

# Willingness To Pay Housing Type 36 Consumer In the Special Province of Yogyakarta

Suripto

Faculty of Economics  
Universitas Ahmad Dahlan  
Yogyakarta, Indonesia  
[suripto@ep.uad.ac.id](mailto:suripto@ep.uad.ac.id)

Lestari Sukarniati

Faculty of Economics  
Universitas Ahmad Dahlan  
Yogyakarta, Indonesia

**Abstract**—Demand for homes In the Special Province of Yogyakarta experienced an increase caused by population growth, so the need for housing is very urgent. The desire to buy a home is faced with a choice of the home to be chosen by a prospective buyer. Preference becomes essential for consumers to buy a house when they are met with limited income. This study analyses what attributes affect the desire of potential buyers to purchase type 36 homes in Bantul, Sleman and Yogyakarta. The population of this study is in the Special Province of Yogyakarta while the sample is Bantul, Sleman and Yogyakarta with an example of 49 people. Analytical tool used is the logit model. The results showed that consumer preferences choose type 36 formulation at a price of 400,000,000 rupiahs. The determinant model of willingness to pay type 36 in Bantul, Sleman and Yogyakarta is influenced by variables: Residence Region (X1B), Sex (X2JK), Marital Status (X3), Age of respondent (X4), shopping place (XBLJA ), venue facilities (XKES), Access to Education (XPDDK), and Access to Work (XTKJ).

**Keywords**—willingness to pay; house type 36; logit model

## I. INTRODUCTION

Home or residence is a basic human need that must be fulfilled, in addition to the need for food and clothing. Perberkembang number of people will have implications for the increasing demand for housing. Every individual human will prioritise meeting basic needs rather than secondary needs. Likewise, with the need for a home, everyone will try to meet the needs of the house in every level of community life by paying attention to the tastes and abilities.

The population in the Special Province of Yogyakarta (DIY) continues to increase, with growth during the 2015 to 2016 period reaching 1.13% (BPS, DIY In Figures 2017). The development of a limited number of people and the amount of land makes the need for housing not enough to meet the demand for

housing. Rising house prices also drive this insufficiency and not followed by increasing public income. The desire to buy a house will be hindered by the inability of the community to buy a house. This research will examine the public's willingness to pay for type 36 houses. Furthermore, whatever variables are determined that determine the community can track the price of the home.

## II. LITERATURE REVIEW

In general, willingness to pay (WTP) is defined as the amount that can be paid by a consumer to obtain an item or service. (Whitehead, 2005) [1] states that WTP is the maximum price of a thing that consumers want to buy at a particular time. (Tan, 2016) [2] emphasises the understanding of WTP on how much consumers can purchase an item. The WTP is a price at the consumer level that reflects the value of goods or services and sacrifices to obtain it (Scarpa and Willis, 2010) [3] On the other hand, WTP is intended to determine the purchasing power of consumers based on consumer perceptions [3]

(Leszczyńska, 2015) [4] examines consumers' willingness to buy environmentally friendly products. This study presents the results of research regarding willingness to pay (WTP) for selected ecologically friendly products. The research objective is to evaluate readiness to pay (Willingness To Pay, WTP) for environmentally friendly products by looking at the relationship between the will and values of individuals by comparing perceived product benefits. The results of the study show that WTP buys products are closely related to the usefulness of the products that consumers expect. The research methodology was conducted to assess PAPs by comparing the value of environmentally friendly products with non-environmentally friendly products. The findings of research on non-

environmentally friendly products are evaluated slightly higher than their actual (market) value. Eco-friendly products are reviewed below their market value. Research implications can be a starting point for research on the effect of value systems on the decision to purchase environmentally friendly products.

