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Purchasing Behaviour and Relational Contract Decision of Retailers in the Grasshopper Value Chains in Uganda

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RELATIONAL CONTRACT DECISION OF RETAILERS IN THE GRASSHOPPER VALUE CHAINS IN UGANDA

Summary

Agrifood marketing in sub-Saharan Africa (SSA) is associated with high inefficiencies due to high transaction costs, poor coordination and asymmetric information. These challenges lead to high food prices and limited food accessibility for consumers. Formal contracts could address these challenges, but are largely non-existent in the traditional agrifood marketing. Studies addressing the agrifood marketing challenges have focused mainly on farmers and consumers. However, the intermediary actors who bridge the gap between farmers and consumers have received limited attention in scientific and policy debates in SSA. The paper therefore analyses factors that influence relational contract decision of retailers using a primary data set from 500 grasshopper retailers in Central Uganda. We find that most retailers procure grasshoppers through spot market transactions. However, a few of them enter into relational contract with their suppliers. Consistent with relational contract theory, trust and close relationship reinforce relational contract between retailers and suppliers. We also find that transactional factors such as ownership of transport asset and cost prices of grasshoppers stimulate retailers to engage in relational contract with suppliers.

Keywords

Grasshopper Value Chain, Retailers, Relational Contract, Buyer-Seller Model, Uganda.

1. Introduction

Marketing challenges such as high transaction costs, poor vertical coordination, poor access to support services, asymmetric information, and lack of standardisation hinder the active participation of farmers, intermediaries and consumers in the agrifood sector in Sub-Saharan Africa (SSA) (MONTALBANO et al., 2018; BALIRWA and WAHOLI, 2019; BURKE et al., 2019). These challenges are also the main causes of market failures and inefficiencies in SSA, leading to limited access to food, poverty and food insecurity (BARRETT, 2008; BARRETT et al., 2012). Formal contracts are a strategic tool to mitigate market failures and stimulate market participation among market participants, especially smallholder farmers to promote their welfare in SSA (BARRETT et al., 2012; BELLEMARE, 2012; BELLEMARE and NOVAK, 2016; BELLEMARE and BLOEM, 2018). Hence, there is a growing body of literature on this subject. BARRETT et al. (2012), for example, used systematic literature to identify patterns of contract participation, reasons for non-participation, welfare implications, extent of contract noncompliance and dynamism of agricultural value chain as farmers and firms enter and exit contracts in five countries: Ghana, India, Madagascar, Mozambique and Nicaragua. BELLEMARE (2012), BELLEMARE and Novak (2016) assessed impacts of contract farming on welfare of smallholder farmers in Madagascar. BELLEMARE and BLOEM (2018) conducted a systematic review that addresses the research question “Does contract farming improve welfare?”.

However, compared to farmers and consumers, little attention has been paid to the mid-stream actors in the agri-food sector in SSA (REARDON, 2015, AGRA, 2019). From a theoretical perspective, microeconomic theory pays much attention to modelling two groups of economic actors - producers and consumers - but the role of actors in the middle of the sector, including retailers, has not been recognised by microeconomic theory (FAFCHAMPS, 2004). The

concerns of FAFCHAMPS (2004) are also supported by REARDON (2015) and AGRA (2019) that issues affecting midstream actors in the agrifood chains are mostly excluded from scientific discourse and policy debates in SSA. FAFCHAMPS (2004) and REARDON (2015) argue that challenges faced by mid-stream actors should be critically considered in the scientific debates as these actors contribute to ensuring sustainable food security and employment. For example, AGRA (2019) shows that 80% of agricultural outputs in Africa are marketed and handled by mid-stream actors, and 96% of these marketed agricultural outputs are supplied through domestic markets. These domestic markets are dominated by small and medium mid-actors, who create markets for rural farmers who have limited access to urban markets in SSA. Mid-stream actors also contribute 40% of the total gross value of the agrifood sector, suggesting that they play an active role in promoting value addition, thereby reducing food wastes in the sector in SSA (AGRA, 2019). In addition, midstream activities such as wholesale, retail, logistics and processing, and farm activities account for 25% of rural employment in SSA. Mid-actors will continue to play a crucial role in revolutionising the agrifood chain in the next 10-20 years (AGRA, 2019). These facts demonstrate the mid-stream actors are equally important as farmers and consumers. Therefore, researchers need to pay attention to addressing marketing challenges that affect effective business operations of mid-stream actors in the agrifood sector, including edible insect markets.

