Do Social Networks have Effects on the Risk Attitude of Commercial Poultry Farmers? Evidence from Southwest Nigeria

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Abstract. Poultry production decision setting is full of risk and imperfect information. Attitude towards risk is a measure of farmers' willingness to take risks which is an important determinant in their production decisions. Strong social capital emanating from social networks can lead to efficient risk management strategies, thereby minimizing risks faced by the farmers. Therefore, the effects of social capital on the risk attitude of small-scale commercial poultry farmers in Oyo state were assessed. Data were collected from two hundred small-scale farmers and analysed using descriptive and inferential statistics, factorial analysis, multinomial logit and a two-stage least square. Results showed that 52.5%, 37.5% and 10% of the poultry farmers were risk averse, risk neutral and risk preferring, respectively. About 31.4% and 68.6% of the female and male farmers respectively were risk averse. Close to a fifth, a quarter and two-thirds of the risk averse, risk neutral and risk takers respectively contributed 21-30% of the decisions in the associations. Fourteen percent of the farmers belonged to homogeneous groups. The choice of being risk averse was affected by marital status, educational level, family size, percentage spent on poultry income and aggregate social capital. There was no reverse causality between risk attitude and social capital.
Keywords: social capital, risk behaviour, multi-item scale, reverse causality, poultry farmers.

Introduction

The Nigerian poultry industry was estimated at NGN 80 billion naira (USD 600 million) and made up of about 165 million birds, which produced 650,000 MT of eggs and 290,000 MT of poultry meat in 2013 (Sahel, 2015). This has made the nation the second highest egg producer in Africa after South Africa's 200 million birds. Although the industry is the most commercialized and fastest growing sub-sector of the animal husbandry sector in Nigeria (Heise, Crisanb & Theuvsenc, 2015), it is encumbered with problems of feed-food competition, reliance on the import of improved breeds, low investment base, lack of equity capital, inefficient production systems, increasing costs of feeds, poor quality chicks, and low level of technological adoption (Alabi & Isah, 2002; Aboul-Naga & Elbeltagy, 2007). The poultry production decision environment is therefore made up of risk and assymetric information. Poultry production faces a myriad of risks including price fluctuation, changes in government policies and production risks, all of which

cause profit volatility and affect farmers' behavior with respect to input choice decisions (Picazo-Tadeo & Wall, 2011). Production risk exists in poultry farming which is caused by the unpredictable weather, disease outbreak and hence uncertainty of poultry outputs (Boehlje, 2002).

The Nigerian poultry sector is highly splintered with most of the chicken raised on small-scale commercial farms with less than 1,000 birds (Sahel, 2015). This unfortunate state of Nigerian poultry production is influenced by attitudes of farmers towards risks of adoption of innovations, which are linked to risks in the production and socioeconomic environments. Risk emanate from direct impact of uncertainties on the decision making process owing to farmers' attitude towards risk. Commercial poultry farming systems in Nigeria is affected by farmers' behavior to production risks. Their attitudes to risks are foremost factors influencing the rate of dissemination of new technologies among the farmers and of the product of rural development interventions

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(Yu, Hailu, & Cao, 2014). Ellis (2000) used income variance approach to classify farmers' production decision behaviour as risk-preferring (willing to take the risk of doing better than expected with a known probability of not doing well as expected); risk-neutral (indifferent between certain and uncertain outcomes with the same probable value of income); and risk-averse (prefers certainty of a given income yielding the same projected value for income but which involves uncertainty). Attitude towards risk is a measure of farmers' willingness to take risks which is an important determinant in their production decisions (Jussaume & Glenna, 2009).

In response to the throng of risk factors associated with farming, farmers have adapted ex-ante and ex-post forms risk management skills (Fafchamps, 1992). Ex-ante methods either reduce the probability of occurrence or reduce the potential impact of a shock while ex-post measures are coping strategies to relieve the impact of a shock after its occurrence. Strong social capital from social networks can contribute to making ex-ante as well as ex-post risk management more efficient, thereby reducing the risk faced by the farmers. This is because social networks encourage dissemination of agricultural innovation.

