomic practices such as weed control and agrochemical application regimes as well as harvesting and transport methods are less specified. Side-selling and failure to show up to purchase contracted produce are major contractual breaches by farmers and exporters respectively. Whiles farmers mostly prefer to stay in the contract but fail to trust exporters who breach contract in subsequent trade, exporters prefer to terminate contract with farmers who breach contract as a mechanism to enforce contract. The Logit regression results show that being an older farmer, farm size, a farmer and a buyer coming from same community and frequent monitoring of farm have negative influence on side-selling whiles shorter trading relationship, proximity of farm to alternative market and a farmer being a male have a positive influence on side-selling.

Keywords: Relational contracts, High value supply chains, Vegetables, Side-selling, Ghana

JEL codes: Q02, Q13, L14, L23

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1 Introduction

In the last 2 years the Ghanaian vegetable export has been banned from profitable European Union Markets. The main reason for this was the consistently high levels of contamination by harmful organisms in vegetables that were being exported (European Commission Report, 2015; Gonzalez *et al.*, 2016). Reasons cited for this was poor coordination between producers and exporters as well as lack of control of farm operations by exporters (Ghanaweb, 2015; Saavedra *et al.*, 2015; Gonzalez *et al.*, 2016; discussion with the vice president of Vegetable Producers and Exporters Association of Ghana - VEPEAG). However, there is limited information on how the vegetable export market operates. More specifically, there is limited understanding of the extent of contracting between farmers (particularly smallholders) and exporting firms and how contracts are enforced. The purpose of this research is thus to examine the nature of contracting in the Ghanaian vegetable export industry and to shed light on factors that may be determining poor coordination in the supply chain. The ban has already affected the already declining foreign exchange earnings from vegetables. Earnings from vegetable export has reduced from \$15 million just before 2008 down to about \$8.5 million in recent times (Gonzalez, *et al.*, 2016). The Minister for Food and Agriculture, in his address at the launch of the 2016 vegetable sector business opportunity report noted the ban continues to affect the nation's foreign exchange inflows, farmers income and job opportunities for many farmers.

Generally, discussions on contract farming in the literature focus on its role in coordination between upstream producers and emerging global agri-food markets (Eaton and Shepherd, 2001; Kirsten and Sartorius, 2002; da Silva, 2005; Maertens and Swinnen, 2006; da Silva and Rankin, 2013), reducing risk associated with procurement by buying firms, improving farmers'

income (Little, 1994; Singh, 2002; Barrett, 2012) and whether participation includes or excludes smallholder farmers (Little and Watt, 1994; Warning and Key, 2002; Miyata *et al*, 2009; Wang *et al*, 2011; Key and Runsten, 1999; Singh, 2002; Guo *et al*, 2005; Barrett *et al*, 2012). This article focuses on the role of contract farming in enhancing coordination in the agri-food supply chain. Empirical studies in Africa and other developing countries shed light on how contract farming helps integrate smallholder farmers to modern marketing channels (Maertens and Swinnen, 2006). Nonetheless, many studies have indicated several enforcement problems that affect performance of contract farming as a coordination mechanism. Barret *et al*. (2012) identified lack of commitment to comply with contractual agreement by parties. Guo *et al*. (2005) and Singh (2002) observed high default rate, delayed payment, biased contract terms and cheating in contractual arrangements.

Contract enforcement and ultimately achievement of coordination to some extent depend on how contract design takes into account factors that are likely to impact enforcement. It also depends on the extent to which buying firms incorporate contract terms that are preferred by farmers, but not focusing on terms that are favorably to the firms themselves (Abebe *et al.*, 2013). In this regard, emerging studies on contracting in the agricultural supply chain have examined contract design terms or provisions that are preferred by farmers both in developed and developing countries (Vassalos *et al.*, 2013; Abebe *et al.*, 2013; Barrowclough *et al.*, 2015). The implication of those studies was to signal to buying firms the kind of contract terms that farmers preferred and which should guide them in their contract design. What the existing literature does not adequately address is whether contract terms that parties find preferable and which are incorporated in their design, adequately take into account factors that can influence enforcement of these terms. We argue that for a contract to achieve coordination, it is not enough that contract terms meet the preferences of farmers or buying firms. It must be

recognized that certain factors exogenous to the terms themselves as well as the type of agreement (formal or informal) governing parties' relationship can influence parties' incentives to either comply or breach the terms. While it may seem easy to comply with the terms themselves, certain factors could erode incentives to comply with the terms, resulting in contractual breaches and subsequently coordination failure. Hence the design must take into account factors that are likely to impact on enforcement of these terms including the kind of contract itself. For example a contract for the purchase of a commodity that has an alternative market should recognize that what goes on in the alternative market can influence parties' performance of the contract. Moreover, a contract term that maybe easily enforced in a formal contract may be difficult to enforce in an informal (relational) contract without appropriate measures.

In this study, we examine whether contract terms or provisions that are specified in the design of contracts in the vegetable supply chain in Ghana (the nature of contracting) are able to achieve coordination and what factors influences farmers' incentives to breach contract terms, specifically breaching an agreement to supply all contracted produce to the buyer (a condition known as side-selling).

2 Literature review

The design of mechanisms to enhance coordination in agri-food supply chains has received much attention in the academic literature (MacDonald, 2015; Barrett *et al.*, 2012; Reardon *et al.*, 2009; Bijman, 2008; da Silva, 2005). This interest has been especially strong for developing countries where primary agricultural production constitutes a major component of their economies. In particular, the lack of co-ordinated procurement and supply systems are

recognised as a barrier for Sub-Saharan African (SSA) smallholder farmers seeking access to the emerging high value markets. Notably, stringent food safety and costly certification procedures raise barriers for resource poor smallholder farmers to be involved in high value supply chains when operating in isolation. Recent empirical and theoretical studies considered contracting as an important coordination mechanism that can be used to link agricultural producers to markets (Barrett *et al.*, 2012; da Silva, 2005; Singh and Asokan, 2005; Anno, 2003 and Eaton and Shepherd, 2001).

The different models (Eaton and Shepherd, 2001) and types (Mighell and Jones, 1963) of contract farming indicated by theory and practice offers varying degrees of contractor involvement in farmers' operation and ultimately how activities between the parties are coordinated. The centralized and the nucleus estate models provide an opportunity for higher contractor involvement, enabling him to monitor farmer's production and distribution process (Eaton and Shepherd, 2001). In the nucleus estate model, the contractor operates his own farm which he can use as a demonstration field to teach farmers suitable agronomic practices. These models could be well suited for the production of crops for which higher coordination between farmer and contractor is needed to achieve the desired product quality, though the nucleus estate is commonly applied in plantation cultivation. The multipartite model is where the state steps into to provide support such as input provision and extension service to farmers while the contractor is responsible for buying the produce (Eaton and Shepherd, 2001). This is relevant where the contractor lacks the financial strength to provide this support. Coordinating production and distribution activities may be relatively difficult in this model. If intermediary model is used the buyer formally contracts with middlemen who in turn enters into informal contract with several smallholder farmers (Bijman, 2008). This is helpful in dealing with large number of small farmers but have the potential of disconnecting farmers from the contractors

and dilute efforts at providing incentives to farmers and delivery of quality produce to the firm. A contract farming could also take the form of the informal model (Eaton and Shepherd, 2001; Little, 1999). This model is based merely on verbal agreement and is noted to be more preferred in Africa (Danson *et al.*, 2004). It is commonly applicable in purchasing fresh vegetables but has a higher risk of default by both parties (Eaton and Shepherd, 2001). In this regard, Eaton and Shepherd (2001) noted that this model is not suitable for the production of crop that has alternative markets where farmers can easily engage in extra contractual sales.

