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Factors Affecting Consumers' Willingness to Pay for Chicken Meat from Biosecure Farms

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Abstract**—**The research aimed at investigating the factors affecting consumers' willingness to pay for chicken meat from biosecure farms. The research was conducted in Makassar City, South Sulawesi Province, Indonesia. Samples were taken using random sampling technique in two supermarkets namely Lotte Mart and Gelael. Total samples were 50 respondents which comprised the chicken meat consumers. To find out the consumers' willingness to pay for chicken meat from the biosecure farms, the contingent valuation method was utilized. Data were collected through interviews and questionnaires. Probit Logistic was estimated to examine the factors affecting the consumers' willingness to pay for at the premium price for chicken meat from the biosecure farms. The research indicates that the education and income affect significantly the consumers' willingness to pay for chicken meat from the biosecure farms ($P < 0.05$). The results of the study will be beneficial for the policy makers, producers, consumers and those conducting research.

Keywords**—**Biosecure, chicken, farms, consumer, willingness to pay.

I. Introduction

RECENTLY, there has been growing concern on the food safety and quality. Animal husbandry products contribute to fulfill the demand for animal proteins such as meat, eggs and milk. To get the good quality and safety of the animal products, biosecurity is one the methods in farm which should be applied by farmers.

Biosecurity is a relatively new word in common vocabulary and is not found in many dictionaries and thesauri. Its broad meaning is the literal safety of living things, or the freedom from concern of sickness or disease [1]. Biosecurity is security from transmission of infectious diseases, parasites, and pests to a poultry production unit [2]; and the implementation of policies and procedures that prevent the introduction and spread of disease [3]. Biosecurity means doing everything to keep diseases out of the flock. "Bio" refers to life, and "security" indicates protection. Biosecurity is the key to keep the poultry healthy. It is what you do to reduce the chances of an infectious disease being carried to your farm, your poultry yard, your aviary, or your pet birds by people, animals, equipment, or vehicles, either accidentally or on purpose [4].

Four biosecurity principles; management of the flock, control of incoming animals, control of in-and out-going materials, and control of other animals, have been proposed [2].

Biosecurity measures can be instituted by ensuring poultry foods are free of pathogens and mycotoxins such as aflatoxins. Water, air, medication and litter materials must equally be cleaned and permitted no entry of pathogens. Humans, vehicles and equipment entering and/or leaving the poultry unit must be disinfected thoroughly. Finally, day old chicks from hatchery, chicks from other sources (e.g. hens) and other chickens must be from secured and verified sources. The flock must be separated by ages [5].

Reference [6] defines biosecurity as management to keep diseases out of the flock. It is regarded as key to controlling some of the serious poultry diseases in Indonesia such as Avian influenza and Newcastle disease. Reference [7] indicates that individual farmers in both in clustered and non-clustered poultry farms do not apply biosecurity standard operational procedures (SOP) in optimal ways; because the company is already responsible for all disease prevention measures through vaccination program and provides all input for poultry production.

Biosecurity consisted of isolation, traffic and sanitation. The objective of biosecurity is to prevent the diseases to enter the cages, so that the resulted chickens are healthy for consumers. The chickens coming from the cages that implement the biosecurity are certainly more expensive than the chickens which come from the cages which do not apply the biosecurity. Price given by consumers of the chickens which come from the cage applying biosecurity enclosure using the contingent valuation method (CVM) have been estimated for WTP [8].

Reference [9] argues that WTP can be defined as the maximum price the consumer accepts for paying or the upper limit of the acceptability margin. Three types of methods have been proposed to help set prices: The methods that use real data to calculate price elasticities or hedonic prices, the methods that use surveys to estimate WTP (conjoint analysis and contingent valuation) or to estimate price elasticities (conjoint analysis, contingent valuation and price tests via simulated purchases) and incentive-compatible methods (Vickrey auctions and BDM lotteries). The physical features of the product and their presentation, as well as their customization, positively influence WTP. Various price policy factors also offer opportunities to capture the consumers'

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WTP: Three-part tariffs, bundled offers and payment by credit cards. Finally, the purchasing environment can affect WTP. Promotions have a negative impact on WTP. The presence of competing products seems to have a negative effect on WTP (online auctions).

