My lived experience should also explain my market choice:
Mixing methods to examine the influence of transaction cost on live chicken sales in Nigeria

Antia-Obong, E.A*, Carmen Hubbard, Guy Garrod

Discussion Paper prepared for presentation at the 90th Annual Conference of the Agricultural Economics Society, University of Warwick, England

4th - 6thApril 2016

*Corresponding author: e.a.antia-obong@newcastle.ac.uk
Centre for Rural Economy, School of Agriculture, Food and Rural Development, Newcastle University, Agriculture building, Newcastle Upon Tyne, NE1 7RU, United Kingdom

Abstract

Transaction cost economics posits that farmers opt to sell in a market that minimizes their costs of participation. Smallholder farmers in Nigeria face the choice of travelling to sell live chicken at the spot market or at the farm-gate. However, little is known of the factors that influence their choice. So far, studies on market choice overlook farmers lived experience in explaining their market decision. To investigate this gap in research, an explanatory sequential mixed methods design comprising a quantitative phase; followed by a qualitative phase is applied for the first time. We use a two-limit Tobit model to obtain quantitative results from a survey of 259 smallholder farmers in the first phase. Results show that: regular/repeat customers, bargaining power, access to extension services, access to credit, distance to the nearest township, stock size, bicycle ownership and price are factors that significantly influence the choice of selling at the farm-gate. In order to explore this finding in more depth, a qualitative phase was developed and 25 purposively selected respondents were interviewed. The overarching significance of this study is that by integrating quantitative and qualitative data substantially more information is obtainable than is usually obtainable from quantitative data alone.

Keywords   Mixed methods, transaction costs, poultry markets, tobit model, smallholder farmers, Nigeria.

JEL code: Q12, Q13

1. Introduction

The Nigerian poultry sub-sector is under an import ban policy; as a direct means of protecting the domestic market from foreign competition, the implementation of the policy continue to attract the interests of policy makers in support of domestic poultry market participation. Smallholder farmers make up the largest group of farmers in the sub-sector and are generally defined as a group of heterogeneous non-salaried farm households typically stocking 100 birds and below (Sonaiya and Swan, 2004; Kryger *et al.*, 2010). According to (Alabi and Isah, 2002; Alabi and Aruna, 2005; Adene and Oguntade, 2006) smallholder farmers contribute about 80% of available chicken stock in Nigeria, but account for only about 11% of chicken sales mostly due to poor market access conditions (Heise *et al.*, 2015).

Typically, smallholder farmers sell live chicken through the open market or farm-gate and can decide to sell all, a proportion or none at either market outlets. Hobbs (1997) assert that what might inform a farmers choice of a particular market outlet is the transaction costs occurring in one market outlet over the other. Transaction costs are costs that arise in the process of monitoring, negotiating and gathering information on a transaction; Hubbard (1997) as such the higher the costs of undertaking these processes in a particular market channel the less likely will a farmer use that market channel; therefore not being able to access low transaction costs market outlet contribute to the low level of sales experienced by smallholder farmers. However, available literature addressing market selection rely solely on quantitative evidence in explaining farmers market choice without consideration to subjective factors based on farmers opinions and perspective that shape their decisions.

Therefore, for this study beyond testing the hypothesis that smallholder farmer's choice between selling at the open market and farm-gate sales is influenced by transaction costs and household factors, the study probes further using qualitative data to account for the subjective views of farmers in order to provide context-specific meaning on factors influencing farmer's selection of a given market channel. We make a case for considering farmers lived experiences when investigating factors that influence market outlet selection. Our aim is to apply mixed methods approach to identify objective and subjective factors that influence the selection of live chicken sales in order to proffer measures aimed at increasing market participation by smallholder poultry farmers. Our use of mixed methods; in particular the explanatory sequential mixed methods design to explain transaction costs factors influencing the choice of market is original and fills a gap in the transaction costs economics literature by drawing on farmers perspective in explaining the factors that influence farmers market choice for live chicken sales.

2. Transaction costs and market selection

Transaction costs economics posits that there are costs incurred in carrying out market exchanges (Hobbs, 1997; Hubbard, 1997). However, compared to physical production costs that are tangible and easy to measure; transaction costs are not easily identifiable and are therefore not easily separable from other managerial costs Bruyn *et al.* (2001). According to Delgado (1999) In Africa, transaction costs in marketing arises because the true costs of goods and services are not captured in market prices which makes market participation difficult for smallholder farmers, key insights expressed in the seminal works of (Coase, 1937; Williamson, 1986) are that market agents are transaction costs minimisers, in the sense that they carry out market exchanges in a manner aimed at reducing their cost of participation in any given market; accordingly, the selection of one market channel over another is attributable to low transaction costs incurred in the chosen market channel. This point is also expressed by Osebeyo and Aye

(2014) which notes that when the costs of transaction in a market channel are higher than the value derived from the transaction, farmers are less likely to trade.