Social capital refers to social capital related to the formal and informal links, shared values and understandings in society that enable individuals and groups to trust each other and so work together to harness economic opportunities. It is made up of trust, norms, sanctions and flow of information through the social structure (Coleman, 1998; Putnam, 2000). Existing literature on social capital and welfare is vast (Grootaert *et al.*, 2004; Narayan & Pritchett 1997; Okunmadewa,Yusuf, & Omonona, 2007; Yusuf, 2008; Adepoju & Oni, 2012; Adepoju, Timothy,& Oyekale, 2013; Olowe *et al.,* 2014). Risk aversion of poultry farmers has also been documented in the literature (Ajetomobi & Binuomote, 2006; Ayinde *et al.,* 2012; Salman, Ashagidigbi & Jabar, 2014). However, little is known about the relationship between social capital and risk attitude of poultry farmers in Nigeria. This study investigated the causality between social capital and risk attitude of small-scale commercial poultry farmers in Oyo state.

Materials and Methods

Primary data were collected using a two-stage sampling procedure. The first stage was a purposive selection of Ido and Oluyole Local Government Areas (LGAs) out of the six LGAs in the suburbs of Ibadan city owing to a high concentration of poultry farms in the LGAs. Sequel to this, a random selection of two hundred small-scale poultry farmers was done. Small scale poultry production was categorised between 500-2500 birds FAO (2008). The semi-structured questionnaire sought information on the socio-economic characteristics of the farmers, the sources of risks to farmers, the dimensions of social capital and the effect of social capital on risk attitude of small scale poultry farmers.

Six social capital indices were estimated. Cash contribution is the annual membership due paid to the various associations, which the household members belong to. Cash contribution reveals members commitment to the group and the coefficient is expected to be positive (Grootaert, 1998). Labour contribution is the total number of days worked by household members or the number of days worked in a year as membership contribution. Decision Making is average participation in the decision making of the three most important groups to them multiplied by 100 for each household. Heterogeneity index is an aggregation of variation of members of the three most important institutions to the households with respect to differences within kin groups, occupation, economic status, religion, gender, age group and same occupation. The highest attainable heterogeneity score of 10 was assigned to each association. The sum of scores for each household was then divided by 30 to obtain an index and then multiplied by hundred. Membership Density is the summation of the total number of associations to which each household belongs. Meeting Attendance Index was estimated by the ratio of total attendance of household members at meetings to the number of scheduled meetings of the three most important associations in a year. The value was then multiplied by 100 (Maluccio, Haddad & May, 2000; Aker, 2005). Aggregate social capital index is also known as the multiplicative social capital index. The index was calculated using the products of density of membership, heterogeneity index and decision making index of households in their various social groups.

Data were analysed using descriptive statistics, factorial analysis, multinomial logit and a two-stage least square. Factor analysis was used to reduce variables and to identify a small number of factors that explained most of the variance observed in most of the manifest variables. It was used to bring inter-correlated variables together under more general underlying variables, which were used to categorize the farmers into risk attitude groups (risk preferring, risk neutral and risk averse). Descriptive statistics were used to profile the risk attitude categories of the farmers.

The multinomial logit regression model was used to determine the risk attitude of small scale farmers. The multinomial model is explicitly expressed as:

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$$Y_1 = \alpha_1 + \beta_1 X_1 + \cdots \beta_n X_n + \varepsilon_i$$

$$Y_2 = \alpha_2 + \beta_2 X_2 + \cdots \beta_n X_n + \varepsilon_i \qquad (1)$$

$$Y_3 = \alpha_3 + \beta_3 X_3 + \cdots \beta_n X_n + \varepsilon_i$$

Where Y_i represents three unordered categories of risk attitude:

Y_1 = those who were risk averse
Y_2 = those who were risk neutral
Y_3 = those who were risk takers
X_1 - Xn represent vector of the explanatory variables
$\beta_1 - \beta n$ represent the parameter coefficients
εi = represents the independently distributed error terms
$\alpha_1 - \alpha_3$ are the intercepts or constant terms

Two-Stage Least Square (2SLS) regression was estimated to assess the endogeneity effect of social capital on risk attitude of farmers. This technique is used when the endogenous variable's error terms are correlated with the exogenous variables. Instrumental Variables (IV) were used to cut correlations between the error term and social capital index. The 2SLS reduces the correlation of the explanatory endogenous variable with the error term Olayemi (1998) and was therefore used to estimate bicausality between social capital and risk attitude of farmers. An instrumental variable Z is defined as:

$$X = g(Z, U)$$
$$Y = f(X, U) \qquad (2)$$

where *f* and *g* are two random functions and *Z* is autonomous of *U*. However, the measurements of *Z, X* and *Y* do not allow for the identification of the average causal effect of *X* on *Y*.