Edible insects such as grasshoppers are an important cultural food in Uganda. Grasshoppers are seasonal, as they are harvested in the wild during two major seasons: April-June season and November-December. Grasshopper markets attract many participants such as collectors, wholesalers, transporters and retailers in Uganda. Retailers in particular bridge the gap between consumers and collectors or wholesalers, making grasshoppers more accessible to urban consumers in either processed or non-processed forms (ODONGO et al., 2018). Retailers buy either non-value-added or value-added grasshoppers from wholesalers located in various markets in central Uganda. They can purchase raw grasshoppers directly from collectors in peri-urban or rural areas. There are hardly any formal contracts in the grasshopper market chain. Instead, retailers in grasshopper markets develop a relational contract between the market actors. Relational contract refers to unwritten codes of conduct and informal agreement between market actors in exchange of goods and services (BAKER et al., 2002; BROWN et al., 2004). However, relational contract decision of retailers is not well investigated and understood in the literature, particularly in the edible insect value chains.

The present paper analyses factors that influence retailers' decision to engage in relational contract with their suppliers in the grasshopper value chain in Central Uganda.

Our paper contributes to filling the gaps in research and policy on mid-stream actors by providing better insights into relational contract, which have not been rigorously investigated from the perspective of mid-stream actors in the agrifood sector in SSA. Related to our study is the empirical work of ABDULAI and BIRACHI (2009), which focuses on socioeconomic and transactional factors affecting trader-supplier transactions such as spot markets, relational and written contracts, without exploring how social factors such as trust influence these coordination mechanisms, especially relational contract. Our study contributes to expanding the study of ABDULAI and BIRACHI (2009) by incorporating social factors such as trust, close relationship and number of suppliers traded with in relational contract model. Insights into relational contract are crucial for developing a formal contract to suit an emerging agri-food sector like edible insects. This statement is supported by GIBBONS and HENDERSON (2012) arguing that without insights into informal relationships among economic agents, it would be difficult to understand the nature of formal contracts. Also, empirical literature on marketing of edible insects is scanty, especially on marketing relations of retailers. To the best of our knowledge, this is the first study on edible insects that thoroughly examines retailers' relational contract.

2. Analytical Framework

We draw on the buyer-seller matching model developed by TADESSE and SHIVEY (2013) and relational contract theory to analyse the relational contract decision of retailers. The buyer-seller matching model suggests that economic and social factors are crucial for developing relational contract in small businesses and rural markets (TADESSE and SHIVEY, 2013). Economic agents make calculated decisions on performing favours and making and sustaining business relationships with anticipated potential future benefits of such decisions (TADESSE and SHIVEY, 2013). Based on the buyer-seller matching model, we conceptualise that sellers and buyers in the grasshopper markets are not randomly matched rather they operate within a social environment where trust is developed to establish a long-term business relationship (TADESSE and SHIVEY, 2013). Retailers are expected to purchase from those they know best, on the assumption that the seller has a social obligation and a business incentive to act fairly, even if the trader has limited information (TADESSE and SHIVEY, 2013). In this regard, retailers can repeatedly transact with the same suppliers to reduce the costs of searching for information on buyers. Consistent with the buyer-seller matching model, the theory of relational contract emphasises more on social factors, notably trust and close relationship as key determinants of successful relational contract between market actors (BAKER et al., 2002; BROWN et al., 2004). Based on these theoretical perspectives, we express retailers' relational contract decision (RC_i^*) as a function of transactional factors, social factors, financial factors, and human capital, which is specified using a binary Probit model as:

$$(1) \quad RC_i^* = \pi + \sum_{j=1}^8 \omega_j \text{Transactional_factors}_{ij} + \sum_{j=9}^{15} \varpi_j \text{Social_factors}_{ij} + \sum_{j=16}^{20} \alpha_j \text{Human_capital}_{ij} + \sum_{j=21}^{22} \beta_j \text{Financial_factors}_{ij} + \xi_i$$

where the relational contract decision (RC_i^*) indicates 1 if i th retailer establishes an oral agreement with the supplier and 0 otherwise. j represents different explanatory variables. $\text{Transactional_factors}_{ij}$ indicate transactional variables such as cost prices and selling prices of value-added and non-value-added grasshoppers, record keeping, access to market price information, ownership of transport assets such as vehicle and motorbike, transport cost. $\text{Social_factors}_{ij}$ represents social factors, encompassing membership of association, close relationship, trust in product prices, quality and quantity, and number of suppliers that retailers purchased grasshoppers from. $\text{Human_capital}_{ij}$ represents human capital such as retailers' location, age, gender, education and experience. $\text{Financial_factors}_{ij}$ denote financial factors which include access to credit and retailers' annual income. Definitions of these explanatory variables are shown in later in Table 1. $\pi, \varpi_j, \omega_j, \alpha_j, \beta_j$ represent the parameters to be estimated. Following WOOLDRIDGE (2002), the probability of a retailer engaging in relational contract is expressed as:

$$(2) \quad \Pr(RC_i = 1) = \Phi(X' \lambda)$$

where X_i represent a set of explanatory variables. \Pr denotes probability. λ is a vector of parameters. $\Phi(\cdot)$ is the standard normal cumulative distribution function. The coefficients of the Probit model do not provide information on the marginal effect, which is a change in the dependent variable resulting from a change in an explanatory variable (WOOLDRIDGE, 2002; CAMERON and TRIVEDI, 2010). Hence, we compute the marginal effects associated with explanatory variables as:

$$(3) \quad \frac{\partial \Pr(RC_i = 1 | X_i)}{\partial X_i} = \frac{\partial RC_i}{\partial X_i} = \Omega(X' \lambda) X_j$$

$\Omega(\cdot)$ denotes the standard normal distribution density.

3. Survey design and data

We used cross-sectional data collected from randomly selected grasshopper retail business owners in Kampala and Masaka Districts in Central Uganda collected in December 2019. A multistage cluster sampling technique was employed in the study. First, Kampala and Masaka districts in Central Uganda were purposively chosen because they are well known for the trading of large volumes of grasshoppers. Second, ten major markets (Busega, Katwe, Old Taxi Park, Ndeeba, Kawerle, Nateete, Kamwokya, Kibuye, Nakasero, and Usafi) known for grasshopper trading were selected from Kampala District and two markets (Nyendo and Masaka Central) from Masaka District. The lists of the traders in these markets were not available; hence, a sampling frame of 1250 retailers was generated. Five hundred retailers were randomly selected from the sampling frame. The sample size comprises 343 retailers from Kampala District and 157 from Masaka district. A structured digital survey questionnaire was designed using KoboTool Box to collect relevant information from grasshoppers retailers in the selected districts in Central Uganda.

Table 1 presents summary statistics of the variables included in the models. We find that most retailers purchase grasshoppers, particularly unplucked, from wholesalers. Unplucked grasshoppers refer to raw grasshoppers with legs, wings and antennae.