Empirical studies investigating the impact of transaction costs on farmers market selection are few, a systematic review of literature show that seven papers address the subject, however two papers (Bruyn *et al.*, 2001; Fafchamps and Hill, 2005) were excluded from the review since the models applied in the studies were not applicable in the current study as such did not meet the inclusion criteria; likewise Tung (2005) was excluded from the review as it failed to meet the inclusion criteria because it was not a published research article. Of the four papers reviewed, two were conducted in Africa i.e. Namibia (cattle markets) and the great lakes region comprising of Uganda, Burundi and Democratic Republic of Congo (banana markets) (Jagwe and Machethe, 2011; Shiimi *et al.*, 2012) the other two papers were in China (cattle markets) and the United Kingdom (cattle markets) (Hobbs, 1997; Gong *et al.*, 2006) however, the types of market channels in each study differ, of the four studies reviewed, only Jagwe and Machethe (2011) compared farmers market selection by specifically using the terms farm-gate and open market channels applying a probit model, Gong *et al.* (2006) compared sales between spot markets and forward contracting channels; Hobbs (1997) compared cattle sales carried out between live-ring auctions and direct to parker channels both using two-limit tobit models, and Shiimi *et al.* (2012) compared formal and informal market outlets for cattle marketing using Craggs double hurdle model.

The outcome of the systematic review show that no study in Nigeria examine the role of transaction costs in market selection, also besides the study by Tung (2005) which focused on poultry markets in Vietnam (not peer –reviewed) smallholder poultry market selection has not been studied empirically in Nigeria or elsewhere. In the empirical analysis of transaction costs on market choice, consideration has not been given to the lived experiences of farmers, hence the perspective of farmers in explaining their market choices have been overlooked because all the studies apply quantitative approaches. Obtaining farmer's perspective is important because transaction costs is classified into observable (tangible) and unobservable (intangible) Holloway *et al.* (2000). Therefore, in empirical studies; non-observable costs have not been expressly accounted for because they are difficult to measure; which explains why studies on transaction costs and market choice have largely been quantitative by using proxy variables to capture observable costs (quantitative approach).

In this study therefore, beyond testing the hypothesis that smallholder farmer's choice between selling at the open market and farm-gate sales is influenced by transaction costs and household factors, the study probes further using qualitative data (non-observable costs) to account for the subjective views of farmers in order to provide context-specific meaning on how these factors influences farmer's market channel selection. The study therefore adopts an explanatory sequential mixed methods design this method of investigation to our knowledge has not been attempted before and so no clear empirical guidelines exist in the transaction costs literature.

3. Live poultry marketing in Nigeria

In Nigeria, live chicken is the dominant form by which chickens are sold, the reason is that facilities for processing and storage are limited as such live poultry market is dominated by middlemen that provide an invaluable service of buying live chicken in bulk from farmers. The nature of live chicken markets is that when birds are ready for market, because they are not processed and refrigerated, farmers face the urgency to sell off as quickly as possible because of the additional costs incurred in feeding market ready birds and if farmers do not continue to

feed them well they reduce in weight which has a bearing on price. Live birds are largely sold at the farm-gate through middlemen or directly at the open market; this study posits that transaction costs inform the proportion of chicken that is sold through either market channels. Although the study focuses on transaction costs, it does not in any way negate the importance of other studies (Alabi and Isah, 2002; Ojo, 2003; Alabi and Aruna, 2005; Yusuf and Malomo, 2007; Kperegbeyi *et al.*, 2009) whereby production costs factors have been observed to influence poultry production.

4. Methods

4.1 Study design

A mixed methods approach (Johnson *et al.*, 2007; Creswell, 2013) is used to achieve the research objectives, the procedure involves collecting, analysing and integrating quantitative and qualitative data within a single investigation Ivankova and Stick (2007). The need for mixing both approaches is because the research objectives cannot be achieved using either approaches due to the complex nature of market selection decisions taking into account farmers perspectives, nuances, opinions, and subtleties that are not directly measurable but play a role nonetheless. This study adopts an explanatory sequential mixed methods design involving two distinct phases of data collection, analysis and integration Creswell *et al.* (2003). The first is the quantitative phase whereby numeric data is collected and analysed and the results inform the design of the qualitative (text data) phase. The qualitative data assists in the explanation of the quantitative data by giving meaning to how farmers explain the factors influencing their market channel choice.

For this study, the quantitative data helped identify significant factors that inform the selection of farm-gate over open market channels and guided the recruitment of participants for the second phase. The qualitative data was used to explain why the significant factors identified in the first phase were significant predictors of market selection. As such, the quantitative results gave a general view of the research problem and the qualitative results helped explain the significant results in more depth by examining farmers' views about their market channel choice. This study places priority on the quantitative phase, because without the results the qualitative phase is not possible Cronholm and Hjalmarsson (2011) the qualitative data inform or support the findings from the quantitative data, its role is therefore complementary. The study was approved by the ethical committee of the Faculty of Science, Agriculture and Engineering, Newcastle University, United Kingdom on 14th May 2015 (Ref:15-ANT-50). Each phase of data collection and analysis are detailed below.

4.2 Phase I: Quantitative Data Collection and Analysis

The following questions guided the first phase of this study:
1. What is the preferred market channel for the sale of live chickens in the study area?
2. What factors influence the selection of the preferred market channel?

4.2.1 Data Collection

For the quantitative phase, a cross-sectional survey, was carried out on 259 participants using a 59 – question questionnaire. In order to be eligible for the survey, farmers needed to have been engaged in poultry business for at least a year and must have a stock size of 200 birds and below, the first part of the survey instrument contained socio-economic questions (see appendix A, table 1), while the second part (appendix A, table 2) contain transaction costs questions that are expected to influence choice of market and is broken down into information costs, negotiation costs and monitoring costs (Hobbs, 1997; Gong *et al.*, 2006). Transaction costs is

context dependent as such the variables used in this study apply specifically to poultry markets in Nigeria, these variables are described in Appendix A.

