Models of Tenure Choice on the Housing Preferences of City Government Employees of Dasmariñas and Cavite City, Philippines: A Comparative Study

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ABSTRACT

This study aimed to develop and compare the models of tenure choice on the housing preferences using micro data from the respondents of the city government of Dasmariñas and Cavite City. It attempted to assess the housing demand through a model of household preferences that depict tenure choice. More specifically, it planned to find out the status of housing and dwelling tenure of the city government's employees and to determine if the decision to buy or rent a house, referred to as tenure choice conditioned by demographic, economic and housing characteristics. Maximum likelihood estimation (MLE) was used to estimate the unknown parameters that can affect the decision on home ownership. The results derived from logit and probit model provided evidences on the possibility of the different significant predictor variable of tenure choice for government employees in two different cities.

Keywords: tenure choice, housing preferences, government employees, maximum likelihood

1. Introduction

Owning or renting a housing unit is one of the economic decisions to be made by any individual household, couple, or family. Several studies have been conducted about tenure choice using the primary and secondary data but mostly conducted in other countries. A number of test and analyses have been tried and tested to determine the effect of the predictor variables on home ownership. To date, few studies have been conducted in the Philippines employing the government employees as the respondents. The government employees are the one helping the national and local government in serving the countrymen. Among others, housing is one of the basic needs that should be given an attention by the government, both local and national. Providing the basic needs such as housing to the government employees can improve their well being and help to develop a productive citizen of the country.

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More than one-third or 37.47 percent of the Philippine's population are residing in the provinces of Cavite, Bulacan and Pangasinan. Among the provinces, Cavite had the largest population with 3.09 M followed by Bulacan with 2.92 M and Pangasinan with 2.78 M (National Statistics Office, 2010). Among the cities in the Cavite province, Dasmarinas City and Cavite City were chosen as the locale of the study. These two cities differ in terms of city classification based on the revenue earnings. Dasmariñas is considered as a first class while Cavite City is a 4th class city. Comparing the tenure choice of government employees residing in these two cities can provide vital information if there are differences on the tenure preferences.

The proximity of Cavite province to the National Capital Region (NCR), made the province attractive to immigrants. The growing population in the cities is accompanied with increase in the consumption of housing units. Housing consumption varies from one household to another. Some household choose home ownership rather than rental housing. They prefer different types of dwellings and different housing features. There are cases wherein, housing demand does not represent housing consumption pattern. Furthermore, household preferences do not meet the needs of the family. Households wanted to have a housing unit but are not able to have one. Several factors and reasons can be cited why households were not able to buy the housing units that are in accordance with their wants. Also the issue of housing affordability and the availability of the housing unit based on the household preferences is a factor. Housing taste and preferences are well aligned with the housing needs however; households are not able to convert those into housing demand. This resulted to gap between housing demand and housing needs (Center for Housing Research, 2010).

1.1. Housing in the Philippines

House construction varies from one place to another. As defined by the National Statistical Coordination Board (NSCB), housing unit is a structurally separate and independent place of abode which, by the way it has been constructed, converted, or arranged, is intended for habitation by one household. Climatic condition and financial position are some consideration in building a house. Years had passed, housing evolved, people considered the size, shape, design materials to be used and the location. Priemus (1984) enumerated different functions of a house that include center for shelter and personal care, domestic activities and accommodation of daily external activities. In reality, financial constraints, among others, make the ideal dwelling not possible for people to achieve. People tend to choose dwelling that can provide the highest possible amount of housing satisfaction given the resources that they have at hand. Individual decision is indispensable in acquiring a housing unit. It is important for house developer to consider the preferences of the consumer in making plan and house construction. In doing so, it can increase the sales of the housing unit and minimize the unoccupied or unsold housing unit.

Nowadays, the housing developers created a house that will fit the financial capabilities of the dwellers. Most of the housing units that are constructed are either economic or socialized. The BP 220 distinguished the economic housing from socialized housing. Economic housing is a type of housing project provided to average income

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families while socialized housing refers to housing programs and projects covering houses and lots and home lots only undertaken by the government or the private sector for the underprivileged and homeless citizens which shall include sites and services development, long term financing, liberalized terms on interest payments, and such other benefits in accordance with the provisions of R.A. 7279 or the urban development and housing act of 1992 (HLURB, 2008).

The BP 220 states that the minimum lot area are as follows: (1) single detached is 72 sq. m. (economic housing) and 64 sq. m. (socialized housing); (2) duplex/single-attached is 54sqm (economic housing) and 48 sq. m. (socialized housing); and (3) row house is 36 sq. m. (economic housing) and 28 sqm (socialized housing). The minimum floor area requirement for single-family dwelling shall be 22 square meters for economic housing and 18 square meters for socialized housing. The minimum setback of dwelling unit both for economic and socialized housing project shall be as follows: front setback 1.5 m., side 1.5 m. and rear 2.0 m.

The National Building Code of the Philippines (PD 1096) states that the minimum area of rooms for habitations is 6 sq. m. with at least a dimension of 2.00 meter; kitchen is 3.00 sq. m. with a least dimension of 1.5 m. and the bath and toilet is 1.20 sq. m with a least dimension of 900 millimeters.

As reported by the Housing and Land Use Regulatory Board (HLURB), the total housing needs in the Philippines for the period from 2007 to 2016 would reach 7,552,409 units. About 3,624,999 new households are most likely to afford to own/rent a house. Among the housing packages available, the socialized housing scheme account for the largest at 68.10 % of the housing target of which resettlement has produced the biggest number of shelter units. From 2005 to 2010, the resettlement provided 107,079 shelter units, followed by the presidential proclamation with 93,233 and the community mortgage program (CMP) with 52,689 shelter units.

1.2. Background on Housing Subdivisions and Housing projects in Cavite

The provincial government of Cavite recognized the importance of decent housing in providing a better quality of life and well-being which are necessary to become a productive citizen. Based from the report of the provincial government, Socio-Economic and Physical Profile 2012, the HLURB issued 79 permits to sell to real estate developers. A total of 31,307 lots and housing units are available for sale however; these units are located in General Trias, Bacoor City and Trece Martires City only. In Dasmariñas, the SM Development Corporation (SMDC) donated a 3.84 hectare of land located at barangay Paliparan. It can accommodate more than 200 families, with road network, drainage and water distribution (http://www.pia.gov.ph/?m=1&t=1&id=70950).