Earlier studies used trust as an instrumental variable to verify the endogeneity effect of social

capital (Narayan & Prichett, 1997; Grootaert, 2001; Grootaert & Bastelaer, 2002; Okunmadewa, Yusuf, & Omonona, 2007). However, the limitations of trust as an instrument for social capital were acknowledged by Putnam (2000) and Yusuf (2008). We therefore used other instruments proposed by Aker (2005), which are household's length of residency in its present locations, charity contribution in the past year and membership of a faith-based organization.

Results and Discussion
Classification of poultry farmers according to their risk attitude

The explanatory factor analysis on the scale items yielded Eigen values which exceeded one (Table 1). The total variance explained by factors 1, 2 and 3 were 39.8, 19. 3 and 17.4% that amount to 76.6%. Validity of the data was examined using Kaiser-Meyer-Ohlin (KMO) measure of sample adequacy and Barlett's test of sphericity. These tests satisfied the validity of data for factor analysis (Table 2).

On the basis of the following questions, the first three items made up scale 1 while the last three items made up scale 2. The reliability scale ranges from zero to one, with higher values indicating greater reliability (Malhotra, 2010; Cronbach, 1951) (Table 3). Scaling was from −2 for strongly risk seeking to 2 for strongly risk averse as used by Franken, Pennings, & Garcia, 2014.

Based on this scale, all the sampled farmers were grouped into risk averse, risk neutral and risk taker using the average sum of the score of the items of the more reliable scale which are items 2 and 3, farmers with a negative score were risk takers; those with a score of zero were neutral; and those with a positive score were risk averse.

Table 1

Result of Factor Analysis

Total Variance Explained						
Component	Initial Eigen Value			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.36	39.772	39.772	2.36	39.772	39.772
2	1.163	19.383	59.1552	1.163	19.333	59.158
3	1.046	17.430	76.585	1.046	17.430	76.585
4	0.620	10.333	86.918			
5	0.444	7.395	94.314			
6	0.341	5.685	100.0			

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Table 2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.615
Bartlett's Test of Sphericity	Approx. Chi Square	255.098
	Df .	15
	Sig.	.0000
Cronbach's Alpha		No of Items
0.655		6

Table 3

Factor Analysis and Reliability

S/N	Items	Factor loading
1	I prefer production certainty to uncertainty	0.618
2	I am willing to take higher production risk in order to realize higher output	0.722
3	I always love taking production risk	0.744
4	I am willing to take higher production risks in order to realize higher average returns	0.663
5	I easily adopt new technology	0.645
6	I give birds vaccination as at when due	0.270

Risk Attitude Profile

Results showed that 52.5%, 37.5% and 10% of the poultry farmers were risk averse, risk neutral and risk preferring, respectively. This is consistent with apriori expectation that most farmers are risk averse and also in agreement with various studies (Salimonu & Falusi, 2009; Sekar & Ramasamy, 2001). A higher proportion of the poultry farmers (51.50%) were in the age bracket of 41-50 years (Table 4). This is similar to Ajetomobi and Binuomote (2006) where a third of the respondents were within the age range of 41 to 50. These farmers belonged to the active labour force and were expected to manage their farms effectively. However, about a tenth of the risk averse and risk neutral farmers were less than thirty years old respectively while a tenth of the risk takers were within 51 to 60 years of age. A higher percentage of the female farmers (68.57%) were risk averse than their male counterparts (31.43) owing to the fact that female farmers are often faced with lack of access to productive assets owing to gender inequality. About half of both the male and female farmers, respectively were risk averse while about 12% and 0.67% of the male and female farmers respectively were risk preferring. About two-thirds of the farmers were married while the rest were unmarried (single, divorced and widowed).

A majority of the risk averse (65.71%), risk neutral (69.33%) and risk preferring (50%) farmers were married. About two-fifth of the farmers had university education while a tenth of them had no formal education. About 95% of the risk prefers had tertiary education while about 54% of farmers with secondary education were risk neutral. The result is similar to the findings of Ajetomobi and Binuomote (2006) that most poultry farmers have formal education. In a typical African setting, most households are extended (Mberu, 2007). A typical poultry farming household had five members which is small when compared to Kouame (2010) where the average household size was 13 members. About a third of the rural households had more than four to five family members while those with four to five members had the highest frequency and were risk averse.