The survey was administered face to face and participants were sampled using a single stage cluster sampling technique Lohr (1999),the study was set in Akwa Ibom state, southern Nigeria, the state has one of the largest poultry population in Nigeria. Three local authorities (Uyo, Abak and Etim Ekpo) were purposively selected for this study. Uyo is the economic hub of the state while the population density of chickens in Abak and Etim Ekpo are above the state average, which makes the study area a good representation of smallholder farmers in the region. The three local authorities are grouped into four blocks with thirty clusters out of which 17 clusters comprising of 140 villages were randomly selected, and farmers that met the criteria were surveyed.

4.2.2 Data Analysis

The dependent variable (proportion of live chicken sold through the farm-gate) is censored at a lower and upper limit, seventy percent of the dependent variable are limit data with surveyed farmers selling either none (zero) or all (100%) of their chicken through the farm-gate (table 3). The higher the proportion that is sold through the farm-gate, the lower the proportion sild through spot market. The fit analytical technique for the data is a two-limit tobit model and is specified as follows:

$$y^* = \beta' x + \mu$$

And

$$y = L_1 \ \ if \ y^* = L_1 \ (Lower \ band)$$
$$y = y^* \ \ if \ L_1 < y < L_2$$
$$y = L_2 \ \ if \ y^* = L_2 \ (Upper \ band)$$

Where y^* is the latent variable i.e. the potential proportion of live chicken sold), β' is vector of unknown parameters, x represents vector of independent transaction costs and socio-economic variables; $L_1 = 0$, the lower limit i.e. the proportion of farm-gate sales equals zero; $L_2 = 1$, the upper limit i.e. the proportion of farm-gate sales equals one.
The expression of the likelihood function for this model is:

$$L(\beta, \sigma | y, x, L_1, L_2) = \prod_{y=L_1} \Phi\left(\frac{L_1 - \beta' x}{\sigma}\right) \prod_{y=y^*} \frac{1}{\sigma} \Phi\left(\frac{y - \beta' x}{\sigma}\right)$$
$$\times \prod_{y=L_2} \left[1 - \Phi\left(\frac{L_2 - \beta' x}{\sigma}\right)\right]$$

$\prod_{y=L_1}$ stand for the first product over the lower limit L_1(no farm-gate sales) observations, $\prod_{y=y^x}$, is the second product over the non-limit observation (mixture of farm-gate and spot market sales) and $\prod_{y=L_2}$ is the third product over the upper limit L_2 (all farm-gate sales).

4.3 *Phase II: Qualitative Data Collection and Analysis*

The second phase of this study will be guided by the following question:

1. How can farmers' perspective inform or support the factors identified in the quantitative phase to influence their market selection decision?

4.3.1 *Data collection*

Data was collected through individually conducted semi-structured interviews. The interview guide was broken down into themes and sub-themes corresponding to the quantitative findings; the enlisted participants were contacted by phone and a suitable time and place was arranged at the convenience of each participant. Prior to going to the field, the research team reviewed the interview guide to ensure questions were properly worded to reduce ambiguity and enhance clarity of the interview guide.

After informed consent was granted, each individual was interviewed in Ibibio, the native tongue of the Akwa Ibom people; and 'Pidgin English', a blend of English and native dialects used to communicate with people who do not really share a common language.. Each interview was audio-taped using a smart phone and a digital voice recorder; the use of both devices safe guarded against loss of data by ensuring back up in case one of the devices malfunction; the data was also supported with interview notes made during the course of the interviewing. The interviews only stopped when new themes were no longer emerging i.e the point of data saturation Mason (2010) a total of 25 interviews were carried out and recorded.

4.3.2 *Data Analysis*

Text data obtained from the qualitative phase is analysed using a conventional content analysis by applying a framework approach (Smith and Firth, 2011; Gale *et al.*, 2013) in order to interpret and extract meaning from text into themes. According to Hsieh and Shannon (2005) in the conventional content analysis coding categories are derived directly from the text data making it smore meaningful in explaining and interpreting quantitative findings since information obtained directly emanates from the interviewed participants.

To analyse the data, the audio recordings is listened to several times by the corresponding author in order to familiarise with the data and develop a general overview (Taghizadeh *et al.*, 2015). Afterwards, each recording is exactly transcribed; the transcribed data will be read several times to identify recognisable elements. At this point, each phrase and word is taken as a unit of analysis; the text are coded into sentences or important paragraphs (Taghizadeh *et al.*, 2015) until the themes identified to influence farmers market choice finally emerges.