Chicken meat consumption in Indonesia for the last three years from 2009 to 2011 fluctuated from 3,076 kg/capita/year to 3,650 kg/capita/year respectively. After that, it decreased to 3,494 kg/capita/year [10]. Cases of Avian Influenza which emerged in Indonesia in 2007 had provided valuable lessons for the chicken farmers and chicken consumers. Breeders will certainly improve biosecurity in the stables, the consumers will be more cautious when they purchase chickens. According to [11], there are several factors affecting demand for products, such as prices of the products themselves, prices of the substitutes and complementary products, taste and preferences, real income, relative prices in future and number of population.

Reference [12] argues that the consumers are willing to pay 23.26% per kg more for indigenous chicken meat and 41.53% for the eggs. The socio-economic factors such as; the age, income, education and family size, significantly determined the consumers' willingness to pay for the chicken meat.

This study aimed at investigating the factors affecting the willingness to pay for chicken meats originating from the stables which implement the biosecurity.

II. Materials and Methods

A. Survey Design

This study was conducted in 2011. Two supermarkets selling the chicken meats taken from the biosecure farms were selected as samples. The respondents were the people who purchased the chicken meats. The study was conducted on chicken meat consumers in the supermarket. The data were collected using a questionnaire which was clearly understood with the help of two different pictures showing the biosecure poultry farms and non-biosecure farms. The study was carried out in Makassar City by conducting a survey of 50 chicken meat consumers. The exploratory survey was conducted using face-to-face interviews in the supermarkets.

The questionnaires used in this study were composed of two parts. In the first part of the questionnaire, the consumers' socio-economic and attitude characteristics were measured. The socio-economic characteristics are age, gender, education level of respondents and monthly household income. In the second part of questionnaire, the consumers' willingness to pay for the chicken meats from the biosecure farms was examined. After providing information on the picture of the biosecure farms, the respondents were asked how much more they would pay for chicken meats from the biosecure farms than from the conventional farms.

The respondents were asked to state the premium price they would be willing to pay for 1 kg chicken meat produced under the described conditions. A payment scale technique with seven consequential bids ranging from IDR 1,000 to IDR 7,000 was offered to elicit this premium price. An actual reference market price of about IDR 23,370 for 1 kg conventional chicken meat was presented to help the consumers make their choices, which provided the detailed information about the consumers' responses on WTP question. The use of many bid amounts was to cover the various prices for chicken meats in Indonesia markets.

Consumers' WTP for chicken meats from biosecure farms was considered as dependent variable in the research. The respondents were posed with the following WTP question: Suppose your favorite purchased chicken meat has a premium price, assuming no difference in taste and nutritional content, would you pay slightly more for chicken meat from the biosecure farms?

B. Regression Analysis

Regression model estimated the sub-sample of the respondents reporting the positive WTP. The regression analysis was conducted in order to show the effect of socio-economic characteristics on the consumers' purchasing decisions. The independent variables used in the study included: (a) Dummy variable: Gender (o = male, 1 = female); (b) Continuous and interval variables: Age (three age groups comprised: 25-32, 33-40, 41-49). The ages were coded 1 to 3 respectively; education levels (four education levels were specified: 1-6, 7-9, 10-12, 13-16. The education level was coded from 1 to 4 respectively). Income (four income groups were classified: IDR < 3,000,000 IDR 3,000,000 - < 5,000,000 IDR 5,000,000 - < 10,000,000 and ≥ 10,000,000). The income groups were similarly coded from 1 to 4, respectively.

C. Willingness to Pay: CVM

Contingent valuation is a stated preference method used for the valuation non-market goods and services [13]. It is a survey-based method in which the respondents are asked their preferences towards a presented hypothetical market. The method combines neoclassical economic theory and socio-empirical methods to estimate the economic values of goods, services or public programs.

Consumers' willingness to pay for the chicken meats from the biosecure farms was measured using a direct valuation method: Contingent valuation (CV). A mixed questioning procedure, normally called closed-ended with follow-up, was used. This procedure consisted of a dichotomous choice (DC) question and a maximum WTP question. In the DC question, the consumers were asked whether or not they were willing to pay for a premium price X to buy the chicken meats from the biosecure farms instead of a conventional one. The amount X is a percentage over the price of the conventional ones. The amount X was the percentage over the price of the conventional chicken. The consumers' responses were YES if they were willing to pay at least Ai for chicken meats from biosecure farms, or otherwise NO. The consumers were then asked for the exact premium they were willing to pay. After WTP values obtained by the CV method, the next stage was to analyze the factors that were affected by the multiple regression analysis and defined the efficiencies of the

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determination (R^2) to find out the effects of these variables together with the amount of WTP (y).