Distribution of respondents based on assets characteristics and risk attitude

A majority of the farmers have 6-10 years of experience in poultry farming. About 48.57% of the farmers with one to five years of farming experience were risk averse, 57.33% were risk neutral and 50% were risk preferring representing 52% of the sampled farmers (Table 5). With respect to access to credit, about 67% of all the farmers and a higher proportion of the farmers in all the risk groups had access to

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Table 4

Risk Attitude and Socioeconomic Characteristics

Socioeconomic variables	Risk Averse N=(105)	Risk Neutral N=(75)	Risk Preferring N=(20)	Total N=(200)
Age				
21-30	10(9.52)	8(10.67)	6(30.00)	24(12.00)
31-40	25(23.81)	15(20.00)	3(15.00)	43(21.50)
41-50	47(44.76)	40(53.33)	9(45.00)	96(48.00)
51-60	23(21.90)	12(16.00)	2(10.00)	37(18.50)
Gender				
Female	33(31.43)	23(32.00)	4(20.00)	60 (30.50)
Male	72(68.57)	51(68.00)	17(80.00)	140(69.50
Marital status				
Single	18(17.14)	14(18.67)	7(35.00)	39(19.50)
Married	69(65.71)	52(69.33)	10(50.00)	131(65.50)
Divorced	6(5.71)	8(10.67)	3(15.00)	17(8.50)
Widowed	12(11.43)	1(1.33)	0(0.00)	13(6.50)
Educational status				
No formal education	9(8.57)	11(14.67)	0(0.00)	20(10.00)
Primary	13(12.38)	20(26.67)	3(15.00)	36(18.00)
Secondary	10(9.52)	12(16.00)	0(0.00)	22(11.00)
Post-secondary	53(50.48)	26(34.67)	8(40.00)	87(43.50)
Postgraduate	20(19.05)	6(8.00)	9(45.00)	35(17.50)
Household size				
2-3	15(14.29)	4(5.33)	6(30)	25(12.50)
4-5	56(53.33)	41(54.67)	14(70)	111(55.50)
6-8	34(32.38)	30(40)	0(0.00)	64(32.00)

Note: Figures in parenthesis are %.

credit. Membership of a poultry farmers' association is expected to improve farming system, management and income. Two-fifths of the farmers did not belong to poultry farmers association and they formed the highest proportion of farmers in the three risk groups.

Distribution of respondents based on farm characteristics and risk attitude

Based on the source of water available to the farmers, 51.50% of them had a borehole as their source of water, 44.50% had a well as source of water and 4.50% of the farmers had a river as the source of water which is the least of all (Table 6). More than half

of poultry farmers used a borehole as source of water, this may be because poultry farmers are more educated and recognize the importance of a good water source for their business Risk taker farmers had the highest percentage 55% of those using a borehole, risk averse farmers had the highest percentage 48% farmers that use a well as their source of water and risk neutral farmers had the highest percentage 5% of those who depend on a river as their source of water. The result of the percentage of income spent on farming shows that those farmers that spent between 26-55% had the highest percentage, which is 46%, and those that spent 86-100% had the lowest percentage, which is

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Table 5

Risk Attitude and Assets

Assets characteristics	Risk Averse =(105)	Risk Neutral =(75)	Risk Taker =(20)	Total
Farming Experience(years)				
1-5	51(48.57)	43(57.33)	10(50.00)	104(52.00)
6-10	46(43.81)	20(29.33)	10(50.00)	78(39.00)
11-15	8(7.62)	10(13.33)	0(0.00)	18(9.00)
Access to Credit				
Yes	76(72.38)	47(62.67)	11(55.00)	134(67.00)
No	29(27.62)	28(37.33)	9(45.00)	66(33.00)
Poultry Association Membership				
Yes	43(40.95)	29(38.67)	9(45.00)	81(40.50)
No	62(59.05)	46(61.33)	11(55.00)	119(59.50)
Annual Income (Quartile)				
1st	16(15.26)	9(12)	1(5)	26(13)
2nd	41(39.05)	27(36)	7(35)	75(37.5)
3rd	20(17.14)	27(36)	6(35)	53(26.5)
4th	28(26.6)	27(16)	6(35)	46(23)

Note: Figures in parenthesis are %.