5. Results

5.1 Phase I: Quantitative study

The first research question sought to find out the preferred market channel for the sale of live chickens, the results from figure 1 show that selling at the farm-gate was the preferred market channel with 93% of farmers opting to use the farm-gate as their main market channel. The results suggest that transaction costs i.e. the costs of doing business Hubbard (1997) is lower at the farm-gate as such as farmers minimize their costs of transaction by choosing to sell at the farm-gate as opposed to selling at the spot market. Having established farmers preferred market channel, the second research question sought to identify the factors that influence farmer's selection of farm-gate over spot market, table 1 gives the results of the two-limit tobit analysis.
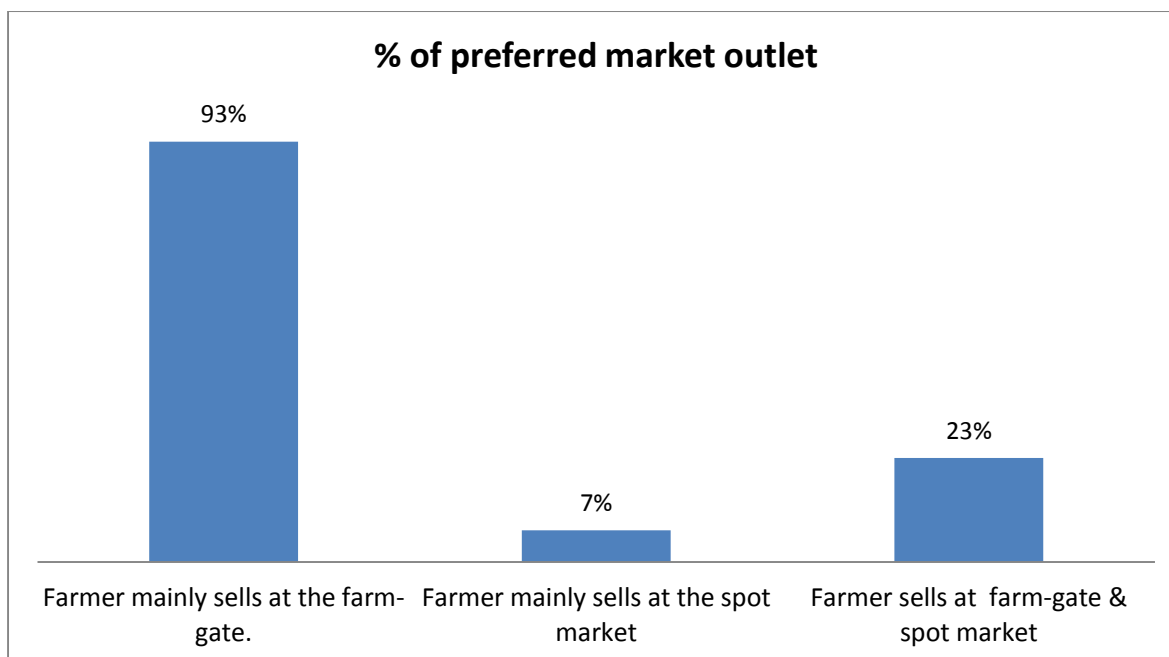
Figure 1: preferred farmer sales outlet

Table 1: Two-limit Tobit model

Two-limit Tobit model	
Dependent variable	Proportion of chickens sold at the farm-gate
Variable	Coefficient
Constant	-556.7086 (304.9751)
STOCK	0.8304*** (0.0582)
PRIXCHK	-0.5209** (0.2743)
BICYC	-148.7218* (82.0723)
CRED	-197.0265* (104.942)
EXTSERV	-190.0974*** (75.1967)
TIME2HECN	215.0994*** (72.8849)
REPCUST	506.621** (237.2486)
BARPOW	113.3415*** (41.3655)
Model Summary	
Number of observations	259
Log pseudo likelihood	-1829.9678
F(8,251)	60.44
Prob>F	0.0000

***, ** and * = 1%, 5% and 10% significance level respectively and numbers in parentheses are robust standard errors.

The equation for the regression analysis with significant results was as follows:

DFGATE2 = $\hat{\alpha}+\hat{\beta}_1$STOCK$+\hat{\beta}_2$PRIXCHK$+\hat{\beta}_3$BICYC$+\hat{\beta}_4$CRED$+\hat{\beta}_5$EXTSERV$+\hat{\beta}_6$TIME2HECN$+\hat{\beta}_7$REPCUST$+\hat{\beta}_8$BARPOW

The results from the tobit model show that three socio-economic factors and five transaction costs factors inform farmers' choice of farm-gate sales. Also, besides the coefficients, access to bicycle (BICYC) and access to information on credit facilities (CRED) that are significant at 10%, the other coefficients are significant at 1% and 5% levels.

Results reveal that the proportion of chickens sold through farm-gate is positively influenced by the number of chickens farmers stock (STOCK), in other words, the larger the quantity a farmer has the more likely will the farmer sell through the farm-gate. Since it is unlikely that a buyer will travel to a farm only to buy a few number of birds, in almost all cases, buyers use mini-vans to transport birds from the farm-gate indicating that large amount of birds are bought straight off. As noted, farmers generally sell live chicken which creates the urgency to sell off as quickly as possible, the result is therefore not surprising, since selling at the farm-gate entails bulk buying which is the quickest way of selling, when compared to spot markets where products are exchanged between numerous individual buyers and sellers, mostly buying in small units for home consumption, which take away the bulk element, leaving farmers to incur additional costs of feeding market ready birds as well as transport costs of moving live birds to and from farms which invariably raises the costs of transaction. Hence famers opt to sell through the farm-gate because of the volume of sales and quicker sale time.

Selling at the farm-gate is also positively influenced by farmers' farm location (TIME2HECN), the results suggests that farms need not be located near townships or urban areas in order to sell their birds; implying that remoteness of farms does not deter buyers. Although, this finding is not in line with a priori expectation of the sign; as it is expected that farms that are remotely located are less likely to attract buyers as such a negative sign was expected. A possible explanation is that since selling at the farm-gate increases with quantity of chickens stocked, farmers with large stock are mostly located in remote rural and peri-urban areas where land is available and relatively affordable as such selling at the farm-gate involves buyers (middlemen) travelling to rural remote farms. In the study area, it is not uncommon to find mini-trucks or pick-up vans in rural communities filled with market ready birds leaving farmers farms.

