Senior Research

Socio-demographic Characteristics and The Preference of Bangkok's Condominium Location

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Abstract

This paper applied a choice experiment technique to study the preference of mid-range condominiums' location in Bangkok, Thailand. Conditional logit models comprising location attributes were estimated for all samples and various sub-samples regarding individuals' socio-demographic characteristics such as gender, household monthly income, household size, current residential location, and current workplace location. The sub-samples according to other individuals' characteristics such as travel characteristics and consumer types were also considered in this study. The models were then used to compute the marginal willingness to pay for each location attribute levels. The results found that crime rate is the most importance characteristic that affecting the condo purchasing decision, followed by condo zone, accessibility, and view, respectively. Further, different individuals' characteristics were found to have different preferences for condominium locations.

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Introduction

Most of stated preference studies employed contingent valuation method in order to reveal the preference. The method allows researchers to ask a respondent directly for his or her willingness to pay for a specific commodity. However, it is not suitable to deal with cases of commodities that have several attributes and where these attributes are change at the same time, for example, in this case is a condo location. As a consequence, another stated preference method called "choice experiment" was applied in this research. The choice experiment technique describes goods in terms of their attributes and levels, in contrast to contingent valuation method where goods are described in terms of goods themselves. Thus, the trade-off can be expressed in terms of goods rather than in monetary value, like contingent valuation, the willing to pay can be revealed indirectly for this kind of situation.

The choice experiment motivated this research to study in condominium location since there are few studies using the choice experiment in real estate economics. Most of papers applied this method in transportation and environmental economics. Moreover, the condominium market has been strongly grown in Bangkok since the last two years, with prices rising and developers launching new projects to tract the demand. Especially in the areas with BTS sky train and MRT subway routes attract more commuters to live in. According the research published by Colliers International Thailand, average prices for new condominium projects in Bangkok increased by 21% quarter-on-quarter. In the fist half of 2013, the number of the new launches was 12% higher compared with the same period of 2012. Another reason is that condominium location is a key factor influencing consumers' buying decision and prices. Average selling prices were recorded at approximately 89,000 baht per square meter. The research also indicted that a price declines once a condominium is located more than 200 meters from a mass transit station, and substantially drops once the distance is more than 1,000 meters. Furthermore, the condo location has various attributes or characteristics in terms of zone, accessibility, view, etc.

Since the contingent valuation technique is inappropriate when evaluating goods with no attribute, in order to examine the preference of each characteristic of a good, this paper attempts to develop the choice experiment technique in order to evaluate the condominium features in terms of the location characteristics, in particular, in Bangkok according to socio-economic characteristics of Thai middle-class that are the major consumers of condo market. In addition, the findings carried out in this paper may be very useful for Bangkok city planning and Bangkok policy because it provides information about the distributed preference of residential location regarding different socio-demographic characteristics of Bangkok residents.

Research Objectives

The main purpose of this study is to determine how the preferences for the location of condominiums differ regarding to socio-demographic characteristics such as gender, household income, household size, current residential and workplace location. This focuses particularly on the case study in Bangkok, Thailand. To be more specific, this paper aims to examine the relative importance of location factors or characteristics that influence the decision on selecting a condominium. In addition to the willingness to pay of different features among each location characteristic can be compared, and then their magnitudes can be identified in terms of the percentage.

Scope and Limitation

Practically, the condominium sector is broad with various segments. The focus of this research is particularly mid-range condominiums in Bangkok, since the condominium segment provides the largest market share in the Bangkok's condo market. Moreover, in fact there are many characteristics of condominiums, for example, dwelling characteristics –the number of rooms, room sizes- neighborhood characteristics, and location characteristics. As a result of one of the key factors that influence consumers on their condominium buying decision is a location as well as typically the prices of condominiums are classified according to locations, this study considers only on the location characteristics of condominium.

However, due to time, logistical and financial limitation, this paper considers merely on the case in Bangkok, and the sample size was limited to 375 with random sampling. The estimations of the results were assumed that the respondents in this study refer to the population in middle class of Bangkok. Furthermore, the brand of a condominium was not labeled in the survey question or the study. There was just necessary background information provided the facts for respondents to analysis. Lastly, only demand side of mid-end condominium was considered in this study.

Literature review

This overall review focuses mainly on areas where the existing research most closely relates to this paper. First of all, most of reviewed literatures involve the findings of factors influencing the housing location choice, in particular socioeconomic factors, as well as housing location preference. Moreover, the second part of this review discusses a little on the technique of collecting data and method used in the analysis. At the end of the literature review informs a conclusion of the methodology and contribution of this paper.

Review of housing location choice and housing preference

A wide range of research discusses on the determinants of housing location choices, regarding housing mobility and location choice classify the variables affecting housing choices into four groups. The first group is demographic factors such as income, age, and family size. The second one is social factors such as school quality, ethnicity, and crime. The third one is location and neighborhood factors, namely, accessibility, density and amenity, and taxes. And the last group is housing cost and affordability.

O'Sullivan (2009) studied the role of household preference and lifestyle in housing location choice. That is, a high-income household is more likely than a low-income household to choose large, high quality housing. The reason simply is the high-income household has a greater housing budget. At the same time, even though two households have the same income and budget on housing, the dwelling choices may not be alike, due to difference in their preferences for dwelling type. Jun (2013) applied a random utility-based land use simulation model of the Seoul metropolitan area to evaluate the impact of medium- and high-income households' preference for apartments on residential location choice. The findings imply that apartment preference of medium- and high-income groups would have contributed to providing more apartment units, more housing unit in suburbs, and higher apartment rent premiums in wealthy communities than the housing market assuming under the consideration of housing type, location, and rents.

The different between male and female on the decision of selecting housing location has studied in various researches. Sermon and Koppelman (2001) developed multinomial logit models of residential location choice for two-worker households in the San Francisco Bay Metropolitan Area to identify household characteristics in relation to the relative differences in household sensitivity to female and male commute time when making residential choices. The discrete choice approach is used to provide direct analysis of gender disparities in commute length. The approach bases on the basis of random utility theory, which say that households trade off various locational attributes when choosing the location that maximizes their utility. The results reveal that preference of children, occupation of the male worker, and the relative order of the last residential change and the female workers' workplace are

important determinants of female and male commuting time parameters in household residential location utility functions. The paper seems to support the study of Turner and Niemier (1997) that found that woman have commute time less than men because women tend to perform more of household maintenance and child- rearing responsibilities. Their result identifies that presence of children is a strong factor in explaining differences in female and male commute times. Furthermore, Hanson and Pratt (1995) finding suggests that male workplace changes lead to household residential location changes and female workplace changes, and this pattern leads to shorter female and longer male commuting times.

Some researches investigate the impact of location characteristics and overall individual socioeconomic characteristics in determining the residential location choices of households. Wu , Zhang, & Dong (2012) used a large-scale household survey and aggregated census data from Beijing and the hybrid conditional logit model of residential location choice to estimate the impacts of both location-specific characteristics and individual-specific characteristics on households' residential preference. It assumes that the choice outcome of one household will not affect the neighborhood components, the local public goods distribution or even the housing market structure in the city. The result found that location-specific factors, such as distance to the central business area, job accessibility, local public goods as well as socio-demographic attributes of residential zones are strongly importance in determining the location choice of households. However, most of these location specific factors, when interacted with individual-specific characteristics such as income, commuting time, educational attainment reveal substantial differential impacts in residential choice across the urban space. In addition, household residential location choice in Beijing show a strong social and spatial differentiation with respect to variations in household income, commuting time, education background, lifecycle, occupation, and housing sources.