Market specification contract mainly specifies terms of sales of the produce such as the quality to be delivered, time of delivery and place of delivery with no involvement of the contractor in production processes (Mighell & Jones, 1963; Bijman, 2008). In markets where absolute adherence to quality standards are required market specification contract might not be suitable, especially where farmers lack the competence and technology for the production of high value crops without supervision. In production management contract, on the other hand, the contractor specifies and monitors farm activities such as the production methods, inputs application regimes and harvesting procedures that farmer should follow (Bijman, 2008). This ensures that activities from farm up to final delivery of produce are highly coordinated. This contract may be beneficial for purchasing high value crops for which strict quality standards ought to be followed. Resource providing contract offers an opportunity for farmers to receive input credits and new technology services (Key and Runsten, 1999; Kirsten and Sartorius, 2002; Maertens and Swinnen, 2009; Abebe *et al.*, 2013; Shepherd, 2013; MacDonald, 2015). It can therefore be suitable when contracting with smallholder resource poor farmers.

A contract, whether formal or informal specifies all obligations of each of the contracting

parties and parties are obliged to comply with their obligations (execution of contract terms) For example a typical contractual arrangement between a buyer and farmers in the vegetable supply chain may specify the seed to be sown, the fertilizer to be applied, the kind of pesticides to apply, chemical application regimes, the expected output, time and place of delivery as well as the buyer's obligation such as the time to turn up to purchase the produce, the price to be paid and payment method. However, imperfections in the state of nature, information asymmetry between contracting parties and parties' inability to specify every possible contingency in the contractual agreements may render contracts vulnerable to breaches by either of the parties (Minot, 2011). Minot (2011) identified side-selling (the sale of contracted produce to other buyers) as a major problem in contract farming. Credit default, failure to deliver the required quality and quantity and failure to adhere to agreed production time lines are other common contractual breaches by farmers (Barret *et al.*, 2012; Minot, 2011). Also buying firms breach contract by failing to show up to buy contracted produce, reducing agreed produce price after farmer has delivered, unduly rejecting produce and defaulting payment for produce purchased on credit (Barret *et al.*, 2012; Minot, 2011; Little, 1999). Factors that give extra benefit or pose challenge to any of the party in executing the contract may provide incentives for him or her to breach it. For example Minot (2011) noted that when prices in an alternative market increases above contract price farmers may want to engage in side-selling, while buyers will want to reduce agreed contract price when the alternative market price decreases below contract price. This suggest availability of alternative market can affect incentive to comply with certain terms of the contract (Baker *et al.*, 2002). Other personal characteristics of either the farmer or the buyer may also impact their decision to comply with contract terms. Where contracting parties are able to spell out obligations and contingencies in a formal complete contracts, third parties such as the courts are able to provide enforcement, thereby reducing the incidence of breaches (Udry 1990; Hart and Holmstrom, 1989;

Fafchamps, 2004). However, in the case of informal contracts, which is common in most agricultural contract relationship in Africa (Danson *et al*, 2004), inability to specify all obligations and contingencies leaves compliance at parties' discretion. Hence factors such as the outside option (alternative market), where applicable, which has been noted to affect parties' temptation to breach a contract (Baker *et al.*, 2002; Minot, 2011) may be more influential in informal contracts.

To enforce informal contracts therefore, relational contracting which involves repeated interaction between parties (Baker *et al.*, 2002; Fafchamps, 2004; 2006; Gibbons, 2005) multilateral reputation, communication, and trust building have been suggested as self-enforcing mechanisms (Williamson, 2002; Fafchamps, 1996). Minto (2011) added information sharing, farmer groups and close monitoring as having potential to control side-selling and default in contract farming. Repeated trading refers to situation where contracting parties trade successively infinitely into the future but trade relationship ends as soon one party fails to honour his part of the terms of the trade (Fafchamps and Gubert, 2007). The power of repeated trading as self-enforcement mechanism lies in the value of the future relationship. When a party's expectation of the value of future trade is relatively higher, and relationship ends as soon as one party breaches an obligation (Fafchamps and Gubert, 2007), then the threat of termination of the relationship can serve as disincentive for contract breaches (Baker *et al*, 2002; Levin 2003). Trust is very important in relational contracting where enforcement relies on a kind of *quid pro quo* understanding. For example in settings where enforcement by legal institutions are lacking, traders rely mostly on personal trust to protect themselves against the risk of contract breaches (Fafchamps, 2004). Traders will comply with promises of future transactions such as defer supplies and payments from parties they know and trust than those they are not familiar with. Repeated trading and reputation enhances trust among trading

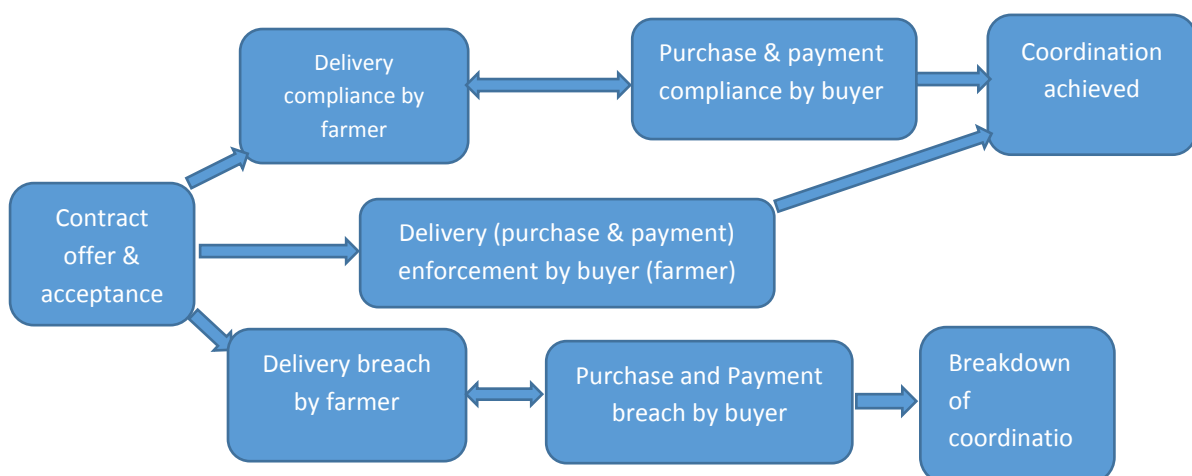
parties ex-ante and also offer an opportunity for parties to respond appropriately to new situations ex-post (Baker *et al*, 2002; McMillan and Woodruff, 2000; Ben-Ner and Putterman, 2001). Reputational effects are more likely to be built in farmer groups (FBOs). Communication and feedback between contracting parties where issues concerning their relationship is discussed is believed to promote contract compliance (Kandori, 1992; Ellingsen and Johannessen, 2004; Brandts *et al.*, 2014). Various platforms including frequent monitoring in trading relationships could offer an opportunity for communication between trading parties and information sharing between parties. A contract type or model that offers an opportunity for close monitoring becomes helpful.