(Ilmiah and Sipil, 2014) [5] examined the WTP of construction workers for safety and health insurance against the amount of willingness to pay (WTP) by construction workers. The elicitation method used is closed-ended dichotomous choice through double bounded technique by collecting data through surveys directly to a sample of building construction workers. The analysis was carried out with four models using the Chi-Squared Automatic Interaction Detector method indicating that the length of the project, age and status of respondents became good predictors of their decisions. Analysis of double models bounded shows that the length of the project is the only significant variable at level 0.05 determines the WTP of professional safety insurance. From the overall estimation model, WTP ranges between Rp. 57,552 (0.57% dependent value) and Rp. 61,970 (0.62% dependent value). This means that the willingness to pay construction workers is above the current personal accident premium (0.25% -0.40%).

[2] examined housing PAPs in Kuala Lumpur and Selangor. This study determines the response of willingness to pay (WTP) to changes in structural attributes, neighbouring state attributes of home structure attributes and control variables. In a study using 299 households from Kuala Lumpur and Selangor in Malaysia. The results show that housing developers must build an environment that encourages a friendly and sustainable environment as an attraction for home buyers and is willing to pay more to live in a friendly atmosphere. This study suggests that the government must create a vision and provide policy directions and guidelines that describe all aspects needed to support a sustainable environment.

(Chea, 2016) [6] researched PAPs to visit cultural heritage in Malacca. This research was conducted in Melaka City with a total sample of 502 visitors in the historic city. The purpose of this study is to estimate the economic benefits of the inheritance of life in the town of Melaka, as a result, will be able to provide an understanding of the value of this unique heritage to the community. The research method used is Single-Bounded (Single-Bounded CVM) Contingent

Assessment Method, and two Bounded (Double-Bounded CVM) Contingents. In CVM, the logit model is determined based on the dichotomous method to predict willingness to pay (WTP) randomly with five different choice values (RM3 / RM4 / RM5 / RM6 / RM7).

### III. METHODOLOGY

To determine the WTP for type 36 housing, starting from the concept of utility, namely the benefits or satisfaction of consuming type 36 housing at a specific time Determination of WTP with a utility approach, for example, is done by [2]; [8] and (Longo, Markandya and Petrucci, 2008) [7] This approach begins with the assumption that every individual or household always tries to maximise its utility with a guaranteed income, and that individual will determine the amount of demand for goods or services to be consumed. The application is defined as the amount of products or services that want or want to be bought or paid for (willingness to buy or willingness to pay) by consumers at a certain price and at a particular time. The utility that a consumer will get has to do with the amount paid which can be measured by a PAP. Efficiency obtained from the item.

Determination of PAP by assuming that households spend their income to buy a house and to set up a set of items other than the home, by paying their rent. Expected profit during the lifetime symbolised  $I$ , consumption other than the house signified  $X$  and house prices  $P$ . House prices are a function of the housing attribute typified by  $M$  which is a vector that contains home attributes both economic and non-economic properties (expense, income and environmental attributes). Household budget constraints can be written as:

$$PX + P(M) = I$$

(1) The household tries to maximise utility, denoted  $U$ , which is a function of  $X$ , and  $M$ . Consumers seek to optimise their efficiency, reach the optimum point (stationary) with the following conditions:

$$\frac{\partial P(M)}{\partial M_i} = \frac{\partial U / \partial M_i}{\partial U / \partial X}$$

(2) Equation 2 shows that the left side is the implicit marginal price for the housing attribute ( $M_i$ ) and the right side is the marginal utility of the housing attribute ( $M_i$ ) which shows the marginal utility of the  $M_i$  house with the minimal substitution of item  $X$ . The right side of the equation indicates that the maximum satisfaction

of housing consumers requires assumptions about the specific form of the home utility function, where happiness has the formulation depending on the marginal utility of goods other than the house.