Wang and Li (2006) applied state-of-the-art experimental design methods to develop choice experiments in Guangzhou, China. Beside, they examined two choice dimensions of housing preference while most studies examined only one. Thus, Joint logit models comprising both neighborhood and dwelling attributes are estimated for the overall sample and for various sub-samples classified by family income, age, education, nature of employment organizations, and district of current residence. The models are then used to compute utilities for different attribute levels, the impacts of these attributes on choice probabilities, and the relative housing prices that the respondents are willing to pay for buying a house in different districts, with different accessibilities, of different types, etc. The study shows that neighborhood and location-related attributes are found to be more important than dwelling-related attributes in home purchase decisions. Further, factors such as family income, age, education, nature of employment organization, and current residential location affect housing preference. In comparison with the high-income group, the low and medium income groups show stronger preference towards the inner core districts and place

more importance on living convenience and accessibility to public transport. The high-income group, however, is more willing to move to outer district and pay more attention to the quality of dwelling. Similarly, people with less education attainment show stronger preference towards the inner core districts. While the age effect is generally not strong, the findings show that the younger age group particularly favors the suburb that contains the new central business districts. Lastly, people working in state work units are generally more concerned with neighborhood security and the internal design of the building.

As have seen in the reviewed literatures, the relevant literatures show that socioeconomic or individual characteristics have an impact on housing location choice, for example, high- income groups have preferences more for housing size in suburbs and higher premiums in wealthy communities while low-and medium-income groups prefer inner core district, living convenience, and accessibility to public transport. Less education people are more likely to move in inner district whereas the younger age groups favors outer district. In addition, gender is found to have a difference in decision making on housing location through female have less commute times than male.

Most researches use the discrete choice model and random utility theory as a concept to analyze the individuals' preference. And different types of logistic model are employed as a tool of analysis. The major difference is the data used for the analysis. Some studies either use the existing data in the market, known as reveal preference data or non-market information known as stated preference data. Some use both kinds of data for the analysis. And this will be discussed in the next part of this literature review.

Review of stated preference and choice models

The stated preference method has proved to be particularly useful where there is an absence of actual market information from which preferences can be revealed (Walker et al., 2002). Few studies apply stated preference method as well as use experimental data in evaluating housing location preference (Timmermans and van Noortwijk, 1995; Wang and Li, 2006). Discrete choice experiments were developed widely in the areas of transport economics, tourism and recreation research, health economics, marketing, environmental economics, and telecommunications. For example, Ryan, Bate, Eastmond, and Ludbrook (2001) applied the technique to rheumatology outpatient clinics. Dellaert,Borgers and Timmermans (1995) introduced and tested a choice experiment approach to modeling Dutch urban tourists' choice of activity packages for a weekend in Paris. Kemperman, Borgers, Oppewal and Timmermans (2000) examine the hypothesis that theme-park choice is partly influenced by variety-seeking and seasonality effects in The Netherlands. Birol, Karousakis, and Koundouri, (2006) employed a choice experiment to estimate the values of changes in several ecological, social and economic functions that the Cheimaditida wetland provides to the Greek public.

In a situation of non-market goods that is a condominium in this study, hypothetical scenarios can be created in order to find the preferences and put a willingness to pay on this. This technique is called a stated preference method (Alpizar et al, 2001; Bateman et al, 2002). It is separated into two groups: choice modeling techniques (CM) and contingent valuation method (CVM). For contingent valuation, respondents are given information on a non-market good and asked for their willingness to pay for the good. Such a circumstance runs the risk of overestimate the WTP. One reason is that respondents are asked to valuate the goods that they might not have actual monetary value. Hence, it is difficult for respondents to know how to value the good in the questions. Secondly, when the scenario is hypothetical, respondents know that they will not be forced to pay the money in real life and therefore have no incentive to state the WTP closely to their real WTP. Moreover, the method is not suitable in the cases where changes are multidimensional, such as a case where several condo location characteristics are altered at the same time (Hanley et al, 2001).

Choice modeling (CM) is commonly used in the survey where goods are described in terms of attributes and levels, in contrast to CVM where the good is described as the good itself and thus WTO is stated directly (Alpizer et al, 2001). This is the reason why the model highly has been used in marketing purposes. In addition, the trade-off can be presented in terms of goods rather than in monetary terms, like in CVM. This property can reduce the risk of overestimating WTP (Hiselius, 2005). However, CM has the risk of creating a cognitive burden for the respondents. Too many attributes and levels included make a survey too difficult for respondents to comprehend. Further, it is sensitive to the survey design and that the accurate levels and descriptions are included in the choice sets (Bateman et al, 2002).

Choice experiment (CE) is a subset of the CM technique and has its origin in conjoint analysis, which is a well-known method applied in marketing studies to access the demand for new products. The CE method based on the random utility theory. This is in line with the consumer demand theory developed by Lancaster. According to Lancaster (1966), utility is derived from attributes or characteristics of goods instead of directly from the goods themselves.

Conclusion and contributions

In fact, the full information of condominium location preference in Bangkok is not available. The stated preference method is probably the best choice for modeling the preference of condominium location. In this study purposes to employ discrete choice models in order to model the preferences of condominium location in Bangkok as well as apply discrete choice experiment approach as a technique of collecting stated preference data which is similar to the study of Wang and Li (2006).

This study has two features that distinguish it from the existing literature, in terms of the method of revealing individuals' housing preference on location. Firstly,

many studies have presented the impact of socioeconomic characteristics on housing location preference using reveal preference data or stated preference data by using a CVM. Few have however developed CE technique to collect the required information used for the analysis in the housing area. The approach has an advantage in which it allows to imitate the real situation and respondents are required to make decisions by maximizing their utility corresponding to multi-attributes changes in goods. This implies that condominium location choice decision comprise of multiple dimensions such as price, zones, accessibility, scenery, neighborhood, etc. Ones have to trade off their utility according to some combination of choices. Moreover, the technique avoids the problem of overestimating WTP since the trade-off is expressed in terms of attribute changes in goods rather than monetary value and thus WTP is referred indirectly. Lastly, this study presents the first attempt to apply choice experiment approach in housing location decision, specifically applied to condominium in Bangkok, a capital city of Thailand.

Conceptual Framework

In order to evaluate the preferences of mid-end condominium consumers, this study applied the choice experiment method where respondents are presented with various choice situations of two or more alternatives and asked to choose the most preferred. One scenario is generally defined as a status quo, for example, no buy or to stick with a default scenario. Each scenario is described by a number of levels of a set of attributes and attributes can be qualitative or quantitative in nature.

The choice experiment (CE) is based on the random utility theory (RUT). It builds on the discrete choice theory that used to derive conventional demand curves (Bateman et al, 2002). According to the RUT, the individual's indirect utility function (U) composes of two parts, a deterministic element V and a stochastic element, ε.

$$U = V + \varepsilon \qquad (1)$$

The deterministic elements are factors or attributes that researcher can observe while the stochastic elements are unobservable factors that affect choices. The utility function is derived from the goods attributes rather than the goods itself. The contribution of each attribute or the relative importance is the part-worth of the utility. In this study, V (linear-in-parameters) expresses the relative importance of choice attributes such as area, accessibility, view, and crime rate.