The National Housing Authority (NHA), the provincial Government of Cavite and other LGU are working together in providing low-cost and socialized housing. There are 17 resettlement projects with 66, 353 units in 1,165.2052 hectares in Cavite. As of December 31, 2012, there are four (4) NHA Resettlement Housing project in Dasmariñas of which 103 housing units are allocated to the Government employees and PNP employees. The number of available units is a small number compared to the government employees

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working in Dasmariñas. No housing projects were located in Cavite City (Socio-Economic and Physical Profile 2012).

Government employees' face a problem in acquiring a decent housing unit due to the limited number of housing projects for the government employees of Dasmariñas and in the case of Cavite City, no housing project is located in the area. This paper attempts to assess the housing demand of the employees of the city government through a model of household preferences that depicts the tenure choice. More specifically, it aimed to address the following questions: (1) to find out the status of housing and dwelling tenure of the city government's employees; and (2) to determine if the decision to buy or rent a house, referred to as tenure choice conditioned by demographic, economic and housing characteristics.

The following null hypotheses which have been drawn from the preceding problem statements would either be refuted or validated by the empirical results: (1) Ho: The Dasmariñas City tenure choice model is a good fitting model. (All the coefficients in the regression equation take the value of zero); (2) Ho: The tenure choice of Dasmariñas respondents is not significantly influenced by demographic characteristics, economic characteristics and housing characteristics; (3) Ho: The Cavite City tenure choice model is a good fitting model. (All the coefficients in the regression equation take the value of zero); and (4) Ho: The tenure choice of the Cavite City respondents is not significantly influenced by demographic characteristics, economic characteristics and housing characteristics.

2. Literature Review

A number of studies used different statistical method to capture the predictor variables affecting tenure choice such as logit employed by Yust, et al. (1997), Kim and Sik Jeon (2012) and Ho (2014) and probit used by Ioannides and Rosenthal (1994), Iwata and Yamaga (2008), Lui, and Suen (2010), Zhou (2011) and Carter (2011). Other studies used other test namely: genetic algorithm (probabilistic approach): Yavas, et al. (2005), hedonic pricing: Leung and Tsang (2012) and Ho, and Hensher, (2014), stratified estimation: Ahmad, et al. (2012), descriptive (5-point response): Opoku and Abdul-Muhni. (2010).

Previous literature included age of the respondents in the tenure choice decision. Painter and Lee (2009) examined the factors affecting the decision of the older household on housing transition. The findings showed that age was not related to housing tenure choice for older household. However, in a study of Carter (2011) found out that the propensity of homeownership increases with age. Kim and Sik Jeon (2012) found out that the probability that the tenants will rent while owning houses, increases until such time that the tenant reaches age 50, and then declines. Furthermore, the probability that married households with school-age children choose to rent while owning a house is greater.

In terms of civil status, the study of Painter and Lee (2009) on housing tenure transition revealed that tenure choice was found to be unaffected by civil status (single) of the household.

Ho (2014) found out that tenure choice was significantly influenced by household income and household structure. Carter (2011) looked at the effect of separate incomes of the wife and the husband on housing tenure choice. The result revealed that there was no

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endogeneity of the income of the wife. Moreover, the income coefficient was found not to be significant but found to be intermittently jointly significant. Another study was conducted in relation to income, Opoku and Abdul-Muhni. (2010) used the 5-point response scale in determining the housing preference and found out that the respondents preferred small houses over apartments. Despite having limited income, the respondents preferred to buy houses rather than rent. Those who intend to buy prefer small houses or duplex while those who intend to rent prefer apartments. In the study conducted by Ortalo-Magné and Rady (2008) found out that homeowners who have greater income than their neighbors' have moved in a community that experiences strong price growth. Kim and Sik (2012) confirmed that income, house values, size and age distribution of households, and rate of population change have effects on homeownership and are significant determinants of tenure decision.

In relation to geographical location such as travel time to the city proper and nearest relative, Lui and Suen (2010) used probit in studying the mobility and found out that respondents are more likely to relocate farther away from their original place of residence and less likely to work in the same place as they live. On the other hand, the findings of Ioannides and Rosenthal (1994) using the ordered probit model disclosed that consumption demand was more sensitive to demographic variables and proximity to urban suburbs. Painter and Lee (2009) found out the probabilities of becoming a renter or downsizing are lower on the homeowners living next to one's children.

In terms of loans accessibility, the study of Ionnides and Henderson (1986) revealed that single and people with lower education, age and current income have a high probability of being turn down on mortgage.

Khan (2000) and Goodman (2002) confirmed that the tenure choice is correlated with the length of stay in the current unit. Khan (2000), made a dynamic modeling of housing tenure choice based on panel data using the maximum simulated likelihood method. The results revealed that there was a correlation found between mobility and becoming a homeowner. It was supported by the findings of Haurin and Gill (2002**)** as cited by Kim and Sik (2012) the expected length of stay in a home and the transaction costs of selling are highly important in ownership decisions. Yavas, et al. (2005) found out that the probability of the household to move is dependent of their tenure (own and rent) but independent of the length of stay in the current unit. In contrast to the study of Goodman (2002), as cited Yavas (2005) the tenure choice is correlated with the length of stay in the current unit.

Iwata and Yamaga (2008) used the probit model to estimate if the housing units were in sound condition or not. Findings revealed that renter-occupied single-family housing was less likely to be in sound condition compared to the owner-occupied single-family housing. Tenure security hastens the deterioration in the quality of single-family rental housing. Renter-occupied units in longer tenancy are less likely to be in sound condition than units in shorter tenancy.