According to [14], to determine the effect of each independent variable on the dependent variable simultaneously (together), test F (Fisher) was done with reasons:

- If the F count is greater (>) than the F table at the 5% level of significant, this means the independent variables (X) have significant effect on the dependent variable (Y), or Ho is rejected.
- If F count is smaller (<) than F table at the 5% level of significant, this means the independent variables (X) had no significant effect on the dependent variable (Y), or Ho is accepted.

To determine the effect of independent variables on the dependent variable partially, the T test was used:

- If the T count is greater (>) than T table at the 5% level of significant, this means partially independent variables (X) has significant effect on the dependent variable (Y), or Ho is rejected.
- If the T count is smaller (<) than T table on significant 5%, meaning independent variable (X) had no significant effect partially on the dependent variable (Y), or Ho is accepted.

III. Results and Discussion

A. Characteristic of Respondents

The descriptive statistic of variables affecting WTP can be seen in Table I.

TABLE I
THE ANALYSIS OF SOCIO-ECONOMIC VARIABLES

	WTP	Age*	Gender	Education**	Income***
Mean	0.34	1.42	0.26	3.34	2.1
Min	0	1	0	1	1
Max	1	3	1	4	4
Sd	0.47	0.73	0.44	0.59	0.88

* Three age groups are divided into: 25-32, 33-40, 41-49. The ages are coded from 1 to 3.

** Four education levels are classified in: 1-6, 7-9, 10-12, 13-16. The education levels are coded from 1 to 4 respectively

*** Four income group are categorized (IDR < 3,000,000 IDR 3,000,000 - < 5,000,000 IDR 5,000,000 - < 10,000,000 and ≥ 10,000,000). The income groups are similarly coded from 1 to 4, respectively.

The characteristics of respondents can be seen in Table II.

Based on this research, the average age of the respondents is 34.24 years. Majority of the age is between 25 and 32 years (52%). The respondents comprise 50% males and 50% females Majority of the respondents (66%) graduated from universities. Most of the respondents have the income ranging from 3,000,000 - below IDR 5,000,000 (37%).

B. Willingness to Pay as Estimated

The frequency distribution of WTP amounts is shown in Fig. 1.

Based on this research, 86% of the respondents are willing to pay extra for the extra prices for the chicken meats from the biosecure farms, whereas the rest (14%) reject to pay more, WTP was much stronger for three bids. The second bid (IDR 2,000) is the most preferred one and is chosen by 39.5% of the respondents. The second most preferred bid was the third one (IDR 3,000), which is chosen by 30.2% of the respondents. The first bid (IDR 1,000) is chosen by 16.3% of the respondents and is the third most preferred bid. The highest bid (IDR 7,000) is chosen by only 4.7% respondents.

TABLE II
CHARACTERISTICS OF RESPONDENTS

Characteristics of respondents	Chicken Meat Consumer
Average Age (year)	34.24
Distribution of the age (%)	
• 25-32 year	52
• 33- 40 year	30
• 41-49 year	18
Gender (%)	
• Male	50
• Female	50
Level of Education (%)	
• Junior High School	0
• Senior High School	34
• Bachelor	66
Monthly household head income (%)	
• < IDR 3,000,000	36
• IDR 3,000,000 - < 5,000,000	37
• IDR 5,000,000 – 10,000,000	18
• > IDR 10,000,000	8

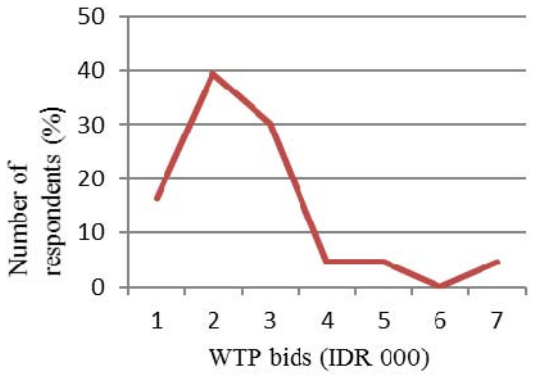


Fig. 1 Frequency distribution of WTP for the chicken meats from the biosecure farms

C. The Linear Regression Model

According to [15], the income, education, perception of and attitudes towards FTC (Food Traceable Certificate), as well as the degree of concern over the food safety, have the significant effects on the consumer's WTP of the premium price for the FTC. However, the effects of these factors on the actual premium price that a consumer is willing to pay are quite different. Conditioned on the consumers being willing to pay a positive price premium, income levels, and degree of concern over the food safety are the only two factors which have the significant effects on the actual premium the consumers are willing to pay.