Various goods, condos in this case, have different attributes. The alternatives selected by participants will typically maximize their utility given their incomes and others are constant. In a choice set C with J number of alternatives an individual will choose alternative a over the other alternatives in a choice set C if the utility received from alternative a is the highest among all alternatives. This can be described as following:

$$U_a > U_j \qquad (2)$$

Where U_a represents the utility of alternative a. U_j is the utility of other alternatives in choice set C. The utility of an individual can be expressed as:

$$U_a = V_a + \varepsilon_a = \beta X_a + \varepsilon_a \qquad \text{for alternative } a \qquad (3)$$

$$U_j = V_j + \varepsilon_j = \beta X_j + \varepsilon_j \qquad \text{for other alternatives in choice set } C$$

Where β is the vector of the preference of coefficients in relation to attribute X. Substituting (3) into (2) will provide:

$$V_a + \varepsilon_a > V_j + \varepsilon_j \qquad (4)$$

$$(V_a - V_j) + (\varepsilon_a - \varepsilon_j) > 0$$

Since a stochastic component is in the utility function, no certain predictions can be made and the analysis becomes the probability of choosing alternative *a.* That is:

$$\text{Prob}(U_a > U_j) = \text{Prob}[(V_a - V_j) + (\varepsilon_a - \varepsilon_j) > 0] \quad (5)$$

The equation (5) is true under assumptions on a probability distribution of the error part ε are made. It is normally assumed to be independently and identically distributed with an extreme value (Gumbel) distribution. The distribution of error term implied that the probability of *a* being chosen as the most preferred can be expressed in terms of the logistic distribution, know as conditional logit model (Mcfadden, 1973), as shown in equation (6):

$$\text{Prob}(a \mid C = a, b, c, \ldots, J) = \frac{e^{V_a}}{\sum_{j=a}^{J} e^{V_j}} \quad (6)$$

$$= \frac{e^{\beta x_a}}{\sum_{j=a}^{J} e^{\beta x_j}}$$

Explanatory variables *X* e.g. condo location attributes assume different values in each alternative and the probabilities rely on the difference in the value of the characteristics or attributes across alternatives. When choices among a set of commodity are made based on their characteristics or attributes, conditional logit model is the most commonly used (Ben-Akiva & Lerman, 1985).

The selections from a choice set should fulfill the condition of independence from irrelevant alternatives (IIA) property, which stated that the relative probabilities of two options being chosen are unaffected by the introduction or removal of other alternatives (Bateman at al, 2002).

The choice model is estimated using maximum likelihood estimation procedures and assumes liner-in-parameters functional form for deterministic portion of the indirect utility function (Ben-Akiva and Lerman, 1985). The coefficients of the variables in the utility function are the marginal utility of the variables. Marginal rate of substitution (MRS) is defined as the negative ratio between two attributes. When one of these is a cost attribute, marginal willingness-to-pay (WTP) or implicit prices for various condo location attributes can be calculated. It is consistent with the utility maximization as long as a status quo or "will not buy" option is included (Hanley, Mourato and Wright, 2001). Thus the marginal WTP is equal to

$$WTP = -\frac{\beta x_i}{\beta price} \quad (7)$$

Methodology

Design of choice experiment

In this research choice experiment is the main methodology. It is an attribute-based stated preference method or choice-based conjoint analyses where a respondent is presented to a choice set of alternatives and directly asked to choose the most preferred one. It is used in estimating the level of preference and economic values of changes in attributes or characteristics of goods.

Sanko (2001) provided the guideline for stated preference experimental design. There are three steps involved in the design of choice experiment for this study. First, the definition of attributes and their levels are created. Then, choice sets of the experiment are designed. Lastly, the choice experimental design is employed and developed in a questionnaire.

1.1. Condominium location attributes and their levels

An attribute is a characteristic or feature of an alternative. A level or attribute level refers the value of an attribute. One attribute can have two or more levels. For this study, there are five attributes incorporated in this experimental design, namely, condo zone, accessibility, view, crime rate in condo location, and price of mid-end condominiums. All attributes are considered generic or unlabeled. Each attribute has three levels. The identification of attributes and attribute levels rely on the purpose of this study. The condominium location attributes and attribute levels used in choice experiment design are presented in Table 1.

The classification of condo zones in this experiment is based on the information by the environmental quality control and management division, Bangkok. According to the city division in 2001, inner city comprises of 21 districts such as Pranakorn, Pomprabsadtruprai, Sumparnthawong, Pathumwan, Bang Rak, Yannawa, Sathorn, Bang Khor Lam, Bang Sue, Phayathai, Dusit, Ratchatewi, Huaykwang, Khlong toei, Chatuchak, Thonburi, Khlong Sarn, Bangkok Noi, Bangkok Yai, Din Dang, and Wattana. Urban fringe or middle city is composed of 18 districts such as Prakanong, Bang Khen, Pra-vate, Bang Kapi, Ladprao, Bueng khum, Bang Plud, Phasicharoen, Chomthong, Ratburana, Suan Luang, Bang Na, Toong Kru, Bang Kae, Wangthonglang, Khunnayao, Saparnsoong, and Saimai. Finally, suburb or outer city comprises of 11 districts such as Meenburi, Don Meung, Nong Jok, Ladkabang, Talingchan, Nong Kham, Bang Khun Tien, Laksee, Khlong Sam Wa, Bang Bon, and Taweepattana.

The attribute levels of accessibility are mass transit lines, workplace, and Shopping centers or convenient store. Mass transit lines refer to BTS, MRT, and Airport rail link. Workplace in this study represents the respondents' workplaces. And shopping centers or convenient stores include Central, The Mall, Robinson, Tesco,

BigC, Seven eleven, Max value, etc. Specifically, the accessibility means that respondents can approach to one of those three places within 15 minutes.

Table 1: Condominium location attributes and their levels

Attributes	Levels	Variable name	Description
Condo zone (*Zone*)	Inner city	*Inner*	Location of a condominium classified by zone
	Middle city	*Middle*	
	Outer city	*Outer*	
Accessibility	Mass transit line	*Mass*	Place around a condominium with access time of 15 minutes
	Workplace	*Workplace*	
	Shopping centers/Convenient stores	*Shopping*	
View	River	*River*	Scenery surrounding a condominium
	Open space	*Open*	
	High building	*Building*	
Crime rate (*Crime*)	Low level	*Good*	Level of crime rate in condo location
	Moderate level	*Avg*	
	High level	*Bad*	
Price	150,000 baht/sqm		
	108,000 baht/sqm		
	74,000 baht/sqm		

View attribute consists of river, open space or landscape without high buildings, and high buildings. The view is defined as the scenery that residents can view outside the window from their condominiums.

Crime rate represents the average numbers of crime occur in a district per day. The acts like murder, rape, and theft are considered as crime. As reported by the metropolitan police bureau in 2013, the average crime rate is 6 per day per 1 district in Bangkok. In this experimental design the low level of crime rate is 8 and the high level of crime rate is 4.

For the price of mid-end condominiums, their levels were obtained from thinkofliving.com. A mid-range condo segment can be divided according to the price in terms of baht per m^2 into three classes. One is a main class, which widely

constructed to attract consumers in mid-end segment nowadays. Its price is in the range of 70,000 to 90,000 baht per m^2. Second, upper class condominiums mostly are located close to mass transit links with the average price of 90,000 to 120,000 baht per m^2. Lastly, high-class condominiums generally are established in very good location or along mass transit lines. The average price of this class is in the range of 120,000 to 160,000 baht per m^2. Those price levels in choice experiment design are arbitrary set. The ranges between levels are high enough to make respondents trade off between two choices.