Equation 1 will be changed using the translog function as (Potoglou and Kanaroglou, 2007) [8]. This functional form is used to explain the utility function of owning a house as well as the production function in an isocost constraint. This research is a macro with family units so that the whole family is included in a different translog function; all individuals are stigmatised based on the number of individuals in the right specifications. In this study are as follows:

$$U(X, M) = \log X + \sum_{i=1}^k (\alpha_i + \phi_{Ei} E + \phi_{Fi} F + \phi_{Hi} H_i + \frac{1}{2} \sum_{j=1}^k \beta_{ij} \log M_j \log M_j)$$

(3) Where K is the number of housing attributes, E is a variable that shows the attributes of the income ability of consumers to pay, the background of family demography (family size, type of sex, age), and P measures the education of household members. The parameters that determine utility functions are  $\alpha_i$ ,  $\phi_{Ei}$ ,  $\phi_{Fi}$ ,  $\phi_{Hi}$ , and  $\beta_{ij}$ . Where  $\beta_{ij} = \beta_{ji}$ . Differentiating (3) of  $M_i$  and X results in optimisation of satisfaction because it consumes M and X which shows the marginal rate of substitution, namely the right side of equation 2, thus obtaining the following equation 4:

$$\frac{\partial U / \partial M_i}{\partial U / \partial X} = \frac{X}{M_i} \left( \sum_{i=1}^k (\alpha_i + \phi_{Ei} E + \phi_{Fi} F + \phi_{Hi} H_i + \sum_{j=1}^k \beta_{ij} \text{LOG} M_j) \right)$$

(4) Equation 4 will be useful to fulfil the utility maximisation requirements for having a house in Equation 2 and expressed regarding the ratio of two expenditures related to expenditure on the property and non-housing attributes. To maximise the consumption of two items, equation 4 is multiplied by both sides by consuming  $M_i$ 's formulation and dividing it by consumption instead of the formulation of X, resulting in the following equation:

$$\frac{M_i \partial P(M)}{X \partial M_i} = (\alpha_i + \phi_{Ei} E + \phi_{Fi} F + \phi_{Hi} H_i + \sum_{j=1}^k \beta_{ij} \text{LOG} M_j)$$

(5) Equation 5 is what will be estimated in the empirical analysis of this study.

#### IV. ANALYSIS TOOL

Analysis technique with a Single-bounded approach because it is easier to apply [9]. In another study by [5] there was no relevant difference between dichotomous choice approach and single bounded approach and double-bounded in small samples. Some researchers argue that a single-bounded approach is a more suitable

measure for determining PAPs. Some researchers prove that the statistical efficiency of the Single-bounded approach is higher than the second estimate bounded [10]. Information on the correct amount of WTP can be obtained from a single-bounded approach because each respondent is given a set of observations, which produce precision in the estimation of intervals. Additional information on WTP respondents resulted in a more precise estimate of structural parameters and detailed welfare estimates. A single-bounded approach has advantages, for each sample size given, survey costs may tend to be lower. From the Single-bounded approach logistic regression equation is derived in analysing the factors that determine the WTP value of type 36 house purchases in Bantul Regency, Sleman Regency and Yogyakarta City. Logistic regression estimation was chosen because it was related to the optimisation of consumer satisfaction which resulted in a logarithm equation model.

Model estimation uses the logit (Li) model for practical estimation purposes, as follows [7], [5], and [2].

$$Ly_i = \ln\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_{20} X_{20} + \alpha$$

(6)  $\ln p_i$  is the probability of exit 1 (for residents who want to buy a type 36 house in DIY Province is the dependent variable). Independent Variable ( $X_{ij}$ ) consists of:

X1B = area of residence is a dummy variable, worth 1 for people who live in the city of Yogyakarta, and 0 for those who live in addition to the city of Yogyakarta. Measuring the demographic variable F.

X2JK = Is a Gender variable, is a dummy variable, a value of 1 for people of female gender, and 0 for men of male sex measuring the demographic F. variable

X3 = Variable Marital Status is a dummy variable, worth 1 for people who are married, and 0 for people with the status other than marriage, measuring demographic F.

X4 = Age of the respondent in years, measuring demographic variable, measuring demogravi F.