Several literatures focused on housing preferences but very few were conducted in the Philippines, Yust, et al. (1997) used the logistic regression on the housing quality in rural region of Leyte, Philippines, the results revealed that the socio-economic status, village's location, the age of the male-head of the household and tenure were found to be

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significantly related to housing quality. Other study on housing preferences includes Wang and Li (2006) who studied the socio-economic differentials and stated housing preferences in Guangzhou, China. Findings revealed that compared to dwelling-related attributes, the neighborhood and location–related attributes have an important part in home purchase decision. Moreover, variables such as family income, age, education, nature of employment of organization were found to be significant factors affecting house preferences.

Few studies were found on the factor affecting the decision to rent. Ahmad, et al. (2012) used the stratified estimation in studying the demand for housing in Delhi. Results of the estimates found out that the determinants of rent were the floor area, availability of a separate kitchen, permanent material of roof, independent latrine, drainage, and flat type of dwelling structure. Leung and Tsang (2012) estimated a semi-parametric hedonic pricing of the rental price of the housing units based on its intrinsic and neighborhood characteristic. The results revealed that most homeowners have a strong distaste for inequality in their neighborhood. The distaste rises with income and educational level. In a study of Ho (2014) found out that family households were found to be more likely to own than to rent a housing unit. However, propensity of homeownership decreases with the level of house prices (Carter, 2011).

3. Empirical Framework

Tenure choice was classified as either rented or owned. The focus of this paper is on the effect of demographic characteristics, economic characteristics and structural and housing characteristics on tenure choice.

3.1. Demographic characteristics: The household characteristics that are relevant for this study are age, gender, civil status, educational attainment and household size.

- **a. Age.** It was used as a proxy variable for life cycle stage of the respondents. The age of the respondents is assumed to have an impact on homeownership. Household will take time to acquire the necessary wealth to overcome down payment or equity constraints (Bourassa, 1993).
- **b. Gender.** The gender of the household is more likely affect the decision on homeownership. Inclusion of the gender dummy variable can help in determining the presence of gender discrimination on decision making.
- **c. Civil Status.** Civil status is specified by four dummy variables: married, separated, single, and widow.
- **d. Educational Attainment.** The household heads that have attained a high educational level prefer to own house (Zhou, 2011). Educational attainment is classified by four dummy variables: college and college with vocational and MA units, graduate studies, high school and vocational /technical)
- **e. Household Size.** Refers to the number of the household living in a house. A sufficient living area for the household members should be three or less people per room (United Nations Human Settlements Programme, 2003). Household size is more likely affect the decision on tenure choice. Household size consists of the number of children living in a housing unit. Filipino families do observe

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an extended family. Some relatives (old parents, younger siblings and nephews or nieces) are living with them.

3.2. Economic Characteristics. In analyzing the economic characteristics of the respondents, the household expenditure, housing expenses, number of wage earner, tenure in work and availability of loans were taken into consideration.

a. **Household Expenditure.** Housing expenditure was used as the proxy variable for income. Decision on housing tenure is more likely based on income. Income (transitory) helps the purchaser to pay the down payment constraint **(**Bourassa, 1993). Mitlin (2008) explained that poor families who cannot afford to own a housing unit will either rent or buy/built houses in illegal settlements.
b. **Housing Expenses (Maintenance/rental).** Housing expense was used as the proxy variable for dwelling price. Housing expenses is more likely a basis if the household will own a new housing unit or rent. Previous studies used average prices based on census or commercial data or generated through hedonic model as the dwelling price. This paper used the present housing expenses. If the respondent already owned a housing unit, the maintenance cost was taken into consideration and monthly rental for the respondents who do not own a housing unit. The higher the housing maintenance and housing rental the higher the probability to own a new housing unit.
c. **Number of Wage Earner.** The more wage earners in the family, the more likely the household will own a housing unit.
d. **Tenure in Work.** The longer the tenure of the household in the work/job, the higher the security of tenure and better salary, therefore more likely to own a housing unit.
e. **Availability of loans.** Availability of loans is specified by four dummy variables such as Cooperative, GSIS, PAG-IBIG and SSS. Problems faced by the lowest-income group cannot be addressed by the shelter finance alone. This is due to the gap between what they can afford and the cost of the cheapest "good quality" unit with infrastructure and services is too high (Mitlin, 2008). Given this situation, it is important to consider the accessibility of the household to the financial institutions that could lend money to them.

3.3. Structural and Housing Characteristics. The structural and housing characteristics are considered as important attributes in determining the tenure choice of the respondents. In the study the variables included are the number of bedrooms, number of comfort rooms, dwelling are, tenancy duration and travel time to the city proper and nearest relative.

a. **Number of bedrooms.** A sufficient living area for the household members should be three or less people per room (United Nations Human Settlements Programme, 2003).
b. **Number of Comfort Rooms.** Comfort room is considered as one of the most important housing attributes. The number of available comfort rooms is assumed to affect the decision on tenure choice.
c. **Dwelling Area.** The bigger the dwelling area, the more likely respondents will own the housing unit. Household can move freely and feel comfortable at home.

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d. **Tenancy Duration.** Housing units are immobile. The decision of the household to move indicates a new housing choice. Hence, mobility is an observable variable to represent tenure choice (Megbolugbe, Isaac, et al, 1991).
e. **Travel time to the City Proper.** It refers to the proximity to the city proper. Stronger preferences were observed on living convenience and accessibility to public transport (Wang and Li (2006) as cited by Opoku and Abdul-Muhmin, 2010).
f. **Travel time to the Nearest Relative.** The clannish nature of the Filipinos can affect the decision of the household to choose a housing unit near their relatives.

3.4. Econometric Model

The observed endogenous variable in the econometric tenure choice model is binary, taking the value of one if the respondent owned a housing unit and zero otherwise (rented). Logit and Probit models were used to determine the predictor variables of tenure choice model for Dasmarinas and Cavite City. The logistic has slightly flatter tails compared to probit. The parameters of the two models (logit and probit) are not directly comparable.

