

Risk Aversion among Poultry Egg Producers in Southwestern Nigeria

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Abstract: Attitudes towards risk among poultry producers in Southwestern Nigeria are derived from a survey data in a model of safety – first behaviour. The measurements of behaviour toward risk obtained were explained by a set of socioeconomic and structural characteristics of the farmers. The results showed that feed is the most important determinant of egg output in Southwestern Nigeria. The risk premiums were low, encouraging the use of the feeds under safety-first behaviour. The regression results support the hypothesis that risk-bearing capacity of the poultry farmers can be explained by their socio-economic characteristics. Particularly significant for that purpose were family size of respondents, capacity of deep litter, cost of veterinary services, cost of construction of deep litter and cost of purchase of land.

Key words: Southwestern Nigeria, risk aversion, technological change

Introduction

In agriculture, most farmers express their risk aversion in diverse ways, some of which are forward pricing, production practices, insurance, holding liquid reserves, diversification, and liability management or their combination (Boehje and Trede, 1977; Barry, 1984). Generally, these ways have commanded substantial resources from farmers and researchers. In Nigeria, however, most poultry farms are small scale with little opportunity for diversification and insurance. Their attitudes to risk are nevertheless major determinants of the rate of diffusion of new technologies among the farmers and of the outcome of rural development programmes (Tonye *et al.*, 1977; MANR, 1997; Adejoro 2000). For this purpose, this study aimed at identifying the specific determinants of poultry farmers' attitude to risk and quantifying their impact on decision-making.

In this paper, risk is introduced in a model of economic decision making as a safety-first rule. Based on the rule, the security of generating returns large enough to cover subsistence needs influence the decision maker productive resource-use efficiency. According to Scandizzo and Dillon (1976), safety-first criteria tend to be followed whenever the satisfaction of basic needs may be at risk. Given that the safety first model holds, the degree of risk aversion manifested by individual farmer can be obtained from observed behaviour. Assuming a production technology, the risk associated with production and market conditions, the observed level of factor use shows the underlying degree of risk aversion (Moscardi and Javry, 1977). Through this indirect approach the attitude towards risk was measured for a cross section sample of small-scale poultry farmers in southwestern Nigeria.

Materials and Methods

Data for this study were obtained from 360 contact farmers from 4 states in Nigeria. They were selected

through multistage random sampling. In the first stage, three local government areas in each state were randomly selected. In the second stage, 30 poultry farmers keeping layers only were randomly selected in each local government. The population frame was obtained from the Agricultural Development Programme (ADP) office in each local government area. Equal number of poultry farmers was selected in each local government for ease of comparison.

The data were collected with the aid of structured questionnaire. Salient information include socioeconomic characteristics such as age, marital status, sex, family size, educational status, religion, farming experience and production data such as egg output, birds' capacity, labour, feed, drugs, staffing and utility.

Model specification: Following safety first rule, the study was based on two major assumptions namely the randomness of net income and the relationship between inputs (Vector X) and yield (Y) as represented by a Cobb-Douglas production technology.

The postulated relationship is

$$Y = AJ X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} X_7^{b_7} \mu^e \text{-----} \quad (1)$$

Where

Y = total egg output in crates,

l = 1 27

X₁ = age in years

X₂ = level of education in years

X₃ = average feed per annum in kg

X₄ = number of layer battery cages

X₅ = number of layers in deep litter system

X₆ = labour in mandays

X₇ = cost of drugs and veterinary in Naira

μ = error term

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The error terms are assumed to be normally and independently distributed with constant variance and mean of zero (Koutsoyiannis, 2001). From the result of the regression analysis and descriptive statistics the risk aversion parameter was obtained as

$$K(S) = \frac{1}{2} \left[1 - \frac{P_i X_i}{P_f \mu_y} \right] \dots\dots\dots (2)$$

- 2 = coefficient of variation of egg output
- P_i = market price of feed per kg
- X_i = Average feed for each respondent
- P = market price per crate of egg output
- μ_y = mean egg output
- f₁ = elasticity of production with respect to feed

Feed is the most consistent determinant of egg output in the area and it is also the largest component of variable costs (Bamidele, 1986). Its marginal productivity together with coefficient of variation of egg output and factor prices for 2005, provided the value of K for each respondent using (2).