1.2. Choice sets creation

Given a design with five three-level attributes, there are $3\times3\times3\times3\times3 = 3^5 = 243$ possible combinations or profiles of attributes levels that can be created. Each combination explains one alternative. This full factorial design is orthogonal; that is, it ensures that attributes presented to respondents are varied independently from one another. This avoids "multi-colinearity" between attributes, which is a common problem of reveal preference data. Also, all main effects can be estimated and are uncorrelated among desired characteristics. However, such a design is very large and not tractable in a choice experiment. Therefore, it is necessary to reduce the number of combinations. One solution is a fractional factorial design.

For this choice experiment design, only main effects were considered for estimation. Although higher order interactions may be better, main effect design is enough to explain the choice made by respondents. According to Louviere et al. (2000), main effects commonly account for 70% or more of explain variance, two-way interactions typically account for 5% to 15% of explained variance, and higher-order interactions explain the remaining variances.

Following the procedure described by Sanko (2001), the shifting design was used in this study. The shifting method uses the orthogonal main-effect array as the first alternative in each choice set. This method creates one additional alternative by adding a constant to each attribute levels of the initial alternative. In addition to it still maintains the orthogonality of the starting alternative.

R statistical software was used by employing the support.CEs package (Aizaki, 2012). The function *rotaion.design* weas applied to generate choice sets. This command creates an unlabeled type of CE design that can contain generic attributes in the utility function of conditional logit model. For this study, 3 blocks with 6 choice sets each of 2 alternatives were designed as shown in Table 2. The block design requires the division of the choice set into sub-sets known as "Block". This approach is in line with the assumption that the preferences of the samples of respondents are homogeneous. Inevitably, differences between individuals will increase the error of the results.

Table 2: Choice set design

Choice Set	Block	Alternative 1	Alternative 2	Design Codes
1	1	11111	22222	*Condo Zone (1st column)*
2	1	32213	13321	1-Inner city
3	1	33112	11223	2-Middle city
4	1	22222	33333	3-Outer city
5	1	22331	33112	*Accessibility (2nd column)*
6	1	32121	13232	1-Mass transit line
7	2	13321	21132	2-Workplace
8	2	11223	22331	3-Shopping convenience
9	2	31322	12133	*View (3rd column)*
10	2	31231	12312	1-River
11	2	33333	11111	2-Open space
12	2	23211	31322	3-High building
13	3	13232	21313	*Crime rate (4th column)*
14	3	23123	31231	1-Good
15	3	21313	32121	2-Average
16	3	12133	23211	3-Bad
17	3	12312	23123	*Price (5th column)*
18	3	21132	32213	1-150,000 baht/sqm 2-108,00 baht/sqm 3-74,000 baht/sqm

Finally, the choice set design was evaluated according to four criteria of the efficient design (Huber and Zwerina, 1996):

1. Orthogonality. The variations of the attribute levels should be uncorrelated for combinations chosen in all choice sets. With the rotation design by support.CEs in R, the choice set design maintains this condition.
2. Level balance. The level of each attribute should appear with equal frequency in the design. In this design of choice experiment, level balance was achieved as presented in Table 3.

3. Minimal overlap. The same attribute level should not repeat in the same choice set. Due to the shifting method, there is no overlap in this experimental design.
4. Utility balance. The utility in each of two alternatives in a choice set should be set equal. However, there is no good basis to estimate the values of the parameter coefficients, this study did not consider this criterion.

Table 3: Level balance of the choice set design

Attribute Levels	Number of Appearance in the Design				
	Zone	Accessibility	View	Crime	Price
1	6	6	6	6	6
2	6	6	6	6	6
3	6	6	6	6	6

1.3. Employing the choice experiment

By the choice set design the 18 choice sets were divided into 3 blocks with 6 choice sets each. As a result, three versions of the questionnaire were conducted with the choice experiment. The reason to create the block design is to not make it too demanding to respondents. Each block was answered by an equal number of respondents. Furthermore, the final choice sets are complemented with a no-choice alternative since forcing individual to make a decision to select between the two alternatives could overestimate the results.

Moreover, the ordering of the attributes was randomized in each choice set to prevent "learning" which might result in biased choices by the respondents. Another consideration was the consistency of respondents. This survey included a test for transitivity. The seventh choice set was duplicated the first in each version of questionnaire, but with change in the attribute levels in one of the alternatives. For this survey, the attribute price was changed in alternative 2 by reducing one level of price. Therefore, the utility of alternative 2 is higher, whereas the utility of alternative 1 remains the same as in choice set 1. If the respondent chose alternative 2 in choice set 1, it should choose 2 in the seventh as it is better. Hence, the criteria of transitivity would be fulfilled. If the respondent chose 2 in the first choice set and chose 1 in the seventh, the answer is inconsistent. However, if the respondent chose 1 in both choice set 1 and 7, such a respondent cannot be tested. If the individual chose the alternative "Neither" in choice set 1 then chose 1 in choice set 7, which has less utility than 2, the person had violated the transitivity. All respondents who failed the test of consistency were removed from the final data set. An example of a choice set is shown in Figure 1.

Figure 1: An example of a choice experiment used in the survey

Choice Set 1

	Condominium A	**Condominium B**
Accessibility	Mass transit lines	Workplace
Crime rate (times/day/district)	Very Bad (11) / Bad (8) / Average (6) / ***Good (4)*** / Very Good (1)	Very Bad (11) / Bad (8) / **Average (6)** / *Good* (4) / Very Good (1)
Condo Zone	Inner city	Middle city
View	River	Open space
Price (million baht/45 m^2)	6.75	4.86
Which one do you prefer?	☐	☐ Neither ☐

Survey and Sampling design

The questionnaires were directly distributed to random respondents by a researcher. In addition to the choice experiments, the questionnaires were addressed the data needed for the study, for example, socioeconomic and demographics information of respondents, travel behavior, and purchasing behavior. Moreover, the definition for each attribute and attribute level is clearly identified to respondents. The entire survey is found in Appendix A.

Three different versions of surveys were randomly given to 125 respondents for each, giving a total of 375 respondents. A convenience sampling was an option of this survey. The respondents of this study were mater degree or doctorial students from the faculty of commerce and accountancy and the faculty of economics, Chulalongkorn University. Respondents were randomly selected on the spot to complete the questionnaires.

Data Analysis

1.4. Making a design matrix

The function *make.design.matrix* in the package support.CEs in R is able to convert the CE design into a design matrix that is suitable for the conditional logit model. In this CE design, the variables zone, accessibility, view, and crime were treated as categorical variables, while the variable price was assigned as a continuous variable. A unit of the price attribute is a thousand baht per m^2. The categorical

attributes were converted into dummy variables. For example, in a categorical attribute zone with the three levels - “inner”, “middle”, “outer”- dummy variables are created as follows: Since the CE design is unlabeled, two dummy variables are created, a dummy variable “middle” is assumed as the value 1 when the attribute zone takes “middle” and 0 otherwise, and a dummy variable “outer” is assumed as the value 1 when the attribute zone takes “outer” and 0 otherwise.

1.5. Making a data set

The command *make.dataset* creates a data set suitable for a function *clogit* in the package Survival by combining a data set including information of the response to the CE questions and a data set including a design matrix related to these questions.