3%. 60.95% of the farmers that are risk averse spent between 26-55%, 38.67% of the risk neutral farmers spent between 56-85% of their income on poultry farming, 45% of the risk taker spent between 1-25% of their income on poultry farming. On the result of number of family labour employed, 54% of the farmers employed one family labour, 25% of them do not employ any family labour, 2.67% of the risk neutral farmers employed four family labour, 62.67% of the risk neutral famers employed one family labour, 20.95% of the risk averse farmers employed three family labour. The results of number of hired labour employed show that 59% of all the famers did not employ any hired labour. This is because they are small scale poultry farmers: 3.50% of all the levels of risk attitude had four hired labour.

Table 6

Risk Attitude and Farm Characteristics

Farm Characteristics	Risk Averse N=(105)	Risk Neutral N=(75)	Risk Taker N=(20)	Total N=(200)
Source of Water				
Well	43(40.95)	36(48.00)	9(45.00)	88(44.00)
Borehole	57(54.29)	35(46.67)	10(50.00)	103(51.50)
River	5(4.76)	4(5.33)	1(5.00)	9(4.50)
% of Income Spent on Farming				
1-25	12(11.43)	25(33.33)	9(45.00)	46(23.00)
26-55	64(60.95)	21(28.00)	7(35.00)	92(46.00)
56-85	25(23.81)	29(38.67)	1(5.00)	55(27.50)
86-100	4(3.81)	0(0.00)	3(15.00)	7(3.50)
No Family Labour Employed				
0	27(25.71)	16(21.33)	7(35.00)	50(25.00)

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1	53(50.48)	47(62.67)	8(40.00)	108(54.00)
2	22(20.95)	9(12.00)	4(20.00)	35(17.50)
3	3(2.86)	1(1.33)	0(0.00)	4(2.00)
4	0(0.00)	2(2.67)	1(5.00)	3(1.50)
No of Hired Labour Employed				
0	59(56.19)	47(62.67)	12(60.00)	118(59.00)
1	19(18.10)	11(14.67)	7(35.00)	37(18.50)
2	19(18.10)	12(16.00)	0(0.00)	31(15.50)
3	3(2.86)	3(4.00)	1(5.00)	7(3.50)
4	5(4.76)	2(2.67)	0(0.00)	7(3.50)
No of Birds				
1-500	82(78.10)	53(70.67)	19(95.00)	154(77.00)
501-1000	17(16.19)	18(24.00)	0(0.00)	35(17.50)
1001-1500	4(3.81)	0(0.00)	1(5.00)	5(2.50)
1501-2000	2(1.90)	2(2.67)	0(0.00)	4(2.00)
2001-2500	0(0.00)	2(2.67)	0(0.00)	2(1.00)

Note: Figures in parenthesis are %.

Distribution of respondents based on social capital dimensions and risk attitude

With respect to decision making index, about a fifth, a quarter and two-thirds of the risk averse, risk neutral and risk takers respectively contributed 21-30% of the decisions in the associations (Table 7). Heterogeneity of social groups was generally low among the poultry farmers. The 14% of the farmers belonged to homogeneous groups while 45% of them belonged to groups with six to ten heterogeneity score, and they had the highest percentage in the three risk groups. Risk averse individuals must have been exposed to different kind of risk at one time or the other and unwilling to experience it again. In the area of cash contribution, the highest percentage of farmers fell within the cash contribution of NGN 20001to NGN 30000. Further, 40.95% were risk averse, 37.33% were risk neutral while 20% were risk takers.

Table 7

Risk Attitude and Social Capital Dimensions

Social capital dimensions	Risk Averse N=(105)	Risk Neutral N =(75)	Risk Taker N=(20)	Total N=(200)
Decision Making Index				
0	10(9.52)	16(21.33)	0(0.00)	26(13.00)
1-10	25(23.81)	16(21.33)	4(20.00)	45(22.50)
21-30	21(20.00)	20(26.67)	13(65.00)	54(27.00)
31-40	49(46.67)	23(30.67)	3(15.00)	75(37.50)
Heterogeneity Index(%)				
0	7(6.67)	18(24.00)	3(15.00)	28(14.00)
6-10	50(47.62)	31(41.33)	9(45.00)	90(45.00)
11-16	48(45.71)	26(34.67)	8(40.00)	82(41.00)
Membership Density Index				
0	10(9.52)	16(21.33)	0(0.00)	26(13.00)
20	8(7.62)	7(9.33)	4(20.00)	19(9.50)