The logit and probit models of tenure choice models are as follows:

Logit

$$\text{logit}(p) = \log(p/(1-p)) = \beta_0 + \beta_1*\mathbf{AGE} + \beta_2*\mathbf{GENDER} + \beta_3*\mathbf{MARRIED} + \beta 4*\mathbf{SPRATED} + \beta 5*\mathbf{SINGLE} + \beta_6*\mathbf{COLVOMA} + \beta 7*\mathbf{GRADSTUD} + \beta 8*\mathbf{VOCTEC} + \beta 9*\mathbf{HISCHOL} + \beta 10*\mathbf{HS} + \beta 11*\mathbf{HHEXP} + \beta 12*\mathbf{HOEXP} + \beta 13*\mathbf{WE} + \beta 14*\mathbf{TIW} + \beta 15*\mathbf{NBED} + \beta 16*\mathbf{NCR} + \beta 17*\mathbf{DA} + \beta 18*\mathbf{TD} + \beta 19\,\mathbf{COOP} + \beta 20*\mathbf{GSIS} + \beta 21*\mathbf{PAGIBIG} + \beta 22\,\mathbf{SSS} + \beta 23*\mathbf{TCP} + \beta 24*\mathbf{TNR}$$

Probit

$$\text{probit}(p) = \phi = \beta_0 + \beta_1*\mathbf{AGE} + \beta_2*\mathbf{GENDER} + \beta_3*\mathbf{MARRIED} + \beta 4*\mathbf{SPRATED} + \beta 5*\mathbf{SINGLE} + \beta_6*\mathbf{COLVOMA} + \beta 7*\mathbf{GRADSTUD} + \beta 8*\mathbf{VOCTEC} + \beta 9*\mathbf{HISCHOL} + \beta 10*\mathbf{HS} + \beta 11*\mathbf{HHEXP} + \beta 12*\mathbf{HOEXP} + \beta 13*\mathbf{WE} + \beta 14*\mathbf{TIW} + \beta 15*\mathbf{NBED} + \beta 16*\mathbf{NCR} + \beta 17*\mathbf{DA} + \beta 18*\mathbf{TD} + \beta 19\,\mathbf{COOP} + \beta 20*\mathbf{GSIS} + \beta 21*\mathbf{PAGIBIG} + \beta 22\,\mathbf{SSS} + \beta 23*\mathbf{TCP} + \beta 24*\mathbf{TNR}$$

where:

1 = owned

0 = rented

VARIABLE	DESCRIPTION
B	Coefficient
Age	Age
Gender	Gender: 0 – female, 1- male
CIVIL STATUS	
MARRIED	Married: 1 0 0

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SPARATED	Separated: 0 1 0
SINGLE	Single: 0 0 1
EDUCTIONAL ATTAINMENT	
COLVOMA	College with Vocational and MA units: 1 0 0
GRADSTUD	Graduate Studies : 0 1 0
VOCTEC	Vocational and Technical : 0 0 1
HISCHOL	High school : 0 0 0
HS	Household Size
HHEXP	Household Expenditure
HOEXP	Housing Expenses
WE	Number of Wage earner
TIW	Tenure in Work
NBED	Number of Bedroom
NCR	Number of Comfort room
DA	Dwelling Area
TD	Tenancy Duration: 0 - less than 5 years, 1- more than 5 years
AVAILABILITY OF LOANS	
COOP	Cooperative: 1 0 0 0
GSIS	GSIS: 0 1 0 0
PAGIBIG	Pag ibig: 0 0 1 0
SSS	SSS: 0 0 0 1
TCP	Travel time to the city proper: 0 less than 5 minutes 1 more than 5 minutes
TNR	Travel time to the nearest relative: 0 less than 5 minutes 1 more than 5 minutes

Tenancy Choice Estimation

VARIABLES	**SIGN**	**EXPECTED OUTCOME**
Age	+	older respondents are more likely to own a housing unit
Gender	+	male respondents are more likely to own a housing unit
Civil Status		
Singe	-	single respondents are less likely to own a housing unit
Married	+	Married respondents are more likely to

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		own a housing unit
Separated	+	Separated respondents are more likely to own a housing unit
Educational Attainment	+	respondents who have a higher educational attainment are more likely to own a housing unit
Household Size	+	respondents who have a bigger household size are more likely to own a housing unit
Household expenditure	-	respondents who have a bigger household expenditure are more likely to rent a housing unit
Housing Expenses (maintenance/rental)	+	respondents who have a bigger housing expenses are more likely to own a housing unit
Number of Wage Earner	+	respondents who have a bigger number of wage earner in the family, the more likely to own a housing unit
Tenure in Work	+	respondents who have work for longer time in their current job, are more likely to own a housing unit
Number of Bedroom	+	the more bedrooms available, the more likely respondents own a housing unit
Number of Comfort room	+	the more comfort rooms available, the more likely respondents own a housing unit
Dwelling Area	+	the larger the dwelling area, the more likely respondents own a housing unit
Tenancy Duration	+	the longer the respondents stay in the housing unit, the more likely respondents are willing to own a housing unit and a high anticipated mobility are likely to rent a housing unit.
Availability of loans	+	the more accessible loans are, respondents are more likely to own a housing unit
Travel time to the city proper	+	the less travel time to the city proper, the more likely respondent to own a housing unit
Travel time to the nearest relative	+	the less travel time to the nearest relative, the more likely the respondent to own a housing unit

4. Research design and data collection

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The descriptive-causal method of research was used in this study. The descriptive aspect refers to a narrative description of the different demographic, economic and housing characteristic that condition tenure choice: to own or to rent. The causal aspect refers to how certain factors or attributes affect the likelihood or chance that a respondent will buy or rent a house with specific reference to the respondent employees of the city government. Due to time and financial constraint, the study covered only the government employees of the City of Dasmariñas and Cavite City that includes regular, casual and job order (JO) of employees of the city, public school teachers (elementary and high school), police officers, and fire fighters. About 400 respondents were surveyed, 200 from Dasmariñas and 200 from Cavite City. Respondents were selected based on stratified random sampling. There are 5,093 government respondents of Dasmariñas and 1, 647 government employees of Cavite City. The two cities were selected as they have government employees almost earning the same wages and salaries. They differ in terms of geographical location and classification of the cities in terms of income/revenue generated.

The analysis of tenure choice was limited to rent or to own. The result of the survey was based on the decision of the government respondents' interview. These respondents are not necessary the head of the household. Along with the primary data derived from the survey questionnaire, the secondary data from the published articles, journals and literature was used to support and validate the empirical results.