X5 = Respondent's income, measured from fixed income received per month, in 000 Rupiah measures the ability of the consumer to pay (E).

XBLJA = Variable place of shopping is the access variable for the form of shopping near the home of shopping measured by the Likert scale, measuring the formulation attribute (K).

XKES = Variable facility of health location which is measured by the Likert scale measures the formulation attribute (K).

XPDDK = Education Variable is a housing facility that is close to access to education, measured by the Likert scale, measuring the formulation attribute (K).

XTKJ = Variable workplace facility is the location of the formulation close to access to the workplace, measured by the Likert scale, measuring the formulation attribute (K), confounding variable,  $\beta_0$ : constant,  $\beta_j$ : parameter coefficient

## V. SAMPLE

The main problem regarding this sampling is how far the sample is representative of its target population. The results of processing from a sample, called statistics, can be wrong in estimating the value of a formula called a parameter. To determine the sample size of a population, in this study using the method of approach of William Sealy Gosset, the following [12] states that with a total of 30 samples, the average value on the correlation coefficient quickly approaches the real value of the population. This study uses a sample of 49 respondents who were processed to explain Willingness to pay. The estimation tool used is the logit model using Maximum Likelihood Estimator (MLE) because the logit model is a non-linear model in the parameters and in the variables that correspond to the decrease in the model. The estimation of the logit model is done by steps. Testing the willingness to pay variable determinant by checking the model individually (partial) with the Z test statistic test. Next, test the model as a whole (simultaneous), with the likelihood ratio (LR) test statistic and check the goodness of the regression line (goodness of fit) by looking McFadden R2 and Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests.

## VI. DISCUSSION

Statistical probability analysis of willingness to pay families of type 36 Bantul, Sleman and Yogyakarta City formations in D.I Province. Yogyakarta is estimated by estimating the logit model. The independent variables studied are: Residence Area Variables (X1B), Gender (X2JK), Marital Status (X3), Age of Respondents (X4), Amount of Dependents (X5), Respondents' Revenue (X9), Shopping Place (XBLJA), Health Facility Facility Variables (XKES), Education Access Variables

(XPDDK), Workplace Access Variables (XTKJ), while the dependent variable is willingness to pay (Y).

The results of data processing obtained estimation regression model logit determinant of willingness to pay type 36 formulation in the Special Region of Yogyakarta, Sleman and the City of Yogyakarta using MLE are as follows:

**Table 1.** Estimation of MLE Method Parameters for Estimating Willingness to Pay Models

Variable	Coefficient	Z-statistic	(Odd ratio)
C	-11.1453	-1.23324	1.44426E-05
X1B*	4.719944	1.881884	112.1619714
X2JK*	-15.5432	-1.89318	1.77703E-07
X3*	13.24152	2.320885	563273.1735
X4*	0.452068	1.675516	1.571558811
X5	-2.64462	-1.45167	0.071032341
X9	0.002525	0.944005	1.00252819
XBLJA*	-1.56273	-1.64892	0.209563601
XKES*	-1.29693	-2.03613	0.273371118
XPDDK*	-2.88349	-2.29317	0.055939026
XTKJ*	2.055393	2.18777	7.809906563
Log-likelihood		-10.63595	McFadden R-squared: 0.674
LR statistic (10 df)		44.16596	Probability(LR stat): 3.07E-06
Obs with Dep=0		19	Total obs 49
Obs with Dep=1		30	
H-L Statistic:		3.3164	Prob[Chi-Sq(8 df)]: 0.9130
Andrews Statistic:		31.2252	Prob[Chi-Sq(10 df)]: 0.0005

The data source is processed

Test the determinant coefficient individually in Table 2 is done by comparing the value of Z calculated with the Z table for the level of significance ( $\alpha$ ) of 0.05 by 1.64. These results indicate that the variable of the area of residence (X1B), variable Gender (X2JK), Marital Status (X3), Age of respondent (X4), Variable shopping place (XBLJA), Variable facilities place (XKES), Access to Education Variables (XPDDK), Variable access to the Workplace (XTKJ) had a significant effect with a significance level of 5 percent on the type 36 willingness to pay formulation in Bantul Regency, Sleman Regency and Yogyakarta City. As for the Dependent Amount (X5) and Respondent's Revenue (X9), it was not statistically significant on the type 36 determinants of willingness to pay in Bantul Regency, Sleman Regency and Yogyakarta City.