Table 1: Descriptive statistics of the variables included in the models

| Variables | Description | Mean | SD |
|---|---|--------|--------|
| Choice of suppliers | 1 = wholesalers and 0 = collectors | 0.84 | 0.37 |
| Choice of products | 1= value-added and 0 = non-value-added grasshoppers | 0.23 | 0.44 |
| Demand for value-added grasshoppers | Quantity of value-added grasshoppers (plucked and fried) purchased (kg/week) | 100 | 163 |
| Demand for non-value-added grasshoppers | Quantity of non-value-added grasshoppers (unplucked) purchased (kg/week) | 628 | 1817 |
| Relational contract | 1 = oral contract with suppliers and 0 otherwise | 0.21 | 0.41 |
| Nature of relational contract | Price of the product to be purchased =1 and 0 otherwise | 0.83 | 0.38 |
| | Quantity of to be purchased=1 and 0 otherwise | 0.49 | 0.50 |
| | Purchase grasshopper on credit =1 and 0 | 0.43 | 0.50 |
| Human capital | | | |
| District | 1 = Kampala and 0 otherwise | 0.69 | 0.47 |
| Age | Age of retailers in years | 33 | 10 |
| Gender | 1= female retailers and 0 otherwise | 0.59 | 0.49 |
| Education | Number of years of formal education | 8 | 3 |
| Experience | Experience in trading of grasshoppers in years | 7 | 6 |
| Financial factors | | | |
| Credit access | 1= access to credit | 0.26 | 0.44 |
| Annual income | Annual income generated from other businesses (Ugx) | 366538 | 745912 |
| Social factors | | | |
| Association | 1 = membership of association | 0.59 | 0.49 |
| Close relationship with suppliers | 1=close relationship with suppliers | 0.67 | 0.47 |
| Trust with product quantity | 1=trust suppliers with quantity of product supplied | 0.80 | 0.40 |
| Trust with product quality | 1= trust suppliers with product quality | 0.74 | 0.44 |
| Trust with product price | 1=trust suppliers with product price | 0.78 | 0.41 |
| Number of suppliers purchased from | 1 = less than 6 suppliers | 0.36 | 0.48 |
| | 1=6-10 suppliers | 0.37 | 0.48 |
| | 1= more than 10 suppliers | 0.26 | 0.44 |
| Transactional factors | | | |
| Record keeping | 1=record keeping of business activities and 0 otherwise | 0.39 | 0.49 |
| Market price information | 1= access to information on market prices | 0.74 | 0.44 |
| Transport asset | 1=ownership of transport assets such as motorbike or vehicle | 0.11 | 0.32 |

| | | | |
|---|--|-------|-------|
| Transport cost | Cost of traveling to purchasing point and transporting grasshoppers from purchasing point to the selling point | 17642 | 22744 |
| Processing information | 1=access to processing information and 0 otherwise | 0.19 | 0.39 |
| Storage constraint | 1=lack of storage facility and 0 otherwise | 0.28 | 0.45 |
| Cost price of non-value added grasshoppers | Ugx/kg | 6166 | 2398 |
| Cost price of value added grasshoppers | Ugx/kg | 15514 | 4741 |
| Selling price of non-value added grasshoppers | Ugx/kg | 7503 | 2156 |
| Selling price of value-added grasshoppers | Ugx/kg | 25172 | 10782 |

1USD = 3669 Ugx as at 20th December 2019. SD denotes standard deviation.

Source: Authors' computations (2021)

The mean quantity of non-value added grasshoppers (unplucked) is 628kg/week (Table 1). On average, the retailers purchase 100kg of value-added grasshoppers per week, which are either plucked or fried. Plucked grasshoppers refer to raw grasshoppers with legs, wings and antennae removed. Our result shows that all retailers procure grasshoppers through spot market transactions (Table 1). This observation is consistent with the literature that most agri-food markets are based on spot market transaction (BARRETT et al., 2012; TADESSE and SHIVEY, 2013). In addition to spot transactions, 21.4% have a relational contract with their suppliers as a procurement strategy. In the relational contract, retailers agree verbally with suppliers on the price and quantity of products to be purchased (Table 1), while some retailers can purchase grasshoppers from suppliers on credit and pay them after the sale. Such agreements are not documented and cannot be enforced by a third party (court) if they are breached (BAKER et al., 2002).

More than half of the retailers are members of an association. Sixty seven percent of retailers have a close relationship with their suppliers, and more than two-thirds trust their suppliers for product price, quantity and quality. Over half of the retailers purchase grasshoppers from different suppliers (less than 10) during the season. Educated young women dominate the grasshopper retail sector with an average business experience of 7 years. Few of the retailers have access to credit, and they generate on average USD100 per year from other business activities. Proper record-keeping of business activities is not common in the grasshopper retail sector. Few retailers own transport assets such as motorbike or vehicle. On average, retailers spend US \$5 per week on transporting grasshoppers from purchasing to selling point. Access to information on processing of grasshoppers is low among the retailers. The cost value-added grasshoppers per kg is two times higher than the cost of non-value-added grasshoppers. Similarly, the average selling price per kg for value-added grasshopper is about three times greater than the selling price of non-value added grasshoppers. This suggests a premium price can be generated from the sales of value-added grasshoppers.