The respondent's preference was examined based from the stated preferences of respondents. The study used a survey questionnaire for gathering data. The questionnaire was divided into four parts. Part I aimed to gather the housing information. It includes the dwelling type, housing structure, number of comfort room and bedroom, presence of garage and balcony and others. Part II dealt on the present dwelling situation and tenure choice of the respondents. It described the dwelling status of the respondents as well as the tenure preferences whether to rent or to buy. Part III dealt on tenure choice whether the house is owned and rented. Questions on expenses and income are also included. Part IV presented the future plan of the respondents that can aid in the policy recommendation.

Certain ethical issues were considered to ensure the privacy and safety of the respondents. A cover letter and consent forms were made available. The important details of the study such as the objectives of the study were included to understand the role to be played by the respondents in the completion of the research study. Respondents were given the opportunities to clarify if there were questions that they do not understand. The researchers secured consent from each respondent to express their willingness to take part in the study. There were different set of consent forms given to the head of the institutions. The participants were not forced to participate in the research undertaking. Respondents have the option not to write their names on the questionnaires to secure confidentiality.

Pre-test was administered to test the reliability, effectiveness and validity of the self-made questionnaire. SPSS version 19 was used in analyzing the data for Logit and Stata version 12 was used in analyzing the data for Probit model. The following were used in the analysis of the model: (1) overall evaluation of the logistic model; (2) statistical test of the individual predictors; (3) goodness-of-fit statistics; and (4) assessment of the predicted probabilities.

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5. Results and discussion

5.1. Status of Housing and Dwelling Tenure

The study examined the dwelling and tenure preferences of the government employees of Dasmariñas and Cavite City. Based from the survey results, more respondents from Dasmariñas owned a housing unit compared to the respondents from Cavite City. There were 173 or 86.5 % of the respondents from Dasmariñas owned a housing unit while there were only 128 or 64 % in Cavite City. The survey also revealed that 91 or 45.50 % of the respondent from Dasmariñas are living in a bungalow while half of the respondents (50%) from Cavite City were staying in a two storey houses. This can be attributed to the geographical location. Cavite City is situated along the coastal areas. Moreover, most of the areas are flood prone. For the dwelling area, majority of the respondents both in Dasmariñas and Cavite City are living in 72 sqm with 38 % and 32.5 % respectively. In terms of household size, majority of the respondents both in Dasmariñas and Cavite City have 5 members. About 44 % and 42% of the Dasmariñas and Cavite City respondents have 5 members respectively. There were 60% or 30% of Dasmariñas respondents were living in a housing units built from 1991 to 2000 on the other hand 48 or 24 % of the respondents in Cavite City were living in a housing unit that was built before 1980. In terms of years of residency, both Dasmariñas and Cavite City respondents are residence of their housing units for less than 5 years with 29 % and 28 % respectively. Most of the respondents both in Dasmariñas and Cavite City have two bedrooms. Eighty two (82) or 41 % of the Dasmariñas respondents have two bedrooms while in Cavite City there were 83 or 42 %. More than half of the respondents from Dasmariñas and Cavite City have one comfort room with 125 or 62.5 % and 131 or 62.5 % respectively. More than half of the respondents in Dasmariñas, 105 or 52.5 % have garage while in Cavite City, 102 or 51 % do not have garage at home. In terms of presence of balcony, more than half of the respondents in Dasmariñas, 108 or 54 have balcony while 123 or 61.5 % of the respondents in Cavite City do not have balcony. Both respondents in Dasmariñas and Cavite City were living in a residential area. In terms of location of the housing units, most of the respondents of Dasmariñas and Cavite City were residing in a housing unit which were 21 minutes and more away from the city proper. With regard to the travel time to the nearest relative, both respondents in Dasmariñas and Cavite City have 21 minutes and above away.

5.2. Empirical analysis and findings

In this section, the effect of the demographic, economic and structural and housing characteristics on the tenure choice models using the logistic and probit were discussed. Each predictor variables for Dasmariñas and Cavite models were compared and discussed (Table 1).

5.2.1. Logistic Regression Estimates

The sign of age coefficients in Dasmariñas and Cavite Cavite City show a positive association, it indicates that older respondents would choose to own while the younger

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respondents would choose to rent. Age was not confirmed as a predictor variable for tenure choice models both in Dasmariñas and Cavite City.

Gender was discovered to be a predictor variable of tenure choice among respondents in Dasmariñas. The coefficient of gender was found to be statistically significant at 10 % level of significance. Male was more likely to decide to own than female. It seems that patriarchy system is being observed in Dasmariñas City, wherein the male/father/husband dominance prevails. On the other hand, gender was not a predictor variable in Cavite City model.

The dummy variables for civil status were revealed not to influence the tenure choice decision among respondents from Dasmariñas and Cavite City. In both models, single and married (younger ones) were more apt to become renters rather than become owner. The positive sign of separated respondents coefficient means that were most likely to own a housing unit than to rent.

The dummy variables for educational attainment both in Dasmariñas and Cavite City demonstrated a positive association with tenure choice. The higher the educational attainment of the respondents, the more likely they will own a housing unit. Unlike, the respondents of Cavite City who have a college and MA units, the respondents from Dasmariñas with the same educational requirements were found to be a predictor variable for owning a housing unit at 10 % level of significance. An increase in the educational attainment, college with MA units and vocational course, by one unit, the log odds (logit) of owning a house increases by 5.28. Respondents from Dasmariñas and Cavite City who graduated with MA / PhD degree were not confirmed as a predictor variable for owning housing units. Dasmariñas respondents who finished with vocational and technical courses were not also established as a predictor variable.

In Dasmariñas model, household size registered a negative association with tenure choice and found to be statistically significant at 10 % level of significance. An increase in household size by one unit, the log odds (logit) of owning a house decreases by 0.432. Respondents with smaller household size were more likely to decide to own a house whereas respondents with a bigger household were reluctant to own housing units. The coefficient of the household size in Cavite City exhibited a positive association with tenure choice. As the household size increases the more likely the respondents choose to own. However, the number of household members was not a found as predictor for tenure choice.