Another study indicates that the socio-demographic factors namely: income, environmental education, and years of education significantly influence the willingness to pay for the organic vegetables [16].

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Reference [17] found that gender, household monthly income, marital status, attitudes towards the health functions, attitudes toward the active ingredient contents and taste of the products have significant positive impact on the willingness to pay for *C. sativus*, while the price of the products and comparative purchasing behavior have the significant and negative impact on the willingness to pay for *C. sativus*.

According to [18], the average premium for the local animal product is 23%. The willingness to pay for locally grown products is influenced by the age, gender, income as well as by perceived product quality, a desire to support the local economy, patronage of farmers, markets and consumers to the agriculture product quality.

The WTP calculation discloses that the mean value is 21.4%/kg and a median is 19%/kg even though both measures are less than the average premium price [19]. Reference [20] indicates that 82% of the respondents are ready to buy the certified FAW products. The majority of these purchases (95%) are willing to pay an extra sum of approximately €1.5 for 1 kg of the certified FAW broiler fillets. This represents the price increase of approximately 27% in comparison with the actual price of conventional broiler fillets.

According to [21], the factors affecting as well as determining the amount of the premium price a consumer is willing to pay for beef are the household income and price levels.

Reference [22] found that WTP is mainly related to three socio-economic factors; namely: The monthly household income, education level of household head, and monthly conventionally raised chicken meat consumption together with two attitude factors namely: Previously organic food consumption in the household and respondents' opinion about the risks of the conventionally raised chicken meat to human health. These factors are statistically significant and have the positive effect on the WTP. According to [23], household size and monthly household income have negative sign to pay extra for genetically unmodified products. Reference [24] found the income of respondents was not an influence to the WTP for tourist object management in Taman Alun Kapuas; however, only age of respondents influences the WTP.

TABLE III
REGRESSION OF WTP FOR CHICKEN MEATS FROM BIOSECURE FARM

Variable	Regression Model		
	Coefficient of regression (β)	T	P
Gender	0.108	0.882	0.382
Age	0.066	0.874	0.387
Education	0.506	5.710	0.000*
Income	0.014	0.220	0.000*
Constant	-1.520	-3.959	0.000
F	8.532		0.000*
R^2	0.381		

Table III shows that the estimated parameters of the explanatory variables gender, age, education and income were positive sign and statistically significant except gender and age. The gender is not statistically significant because the respondents consist of 50% male and 50% female. The age of respondents is also statistically insignificant because the differences between the youngest (25 years) and the oldest (49 years) is not far enough. The positive sign for the coefficient regression of variables suggested that the premium price for chicken meats from the biosecure farms increase together with the gender, age, education and income variables. The household income level is an important variable influencing WTP. As the household income increases, the probability of WTP for the chicken meats from the biosecure farms also increases. The estimated coefficient of the income (0.014) increase as the income increases. These findings confirm the results of the research about WTP. This study suggests that the relation between the income and WTP is positive and statistically significant [12], [15], [17], [18], [22]. This result does not agree with that of [24] who argues that monthly household income has the negative effect on the willingness to pay extra price. While [24] finds out that the income does not significantly affect the WTP.

The coefficient of the education level is 0,506. This research discloses that the education levels of respondents have the positive effect on the WTP. This has the correlation with the results of [12], [15], [22].

Based on the partially statistic test, variables affect significantly are education and income of respondents. Simultaneously, all socio-economic variables namely gender, age, education and income affect willingness to pay for chicken meat from biosecure farms. The result of this research agrees with that of [15], [17], [22].

F test was significant, meaning that this WTP can be explained by the age, education, gender and income. R^2 = 0.381 meaning that 38.1% of the WTP can be explained by age, education, gender and income variables, and 61.9% are influenced by other variables which were not included in this model.

IV. CONCLUSION

In this study, the factors affecting consumers' willingness to pay for chicken meat from the biosecure farms are explored. Eighty six percent of the respondents are ready to pay more for chicken meats from the biosecure farms. Based on the results of this research, it can be concluded that the education and the income of the respondents are factors affecting the WTP.

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