A simultaneous test based on the LR test shows that the statistic LR value is 44.16596 and the amount and LR table is



25.51. Comparison of statistical LR values with table values indicates that the statistical LR value is far higher than the table value at the 0.05 significance level. This means that the null hypothesis is rejected so that statistically significant independent variables together can explain the model.

The goodness of fit test as shown in Table 2 shows that the coefficient of determination is  $R^2_{McF}$  of 0.674930, which means that variables in the model can explain around 67.5 per cent of the type 36 willingness to pay status variations in Bantul Regency, Sleman Regency and Yogyakarta City in 2013. While the value of Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests  $> 0.05$  showed no significant difference between the classifications predicted with the observed designation. Thus, this logistic regression model is suitable for use as an analytical tool.

#### 4.1 Economic Analysis

This analysis emphasises the suitability of theoretically expected signs and the possible impact on type 36 willingness to pay in Bantul, Sleman and Yogyakarta. The dependent variable is the willingness to pay type 36 formulation, which is measured by a dummy variable, worth 1 if people want to spend the type 36 formulation, and are 0 if they do not want to pay.

The area of residence is proxied by the house of the respondent (X1B), has a positive and significant sign, meaning that the place of housing located in Yogyakarta Special Region has a probability of being preferred to be chosen as a place to live. Respondents' residence observed is the location of consumers in Bantul Regency, Regency Sleman and Yogyakarta City. This variable is a dummy variable, with the city of Yogyakarta as a dummy variable. Following the hypothesis, this variable has a positive and statistically significant effect on the type 36 willingness to pay formulation in Bantul, Sleman and Yogyakarta. The variable coefficient of X1B is 4.71994 with an odds ratio of 1.882, meaning that the probability of increasing the willingness to pay of housing located in the Special Region of Yogyakarta is 1,882 times that of people located outside the Special Region of Yogyakarta. The interpretation of this variable is that the location of the location in Bantul Regency has a higher risk of behaviour compared to housing outside the Special Region of Yogyakarta. This shows that the housing location in Bantul Regency is preferred compared to Sleman Regency and Yogyakarta City. The Gender Variable (X2JK) is a dummy variable, with a Beckmark male. This variable has a negative sign with a coefficient of 15.543 and an odds ratio of 0.000012. This variable has a negative and statistically significant effect on willingness to pay type 36 formulation in Bantul, Sleman and Yogyakarta City with  $\alpha = 0.05$ . This means that women have a lower probability of desire to buy housing than men. Women have a lower willingness to have a home than men, this may be due to the artistic culture that women tend to follow husbands after marriage, so they pay less attention to home ownership.

Variable marital status is a dummy variable, with benchmark not / not married. This variable is individually and negatively related to the significant level of 5 per cent with the willingness

to pay status of type 36 in Bantul, Sleman and Yogyakarta. The coefficient estimation result of this variable is 13,241 with an odds ratio of 5,632, meaning that people with marital status have a probability of buying a house is 5,632 times people who do not have marital status. In other words, people who do not have marital status are less likely to buy a home than those who are married.

The estimated age value (X4) is significant at the 5 per cent significance level with a parameter estimation value of 0.452 while the odds ratio is 1.571. This means that the probability of people who are older than one year has a likelihood of buying a house for 1,571 times than people who are one year younger. This means that the opportunity for older people will have a higher probability of purchasing a home than younger people.