The findings also suggests that the likelihood of selling at the farm-gate increases when farmers have repeat or regular customers (REPCUST), having the guarantee of repeat sales reduces farmers search and negotiation costs, since over time farmers have built a relationship with their customers such that the time spent in searching for new buyers or advertising[1] is reduced; alongside the processes of haggling, arranging payment and building trust. As earlier noted, when birds are ready to be sold, farmers are eager to sell off as quickly as possible so as not to incur additional input costs. Accordingly, having regular customers' means that when birds are market ready duration of sales is shortened and volume per sale is large; resulting in a quicker sell off time and reduction in search and negotiation costs, this situation is a form of quasi-contract farming[2].

 Another result obtained indicate that the proportion of chickens sold through the farm-gate is positively influenced by the degree of bargaining power farmers possess in comparison to the spot market; where little or no relationship is developed between the different sellers and buyers and competition for sales coupled with the small volumes per trade tend to weaken bargaining power for farmers. It is therefore not surprising that farmers opt to sell through the

---

[1] Advertising in this context refer to the time spent carrying out word of mouth awareness.
[2] A form of non-formal obligatory condition where individuals mutually agree to trade with each other.

farm-gate where they can assert stronger bargaining power because the few buyers that travel to farms buy in bulk. Farm-gate sales is more or less organised as a wholesale market; Goossens *et al.* (1994) posit that wholesale markets reduce operating costs and lower product losses by reducing the time needed to complete transactions; enhances fair personal (equilibrium) market price, affords greater price transparency and lowers marketing risks and by so doing transaction costs through the farm-gate is reduced.

Although farmers have stronger bargaining power at the farm-gate, the price of live birds (PRIXCHK) is lower at the farm-gate, however this does not suggest in any way that farmers run at a loss. It is probably because live birds attract the least value addition at wholesale prices; also farm-gate sales does not carry a transport cost hence the low prices. In the study area, middlemen buy live birds in large amounts in a single purchase (>50 birds), process, refrigerate and supply to fast foods, hotels, shops and supermarkets. Prices usually double between live birds and frozen birds, for instance, in the study area, the average price of a kilogram of frozen chicken ranges between ₦2000-₦2300 i.e. about £6.5-£7.49[3], while the farm-gate price for a live chicken is ₦1000 i.e. about £3.26. Perhaps a reasonable conclusion this finding confirm is that products with little or no value addition attract lower prices.

A means of transport is important in any poultry enterprise, however with respect to farm-gate sales the model result indicate that ownership of a bicycle (BICYC) is not of importance or a necessary prerequisite when selling at the farm-gate but possibly more important in spot market sales, since buyers travel with their own transport to buy at the farm-gate. However, ownership of bicycle, although not of importance in farm-gate sales, is often used in carrying out general farm operations, for instance, in the study area several bags of poultry feed which are mostly 25kg per bag is carried by bicycle from the feed shop to the farm. Besides, the use of bicycle is convenient for travelling over short distances or in rural roads not accessible by vehicles.

There seems to be a likely association between farmers able to access to credit (CRED) and extension services (EXTSERV) as well as stock size (STOCK), the results indicate that farmers not able to access credit facilities are not likely to sell at the farm-gate. In other words, farmers that are able to access credit tend to sell at the farm-gate, this finding is rather intuitive considering that bulk sales occur at the farm-gate; having access to credit facilities is an important strategy for expanding and increasing farmers stock. The results posits that farmers without access to credit tend to stock fewer birds and are therefore not able to attract bulk buyers, as such in order to make a sale farmers with fewer birds tend to sell at the spot market where transaction costs are higher; a situation that continue to perpetuate subsistence poultry farming. The variable, whether farmers have access to extension services (EXTSERV) suggests that farmers with access to the extension services tend to sell at the farm-gate*.* In the study area, extension agents are vital information sources for farmers because they link buyers (middlemen) to farmers, provide information on sources of credit facilities, assisting farmers in loan applications and provide valuable information on general poultry management practices. By so doing, farmers stand a greater chance of accessing credit and can expand and increase their stock size; thereby attracting farm-gate sales where transaction costs is lower.

Drawing from the quantitative findings, the following questions are explored in more depth in the qualitative phase:

---

[3] Exchange at the time of survey was £1= ₦307.16

1. Does stock size influence farmers market choice?
2. Can access to credit influence farmers market choice?
3. Can extension personnel influence market selection?
4. Does farm location influence farmers market choice?
5. Does regular or repeat patronage influence farmers' market choice?
6. Can farmers bargaining power influence their market choice?