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40	19(18.10)	10(13.33)	0(0.00)	29(14.50)
60	34(32.38)	23(30.67)	9(45.00)	66(33.00)
80	26(24.76)	11(14.67)	7(35.00)	44(22.00)
100	8(7.62)	8(10.67)	0(0.00)	16(8.00)
Labour Contribution Index(manday)				
0	32(30.48)	31(41.33)	3(15.00)	66(33.00)
1-20	37(35.24)	17(22.67)	9(45.00)	63(31.50)
21-40	14(13.33)	17(22.67)	5(25.00)	36(18.00)
41-60	14(13.33)	10(13.33)	3(15.00)	27(13.50)
61-80	8(7.62)	0(0.00)	0(0.00)	8(4.00)
Cash contribution (₦)				
0	12(11.43)	14(18.67)	0.00%	26(13.00)
1-10000	7(6.67)	5(6.670	2(10.00)	14(7.00)
10001-20000	26(24.76)	14(18.67)	13(65.00)	53(26.50)
20001-30000	43(40.95)	28(37.33)	4(20.00)	75(37.50)
30001-40000	8(7.62)	10(13.33)	1(5.00)	19(9.50)
40001-50000	5(4.76)	0(0.00)	0(0.00)	5(2.50)
50001-60000	5(1.90)	2(2.67)	0(0.00)	4(2.00)
60001-70000	2(1.90)	2(2.67)	0(0.00)	4(2.00)
Meeting Attendance Index				
0	112(1.43)	16(21.33)	0(0.00)	28(14.00)
21-40	1(0.95)	2(2.67)	0(0.00)	3(1.50)
41-60	6(5.71)	2(2.67)	1(5.00)	9(4.50)
61-80	33(31.43)	22(29.33)	11(55.00)	66(33.00)
81-100	53(50.48)	33(44.00)	8(40.00)	94(47.00)
Aggregate social capital Index				
0-19.99	54(51.43)	38(50.67)	13(65)	105(52.50)
20.00-39.99	45(42.86)	33(44)	7(35)	85(42.50)
40.00-59.99	6(5.71)	3(4)	0(0)	9(4.50)
60.00-79.99	0(0)	1(1.30)	0(0)	1(0.50)

Figures in parenthesis are %.

Determinants of Risk Attitude of Small Scale Farmers

Attitude towards risk is a variable that measures farmers' willingness to take risks which is an important determinant in their decision to produce. The result of the multinomial logistics regression indicated that the chi square was 70.55 and significant at 1% suggesting that the independent variables jointly accounts for the variations in the dependent variables (Table 8). The choice of being risk averse was affected by marital status, educational level, family size, percentage spent on poultry income and aggregate social capital. The coefficient of marital status had a positive relationship with the log-likelihood of being risk averse. Similarly, the coefficients of years of formal

education had a positive relationship with being risk preferring but reduced the log-likelihood of being risk averse suggesting that an additional year of formal education would increase the likelihood of a farmer adopting innovation. This follows apriori expectation that formal educational is positively related to being a risk preferer (Babalola, 2014; Dohmen *et al.,* 2012). Further, a unit increase in social capital index and percentage of income spent on farming would increase the log-likelihood of being risk averse by 0.235 unit and 0.838 unit respectively.

However, an additional household member would reduce the likelihood of being risk averse and risk taking by 0.023 unit and 0.837 unit respectively. This supports the findings of Babatunde, Adekunle, &

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Table 8

Determinant of risk attitude of poultry farmers

Variable	Risk Averse			Risk Preferer			Risk Neutral	
	dy/dx	SE	Relative Risk Ratio	dy/dx	SE	Relative Risk Ratio	dy/dx	S.E
Age	0.0187	0.0325	1.0188	-0.0474	0.0533	0.9536	-.112***	.0390
Gender	0.1411	0.3953	1.1516	1.6739**	0.8495	5.3332	.9992	.7893
Marital status	0.5287*	0.3156	1.6968	0.6535	0.4850	1.9221	.2496	.5037
Educational level	-0.4811**	0.1569	1.6178	0.6801**	0.2809	1.9742	.4851*	.2711
Household size	-0.3926**	0.1716	0.6753	-0.8369**	0.3003	0.4330	-.3211	.7187
Access to credit	0.3879	0.4269	1.4740	-0.7263	0.6733	0.4836	.1568	.5073
Experience	-0.0231	0.0762	0.9771	0.0703	0.1294	1.0728	.4801	.4266
Source of water	-0.2570	0.3074	0.7733	0.4892	0.4848	1.6310	.0000	.0001
% spent on farming	0.8378**	0.2426	2.3113	0.4392	0.3881	1.5515	6.34e-07	2.01e-6
No of labour employed	3.11e-06	1.19e-05	1.000003	3.04e-05	1.85e-05	1.00003	.0302	.0311
Per capital expenditure	-2.37e-06	1.45e-06	0.9999	-2.55e-06	2.27e-06	0.9999	-.0009**	.0048
Aggregate social capital	0.2345*	0.1178	1.000005	0.5371	0.0567	0.9999	-.2108**	.0978