In order to examine the influence of socioeconomic characteristics on the level of risk aversion, ordinary least square regression method was used to estimate the linear, exponential and power function of the model

$$K(S) = f(V_1, V_2, \dots\dots\dots V_{17}, \mu) \dots\dots\dots (3)$$

where

- V₁ = Age
- V₂ = Educational status
- V₃ = Family size
- V₄ = Capacity of Battery cage
- V₅ = Capacity of Deep litter
- V₆ = Total amount of feed per annum
- V₇ = Number of skilled labour
- V₈ = Number of unskilled labour
- V₉ = Cost of veterinary
- V₁₀ = Availability of credit facilities
- V₁₁ = Total cost of labour
- V₁₂ = Cost of construction of battery cage
- V₁₃ = Cost of construction of deep litter
- V₁₄ = Average feed per annum
- V₁₅ = Cost of purchase of land
- V₁₆ = Rent of land
- V₁₇ = Hours of labour.

Results and Discussion

The Socio - Economic Characteristics of Respondents:

The socioeconomic characteristics of the respondents are shown in Table 1. On the average, the age of the respondents was 38 years. More than one third of them were within the age of 41 and 50. These people belong to the active labour force and are expected to manage their farms effectively. The Table 1 shows that 61.7% of the respondents were married while 30% were single.

This suggests that the poultry business seems profitable for each family as a means of livelihood. This is because three quarters of the respondents were fulltime farmers. In terms of gender distribution, men constituted 65% of the respondents. The average family size was 3.6. About 71.6% of the respondents had less than 5 family members. More than half (58.3%) of the respondents were products of tertiary institutions. None of them was illiterate.

In Nigeria, there are two main poultry management system and the study area is not an exception. The management systems are battery cage and deep litter systems. About 73.3% of the farmers were using the battery cage perhaps because of its operational efficiency. The other 26.7% used deep litter perhaps because of high acquisition cost of battery cage system. About 40% of the respondents compound their feeds themselves while 60% purchased feed from registered feed mills. More than two-thirds (71%) of the respondents did not have access to credit facilities.

The distribution of the respondents by their level of risk aversion is summarized in Table 3. The results show that the risk aversion centred around K = 1.22. More than two thirds (68.47%) of the respondents had medium level of aversion to risk while about 6.53% had high level of risk aversion. Scandizzo and Dillon (1976) had similar result but used the direct approach of Von Neumann and Morgenstern (1947). Moscardi and de Javry (1977) obtained similar results using the same approach, but their emphasis was on crop production

Determinants of attitudes toward risk:

Socio-economic characteristics are generally defined by 3 classes of variables namely: the nature of the household, its income-generating opportunities and its access to public institutions. An explanation for differences in the degree of risk aversion among the poultry farmers was sought from these characteristics. Age, level of education, family size are in the first class of variables. It is assumed *ceteri paribus* that older farmers tend to be less prone to take risks than younger ones. As shown in Table 4, age did not affect risk significantly. This is not surprising because most of the farmers were small-scale (raising less than 500 layers). For this category; age hardly imply greater on-the-job experience (which may be viewed to be positively associated with risk bearing).

Higher levels of education have generally been associated positively with risk taking. The results in Table 4 contradict this finding. The years of schooling of the respondent had insignificant effect on risk attitude of the farmers.