2.1 Conceptual framework for analyzing the nature of contract design

Our conceptual framework explains the process of contract farming from contract offer through specification of terms to compliance or enforcement of contract terms. The framework is based on theory and practice of contract farming (Eaton and Shepherd, 2001; Bijman, 2008; Fraser, 2003 and Mighell and Jones, 1963) adapted to suit contracting in the high value horticultural supply chain. At contracting stage the buying firm offers contract to the farmer. The buyer should explicitly specify all terms of the contract and each parties' obligations. Terms that can have direct impact on product quality and ought to be explicitly specified include type of seed to grow, type of agrochemical to apply, the desired quality and quantity of output as well as agronomic practices such as weed control timelines, agrochemical application regimes, harvesting and transportation methods. The contract should also consider pricing methods such as fixed pricing or spot market pricing arrangement, premium price for high quality and grading system to be used. The model or type of contract to be used should also be specified. In the high value supply chain this may involve either production management, resource providing,

centralized or the nucleus (out-grower) model which have the capacity to ensure effective coordination of production activities, distribution process and provision of technical and credit support to farmers. Parties also decide whether to indicate contract terms and obligations in a formal written agreement (written contract) or verbal agreement (informal contract). During production and delivery of produce the farmer may breach some or all of the terms of the contract thereby failing to deliver the expected output to the buyer or comply with all the terms and deliver the desired output to the buyer. Compliance with the terms results in achievement of coordination while breaching contract terms leads to breakdown of coordination. The buyer may also breach terms regarding payment or purchase of crop, which also leads to breakdown of coordination. To prevent breaches some enforcement mechanism must be introduced. The choice of enforcement methods depends on whether the contract was formal or informal. Parties can rely on third parties such as the court to enforce formal written contract. They will, however, have to employ self-enforcement mechanisms such as repeated contracting, where parties agree right from contract initiation to have a contract spanning several seasons, to enforce informal contract. If parties are able to enforce contract either way, coordination is achieved, otherwise coordination breaks down. The conceptual framework is shown schematically in figure 1 below.

Figure 1: Schematic representation of contract design between a buyer and a farmer



3 Methodology of the study

3.1 The study area

The study took place in four major regions in Ghana which were; the Greater Accra, Volta, Eastern and Central regions. These were regions in the country noted for high levels of vegetable production for the export market due to their relative proximity to the nation's international airport. Apart from the export market, Greater Accra, being the capital city of Ghana is home to millions of urban dwellers and foreign expatriates who are heavy consumers of both local and exotic vegetables and constitute a substantial market for vegetable growers. All the three other regions share a boundary with Greater Accra.

3.2 Sampling Technique

A sample size of two hundred and forty (240) contracted vegetable farmers comprising one hundred and twenty (120) each in the export marketing channel and the traditional marketing channel was selected. Also the sample consisted of 10 buyers each from the export and traditional marketing channels. Convenient sampling was used to select 30 farmers from each of the two different marketing channels in each of the four regions. It should be noted that, though the sample was conveniently selected, it was a representative of all four major regions involved in the vegetable export trade. The selected farmers comprises those who were actively involved in contract farming. Purposive sampling was used to select 10 buyers in each of the marketing channel. Purposive sampling because the selection had to reflect trading partners (buyers) of farmers involved in the survey. Areas covered by the questionnaire included type of contractual agreement, type of contract (Mighel and Jones, 1963), contract specifications,

contractual breaches (forms and causes) and contracts enforcement mechanisms. Factors believed to affect contract enforcement were also solicited.

3.3 Data Collection Method

Primary data was collected by using a well-structured questionnaire administered to vegetable producers and exporters in the study area. An in-depth interview with Vegetable Producers and Exporters Association of Ghana (VEPEAG) and Ghana Association of Vegetable Exporters (GAVEX) which were two important stakeholders in the vegetable export sector was conducted to obtain pertinent information regarding the current status of the sector.

3.4 Method of Data Analysis

Analysis of nature of contract design and coordination

To examine the nature of contract design and whether it achieves coordination, descriptive statistics were used to analyze contract type used by parties, extent of specification of contract terms, contractual breaches and enforcement mechanisms used base on the conceptual framework in section 2.1.

Estimation of factors that influence side-selling

To estimate factors that influence side-selling among farmers the Logit regression model was used. Since farmer's decision could either be to side-sell or not, we have a binary dependent variable. Independent variables expected to influence farmers' decision to engage in side-selling and were included in this study were farm size, FBO membership, shorter distance from

farm to alternative market, whether buyer and farmer come from same community, shorter trading relationship with buyer, frequency of monitoring and farmer characteristics such as age and gender of the farmer.

The binary logit model

Logistic regression allows us to estimate the probability of a binary response variable (That is when the probability exist between 0 and 1) base on a combination of some independent variables, which are either categorical or numerical. The dependent variable in logistic regression follow as Bernoulli distribution, which is a special case of a binomial distribution where $n = 1$ (i.e. one trial) and success = 1 and failure = 0.

Hence probability of success = P and probability of failure = $1-P$.

To estimate the probability, P , in logistic regression (which follows a Bernoulli distribution) we need to able to link together a in a linear fashion the dependent variables (Bernoulli probability distribution) and the independent variables. The natural log of the odd ratio (known as the logit) allows us to do that.

That is:

$$L_n(odd) = L_n \left(\frac{P}{1-P} \right) = \text{logit of } (P) \quad (1)$$

The linked function is therefore expressed as

$$L_n(odd) = L_n \left(\frac{P}{1-P} \right) = \beta_0 + \beta_1 X_1 \dots + \beta_m X_m + \varepsilon \quad (2)$$

Where

P = the probability

β_0 = intercept

$\beta_1 - \beta_m$ = regression coefficients of the independent variables

$X_1 - X_m$ = independent variables

ε = an error term

In the above logit function, the probabilities, 0 and 1 occurs on the X-axis. To have the probabilities on the Y-axis, an inverse of the logit function need to be taken.

$$\text{Logit}^{-1}(\alpha) = \frac{1}{1+e^{-\alpha}} = \frac{e^{\alpha}}{1+e^{\alpha}} \quad (3)$$

α = linear combination of independent variables and their coefficients. Taking the inverses of the logit function will produce the probability of the event occurring (i.e. probability being '1').

The technique of maximum likelihood estimation is used to estimate the coefficients of the regression equation. Taking the antilog of the logit function in (2) above allows us to estimate the regression equation (i.e. solve for the probability, P).

$$\frac{P}{1-P} = e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2}$$

$$P = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2}} \quad (4)$$

P = the estimated probability.

Running the regression in a statistical software will generate values for the coefficients which when substitute into (4) will enable us compute the value for P .

The logistic distribution function has been used by many studies to examine factors influencing farmers' decision in for example adoption of a technology or practice (Kifle *et al.*, 2016; Supaporn, *et al.*, 2013), choosing a product or service or an attribute of a product or service (Abebe *et al.*, 2013; Vassalos *et al.*, 2013) when the predicted behavior or variable is dichotomous. The logistic regression is close approximation of the cumulative distribution function and is easier to work with. The logistic regression has an advantage over others when analyzing dichotomous dependent variable (Hosmer *et al.*, 1989). Hence we use the logistic regression model in this study to estimate factors influencing farmers' decision to engage in side-selling

Empirical model specification

The parameters for estimating farmers' decision to engage in side-selling were estimated using the logit model:

$$S = L_n \left(\frac{P}{1-P} \right) = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{MALE} + \beta_3 \text{EDU} + \beta_4 \text{FBO} + \beta_5 \text{FM} + \beta_6 \text{SD} + \beta_7 \text{SR} + \beta_8 \text{BC} + \beta_9 \text{FS} + \epsilon$$

Where P is the probability of engaging in side-selling, $P = 1$ means a farmer engaged in side-selling and $P = 0$ means a farmer did not engaged in side-selling.