Risk Neutral = Base   Log Likelihood = -154.2138   LR Chi(36) = 70.55   Prob > Chi^2 = 0.0000
Pseudo R^2 = 0.1861 No of Observation = 200   *** significant at 1%, ** significant at 5%, * significant at 10%.

Olagunju, (2012); Balogun *et al*., (2011) that a unit increase in family size will reduce the likelihood of being a risk taker. Likewise, an additional year of age, unit of per capita monthly expenditure and unit of social capital would reduce the log-likelihood of being risk neutral by 0.112 unit, 0.009 unit and 0.211 unit respectively.

Endogeneity Effects of Social Capital on risk attitude of farmers

In order to assess and correct for endogeneity of social capital, a two-stage least square regression model was constructed (Table 9). A Pearson product moment correlation analysis between aggregate social capital and the instrumental variables showed that length of residency was the only significant (P<0.001) instrument. Length of residency is highly correlated with social capital and uncorrelated with risk attitude because social networks are built over time (Glasear *et al*., 2000).

The adjusted R^2 increased from 0.5802 (with actual social capital index) to 0.5836 in the second stage with instrumental variables (Table 10). Similarly, the coefficient of social capital index in the 2SLS increased from 0.0413 to 0.0481 relative to the OLS

Table 9

Correlation Result

	Length of residency	Membership in religious group	Charity donation
Aggregate social capital	0.095 (0.000)	0.121 (0.089)	0.324 (0.179)
Remark	Significant at 1%	Significant at 10%	Not significant

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Table 10

Estimation of endogeneity effects of social capital

Variable	OLS		2SLS	
	Coefficient	T	Coefficient	T
Age	.0015	1.40	-3.07e-07	-0.74
Gender	.0296**	2.22	.0007**	0.41
Marital status	.0057	0.59	.0296	2.21
Education	.0031	0.62	.01001	0.83
Family size	-.0185**	-3.29	.0033	0.67
Access to credit	-.0238*	-1.77	-.0139*	-1.48
Experience	-.0017	-0.64	-.0276	-1.86
Source of water	-.0078	-0.77	.0009	0.17
% spent on poultry	.1141***	15.12	-.0072***	-0.71
Number of labour	-1.04e-07	-0.27	.1139	15.20
Per capital expenditure	-1.36e-07*	-2.75	-1.75e-07	-0.44
Aggregate social capital	0.0413	-0.56	0.0481**	-0.64
Cons	-.4343	0.87	.0477	0.96
Adjusted R^2	0.5802		0.5836	
Sample size	200		200	

*** Significant at 1%, ** significant at 5%, * significant at 10%.

estimates. These suggested that social capital is truly exogenous and corroborated the findings of Narayan and Prichett (1997), Grootaert (1997), Okunmadewa *et al.* (2007), Aker (2005) and Yusuf (2008).

Conclusion

This study assessed the effect of social capital associated with risk attitude of small scale poultry farmers in Oyo state Nigeria. Approximately half and a tenth of the farmers were risk averse and risk preferers, respectively. The rest were risk neutral. An additional year of education of the farmers increased the likelihood of being a risk preferer while it reduced the likelihood of being risk averse. Thus, formal education has the potential to enhance the likelihood of adoption of agricultural innovation among the poultry farmers. Knowledge of the determinants of attitudes toward risk is essential for diffusion of new technologies among small-scale farmers and enhancing rural development programmes. Poultry farmers should increase the percentage of their income spent on poultry production since increased farm size leads to increased reduction of risk. Social capital significantly influenced risk attitude among the poultry farmers. Promoting social capital formation among poultry farmers is therefore a risk mitigation scheme to enhance their production.

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