Two opposing interpretations can be given to the relationship between risk taking and family size, on one hand, the larger the size of the family, the higher the subsistence consumption needs and given a fixed

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Table 1: Socio-economic characteristics of the respondents

Age	0 – 30	31 – 40	41 – 50	51 – 60	Total
Frequency	84	96	138	423	60
Percentage	3.3	26.7	38.3	11.7	100
Marital Status	Single	Married	Divorced	Widowed	Total
Frequency	108	222	18	12	360
Percentage	30	61.7	5	3.3	100
Education level	No formal	Primary	Secondary	Tertiary	Total
Frequency	0	42	108	210	360
Percentage	0	11.7	30	58.3	100
Family size	1 -5	6-10	>10		Total
Frequency	258	96	6		360
Percentage	71.6	26.7	1.7		100

Source: Field survey, 2005.

Table 2: Regression result: production function

Variable	Coefficients	t ratio
Constant	0.57	4.03
lnX ₁	-0.15**	-3.28
lnX ₂	-0.09	-1.10
lnX ₃	0.01	0.22
lnX ₄	0.91**	19.3
lnX ₅	0.02	1.008
lnX ₆	+0.26*	+2.56
lnX ₇	-0.0067	-0.21
R ²	76%	

Dependent variable: log of crates of egg produced.

*means significant at 5% level, **means significant at 1% level

Table 3: Level of risk aversion

Level	Frequency	%
Low ($0 < k < 0.4$)	15.6	25
Medium ($0.4 \leq k \leq 1.2$)	41.6	68.47
High ($1.2 < k < 2$)	4.6	6.53
Total	360	100.0

amount of land, the lower the willingness of the farmers, to assume risks. On the other hand, family size might affect the labour capacity of the peasant household in which case a larger family size implies greater capacity to assume risks. The result of this study supports this second interpretation. The coefficient of family size was positive and significantly related to level of aversion.

The income-generating opportunities of the poultry farmers are represented by the rent on land, capacity of deep litter, capacity of battery cage, and level of off-farm income. The average rent on land under control for the sample under study was about N1000. The hypothesis here is that having more land (higher rent) permits the farmers to bear higher risks. This reasoning also applies to bird's capacity under either deep litter or battery cage management system. Having more birds would permit the farmers to bear higher risks. Of all the variables, the coefficient of battery cage was significant at 5% probability level and agreed with a priori expectation.

The following variables are used to account for the integration for the farmers with public institutions: use of credit facilities, membership of Cooperative Society. The creation of such group was induced to allow them

Table 4: Regression estimates: risk aversion and socio-economic characteristics

Variable	Regression Coefficient	t- value
Constant	0.79	7.21
V ₁	-0.82	0.44
V ₂	0.48	0.57
V ₃	0.51	3.47***
V ₄	-0.22	-0.72
V ₅	0.48	1.91*
V ₆	-0.89	-1.13
V ₇	-0.399	-3.14***
V ₈	0.73	0.75
V ₉	0.25	0.56
V ₁₀	-0.20	-0.98
V ₁₁	-0.11	-0.49
V ₁₂	-0.59	-0.74
V ₁₃	-0.33	-1.69*
V ₁₄	0.16	1.32
V ₁₅	0.85	23.74***
V ₁₆	0.25	0.90
V ₁₇	0.71	0.89

Source: Data analysis, 2005. *means significant at 10 %

means significant at 5%. * means significant at 1 %

access to credits not as individuals but as a group. In this way transactions costs are reduced for both farmers and banks' technical assistance can be provided more effectively. A farmer in a solidarity group is better able to sustain risks. The results support the a priori expectation.

Conclusions: This study focused on the Estimation of risk aversion for poultry farmers. The results showed that feed is the most important determinant of egg output in Southwestern Nigeria. The risk premiums were low, encouraging the use of the feeds under safety-first behaviour.

The regression result support the hypothesis that risk-bearing capacity of the poultry farmers can be explained by their socio-economic characteristics, Particularly significant for that purpose were family size of respondents, capacity of deep litter, cost of veterinary services, cost of construction of deep litter and cost of purchase of land. Base on this finding it is recommended that packages of technological and

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institutional practices affecting the region should be tailored towards the farmers' risk attitude to enhance the success of such rural development programmes.

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