S = probability of engaging in side-selling

β_0 = intercept

$\beta_1 - \beta_9$ = regression coefficients of the independent variables.

The independent variables are described in table 1 below.

Table 1: Description of variables in the empirical model

<i>Variable</i>	<i>Description</i>	<i>Measurement</i>	<i>Expected sign (+/-)</i>
FBO Membership (FBO)	A farmer being a member of farmer based organization (FBO)	Dummy (FBO = 1, 0 =otherwise)	-
Frequent Monitoring (FM)	Number of times a buyer visit farmer in a production season. 3 times or more implies FM	Dummy (FM = 1, 0 otherwise)	-
Shorter distance to alternative market (SD)	Less than 50km from farm location to alternative market (Accra as proxy for alternative market)	Dummy (SD = 1, 0 otherwise)	+
Shorter contract relationship (SR)	Contract offered or lasted for one or few seasons	Number of times (seasons) farmer has disengaged contract with buyer in last 5 years	+
Buyer from farmer community (BC)	The buyer and the farmer come from same community	Dummy (BC=1, 0 Otherwise)	-
Farm size (FS)	Larger farm size	Number of acres	-
Age of farmer (AGE)	How old the farmer is	Number of years	-
Gender of farmer (MALE)	Being a male farmer	Dummy (MALE= 1, 0 otherwise)	+
Years of education of farmer (EDU)	A farmer having attained higher level of education	Number of years of formal education	-

Hypothesis

i) Ho: FBO membership has no influence on side-selling

Ha: FBO membership has a negative influence on side-selling

This statement holds for: educational level of farmer, age of the farmer, frequent monitoring, farm size, and buyer from farmer's community.

ii) Ho: Shorter distance to alternative market has no influence on side-selling

Ha: Shorter distance to alternative market influences side-selling positively

This statement hold for: Being a male farmer and Shorter trading relationship.

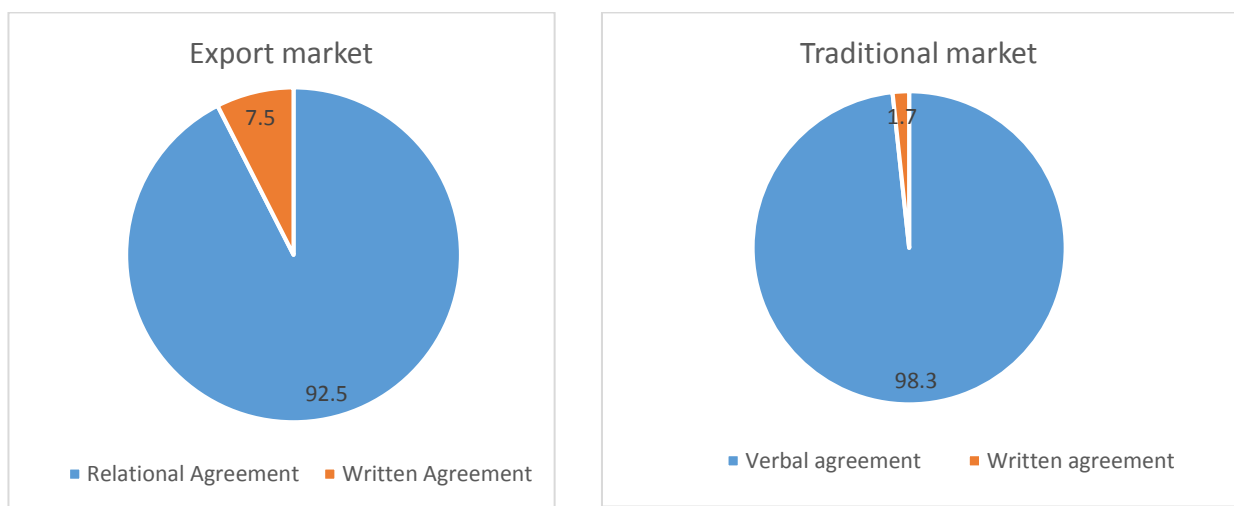
4 Results and Discussion

4.1 The nature of contracting

Type of contractual agreement governing parties' relationship

As can be seen in figure 1, majority (92.5%) of contracted farmers in the vegetable export market channel reported that they had verbal agreement with exporters while only 7.5% indicated they had written agreement. In the traditional market channel, 98.3 % farmers reported their contract involved verbal agreement while only 1.7% had written agreement.

Figure 2: Contractual agreement



Source: Survey data, 2016

The results show that the terms of contractual agreement between farmers and buying firms were verbally communicated but not formally written. Literature on contract theory describes this form of contracting as informal (relational) contracting which are merely based on the trust that each of the party will satisfy his or her obligation. This means buying firms in both the export and traditional marketing channels rely mostly on informal contracting in purchasing vegetables despite their differences in terms of adherence to quality and timeliness of

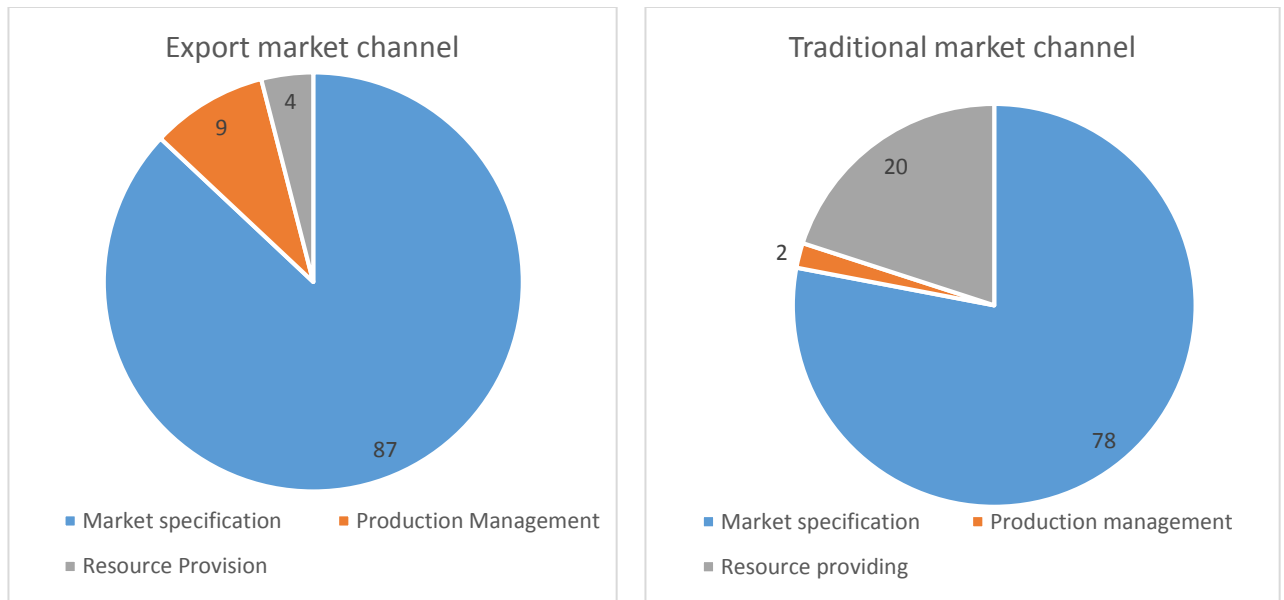
production and marketing processes at their retail market. However, in all the relationship sample farmers indicated contracts were offered only on seasonal basis without any explicit guarantee of continuation, though it was observed that some contracts went beyond one season. The results lend support to the view that because of the communal relationship in Ghanaian societies, it is normal and common practice to have people engage in transactions under informal agreement and understandings especially in the agricultural sector mainly base on trust (Kudadjie-Freeman *et al.*, 2008; Lyon 2000; Little 1999). Besides the high illiteracy rate among Ghanaian farmers may make written contract difficult to initiate. The results also support Fafchamps (2004) and Bogetoft and Olsen (2004) observations that there is a general preference for relational contracting in developing countries' agricultural sector. Inefficiencies within the court system in developing countries (World Bank, 2012) and high transaction cost involved in legal suits in most developing countries especially when dealing with smallholder farmers (Eaton and Shepherd, 2001), has been indicated as some reasons parties prefer not govern their relationship with formal, court enforceable contract.