The respondent data set has to contain the variable ID, corresponding to respondent’s identification number and the variable BLOCK, corresponding to the serial number of blocks to which each respondent is assigned and response variable corresponding to the answers to each CE questions. Additionally the individual’s characteristics variables are included in the respondent data. For the response variables, each alternative must be assigned an integer value starting from 1. For example, if respondent answers alternative 1 in question 1 (q1), alternative 2 in question 2 (q2), and alternative “neither” in question 3 (q3), the response variables – “q1”, “q2”, “q3”- are assigned as “1”, “2”, “3”, respectively.

In this study, each respondent was required to answer 6 CE questions with 3 alternatives including an “opt-out” option, the number of the observations in the data set created by the design matrix and the respondent data set is equal to 18 for each individual.

1.6. Choice modeling

After preparing a data set that fits the choice experiment into a conditional logit model in order to estimate the coefficient of the utility function for condominiums, the function *clogit* in the package Survival was used. The basic utility specification is as follows:

$$U = \beta_{inner}Inner + \beta_{middle}Middle + \beta_{outer}Outer + \beta_{mass}Mass + \beta_{workplace}Workplace + \beta_{shopping}Shopping + \beta_{river}River + \beta_{open}Open + \beta_{building}Building + \beta_{good}Good + \beta_{avg}Avg + \beta_{bad}Bad + \beta_{price}Price$$

In this model, all variables are categorical and dummy-coded, except for Price variable is treated as a continuous variable to be convenient for the calculation of the marginal willingness to pay. Furthermore, all the respondents who are inconsistent were removed from the data set.

Results and analyses

The collected data of 292 respondents out of 375 respondents was analyzed. All of the uncompleted and inconsistent questionnaires were removed from the analysis. In the first part of the results is a description of the samples of respondents that will be used in order to estimate the condominium location choice model in the next section of these analyses.

Respondent Characteristics

The respondents are classified into three types of characteristic, that is socio-demographic characteristics, travel characteristics, and purchasing behaviors.

1. Socio-demographic Characteristics

Table 4: Socio-demographic characteristics of respondents

Characteristic	Percentage	Mean
Age (years)	-	27.6
Gender		
Female	61.3%	-
Male	38.7%	-
Monthly household income (baht)	-	148,500
Below 30,000 baht	5.8%	-
30,000 – 50,000 baht	16.4%	-
50,001 – 100,000 baht	21.2%	-
100,001 – 150,000 baht	15.1%	-
150,001 – 200,000 baht	14.0%	-
Over 200,000 baht	27.4%	-
Occupation		
Employed	68.8%	-
Self-employed/Businessman	13.4%	-
None	17.8%	-
Household		
Size	-	4
Households with children	10.3%	-

Households without children	89.7%	-
Current residential location		
Inner district	50%	-
Middle district	28.8%	-
Outer district	21.2%	-
Current workplace's location		
Inner district	77.7%	-
Middle district	9.3%	-
Outer district	13.0%	-

The socio-demographic characteristics of the respondents are summarized in Table 4. The average age of this sample is 27.6 years. 61.3% are female and 38.7% are male. On average, the household monthly income is 148,500 baht. 27.4% are contributed to monthly household income of at least 200,000 baht and 21.2% are the range between 50,001 and 100,000 baht, respectively.

More than half of respondents, 68.8%, are employees whereas 13.4% are self-employed or businessmen. The remaining have no occupation and are undergraduate Master degree students. The mean of household size is 4. As shown in Table 4, households with children under 15 years old are only 10.3% of samples.

Half of the respondents are living in inner districts. 28.8% and 21.2% are living in middle and outer districts, respectively. The current workplaces of this sample are located in an inner area by 77.7%. However, respondents' workplaces are resorted in suburban by 13% but in middle region by 9.3%.

2. Travel Characteristics

Table 5 shows the result of travel characteristics of respondents. Average travel time from respondents' current residences to their workplaces is 48.1 minutes. More than half (51.7%) of these samples do not use their private vehicles in order to travel to their workplaces while the remaining of the samples do.

Table 5: Travel characteristics of respondents

Characteristic	Percentage	Mean
Travel time (mins)	-	48.1
Private vehicle user		
Yes	48.3%	-
No	51.7%	-

3. Condominium Purchasing Behavior

Respondents are classified in terms of consumer types as shown in Table 6. 20.2% are contributed to consumers who have already bought a condominium within the last two years, 45.2% are respondents who would like to buy a condominium within the next five years, and 43.2% are those who neither bought a condo nor will buy one in the future. Note that there are some respondents being both already consumers and potential consumers at the same time.

The mean of willingness to pay for mid-range condominiums in Bangkok is 102,600.6 baht per square meter. Most of respondents of 43.5% are willing to pay at the range of 70,000 to 90,000 baht per square meter. 32.5% of them are willing to pay 90,001 to 120,000 baht per square meter. For the middle-end condominium with the price over 160,000 baht per square meter is the least willing to pay by the respondents. The results reflect that most of the respondents in this study are middle class or middle-income consumers.

Table 6: Respondents' middle-end condominium purchasing behaviors

Characteristic	Percentage	Mean
Consumer type		
Already consumer	20.2%	-
Potential consumer	45.2%	-
Non-consumer	43.2%	-
Willingness to pay (baht/sqm)		102,600.6
Below 70,000	13.7%	-
70,000 – 90,000	43.5%	-
90,001 – 120,000	32.5%	-
120,001 – 160,000	7.5%	-
Over 160,000	2.7%	-

Condominium location choice model

In this section, a basic conditional logistic model was firstly estimated, using R statistical software with the package support.CEs and package Survival. In Model 1, all the explanatory variables were categorical and dummy-coded except for the Price attribute was treated as a continuous variable. It is necessary to convert the price attributes to a quantitative variable in order to compute for the willingness to pay of the respondents for specific location of condominium attributes. This will provide a single coefficient for the price attribute.

For dummy-coded attributes, one of the variables was set as the base variable. All estimated coefficients are interpreted relative to these base variables. Quantitative variable Price did not require a base variable. The base variable used for each attribute were:

Attribute	*Base variable*
Condo zone	Inner
Accessibility	Mass transit line
View	River
Crime rate	Good

The regression result of the basic model is shown in Model 1 as following:

Model 1: Basic condominium location choice model

	coef	**exp(coef)**	**se(coef)**	**z**	**p**
ASC	2.74330	15.538	0.16913	16.220	0.0e+00
Middle	-0.23695	0.789	0.08193	-2.892	3.8e-03
Outer	-0.79692	0.451	0.08677	-9.184	0.0e+00
Workplace	-0.29227	0.747	0.08410	-3.475	5.1e-04
Shopping	-0.63887	0.528	0.08683	-7.358	1.9e-13
Open	0.00802	1.008	0.08187	0.098	9.2e-01
Building	-0.20542	0.814	0.08564	-2.399	1.6e-02
Avg	-0.33051	0.719	0.07744	-4.268	2.0e-05
Bad	-1.33250	0.264	0.04098	-14.647	0.0e+00
Price	-0.00893	0.991	0.00116	-7.719	1.2e-14

Likelihood ratio test = 603 on 10 df, p = 0 n = 5256, number of events = 1752

Rho-squared = 0.1566709

Adjusted rho-squared = 0.1514755

Number of coefficients = 10

Log likelihood at start = -1924.769

Log likelihood at convergence = -1623.214

Table 7: Marginal willingness to pay of the basic choice model

	MWTP	**5%**	**95%**
Middle	-26.5223	-43.0928	-11.4347
Outer	-89.1999	-118.3681	-68.2212
Workplace	-32.7140	-51.4141	-16.9521
Shopping	-71.5097	-99.6799	-51.3557
Open	0.8977	-14.0992	16.7528
Building	-22.9927	-41.3624	-7.0559
Avg	-36.9944	-55.0074	-22.1904
Bad	-149.1483	-191.8687	-119.8086

Results in Model 1 show that all parameters are highly significant at 1% significance level except for the *Open Space* variable. The signs of the parameters met logical expectations. For an interpretation of the regression result in logistic model, variables are compared within each condo location attribute in terms of the changes in odds ratio (exp(coef)) relative to base variables, holding the other attributes at their mean values. However, the marginal willingness to pay shown in the Table 7 will change with the assumption of values at which other variables are held constant at their current inadequate levels.