The qualitative phase would help provide in greater depth context-specific explanation on the results of quantitative phase listed above. A diagrammatic representation of the study design is presented in figure 2 below:

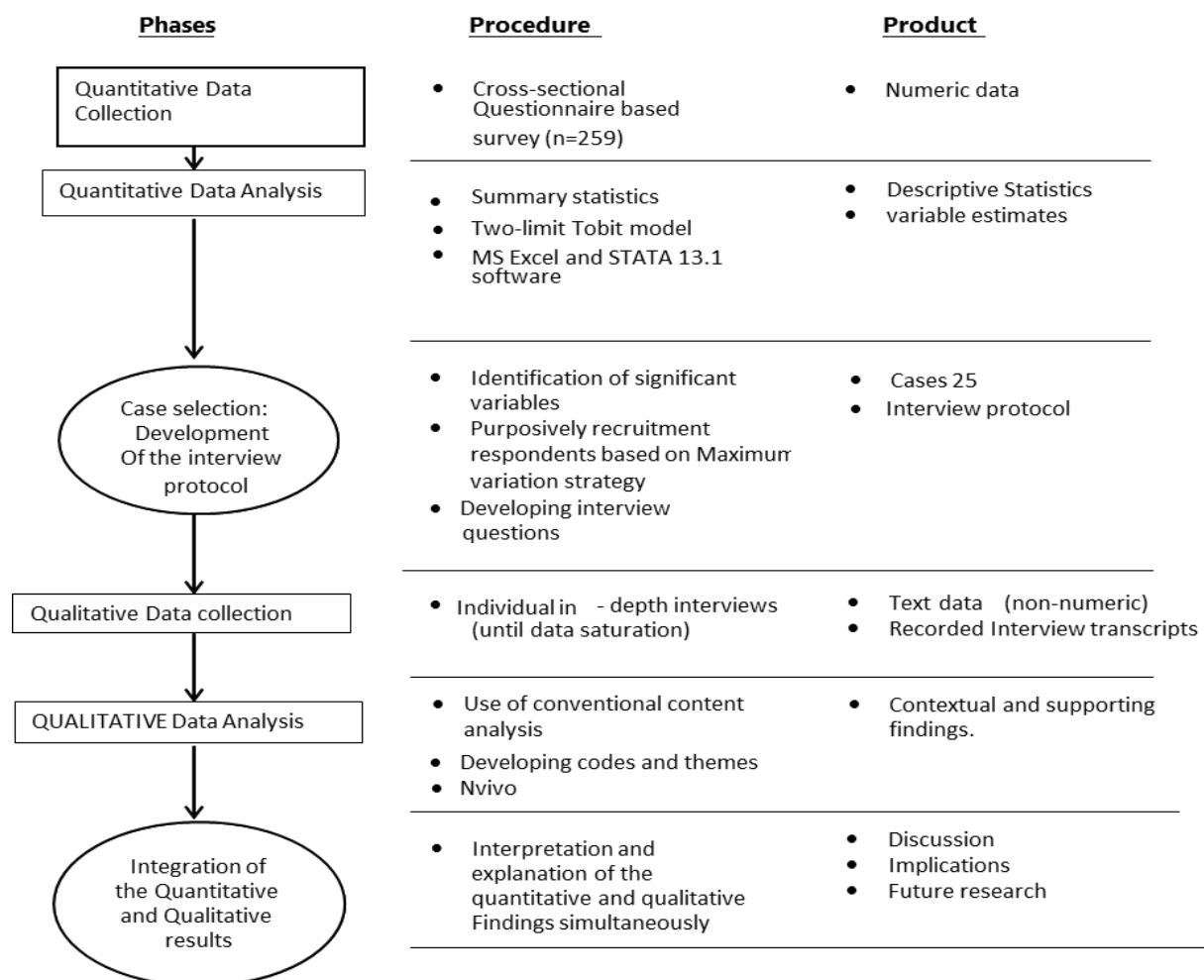| Phases	Procedure	Product
Quantitative Data Collection	• Cross-sectional Questionnaire based survey (n=259)	• Numeric data
Quantitative Data Analysis	• Summary statistics • Two-limit Tobit model • MS Excel and STATA 13.1 software	• Descriptive Statistics • variable estimates
Case selection: Development Of the interview protocol	• Identification of significant variables • Purposively recruitment respondents based on Maximum variation strategy • Developing interview questions	• Cases 25 • Interview protocol
Qualitative Data collection	• Individual in - depth interviews (until data saturation)	• Text data (non-numeric) • Recorded Interview transcripts
QUALITATIVE Data Analysis	• Use of conventional content analysis • Developing codes and themes • Nvivo	• Contextual and supporting findings.
Integration of the Quantitative and Qualitative results	• Interpretation and explanation of the quantitative and qualitative Findings simultaneously	• Discussion • Implications • Future research

Fig.2 Diagram of the explanatory sequential design employed for this study

References

Adene, D.F. and Oguntade, A.E. (2006) 'The structure and importance of the Commercial and Village based poultry systems in Nigeria.', *Poultry production systems: FAO-ECTAD\AGAP*, pp. 1-102.

Alabi, R.A. and Aruna, M.B. (2005) 'Technical Efficiency of Family Poultry Production in Niger-Delta, Nigeria', *Journal of Central European Agriculture*, 6(4), pp. 531-538.

Alabi, R.A. and Isah, A.O. (2002) 'Poultry production constraints: The case of Esan West Local Government Area of Edo State, Nigeria', *African Journal of Livestock Extension*, 1(1), pp. 58-61.

Bruyn, P.d., Bruyn, J.N.d., Vink, N. and Kirsten, F.J. (2001) 'How transaction costs influence cattle marketing decisions in the northern communal areas of Namibia', *Agrekon*, 40(3), pp. 405-425.

Coase, R.H. (1937) 'The nature of the Firm', *Economica*, 4, pp. 386-405.

Creswell, J.W. (2013) 'Steps in Conducting a Scholarly Mixed Methods Study', *DBER Speaker Series Paper 48.*

Creswell, J.W., Plano Clark, V.L., Gutmann, M. and Hanson, W. (2003) 'Advanced mixed methods research designs. ', in A., T. and Teddlie, C. (eds.) *Handbook on mixed methods in the behavioural and social sciences*. Thousand Oaks: Sage Publications, pp. 209-240.