Household expenditure was used as a proxy variable for income. Both in Dasmariñas and Cavite City models, household expenditures were positively associated with tenure choice nevertheless were not found to be a predictor variable for owning a housing unit. The finding was consistent with the results conducted by Carter (2011), that income coefficients were not individually significant. Furthermore, the findings of Ho and Hensher (2014) revealed that income elasticities of demand for owning and renting any dwelling type are relatively inelastic, with a 10% increase in household income resulting in about 1.2% increase in owning and about 3.4% decrease in renting.

The Dasmariñas and Cavite City models illustrated that the number of wage earners in the family was positively associated with tenure choice; however, significant relationship

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was not confirmed. Apparently, although the number of wage earner in the family increases, the earnings of the wage earner were not enough to acquire or own a house.

Tenure in work was found to be a predictor variable in owning housing unit in Cavite City model but not in Dasmariñas model. An increase in work tenure of respondent in Cavite City by one unit, the log odds (logit) of owning a house decrease by 0.024. The negative sign both in Dasmariñas and Cavite City models indicated that respondents who have worked longer in current job preferred to rent than to own housing units. The findings contradict the assumption of the positive association of tenure in work and tenure choice.

The coefficient of the number of bedrooms shows a positive sign both in Dasmariñas and Cavite City model. Housing units with more bedrooms were more likely to be owned than to be rented. However, the number of bedrooms was found to be a non-determinant of tenure choice both in Dasmariñas and Cavite City model. It appears that the number of bedrooms become less priority in owning a housing unit.

The coefficient of the number of comfort rooms demonstrated a positive association with tenure choice both in Dasmariñas and Cavite City. Housing unit with more comfort rooms were more likely to be owned. Apparently, respondents are no longer taken into consideration the number of comfort room in tenure choice as revealed by the findings of non-significance of the coefficient in the model.

Both the coefficients of the dwelling area in Dasmariñas City and Cavite City have a positive sign. Respondents were more likely to own a house with a bigger dwelling area. However, it was not found to be a significant predictor of tenure choice. Dwelling area, are no longer their priority in owning a house.

The coefficient of tenancy duration was found to be statistically significant both in Dasmarinas and Cavite City at 5 % level of significance. In Dasmariñas, an increase in the tenancy duration by one unit, the log odds (logit) of owning a house increases by 0.361 while in Cavite City, an increase in the tenancy duration by one unit, the log odds (logit) of owning a house increases by 0.312.

Availability of loans:

Cooperative - The coefficient of cooperative was found to be statistically significant in Dasmariñas. According to the model, the log odds of owning a house was negatively related to availability of cooperative loans ($p<0.10$). The more cooperative loans available respondents were less likely owned a house. **GSIS –** The coefficient of GSIS was found to be positively associated with tenure choice both in Dasmariñas and Cavite City model. Government employees are members of GSIS; the more available loans from GSIS, the more likely the respondent will own a house. It appeared that being a member of GSIS was not a predictor of tenure as shown by the insignificant coefficients in the model. **Pag-ibig –**The positive sign of the Pag-ibig denotes that the more loans are available from Pag-ibig the more likely the respondent will choose to own a house. It is surprising to find out that Pag-ibig, one of the leading housing loan providers was found not to be a predictor for home ownership for both models. The enhanced housing loan programs of Pag-ibig such as the End- user Home Financing and Affordable housing programs should be reinforced. Respondents opted to avail other housing loans. **SSS –** Some government employees are also members of SSS. The negative sign of the SSS coefficient in Dasmariñas model implies that the more SSS loans available, the less likely the household will prefer to own a

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house. The loans availed from SSS is not intended for housing expenses particularly in owning a house. The insignificant value of the coefficients in Dasmariñas model denotes that respondents do not consider the loans from SSS as a factor in determining the tenure choice. In Cavite model, the positive coefficient of the SSS means that an increase in the SSS loans, the more likely the respondent would own a house. It was found to be a predictor for tenure choice. An increase in the availability of SSS loan, by one unit, the log odds (logit) of owning a house increases by 2.416.

The coefficient of travel time to city proper was positive but not statistically significant both in Dasmariñas and Cavite City. It appears that respondents prioritized to own a house rather than take into consideration the location.

The coefficient of the travel time to the nearest relative was found to be positively associated with tenure choice but not statistically significant both in Dasmariñas City and Cavite City. Although, Filipinos in general are clannish, it seems that proximity to relatives is becoming less fundamental in tenure choice. The advents of modern communication such as cell phones, social networks and the like have rendered the idea of living near to relatives less important.

The constant value of Dasmariñas and Cavite City tenure choice model means that if all the predictor variables are evaluated at zero, the predicted probabilities of homeownership are -8.211 and -29.719 respectively.

5.2.2. Probit results

Age was not found as predictor variable for tenure choice both in Dasmariñas and Cavite City model. The negative sign of age in Dasmariñas model means that younger respondents were more likely to own a housing unit. Older household prefer to rent.

Gender was not found to be predictor variable for tenure choice both in Dasmariñas city and Cavite City model. Male are more likely to choose a housing unit.

Civil status dummy variables:

Married. Married respondents from Dasmariñas were more likely to rent than to own a housing unit. The respondents of Cavite City choose to own housing a unit than to rent. Being married was not found to be predictor variable for tenure choice.

Separated. Separated respondent from Cavite City were more likely choose to own a housing unit than to rent. Being separated was not found to be a predictor variable for tenure choice.

Single. Both single respondents from Dasmariñas and Cavite City were more likely to rent than to own a housing unit. Part of the Filipino culture is that single individuals usually lived together with their parents. In cases that their places of work are far from their house, they rather rent than buy a new housing unit. Being single was not found to be predictor variable for tenure choice.

Educational Attainment dummy variables:

College with Vocational and MA units. Acquiring a college degree with Vocational and MA units was found not a predictor variable for tenure choice both in Dasmariñas and Cavite City. Respondents from Dasmariñas were more likely to own than

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to rent. While the negative coefficient of Cavite city means that the respondents were likely to rent than to own.