As reported by the Model 1, condominiums in middle and outer zones decrease the possibility of a condominium being chosen by 21.1% and 54.9%, respectively, relative to condominiums in inner zones. This can be explained that since the majority of offices, workplaces, or business areas are typically settled in an inner city more than middle and outer cities in Bangkok, therefore, residents greatly prefer to live in condos located in central business areas around inner zones. Table 7 shows that, on average, respondents are willing to pay an extra 26,522 baht per square meter and 89,200 baht per square meter, respectively, for a condo in inner districts, as compared with buying one in middle districts and suburban.

Condominiums located within 15 minutes accessing to residents' workplaces and shopping malls or convenient stores decrease the probability of being chosen by 25.3% and 47.2%, respectively, compared with those resorted close to mass transit lines. Alternatively, respondents prefer to live in a condominium that they can easily access to mass transit stations more than their workplaces and convenience stores, correspondingly. They are willing to pay more for a condominium with quickly accessing to mass transit routes than their workplaces and convenient stores by 32,714 baht per square meter and 71,510 baht per square mete, respectively.

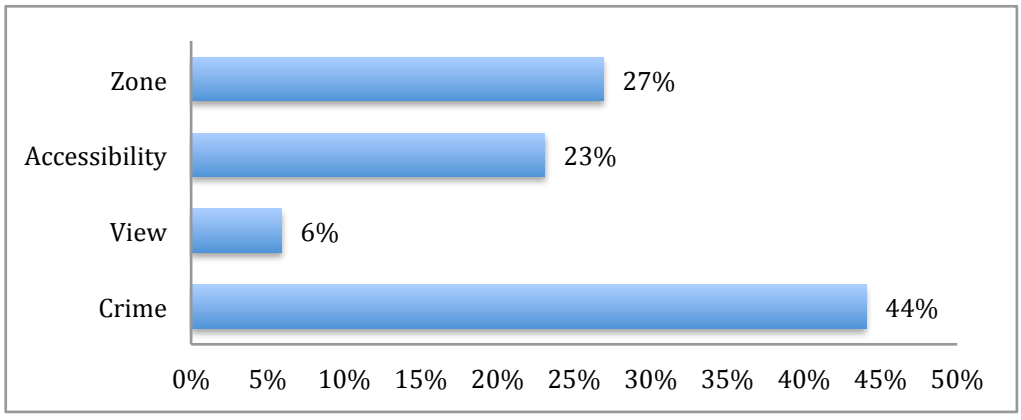
Condos with open space view have greater probability of being chosen than those with river view by 0.8%. However, the open space attribute is not significant. A condo with river view has higher probability of being chosen than one with high building view by 18.6%. This can be attributed to the perception of high buildings as obstacles to a landscape surrounding a residence. Base on the results, respondents are willing to pay an additional 898 baht per square meter to trade a river view condo for a open space view condo, and a reduction of 22,993 baht per square meter for one with high building view.

As logical expectations, condominiums in the areas with average level of crime rate and high level of crime rate decrease their odds of being chosen by 28.1% and 73.6%, respectively, relative to those in the areas with low level of crime rate. Table 7 shows that condos with low rate of crime need a premium of 36,994 baht per square meter and 149,148 baht per square meter, correspondingly, over those with moderate rate of crime and high rate of crime.

Lastly, an additional of 1000 baht per square meter in price of a middle-end condominium decrease the possibility of being chosen by 0.009%, in other words, the price barely effects the probability of choosing a mid-range condominium.

Figure 2 indicates the relative importance of each attribute by computing the attributes' ranges. An attribute's range is the different between the highest and lowest estimated coefficients of its levels. The ranges of all attributes are summed and the contribution of each attribute is calculated according to its proportion.

Figure 2: Relative importance of attributes (in percentage)



This figure demonstrates that crime rate is the most important attribute, with a relative importance of 44%. This is followed by the attributes zone and accessibility, with a relative importance of 27% and 23%, correspondingly. The view is clearly the least important attribute.

The actual probability of being chosen for each location characteristic of a condominium is given in Table 8.

Table 8: Predictions for choices

Attribute	Variable	Exp(coef)	Probability
Zone	Inner	1.000	45%
	Middle	0.789	35%
	Outer	0.451	20%
Accessibility	Mass transit line	1.000	44%
	Workplace	0.747	33%
	Shopping center	0.528	23%
View	River	1.000	35%
	Open space	1.008	36%
	High building	0.814	29%
Crime rate	Good	1.000	50%
	Average	0.719	36%
	Bad	0.264	14%

Preference by respondent segments

The basic condominium location choice model was used to estimate on various segments of the respondents. The segments were made according to socio-demographic characteristics, travel characteristics, and consumer types. All of the regression results and the estimation of marginal WTP for each respondent segment are presented in Appendix B.

The socio-demographic characteristics used for segmentation are described as shown in Table 9.

Table 9:Socio-demographic characteristics used for segmentation

Characteristics	Segments	Remarks
Gender	Female	
	Male	
Monthly household income	Below 150,000 baht/sqm	Low-income
	Over 150,000 baht/sqm	High-income
Household Size	4 or less	Small household
	5 or more	Large household
Current residential location	Inner city	
	Middle city	
	Outer city	
Current workplace location	Inner city	
	Middle city	
	Outer city	

1. *Segmentation by socio-demographic characteristics*

1.1 Gender

The findings present that male and female have different preference of location of condominium in terms of the scenery. Male prefer a river view condo than open space view and high building view condos, respectively, whereas female would rather choose a condo with open space view than ones with river and high building views, respectively. The other location attributes yield the same preferences as the

basis choice model for both male and female. Nevertheless, a female group is willing to pay an extra more than male to stay in an inner city and in low crime rate area, relative to in middle and outer cities as well as in moderate and high rate of crime districts, correspondingly. Condos in inner regions command a premium of 37,769 baht per m^2 and 94,885 baht per m^2 by a female group over those in middle and outer districts, respectively. These premiums are 10.7 and 1.2 times over a male group's premiums. Conversely, male are willing to pay an additional for a condo closed to mass transit links approximately 3.3 times and 1.7 times over female, respectively, compared to ones closed to their workplaces and convenient stores or shopping malls.

1.2 Monthly household income

Results provide the same direction of preferences as the basic choice model for a high-income group. However, only view attributes are different from the basic model for a low-income group in which condos with river view are preferred to those with open space and high building scenery. The group of high income is willing to pay an extra of 19,873 baht per m^2 for an open space view over a river view as well as an extra of 8,996 baht per m^2 for a river view compared to a high building view. The low-income group is willing to pay a price of 5,878 baht per m^2 and 30,588 baht per m^2 higher to buy a condo with open space and high building sceneries, correspondingly. For the remaining location attributes, those who have high household monthly income are willing to pay greater for them than those who have low monthly household income as logical expectations.