Cronholm, S. and Hjalmarsson, A. (2011) 'Experiences from Sequential Use of Mixed Methods', *The Electronic Journal of Business Research Methods*, 9(2), pp. 87-95.

Delgado, C. (1999) 'Sources of growth in smallholder agriculture in sub-Saharan Africa: The role of vertical integration of smallholders with processors and marketers of high value-added items', *Agrekon*, 38.

Fafchamps, M. and Hill, R.V. (2005) 'Selling at the farmgate or travelling to market', *American Journal of Agricultural Economics*, 87(3), pp. 717-734.

Gale, N.K., Gemma, h., Cameron, E., Rashid, S. and Redwood, S. (2013) 'Using the framework method for the analysis of qualitative data in multi-disciplinary health research', *BMC Medical Research Methodology.*

Gong, W., Parton, K., Cox, R.J. and Zhou, Z. (2006) 'Transaction costs and cattle farmers' choice of marketing channels in China: A Tobit analysis', *Management Research News*, 30(1), pp. 47-56.

Goossens, F., Minten, B. and Tollens, E. (1994) *Nourrir Kinshasa: l'approvisionnement local d'une métropole africaine. .* Paris: .

Heise, H., Crisan, A. and Theuvsen, L. (2015) 'The Poultry market in Nigeria: Market Structures and potential for Investment in the Market', *International Food and Agribusiness Management Review*, 18(Special Issue A), pp. 197-222.

Hobbs, J.E. (1997) 'Measuring the Importance of Transaction Costs in Cattle Marketing', *American Journal of Agricultural Economics*, 79(4), pp. 1083-1095.

Holloway, G., Nicolson, C., Delgado, C., Staal, S. and Ehui, S. (2000) 'Agro-industrialization through Institutional Innovation: Transaction costs, cooperatives and milk-market development in the East-African Highlands', *Agricultural Economics*, 23(3), pp. 279-288.

Hsieh, H.-F. and Shannon, S.E. (2005) 'Three approaches to qualitative content analysis', *Qualitative Health Research*, 15(9), pp. 1277-1288.

Hubbard, M. (1997) 'The 'New Institutional Economics' in Agricultural development: Insights and Challenges', *Journal of Agricultural Economics*, 48(2), pp. 239-249.

Ivankova, N.V. and Stick, S.L. (2007) 'Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods Study', *Research in Higher Education*, 48(1).

Jagwe, J.N. and Machethe, C. (2011) 'Effects of Transaction Costs on Choice of Selling Point: A Case of Smallholder Banana Growers in the Great Lakes Region Of Central Africa', *AGREKON: Agricultural Economics Research, Policy and Practice in Southern Africa.*, 50(3), pp. 109-123.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. (2007) 'Towards a definition of Mixed Methods Research', *Journal of Mixed Methods Research*, 1(2), pp. 112-133.

Kperegbeyi, J.I., Meye, J.A. and Ogboi, E. (2009) 'Local chicken production: strategy of household poultry development in coastal regions of Niger Delta, Nigeria.', *African Journal of General Agriculture*, 5(1), pp. 17-20.

Kryger, K.N., Thonsen, K.A., Whyte, M.A. and Dissing, M. (2010) *Smallholder poultry production- Livelihoods, food security and sociocultural significance.* . Available at: http://www.fao.org/docrep/013/al674e/al674e00.pdf (Accessed: 9/1/1016).

Lohr, S.L. (1999) *Sampling: Design and Analysis*. Pacific Grove, CA. USA: Brooks/Cole Publishing company.

Mason, M. (2010) 'Sample size and saturation in PhD studies using Qualitative Interviews', *Forum: Qualitative Social Research*, 11(3).

Ojo, S.O. (2003) 'Productivity and Technical Efficiency of poultry egg production in Nigeria.', *International journal of Poultry Science*, 2(6), pp. 459-464.

Osebeyo, S.O. and Aye, G.C. (2014) 'Transaction costs and marketing decision:a case study of Smallholder tomato farmers in Makurdi, Nigeria', *Urban, Planning and Transport Research*, 2(1), pp. 333-340.

Shiimi, T., Taljaard, P.R. and Jordaan, H. (2012) 'Transaction costs and Cattle Farmer's choice of Marketing Channel in North-Central Namibia', *Agrekon*, 51(1), pp. 42-58.

Smith, J. and Firth, J. (2011) 'Qualitative data analysis: the framework approach', *NurseResearcher*, 18(2), pp. 52- 62.

Sonaiya, E.B. and Swan, S.E.J. (2004) 'Small-Scale Poultry Production', *FAO Animal Production and Health*, pp. 1-57.

Taghizadeh, Z., Vedadhir, A., Behmanesh, F., Ebadi, A., Pourreza, A. and Abbasi-Shavazi, M.J. (2015) 'Reproductive paractices by patterns of marriage among Iranian women: study protocol for an explanatory sequential mixed methods design', *Reproductive Health*, 12(89).

Tung, D.X. (2005) 'Smallholder poultry production in Vietnam: marketing characteristics and strategies', *Paper presented at the workshop "Does poultry reduce Poverty? A need for rethinking the approaches" 30-31 August 2005*. Copenhagen. Network for Smallholder Poultry development.