4. Econometric Results

4.1 Determinants of retailers' relational contract decision

Table 2 shows the determinants of retailers' relational contract decision from the Probit model. Variance inflation factor (VIF) and Breusch Pagan test were performed to check the presence of multicollinearity and heteroskedasticity in the model, respectively. The overall mean VIF of 2.25 suggests that multicollinearity is not problematic in the empirical model. However, heteroskedasticity is present in the model as indicated by the statistical significant ($p > 0.01$) of the chi-square value (36.63). This econometric problem was addressed by estimating the standard errors with the robust estimation approach. The wald chi-square value shows statistical

significance ($p > 0.01$), suggesting that the explanatory variable jointly affect retailers' relational contract decision. For policy implications, we discuss only the marginal effects. The predicted probability shows that the retailers are 0.211 likely to engage in relational contract.

Table 2: Determinants of retailers' relational contract decision

| Variables | Coefficient | Standard errors | Margin effects (dy/dx) | Standard errors |
|---|-------------------------------|-----------------|------------------------|-----------------|
| Human capital | | | | |
| Kampala | -0.534** | 0.215 | -0.104** | 0.039 |
| Age | -0.005 | 0.009 | -0.001 | 0.002 |
| Females | 0.197 | 0.189 | 0.038 | 0.036 |
| Education | 0.032 | 0.022 | 0.006 | 0.004 |
| Experience | -0.002 | 0.016 | -0.000 | 0.003 |
| Financial factors | | | | |
| Credit | 0.391** | 0.176 | 0.076** | 0.033 |
| Asinh (Annual income) | 0.003 | 0.026 | 0.001 | 0.005 |
| Social factors | | | | |
| Association | 0.010 | 0.167 | 0.002 | 0.032 |
| Close relationship | 0.939*** | 0.224 | 0.183*** | 0.043 |
| Trust price | 0.758** | 0.318 | 0.147** | 0.058 |
| Trust quality | 0.843*** | 0.271 | 0.164*** | 0.048 |
| Trust quantity | 1.434*** | 0.430 | 0.279*** | 0.074 |
| 6-10 suppliers | -0.599*** | 0.194 | -0.116*** | 0.038 |
| More than 10 suppliers | -0.898*** | 0.224 | -0.175*** | 0.041 |
| Transactional factors | | | | |
| Asinh(Cost price of non-value added product) | 0.113** | 0.057 | 0.022** | 0.011 |
| Asinh(Cost price of value added product) | 0.098** | 0.048 | 0.019** | 0.009 |
| Asinh (selling price of value added) | 0.026 | 0.027 | 0.005 | 0.005 |
| Asinh (selling price non-value added) | 0.029 | 0.025 | 0.006 | 0.005 |
| Record keeping | -0.102 | 0.165 | -0.020 | 0.032 |
| Market price information | 0.001 | 0.181 | 0.000 | 0.035 |
| Transport asset | 0.953*** | 0.246 | 0.185*** | 0.042 |
| Asinh(transport cost) | 0.005 | 0.017 | 0.001 | 0.003 |
| Constant | -5.313*** | 1.080 | | |
| Diagnostic statistic | | | | |
| Predict probability of engaging relational contract | 0.211 (0.232) ^a | | | |
| Wald chi-square | 83.48*** | | | |
| Pseudo R-square | 0.336 | | | |
| Mean variance inflation factor (VIF) | 2.25 | | | |
| Breusch pagan test for heteroskedasticity | 36.63*** | | | |
| Chi-square | | | | |
| Observation | 496 | | | |

Note: Asinh denotes inverse hyperbolic sine transformation. *, **, and *** denote 10%, 5% and 1% statistical significance, respectively. ^aValue in the parenthesis denotes standard deviation.