1.3 Household size

The group of small family size is willing to pay an additional of 6,388 baht per m^2 and 24,633 baht per m^2, respectively, for a river view compared with an open space view and a high building view, while the large households is willing to pay 16,679 baht per m^2 extra in order to trade a river view condo to an open space view condo, and 20,426 baht per m^2 reduction for one with high building view. The small households is willing to pay a premium lower than the large households by 3,283 baht per m^2 to stay in inner zones as compared to middle zones, but a premium higher by 8,270 baht per m^2 for suburban. Furthermore, they are willing to pay more an extra for condos closed to mass transit lines over their workplaces, yet lower an extra as compared to shopping convenient stores than those who have large family size. These trade offs between the two groups are also the same for the crime rate preference in which condos with low crime rate are preferred over moderate crime rate and high crime rate, respectively.

1.4 Current residential location

The overall estimation reveals the same directions and preferences as the basic choice model outcomes for only those who are living in middle regions, however, only one location characteristic-view- differs from the basic model results for those who are living in inner and outer regions. That is, they favor more for river view than open space view, and high building view, correspondingly. Besides inner district residents have the greatest marginal willingness to pay to stay in inner areas over in

middle and outer areas, as compared with the remaining residents. Middle district residents have the lowest marginal willingness to pay for staying in inner areas over middle area. As well as outer district residents have the least marginal willingness to pay for inner zone condo over outer zone condo. For the accessibility characteristic, inner region residents are willing to pay the highest premiums for mass transit routes following by middle and outer region residents. The results indicate that respondents selected the condo location in terms of zones and mass transit links according to their current residential locations. Note that the mass transit lines practically concentrate more in inner areas than middle areas, and outer areas, respectively. Lastly, results present that residents living in inner region have the highest marginal willingness to pay for condos with low crime rate over those with moderate and high crime rate, respectively. It is not surprise that they are the most sensitive to the rate of crime, as a result of, the crime rate is normally highest in core region and central business areas.

1.5 Current workplace location

The regression outcomes convey that those who work in inner areas are willing to pay greater extras for condo zones than those who work in suburb. They prefer to buy a condo in inner districts than ones in middle and outer districts, correspondingly. While those working in middle areas are willing to pay a premium of 3,957 baht per m^2 to stay in middle districts over in inner districts, and 56,876 baht per m^2 to stay in outer districts. The directions and preferences of the remaining attributes for workers in inner and outer regions are the same as the basic choice model except for view attributes. They prefer river view to open space and high building views, respectively. Yet inner district workers are willing to pay much lower premiums for river view over open space and high building views, as compared with outer district workers. For those work in middle areas, nevertheless, they commands premiums of 3,846 baht per m^2 and 45,374 baht per m^2, respectively, for their workplaces over mass transit lines and shopping convenience. Moreover, they are willing to pay for open space view by 35,243 baht per m^2 extra relative to river view but 5,154 baht per m^2 reduction compared with high building view. Lastly, they prefer a condo with moderate crime rate to one with low crime rate following by high crime rate. This can be explained that respondents choose condo zones according to their current workplace location. And those who work in middle zone prefer to stay close to their workplaces than mass transit stations since the mass transit systems are not highly access in the middle zone compared with the inner zone. Furthermore, the crime rate in middle areas is less than in inner areas, hence, the workers may not too concern about crime.

2. Segmentation by travel characteristics

The segments of each travel characteristic are given in Table 10.

Table 10: Travel characteristics used for segmentation

Characteristics	Segments	Remarks
Travel time	48.1 minutes or less	Short travel time
	More than 48.1 minutes	Long travel time
Private vehicle user	Use private vehicle	
	Do not use private vehicle	

2.1 Travel time

Respondents who have short travel time from their current residences to their workplaces are willing to pay premiums for the condo region and the crime rate more than those who have long travel time. They prefer to stay in inner areas to middle and outer areas, respectively. Also, they prefer to buy condos with low crime rate over those with average and high crime rate, correspondingly. This can be explained that the greatest development of mass transit systems is in inner city, people can lower their hour spending to travel from their residences to workplaces. As a result, the majority of people who have short travel time are living in an inner area, which has relatively high density of business activities and generally has high rate of crime. As a consequence, they favor a condo in the areas closed to their workplaces and one with low rate of crime. However, both short and long travel time respondents would rather buy a condo closed to mass transit links than those closed to their workplaces following by convenient stores.

2.2 Private vehicle user

Both respondents who use and do not use their own personal vehicles for traveling to their workplaces have the same preferences as respondents classified by travel time. Those who do not use personal vehicles have greater MWTP for condo region and accessibility compared with the MWTP of those who use private vehicles. The results are correlated with travel time. This implies that respondents who do not use their own private vehicles are more likely to have short travel time from their residences to workplaces. Thus, they more prefer to stay in inner districts and condos closed to mass transit links because the mass transit lines greatest access to an inner zone in Bangkok.

3. Segmentation by condominium purchasing behaviors

The mid-end condominium purchasing behaviors were identified by segments as given in Table 11.

Table 11: Condominium purchasing behaviors used for segmentation

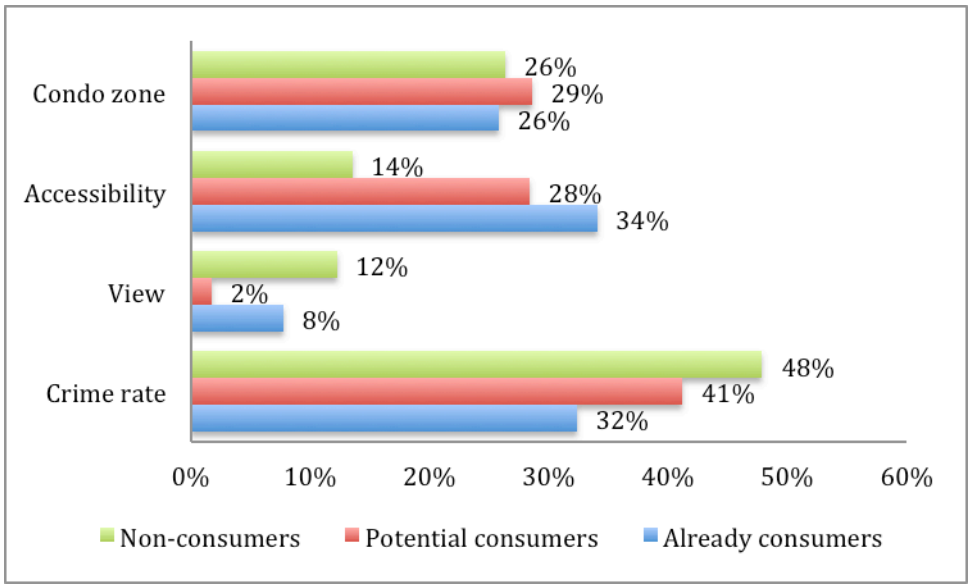
Characteristics	Segments	Remarks
Consumer type	Those who have bought a condo within the last 2 years	Already consumer
	Those who may buy a condo within the next 5 years	Potential consumer
	Those who neither bought a condo in the past nor will buy one in the future	Non-consumer

3.1 Consumer types

The outcomes show the same preference as a basic choice model results for all consumers except for the attribute crime rate of already consumer type. Already consumers are willing to pay an additional of 8,950 baht per m^2 to stay in average level of crime rate condos relative to in low level of crime rate condos. They have closely MWTP for low crime rate over high crime rate as potential consumers but lower than non-consumers. While potential consumers and non-consumers have roughly the same MWTP to buy a condo with low crime rate compared to buy one with average crime rate. All types of consumer have slightly the same MWTP for a condo in inner zones over one in suburb, but potential consumers have more MWTP for an inner city condo relative to a middle city condo than already consumers and non-consumers, respectively. Potential consumers and already consumers have nearly the same MWTP for mass transit lines over their workplaces but higher than non-consumers. Non-consumers have the least MWTP and already consumers have the most MWTP for mass transit links compared with shopping convenience.