Type of contract used by contracting parties

As figure 3 shows, 87% of farmers indicated their contracts with exporters were market specification while 9% and 4% reported they had production and resource providing contracts respectively. In the traditional market channel, on the other hand, 78%, 2% and 20% of farmers said they had market specification, production management and resource providing contract respectively, with their buyers. These findings point to a predominant use of market specification contracts in purchasing vegetables in both export and traditional marketing channels. This means farmers are mostly responsible for all the production activities including

input acquisition, agronomic practices and harvesting of produce and bears all risk associated with production. This type of contract offers limited opportunity of buying firm's involvement

Figure 3: Type of contract used by contracting parties



Source: Survey data, 2016

in farm operations hence less monitoring of farm activities. The implication of using market specification contract is that buying firms are disconnected from farmers on the field and cannot monitor the type of inputs, the application of these inputs and how vegetables are harvested and transported. The likelihood that farmers will comply with recommended agronomic practices cannot be guaranteed especially where smallholder farmers are involved. Moreover, smallholders may find it difficult to access requisite production inputs and technical advice needed for production. Hence delivery of quality vegetables is more likely to be compromised. Possible reason that may account for the use of market specification contract in the export market channel is the problem of trust existing between exporters and farmers. As was revealed in the survey (see contract enforcement strategies by buyers and farmers) one of the aftermath of contract breach is that there is loss of trust between parties in subsequent relationships. Consequently, exporters may not invest in resource providing or production

management contract for fear that farmers may breach the agreement and resort to extra side-selling.

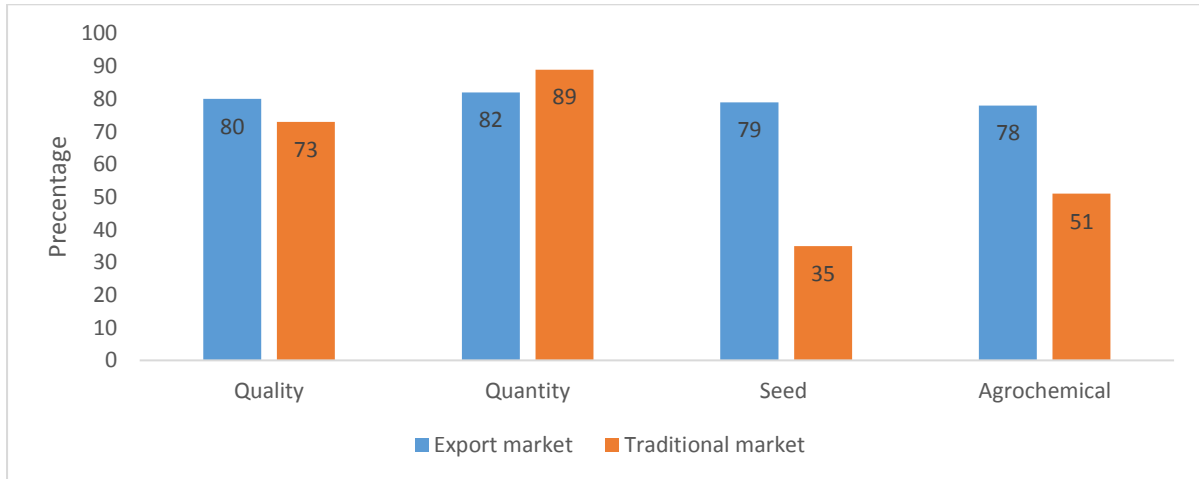
Specification of quantity, quality inputs usage and agronomic practices

As figure 5 indicates, majority (82%) of farmers surveyed in the export market channel indicated that buyers specified to them the quantity of vegetables they should grow at a particular season. There were equally high number (89%) of farmers in the traditional market who pointed out their buyers specified to them the quantity they should produce. In terms of quality of produce to deliver, 80% of farmers in the export marketing channel and 73% in the traditional marketing channel 73% showed that their contract stated it. When farmers were asked as to whether their contract specified the type of seed to grow, most of them (79%) in the export marketing channel responded in the affirmative. However, relatively few farmers (35%) in the traditional marketing channel stated that their contract specified the seed they should grow. With regards to type of agrochemicals, 78% of farmers in the export marketing channel indicated their contract specified it, while an average number of farmers (51%) in the traditional marketing channel indicated it.

In terms of agronomic practices, few (27.5%) of surveyed farmers in the export marketing channel indicated their contract specified agrochemical application regimes. Relatively, lesser number (13%) of farmers indicated this in the traditional marketing channel. On weed control regimes only 13% and 14% of farmers in the export and traditional marketing channels respectively, stated that their contract specified it. Regarding harvesting procedures, 29% of farmers in the export marketing channel mentioned their contract stated it while only 14% of farmers in the traditional marketing channel indicated they have it stated in their contract. On