Variable number of dependents (number of children) has an adverse effect but not statistically significant on type 36 willingness to pay in Bantul, Sleman and Yogyakarta. In theory, this variable is per the argument, the more dependents, with individual income will make the purchasing power to be low, so the interest in buying a house goes down.

Revenue variable (X9) has a positive effect but is not statistically significant on type 36 willingness to pay formulation in Bantul Regency, Sleman Regency and Yogyakarta City at  $\alpha = 0.05$ . In theory, this variable is significant because it is positive, meaning that the amount of income will encourage to have a higher house. Statistically, this variable is not significant, suggesting that income does not affect buying a house. Home ownership is not income dependent.

Variables as a proxy for general home utility use were significantly insignificant, only one sign among the 4 variables was chosen to consider the utility of the house, namely the variable of proximity to the workplace. Variability of proximity to the workplace has a positive and significant sign coefficient of 2.055 and odds ratio of 7.809. This means that people buy a house driven by the motive of wanting to approach the workplace. A formulation that is close to the workplace will have a higher probability of behaviour compared to the remote with the workplace.

#### V. CONCLUSION

Based on the results of data analysis, this research can be concluded as follows:

- 1) The central facility owned by housing that spurred respondents to have the will to buy a type 36 house is the security fulfilment to be inhabited. Respondents have the perspective that the formulation that is equipped with environmental security is the main impetus to be interested in buying a house. The second reason is the formulation that has a low price, and low rates will make respondents increase the willingness to buy a house.
- 2) The method for having the most dominant house that drives a plan to buy a home is to pay in cash. This is because respondents consider the purchase using the cash method is cheaper than the credit method.

- 3) Willingness to pay formulation based on samples can be concluded that respondents tend to choose a price perspective of 400 million. This selection is based on the facilities and attributes of the housing carried by the formulation. People choose a house with a price of 400 million has attributes near the school, guarded by a security guard, payment of credit methods, there is a sports field attributes are not guarded by security, cash, there is a sports field. The characteristic pattern is the presence or absence of security facilities and payment methods (cash). The formulation attribute that became the attention of the next respondent was near the health facility, guarded by the security guard, credit; there was a playground, the price of Rp. 400,000,000.
- 4) Test determinant coefficients individually shows that the variable area of residence (X1B), variable Gender (X2JK), Marital Status (X3), Age of respondent (X4), Variable shopping place (XBLJA), Variable health facilities (XKES), Access to Education Variable (XPDDK), Workplace Access Variable (XTKJ) is statistically significant at the level of significance of 5 percent of willingness to pay type 36 formulation in Bantul, Sleman and Yogyakarta City. While for Total Dependent (X5) and Respondent Revenue (X9) it was not statistically significant to the type 36 determinants of willingness to pay in Bantul, Sleman and Yogyakarta City.

#### VI. SUGGESTION

- 1) Housing development refers to the fulfilment of low prices and is located in a location that is safe from crime. Respondents see that the price factor is affordable and the satisfaction of a sense of security is a perceived factor as the primary utility of owning a house.
- 2) The credit method for owning a house is considered to be a barrier to buying a home because it is deemed to be expensive. The credit method for people who earn less than 4 million is less attractive. For this reason, it is suggested that the information board members and the low housing interest rate
- 3) Willingness to pay type 36 housing is considered too high for the income received by respondents, and this shows that respondents want a home. For this reason, it is recommended to build a simple house at an affordable price for people who earn an average of 3.4 million rupiahs.
- 4) Variables in the region affect the type 36 willingness to pay formulation, meaning that the location of Bantul as a formulation development area is a significant concern in determining the desire to buy a house.
- 5) Facility attributes of housing that most influence the willingness to buy a house is the fulfilment of proximity to the workplace. The formulation utility that is close to

the workplace is an attribute that is prioritised over other characteristics such as fulfilment of health, education and shopping locations. For this reason, the housing development for middle-class respondents is more emphasised in the Bantul Regency, which is affordable.

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