Graduate Studies. The coefficient of Graduate Studies was found to be statistically significant in Dasmariñas model at 5% level of significance. The results revealed that an increase in the number of respondents who have finished graduate studies by one unit, the log odds (logit) of owning a house increase by 1.440. In Cavite City model the negative sign of the coefficient means that the respondents who had finished the graduate studies were more likely to rent than to own a housing unit.

High School. Respondents in Cavite City who have finished high school were found to be more likely to rent a housing unit than to own. It was not found to be statistically significant determinant in tenure choice.

Household Size. The household size coefficient both in Dasmariñas and Cavite City were found not to be statistically significant factor in tenure choice. Furthermore, both models showed a negative sign of the coefficient which was not in accordance to the expected positive sign. The results revealed that the bigger the household size the more likely respondents prefer to rent. Perhaps, the respondents cannot afford to own a housing unit due to bigger daily expenses. Smaller household size was more likely prefer home ownership.

Household Expenditure. Household expenditure was not found to be a predictor variable for tenure choice. The higher the household expenditure of the respondents from Dasmariñas and Cavite City the more likely the respondents rent a housing unit.

Housing Expenses (maintenance/rental). The higher the housing expenses of the respondents from Dasmariñas and Cavite City, the more likely the respondents own a housing unit. The coefficient of the housing expenses was not found to be statistically significant.

Number of Wage earner. Both the coefficient of the number of wage earner in Dasmariñas and Cavite City exhibited a positive sign. It means the bigger the household members who were earning, the more likely the respondents own housing a unit. However, the number of wage earner was not found to be a predictor variable for tenure choice.

Tenure in work. The coefficient of tenure in work both in Dasmariñas and Cavite City demonstrated a positive sign however found to be insignificant determinant of tenure choice.

Number of bedrooms. In Dasmariñas model, respondents prefer to rent a housing unit with more number of bedrooms while in Cavite City, the more bedrooms are available the more likely respondents own a housing unit. Number of bedrooms was not found to be a predictor variable for tenure choice.

Number of Comfort Rooms. The more comfort rooms available, the more likely respondent in Dasmariñas owned a housing unit. Opposite behavior was observed among respondents from Cavite City, the more comfort rooms available, the more likely respondent rent a housing unit than own it. Number of comfort rooms was not found to be statistically significant factor in tenure choice.

Dwelling area. The bigger the dwelling area, the more likely respondents both in Dasmariñas and Cavite City owned the housing unit. Dwelling area was found to be insignificant determinant of tenure choice.

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Tenancy Duration. At 5 percent level of significance, the coefficient of tenancy duration was found to be statistically significant both in Dasmariñas and Cavite City. An increase in the tenancy duration by one unit, the log odds (logit) of owning a housing unit among respondents in Dasmariñas increases by 0.093. On the other hand, an increase in the tenancy duration by one unit, the log odds (logit) of owning a house among respondents in Cavite City increases by 0.048.

Availability of loans dummy variable:

Cooperative. The negative sign of the cooperative coefficient in Dasmariñas model means that respondent that has access to cooperative loans were more likely to choose rental housing. Perhaps the loans available from the cooperative was not enough the own a housing unit. It was not found to be statistically significant.

GSIS. The coefficient of GSIS was found to be negatively associated with tenure choice. The more accessible GSIS loans the less likely respondent own a housing unit. It seems that money loans from GSIS were being used in other expenses. GSIS was not found to be a predictor variable of tenure choice.

SSS. In Cavite City model, SSS was found to be statistically significant at 5 percent level of significant. An increase in the availability of SSS loan, by one unit, the log odds (logit) of owning a house increases by 0622. Conversely, SSS was not found to be statistically significant in Dasmariñas model. The positive coefficient means that more accessible SSS loans are, the more likely respondent own a housing unit.

Travel time to the City Proper. In Dasmariñas model, the coefficient of travel time to the city proper was found to be negatively associated with tenure choice. Respondents were more likely to rent a housing unit which is more accessible to city proper. Housing units that are located near city proper command for a higher price. On the contrary, positive association was observed in Cavite City model. The more accessible the housing units to the city proper, the more likely respondents own a housing unit. Same in Dasmariñas model, travel time to the city proper was not found to be predictor variable of tenure choice. Therefore, it means the respondents do not consider the distance in homeownership decision.

Travel time to the nearest relative. Travel time to the nearest relative was not found to be statistically significant both in Dasmariñas and Cavite City models. Positive association was observed between tenure choice of the Dasmariñas respondents and coefficient of travel time the nearest relative. The less travel time to the nearest relative, the more likely respondent own a housing unit. On the other hand, the negative coefficient of travel time to the nearest relative means that respondent was more likely to rent a housing unit.

Constant term. The constant value of Dasmariñas and Cavite City tenure choice model means that if all the predictor variables are evaluated at zero, the predicted probability of homeownership are -1.097 and -0.892 respectively.

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Table 1. Logistic and Probit Regression Estimates, Tenure Choice model

TENURE CHOICE MODEL				
	DASMARINAS CITY		CAVITE CITY	
PREDICTOR VARIABLES	COEFFICIENT		COEFFICIENT	
	LOGIT	PROBIT	LOGIT	PROBIT
AGE	0.045	-0.008	0.122	0
GENDER	2.4***	0.31	0.864	0.242
CIVIL STATUS				
Married	-0.379	-0.583	-1.255	0.052
Separated	20.213			0.271
Single	-1.559	-0.797	-2.43	-0.141
EDUCATIONAL ATTAINMENT				
College with Vocational and MA units	5.28***	0.877	16.641	-0.337
Graduate Studies	26.031	1.440**	15.942	-0.525
Vocational and Technical	19.39			
High school				-0.002
HOUSEHOLD SIZE	-0.432***	-0.037	0.299	-0.233
HOUSEHOLD EXPENDITURE	0	0	0	0
HOUSING EXPENSES (Maintenance/rental)	0	0	0	0
NUMBER OF WAGE EARNER	0.154	0.172	0.441	0.165
TENURE IN WORK	-0.003	0.002	-0.024**	0.001
NUMBER OF BEDROOMS	0.67	-0.001	0.633	0.156
NUMBER OF COMFORT ROOMS	0.307	0.397	0.993	-0.036
DWELLING AREA	0.017	0.006	0.048	0.004
TENANCY DURATION	0.361*	0.093*	0.312*	0.048*
AVAILABILITY OF LOANS				
Cooperative	-4.294***	-0.422		
GSIS	17.057	-0.273	22.599	
Pag-ibig	10.713		11.116	
SSS	-1.464	0.13	2.416**	0.622**
TRAVEL TIME TO THE CITY PROPER	0.309	-0.044	1.016	0.094
TRAVEL TIME TO THE NEAREST RELATIVE	1.36	0.255	1.509	-0.315
CONSTANT	-8.211	-1.097	-29.719	-0.892
Count R2	90.80%	66.31%	91.80%	85.25%
Likelihood ratio	47.314 (sig.	50.69 (sig	51.062 (sig	53.29 (sig