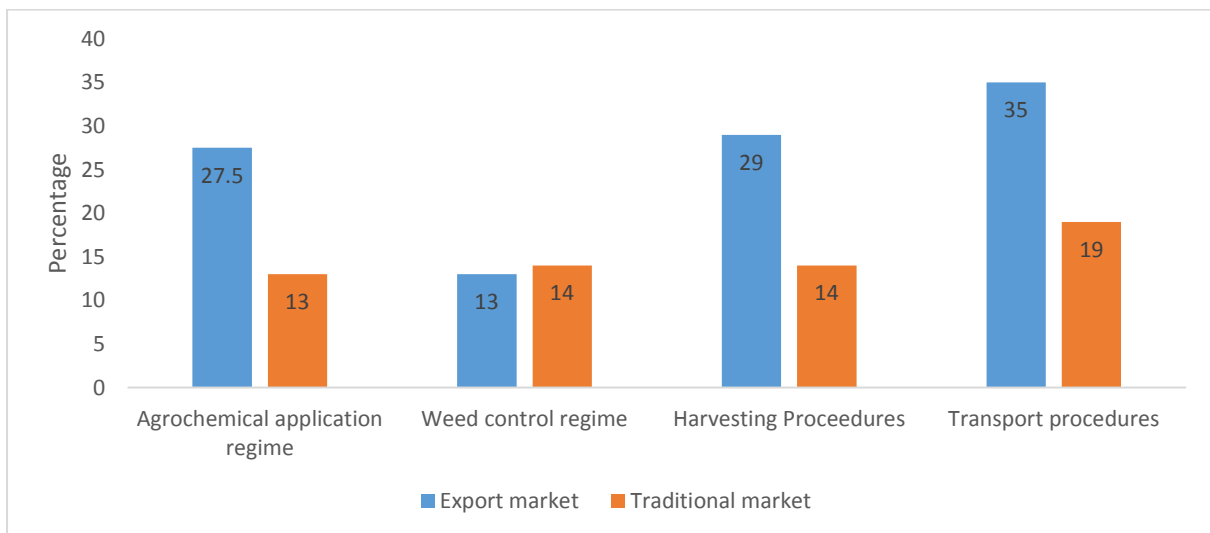
transport procedures, 35% and 19% of farmers in the export and traditional marketing channels respectively, indicated that it was specified. This is shown in figure 6 below.

Figure 5: Quantity, quality and inputs specifications



Source: Survey data 2016

Figure 6: Specification of agronomic practices



Source: Survey data: 2016

The findings show that majority of contracts in the export marketing channel specified quality and quantity of vegetables that farmers should deliver as well as the type of seed and agrochemicals that should be used in line with practices in contract farming (Eaton and

Shepherd, 2001). While majority of contracts in the traditional marketing channel specified the required quality and quantity of produce, only an average and less than average number of contracts specified the type of agrochemicals and seeds to use respectively. Specifying vegetable seeds to grow and agrochemicals to apply means exporters understood the implication of seeds and agrochemicals on quality output. In the traditional marketing channel, quality is not strictly enforced hence the likely reason for less specification of type of seed and agrochemicals. Most farmers continue to rely on traditional and inferior varieties of seeds for production in the traditional market (Saavedra et al., 2014). While most of the contracts in the supply chain specified the quality of the expected output, only few contracts in the vegetable supply chain specified activities such as agrochemical application regimes, weed control regimes, harvesting and transport procedures. These practices have direct impact on the quality of produce and can result in poor quality if farmers themselves do not know exactly how to carry them out. Given that Ghanaian smallholder farmer's access to information on improved crop cultivation practices is limited, this could contribute to poor quality vegetable in the supply chain.

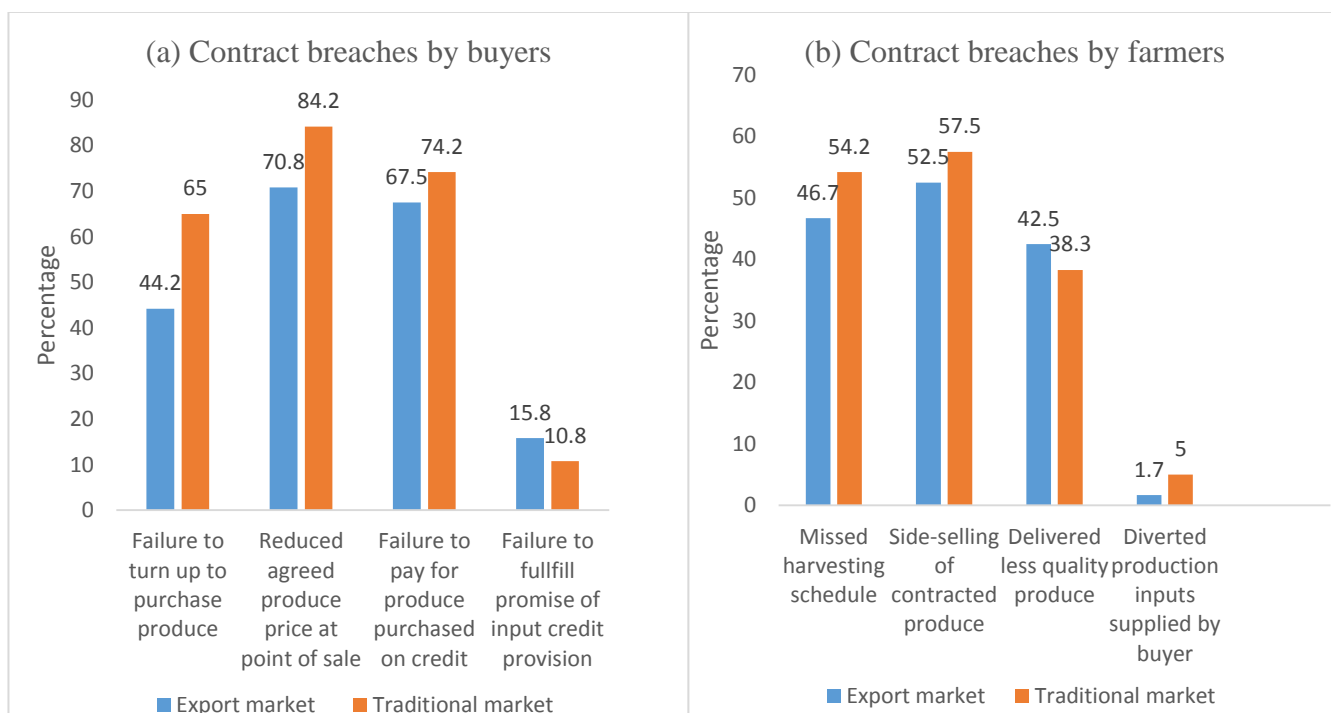
Contract breaches

As shown in figure 8 (a), about 70.8 % and 84.2 % of farmers in the export and traditional marketing channels respectively, reported that they have had the agreed price of their produce reduced by buyers at point of sale. With regards to failure by buyers to pay for produce purchased on credit, 67.5 % and 74.2% of farmers in the export and traditional marketing channel indicated they have been breached in the last five years. In terms of failure to turn up to purchase contracted produce, 44.2 % and 65% of farmers in the export and traditional marketing channels respectively, mentioned that they have been victims. Only 15.8% and 10.8% of farmers in the export and traditional marketing channel respectively, indicated buyers

failed to fulfill the promise of supplying them with production inputs. On the other hand, when farmers were asked to indicate if they had been compelled by any circumstances to breach contract with their buyers, as shown in figure 8 (b), 52.5% and 57.5% of them in the export and traditional marketing channels respectively, said they had engaged in side-selling of contracted produce. Also, 46.7% and 54.2% of farmers in the export and traditional marketing channels respectively, mentioned they had missed harvesting schedule. In terms of delivery of quality produce, 42.5% and 38.3 of farmers in the export marketing and traditional marketing channels respectively, indicated they had delivered less quality than specified by buyers. Only 1.7% and 5% of farmers in the export and traditional marketing channels respectively, said they had diverted inputs meant for contracted crop.

The results show that contractual breaches such as reduction of agreed produce price at point of sale and failure to pay for produce purchased on credit by buyers occurred in majority of the contracts in both the export and traditional marketing channels in the last five years. Among the reasons for this behavior in the export marketing channel is when buyers can have alternative supply source that is cheaper, which normally happens during periods of glut. Another reason is that, between the period parties agree on the price and the time the farmer prepares to deliver the produce, the open market price could fall (Lyon, 2000) and buyers would want to buy at this reduced price. If farmers fail to sell at this price buyers may resort to alternative supply source. An explanation from farmers in the export market channel shows that often exporters may pay part of their debt or may not pay any at all.