Williamson, O.E. (1986) *Economic Organization: Firms, Markets and Policy Control*. Hertfordshire UK: harvester Wheatsheaf.

Yusuf, S.A. and Malomo, O. (2007) 'Technical efficiency of poultry egg Production in Ogun State: A data envelope analysis (DEA) approach', *International Journal of Poultry Science*, 6(9), pp. 622-629.

Appendix A

Table 1: Socio-economic variables of farmers					
Variable name	Measurement	Expected sign	mean	Standard deviation	Percentage for yes =1
AGE	Age group: 1= =<40; 0 = >40.	?+			57.14%
STOCK	Average number of chickens kept from August 2014 to July 2015	+	1076.61	1082.51	
SEX	Whether farmer is male or female (1-0)a	+			73.75%
MARX	Whether farmer is single or married (1-0)a	+			66.41%
PRIXCHK	Average price per chicken (Naira/chicken)	+	1016.28	151.34	
NATIVE	Whether farmer is a native of the community (1-0)a	+			67.57%
YRINVL	Number of years in village	+	24.53	15.24	
EXP	Number of years in poultry	+	7.18	5.38	
HDSIZE	Number of people in household	-/+	5.68	2.67	
FAMLAB	Number of household members actively involved in poultry management.	+	2.54	1.87	
EDUSTAT	Whether farmers have a form of formal education	+			97.68%
	(1-0)a				
NONFAINC	Whether farmers earn income from non-farm work	+			57.92%
	(1-0)a				
CRED	Whether farmers have access to credit facilities	+			13.90%
	(1-0)a				
NONPOINC	Whether farmers earn income from other farm activities besides poultry	+			57.14%
	(1-0)a				
POULTRN	Whether farmers have formal poultry training	+			52.12%
	(1-0)a				

Table 2: Transaction costs variables

Variable name	Measurement	Expected sign			Percentage for yes =1
DFGATE2	Proportion of chickens sold through farm-gate				
Farm-gate	Farmer mainly sells at the farm-gate.				93%
Spot market	Farmer mainly sells at the spot market				7%
Farm-gate & spot market	Farmer sells at farm-gate & spot market				23%
FMTINFO	Whether farmers seek market information from other poultry farmers? (1-0)a	+			98%
MTNEINFO	Whether farmers seek market information from neighbours? (1-0)a	+			91%
EXTSERV	Whether farmers have access to extension services? (1-0)a	-/+			37.50%
TV, RADIO, MOBFONE	Whether farmers have access to a means of information farmers? (i.e. television, radio, mobile phone) (1-0)a	+			TV= 86%, RADIO= 92%, MOBFONE = 97.3%
BACCT	Whether farmers have access to formal banking services? (1-0)a	+			90%
ACCCRDT	How easy/difficult is it to access credit? (1-5)e	-/+	3.98	0.84	
EGOVINFO	How easy/difficult is it to access information from government? (1-5)e	-/+	3.38	0.98	
SAVE	Whether farmers belong to a thrift/savings society? (1-0)a	+			52.12%
COOP	Whether farmers belong to a co-operative society? (1-0)a	+			15.06%
EMKTINFO	How easy/difficult is it to access sales information prior to sale? (1-5)e	-/+	2.58	2.38	
PDLAY	Whether farmers experience delay in payment after sales occur? (1-0)a	-			56.37%
PDURAT	period of payment (weeks)	-	2.4	5.7	
SELLDURAT	Duration to sell off market ready birds (weeks)	-	2.9	1.34	
CREDSELL	Whether farmers sell on credit?	-			49.81%
	(1-0)a				
REPCUST	Whether farmers have regular/repeat customers?	+			93.05%
	(1-0)a				

OFDISCT	Whether farmers provide discount for bulk buyers? (1-0)a	+			56.37%
BARPOW	Whether farmers consider the price they sell to be the best they can offer?	+	2.28	4.16	
	(1-3)c				
CAR, MOTCYC, TRICYC, BICYC	Whether farmers have access to any means of transport? (1-0)a	+			CAR= 23.17%, MOTCYC= 67.78%, TRICYC= 3.47%, BICYC= 20.46%
TIME2MKT	Distance to nearest market (hours)	-	0.64	0.54	
TIME2RD	Distance to nearest tarred road (hours)	-	0.26	0.22	
TIME2HECN	Distance to nearest health centre (hours)	-	0.56	0.43	
TIME2BANK	Distance to nearest bank (hours)	-	0.64	0.49	
TIME2FUEL	Distance to nearest filling station (hours)	-	0.34	0.3	
RDCOND	Whether condition of the road in the community is a problem or not? (1-5)b	-/+	2.86	3.83	
DISTMRK	Whether distance to market is a problem or not? (1-5)b	-/+	2.75	4.24	
RFALL	Whether rainfall is a problem or not? (1-5)b	-/+	2.98	2.39	
MOBIMPT	Whether mobile phone is important or not in selling poultry (1-5)d	+	4.21	0.81	

a = possible responses were yes=1, No =0

b = possible answers were 1= not a problem, 2=minor problem, 3=problem, 4=relatively serious problem, 5= serious problem

c = possible answers were 1= Never the best price, 2= sometimes the best price, 3= Always the best price

d = possible answers were 1= not important at all, 2=not important, 3=moderate, 4=important, 5= most important

e = possible answers were 1= very easy, 2=easy, 3=moderate, 4=difficult, 5= very difficult