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	0.002)	0.002)	0.000)	0.0001)
Pseudo R-squared	58%	31.04%	68.70%	21.40%

*0.01 **0.05 ***0.10

5.2.3. Logistic Regression Model vs Probit Model

5.2.3.1.Logit Model

Using logistic regression, the findings revealed that in Dasmariñas, 5 out of 23 predictor variables of tenure choice were found statistically significant namely: gender, educational attainment, household size, tenancy duration and housing loan (Cooperative). On the other hand, 3 out of 23 predictor variables in Cavite City model were found to be statistically significant such as: tenure in work, tenancy duration and housing loan (SSS).

In Dasmariñas, the likelihood ratio is 47.314($p< 0.002$), it indicates that the model has a good fit. The predictor variables do have a significant effect and create essentially model. The value pseudo R^2 explains 58.0 % of the relationship between the predictors and the prediction. Dasmariñas tenure choice model correctly classifies 90.8 % of the cases correctly. In Cavite City tenure model the likelihood ratio is 51.062 ($p< 0.000$), it indicates that the inclusion of the predictors shows a significant improvement over the model with just a constant. The relationship between the predictor and the prediction can be explained by the value of Pseudo $R^{2,}$ 68.7%. The Cavite City tenure choice model classifies 91.8%. The model used the default 0.5 cut off to classify each subject outcomes.

5.2.3.2. Probit Model

Using Probit model the following predictor variables were found to be statistically significant: (1) Dasmarinas – Educational Attainment (Graduate Studies) and Tenancy duration; and (2) Cavite City - Tenancy duration and Housing loan (SSS).

In Dasmariñas model, the null hypothesis is rejected and accepts the alternative. The likelihood ratio is 50.69 ($p< 0.002$) the model has a better fit with the inclusion of the predictor variables. The value of pseudo R^2 shows how much of the variance in the dependent variable was explained by the model. About 31.04% of the relationship between predictors and the prediction was explicated as the results revealed. The overall percentage in Dasmariñas model is 66.31% which means that 66.31% have been accurately classified as owned or rented. In Cavite model, the likelihood ratio of tenure choice is 53.29 ($p< 0.0001$), which means the null hypothesis is rejected. The model has a good fit with predictors than just a constant. The value of pseudo R^2 captured 21.40 % of the relationship between the predictors and the prediction. The model accurately classified 85.25 % of the cases corrected (owned or rented).

5.3. Housing Prospect

The findings of the study can also provide information on the housing inventory in the cities of Dasmariñas and Cavite City. The data on tenure choice can be used in

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determining the home ownership and rental housing among government employees. This information can be used as baseline information of the national and local government in estimating the viability of the housing market in the two cities. As shown in Table 2, majority of the respondents from Dasmariñas and Cavite City have planned to acquire new housing units within 1-5 years.

Table 2. Time Frame Respondents planned to acquire a Housing unit.

NUMBER OF YEARS	DASMARINAS CITY		CAVITE CITY	
	f	%	f	%
1-5 year	99	49.5	93	46.5
6-10 years	36	18	35	17.5
11- 15 years	2	1	3	1.5
16-20 years	6	3	6	3
21-25 years	2	1	2	1
26-30 years	3	1.5	0	0
Anytime	5	2.5	1	0.5
after retirement			1	0.5
no plan	21	10.5	27	13.5
not stated	26	13	32	16
Total	**200**	**100**	**200**	**100**

About 32.5 % of the respondents in Dasmariñas plan to acquire a house and lot while more than half or 66.5 % of the respondents in Cavite City plan to buy a house and lot (Table 3). It shows a potential housing market in these two cities.

Table3. Property which the respondents want to acquire

Property	Dasmariñas City		Cavite City	
	f	%	f	%
house and lot	65	32.5	133	66.5
house only	1	0.5	11	5.5
lot only	11	5.5	16	8
not stated	123	61.5	40	20
TOTAL	**200**	**100**	**200**	**100**

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6. Conclusion

This study can contribute some significant implication on the housing sector. In the absence of experimental data, a causal interpretation of the results should be adopted with some caution. This study focused on the predictor variables on homeownership in two cities in Cavite province**.** Logit and Probit model were applied to examine the predictor variables on tenure choice. The findings revealed that different sets of predictor variable were found to affect the tenure choice in the two cities that can be attributed to the differences in the demographic and socio-economic profile of the respondents.

The results of the empirical analysis verified that the inclusion of the predictor variables significantly contribute to the tenure choice model both in Dasmariñas and Cavite City. Different predictor variables were found to be statistically significant for Dasmariñas City model; using the logit, the variables found to be significant are gender, educational attainment (College with Vocational and MA Units), household size, tenancy duration and housing loan (cooperative). On the other hand, the variables found to be significant using the probit are educational attainment (Graduate studies) and Tenancy duration. The only predictor variable that was found to be common between logit and probit model is the tenancy duration. In the case of Cavite City, using the logit model, the variables found to affect the homeownership are tenure in work, tenancy duration and housing loan (SSS) while employing the probit model, the predictor variables were the tenancy duration and housing loan (SSS). There were two variables found to be common predictor variable namely: tenancy duration and housing loan (SSS). Comparing the logit and probit model, more predictor variables were found to influence the tenure choice using the Logit model both for Dasmariñas and Cavite City.

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