Figure 8: contract breaches Committed by buyers and farmers from 2010 to 2015



Source: Survey data, 2016

Buyers’ failure to turn up to purchase contracted produce occurred in less than average number of contracts in the export marketing channel but in majority of the contracts in the traditional marketing channels. Little (1999) reported similar act in the pineapple sector in Ghana. Reasons that accounted for reduction of pre- agreed price at point of sale (easy access to alternative supply sources) may equally account for their failure to buy contracted produce. Reneging on promise of input supply occurred in very limited number of contracts in both marketing channels. There is however, only few relationships involving supply of inputs by buyers (resource providing).

Side-selling by farmers occurred in more than average number of contracts in both marketing channels in the last five years and is the predominant form of contractual breaches in both the

marketing channels. The availability of alternative market for vegetables makes it easy for farmers to engage in side-selling. Eaton & Shepherd (2001) noted that if the contract makes use of fixed pricing method there is the possibility of farmers engaging in side-selling whenever the spot market price goes up. Though the relationship here is governed by spot market price, it was observed that in most of the relationships parties agreed on the price some days (predominantly 2 days - 1 week days) before the farmer is expected to deliver the produce. Within that period a farmer could sell the produce to another buyer when a higher offer is received outside the relationship. Missing harvesting schedule and failure to deliver expected quality produce occurred in less than average number of contracts in the export marketing channels. In the traditional marketing channel, however, more than an average number of contracts were not able to meet harvesting schedule while less than average number failed to deliver required quality. Diversion of production inputs occurred in limited number of contracts in both supply chain.

Contract enforcement strategies by buyers and farmers

As shown in table 2, majority (56.7 and 70.8) of farmers in the export and traditional market channels respectively, said they failed to trust buyers in subsequent relationships after the buyer had breached contract. About 38 % and 25% of farmers in the export and traditional marketing channels respectively, said they refused to have further relationship with buyer if buyer breached contract. While 7.5% of farmers in the export marketing channel said they reported cases of contractual breaches to opinion leaders for resolution, 2.5% of farmers in the traditional marketing channel relied on opinion leaders. On the other hand, out of ten (10) exporters interviewed, 7 indicated that they dropped farmers who breached contract with them while 3 said they preferred to resolve the issue with farmers and continued the relationship. In the traditional marketing channel, however, nine (9) out of ten (10) buyers indicated that

they terminated contract with farmers who engaged in contractual breaches. Whiles farmers mostly prefer to stay in the contractual relationship but fail to trust exporters when they have breached by buyer

Table 2: Action taken by contracting parties to enforce contract

	<i>Percentage of farmers export market</i>	<i>Percentage of farmers in traditional market</i>
<i>Action taken by farmers</i>		
Report to Opinion leaders	7.5	2.5
Terminate contract with buyers	30.8	25
Fail to trust buyer in subsequent contract	56.7	70.8
Never breached	5	1.7
Total	100	100
Action taken by exporters	Number of exporters	Number of buyers
Terminate contract with farmers	7	9
Resolve breach using opinion leaders	3	1
Total	10	10

Source: Survey data, 2016

The findings show contract termination as an enforcement strategy, as suggested by relational contracting literature, is less utilized by farmers both in the export and traditional marketing channels. The reason for this may be that there were no explicit provisions for continued (repeated) contract during contract initiation. Farmers knew they only had one seasonal contract, with no guarantee of continuation in the first place, so it would not be credible if they wanted to threaten to terminate contract with buyers who cheated. Their preference to stay in

the relationship but not trust their trading partner meant that there could be more breaches by farmers in subsequent relationships as they may not want to commit to obligations specified by the buyer. On the part of buyers, however, they would want to enforce contract by severing relationship with farmers who breached contract. But, this cannot influence farmers' decision

to breach contract since farmers were aware they did not have any guarantee of contract continuation which they would want to protect. Hence this may fail to effectively enforce contract with farmers. The fact that very few farmers and buyers in both marketing channels relied on opinion leaders to enforce contract suggest that they may not be effective enough in resolving contract breaches.

4.2 *Factors that influences side-selling among farmers*

With reference to the polled regression results in table 3, all variables except education and FBO membership show significant effect on side-selling and had the expected signs. Age has a negative relationship with side-selling, meaning the likelihood that a farmer will engage in side-selling decreases as the farmer ages. The odds of a farmer engaging in side-selling decreases by 0.85 time for each one year increase in age. Being a male farmer has a positive relationship with side-selling and the odds of engaging in side-selling by a male farmer compared to a female farmer is 29.1 times higher. Side-selling decreases with increasing farm size. A unit increase in farm size decreases the likelihood that a farmer will engage in side-selling by 0.56 times. A shorter distance to alternative market increases the likelihood of side-selling. The likelihood of a farmer engaging in side-selling is 7.6 times higher if the distance from farm to alternative market is less than 50 kilometers. If the buyer and the farmer comes from same community side-selling is reduced and the likelihood that such a farmer will engage in side-selling is 0.22 times lesser compared to if the buyer comes from outside the farmer's community. A shorter contract relationship with buyers influences side-selling positively. The odds of a farmer engaging in side-selling is 2.1 times higher if parties have shorter contract compared to if they have longer contract relationship. Frequent monitoring influences side-

selling negatively and the likelihood of a farmer engaging in side-selling is 0.05 times lesser if his farm is monitored at least three times in a growing season.

Table 3 also provides a comparison of factors influencing side-selling in the export marketing and the traditional marketing channels. FBO membership showed no significant effect in both marketing channels. Being a male farmer and farm size were not significant in the export marketing channel but were significant, showing positive and negative effect respectively, in the traditional marketing channel as expected. In the traditional marketing channel, the odds of a male farmer engaging in side-selling is 97.7 times higher than a female farmer while the odds decreases by 0.23 for each acre increase in farm size. Shorter distance to alternative market was not significant in the traditional marketing channel but showed significantly positive effect in the export marketing channel as expected. Education was significant in both marketing channels, but showed an unexpected sign in the traditional marketing channel. The odds of a farmer in the export marketing channel engaging in side-selling decreases by 0.51 for each year increase in formal education but in the traditional marketing channel the odds increases by 1.38 for each year increase in formal education. Age, buyer coming from farmer's community, shorter contract relationship and frequent monitoring showed significant effect and had the expected signs in both marketing channels. Apart from education and buyer coming from farmer's community, the significance levels of variables were higher in the traditional marketing channel than in the export marketing channel. Age has a negative effect on side-selling in both marketing channels. The odds of a farmer engaging in side-selling decreases by 0.73 and 0.82 for each year increase in farmer's age in the export and the traditional marketing channels respectively. There is negative relationship between side-selling and the buyer coming from farmer's community though the significance level of the effect is not robust in the traditional marketing channel. If the buyer comes from the farmer's community, the odds of engaging in side-selling decreases by 0.0007 in the export marketing

channel and 0.17 in the traditional marketing channel. Shorter contract relationship has positive effect on side-selling. The odds of engaging in side-selling increases by 4.70 and 3.13 in the export marketing and traditional marketing channels respectively, as the length of contract relationship reduces by a season. Frequent monitoring have negative effect on side-selling. The odds of side-selling is 0.002 and 0.05 lesser in the export marketing channel and traditional marketing channel respectively, if farm is monitored at least three times in a growing season