Source: Authors' computations (2021)

Human capital

Retailers' in Kampala are 0.104 less likely to establish relational contract with their suppliers compared to those in Masaka. Masaka District is a harvesting hub of grasshoppers. Hence, retailers in this district are more likely to engage in relational contract with their suppliers. The marginal effects of age, gender (females), education and experience show no statistical significance ($p > 0.10$), indicating that these variables do not influence retailers' relational contract decision.

Financial factors

Access to credit increases retailers probability to engage in relational contract with suppliers by 0.076. This finding is contrary to an evidence by MA and ABDULAI (2016) that farmers with access to credit were less likely to engage in relational contract in China. The marginal effect

of annual income is positive but statistically insignificant ($p > 0.10$), showing that an increase in retailers' annual income does not affect their relational contract decision.

Social factors

With the exception of membership of association, all the social factors included in the model show significant effects on retailers' decision to engage in relational contract. For example, retailers who have a close relationship with suppliers are 0.183 more likely to engage in relational contract compared to those with no relationship with suppliers. Also, trust in terms of quantity, quality and price of the products show strong significant positive marginal effects. This evidence shows that retailers who trust suppliers in terms of quantity, quality and price of products are 0.147, 0.164, 0.279, respectively, more likely to establish relational contract with suppliers. These findings confirm the theory of relational contract, which strongly postulates social factors such as trust and close relationship as the main determinants of relational contract (BAKER et al., 2002; BROWN et al., 2004; FAFCHAMPS, 2004; TADESSE and SHIVEY, 2013). Relational contract is not enforced by a third party; hence, establishing trust and close relationship between parties involved are self-enforcing mechanism that will sustain the contract (BROWN et al., 2004; FAFCHAMPS, 2004). Trust will renege moral hazards and information asymmetric that may arise from any of the party involved in the relational contract (BAKER et al., 2002). These findings support the evidence on formal contract that trust and transparency are important to sustain formal contracts between market participants (KANAGARETNAM et al., 2010; TU and BULTE, 2010). TU and BULTE (2010) emphasise that sufficient trust is a precursor for proper functioning markets. An evidence from RULM and QAIM (2020) suggests that economic benefits alone do not encourage farmers to participate in formal contract instead trust and transparency are essential in Ghana. Retailers who purchased from 6-10 suppliers and more than 10 suppliers have 0.116 and 0.175 lower probability to engage in relational contract compared to those who purchased from less than 6 retailers. This finding suggests that retailers who purchased from a few suppliers tend to establish relational contract with them. This empirical evidence is consistent with an observation by FAFCHAMPS (2004) that firms show a higher preferences to conduct business with the people they know already.

Transactional factors

An increase in cost price of non-value-added and value-added grasshoppers increases retailers' probability to engage in relational contract by 0.022 and 0.019, respectively (Table 2). At high product prices, retailers are unable to purchase more grasshoppers from suppliers. To get more quantities to sell, retailers engage in relational arrangement with suppliers. Since, there is trust between the retailer and supplier, the retailer can purchase the products on credit, and then make payment to the supplier after sales. Retailers who own are 0.185 more likely to engage in relational contract compared to those who do not own transport assets.

5. Conclusions

In this study, we have contributed to the scientific debates on retailers by improving our understanding on factors that influence their relational contract decision using a primary data set of 500 retailers from Central Uganda. Retailers express higher preference for non-value-added grasshoppers procured from wholesalers. All retailers procure their grasshoppers through spot market transactions, and few retailers establish relational contract with suppliers as a procurement strategy to deal with unstable supply in the market. Furthermore, we find that transaction costs such as cost prices and social factors such as trust, close relationship and number of suppliers that retailers positively influence their relational contract decision. The

finding reinforces that trust and close relationship are important for the establishment and sustainability of relational contract. We recommend that retailers or investors who are interested in developing relational contract with suppliers of grasshoppers should focus on establishing a close relationship and developing trust with suppliers. This evidence also suggests that trust may be a precondition even for developing a formal contract in the edible insect value chain.

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