Table 3: *Logit estimates of factors influencing side-selling*

Variables	Polled			Export Market			Traditional Market		
	Coef.	Std. err.	Odds ratio	Coef.	Std. err.	Odds ratio	Coef.	Std. err.	Odds ratio
Age	-0.17***	0.03	0.85	-0.32**	0.13	0.73	-0.19***	0.50	0.82
Gender (Male)	3.37***	0.96	29.1	7.18	9.05	1311	4.58***	1.44	97.7
Education	0.02	0.07	1.20	-0.68**	0.34	0.51	0.32**	0.16	1.38
FBO membership	-0.17	0.59	0.84	-1.31	1.65	0.27	0.63	1.03	1.89
Farm Size	-0.58**	0.26	0.56	-0.98	0.48	0.91	-1.44***	0.52	0.23
Close to alternative market	2.02***	0.64	7.56	8.33**	4.18	4160.5	1.51	1.07	0.16
Buyer from farmer's community	-1.54**	0.64	0.21	-7.20**	3.69	0.0007	-1.79*	1.07	0.17
Shorter contract relationship	0.73***	0.23	2.08	1.54*	0.85	4.70	1.14***	0.43	3.13
Frequent monitoring	-2.99***	0.61	0.05	-8.33**	3.27	0.002	-3.05***	1.09	0.05
Constant	4.69	1.85	110	12.63	10.22	305789.6	2.33	3.44	10.22
Observations	240			120			120		
Prob > chi2	0.000			0.000			0.000		
Pseudo R2	0.73			0.86			0.75		
Log Likelihood	-45.1			-11.48			-20.3		

***P < 0.01: **P < 0.05: *P < 0.1

The regression results show that age, gender, farm size, shorter distance from farm to alternative market, buyer and farmer coming from same community, shorter trading relationship and frequent monitoring influences side-selling in the vegetable supply chain. The results show that older farmers are less likely to engage in side-selling compare to younger farmers. The reason could be the widely held believe that as people age they become more trustworthy (Bailey, 2015) and are less likely to cheat. Also older farmers may be less explorative which may limit their information on marketing channel options. Moreover, the negative relationship between a being a male farmer and side-selling means that male farmers are more likely to engage in side-selling than female. Males are believed to be less trustworthy and less likely exhibit reciprocity in trading relationship compared to females (Rau, 2011). Males are more explorative and can intensely search for marketing channel options. nature of males may enhance Farmers with higher levels of education are less likely to engage in side-selling in the export marketing channel but are more likely to do so in the traditional marketing channel. Highly educated farmers may have better appreciation of contract arrangements and the long term implications of being loyal to one's trading partner. They are also more likely to be fast learners and adopters of good agronomic practices that suit the export market. Exporters may pay special attention to these suppliers thereby limiting the possibility of side-selling. Exporters who buy from the traditional market will target farmers who are able to produce vegetables close to the required quality. These are likely to be the educated farmers. Hence the positive relationship between side-selling and education in the traditional marketing channel. The negative influence of farm size on side-selling implies that farmers who cultivate larger acres of farms are less likely to engage in side-selling compared to their counterpart farmers with smaller landholdings. To reduce their transaction cost, buyers are more inclined to buy higher volumes of produce from larger farms. This will minimize incentives for larger farms to engage in side-selling. A shorter distance to alternative market is positively related to side-

selling because it offers farmers easy access to other marketing channels where they can easily divert some contracted produce. Studies have shown that outside options in the form of alternative markets to trading partners present a temptation to cheat in contractual relationship (Baker *et al.*, 2002). The relationship between side-selling and buyer and farmer coming same community shows that farmers are less likely to engage in side-selling if buyer lives and or come from the same community as farmers. This is because social network and the sense of belongingness among Ghanaian societies may discourage such cheating. Besides people are more concerned about their reputation in the community when they live closer to each other and may not want to be shamed before their neighbors. Moreover, some traditional authorities such as the chief are more effective in dispensing justice at the communal level over their own subjects and can easily penalize people who are found to engage in behaviors such as side-selling. The positive relation between shorter trading relationship and side-selling is because farmers are not afraid to cheat buyers if they don't foresee any continuation of the relationship after the current period. This confirms studies that show that lack of repeated trade provides an incentive to contract default (Baker *et al.*, 2002; Levin 2003). The reason for the negative relationship between side-selling and frequent monitoring is that monitoring serve as a check on farmers. Buyers are able to establish good relationship with farmers which increases their commitment to the contract.

5.0 Conclusion

The results from the study shows a similar pattern of contracting in the export market channel and the traditional market channel in the vegetable supply chain in Ghana. The stringent quality requirement of the export market should have called for contracting processes that ensured tighter coordination than pertains in the traditional market. Supply contracts which are

predominantly used in the supply chain lacks the capacity to provide sufficient coordination required between smallholder farmers and buyers especially in the export marketing channel where product quality is critical. If contract is to ensure efficient coordination and deliver quality produce then, a contract that ensures that producers have access to requisite production inputs and technology as well as enables contractors to have oversight control in the manner production practices are carried out by farmers, preferably resource providing contract, production management contract or centralized model, should be encouraged. Moreover, failure to fully specify agronomic practices required for the production of quality vegetable is identified as a major source of breakdown of coordination in terms of performance of contract terms in the supply chain. While side-selling constituted a major form of contractual breach committed by farmers, reduction of pre-agreed produce price was also a common contractual breach perpetrated by exporters. The implication of this behavior is that parties are unable to trust each other in the relationship. When farmers do not trust that buyers will always comply with the agreed price, they will not be willing to invest in costly agronomic practices to tailor produce to the needs of the buyer for fear of being held-up. Buyers, on the other hand, may not be willing to invest in farmers' production either through resource providing or production management contract for fear that farmers may side-sell the produce. Approaches adopted by parties to enforce contract has not been able to work effectively to ensure contract compliance. Contracts fail to adequately consider some factors that can affect compliance with contract terms, giving rise to contractual breaches (side-selling) in the supply chain. Though parties preferred informal agreements they failed to consider repeated contracting which has the potential to enforce compliance with contract terms. Seasonal contracts which are being offered by buyers, which do not give any explicit guarantee that the contract will continue in the following season does not provide enough incentives for farmers not to side-sell or buyers not to breach payment agreement since they have no future relationship to protect. Moreover,

frequent monitoring is able to reduce the incidence of breaches but parties' preference for supply contracts (market specification contracts) does not provide the platform for frequent monitoring of farms. In spite of the negative effect of alternative marketing channel on side-selling contractors fails to differentiate contract supply arrangement from arrangements in the open marketing channel in their contract design. Contractors use spot market price in purchasing produce from farmers without offering premium for higher quality. This makes it easier to transfer contracted produce into other markets through side-selling. The results of the study help explain the causes of the recent ban on vegetable exports from Ghana to the Profitable European Market. Coordination between exporters and farmers is weak and some factors that could impact on parties ability to comply with terms are of the contract are ignored in the contract design Future work should therefore examine appropriate contractual design that can enhance coordination and enforcement of contract terms in the supply chain with a hindsight of factors that can influences breaches such as side-selling.

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