Figure 3 shows that for already consumers, accessibility is the most important attribute, with a relative importance of 32%. The less important attributes are crime rate, area, and view respectively. While crime rate is the most important attribute for potential consumers and non-consumers, with relative importance of 41% and 48%, correspondingly. These are followed by accessibility and area attributes. Additionally, the view is the least important attribute for all consumer types.

Figure 3: Relative importance of attributes for consumer types (in percentage)



Conclusions

The research applied a choice experiment approach to value location attributes for mid-range condominiums in Bangkok, Thailand. The study covered 292 respondents using a convenient random sample. Four condominium location attributes were considered, which are condo zone, accessibility, view, and crime rate. And each attribute consists of three attribute levels. The conditional logit models were estimated for the entire sample and various sub-samples classified by gender, monthly household income, family size, current residential and workplace locations. There are also the estimated choice models for the other segments classified travel time, personal vehicle user, and consumer type. The model then use to compute the relative importance of location attributes as well as the distributions within each location attribute.

The results exist that most of respondents have medium household monthly income and are employees. The inner city is the most concentration of residential and workplace locations for this sample. Around half of respondents use their own personal vehicle traveling to work and are potential consumers of mid-end condominiums in Bangkok.

This study reveals that people in Bangkok attach greater importance to crime rate, condo zone, accessibility, and view, respectively. In these attributes, people place the preferences for inner city over middle city following by outer city. The easily accessibility to mass transit lines is the most preferred following by workplaces and shopping convenience. People like open space view better than river view and high building view, correspondingly. Lastly, the low crime rate location is more likely to be selected than average and high crime rate location.

The differences in socio-demographic factors were found to be different in the preference of condominium location. Female shows stronger preference towards the inner city and low rate of crime location, where as male place more importance for mass transit links. The high-income groups prefer more on the inner city, mass transit lines, and low crime rate as compared with the-low-income groups. The large family places more importance for open space view whereas the small family prefers river view. People choose condo location, accessibility to mass transit stations, and crime rate according to their current residential locations. However, they select only condo zone according to their workplace locations. Moreover, those who have short travel time reflect the possibility of not using their own personal vehicle in order to travel to work. They have strong preference to stay in inner districts with easily access to mass transit links and low crime rate location, as compared to those who have long travel time or use their own private vehicle to travel to their workplace. Finally, potential consumers have more preferences for inner zone and low crime rate location than the others. While already consumers place more importance for accessibility of mass transit systems than the other consumers.

These finding suggest that middle-income consumers are willing to pay higher price of condominium in inner core districts than in middle zones and suburb. Additionally, the consumers have strong preference to stay in a condo with easily approach to mass transit stations. Therefore, the mass transit systems in Bangkok should be expanded so that people will have less consideration to stay in an inner area, as a consequence the population density might be less in the inner area. Furthermore, since the crime rate shows as the most importance factor of condo location, the government can support the condo market by promoting the policy that help reducing the crime rate.

However, there is a possibility to develop this study for the further research in order to provide more interesting findings. The study of condominiums can be covered more segments such as low-end and high-end condominiums. The results would reflect greater pictures of the condo market. The choice model in this paper can be extended further to include more characteristics of condominiums in order to increase accuracy and precision of estimations. In addition, the survey designs can be developed to account for the risk of under or overestimate WTP by conducting several versions of survey designs since choice experiment method faces the drawback of a cognitive burden for the respondents.

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Appendix

Appendix A – Survey Questionnaire

แบบสอบถาม

***เรื่อง** ลักษณะทางสังคมและประชากร และความชอบต่อทำเลที่ตั้งของคอนโดมิเนียมระดับกลางในกรุงเทพมหานคร*

วัตถุประสงค์ แบบสอบถามนี้จัดทำขึ้นเพื่อเก็บรวบรวมข้อมูลสำหรับการศึกษาค้นคว้าอิสระเพื่อการศึกษาของนักศึกษาระดับปริญญาตรี คณะเศรษฐศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย โดยข้อมูลในแบบสอบถามจะนำไปใช้ประโยชน์เพื่อการศึกษาเท่านั้น ทั้งนี้ ผู้วิจัยขอขอบพระคุณผู้ตอบแบบสอบถามเป็นอย่างยิ่ง ที่สละเวลาและให้ความร่วมมือในการตอบแบบสอบถามมา ณ โอกาสนี้

คำชี้แจง

1. กรุณาทำเครื่องหมาย ✓ ลงในช่องสี่เหลี่ยมที่ท่านเลือกและเติมข้อความหรือตัวเลขลงในช่องว่างที่มีให้
2. แบบสอบถามมีทั้งหมด 3 ส่วน ดังนี้

   ส่วนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

   ส่วนที่ 2 ข้อมูลประกอบการตอบแบบสอบถาม

   ส่วนที่ 3 แบบสอบถามการทดลองแบบทางเลือก

3. ข้อมูลที่ได้รับจากผู้ตอบแบบสอบถามจะถูกเก็บเป็นความลับ

ส่วนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

เพศ: ☐ ชาย ☐ หญิง

อายุ: _____ ปี

ระดับการศึกษา: ☐ กำลังศึกษาปริญญาโท ☐ กำลังศึกษาปริญญาเอก

รายได้ทั้งครอบครัวต่อเดือน:
- ☐ น้อยกว่า 30,000 บาท
- ☐ 30,000 – 50,000 บาท
- ☐ 50,001 – 100,000 บาท
- ☐ 100,001 – 150,000 บาท
- ☐ 150,001 – 200,000 บาท
- ☐ มากกว่า 200,000 บาท

สถานะการจ้างงาน:
- ☐ ลูกจ้าง - full time
- ☐ ลูกจ้าง - Part time
- ☐ ว่างงาน/กำลังหางาน
- ☐ เจ้าของกิจการ
- ☐ อื่นๆ โปรดระบุ _____

จำนวนสมาชิกในที่อยู่อาศัย: _____ คน

จำนวนเด็กอายุต่ำกว่า 15 ปีในที่อยู่อาศัย: _____คน

ที่อยู่อาศัยจริงในปัจจุบัน: เขต _____

สถานที่ทำงานในปัจจุบัน: เขต _____

ระยะเวลาที่ใช้เดินทางจากที่อยู่ปัจจุบันไปที่ทำงาน/สถานศึกษา: _____นาที

คุณใช้รถยนต์หรือพาหนะส่วนตัวในการเดินทางไปทำงาน/สถานศึกษาหรือไม่ ☐ใช่ ☐ไม่ใช่

ในช่วงระยะเวลา 2 ปีที่ผ่านมา คุณเคยซื้อคอนโดมิเนียมในกรุงเทพฯใช่หรือไม่ ☐ใช่ ☐ไม่ใช่

ภายในระยะเวลา 5 ปีข้างหน้า คุณคาดว่าจะซื้อคอนโดมิเนียมในกรุงเทพฯใช่หรือไม่? ☐ใช่ ☐ไม่ใช่

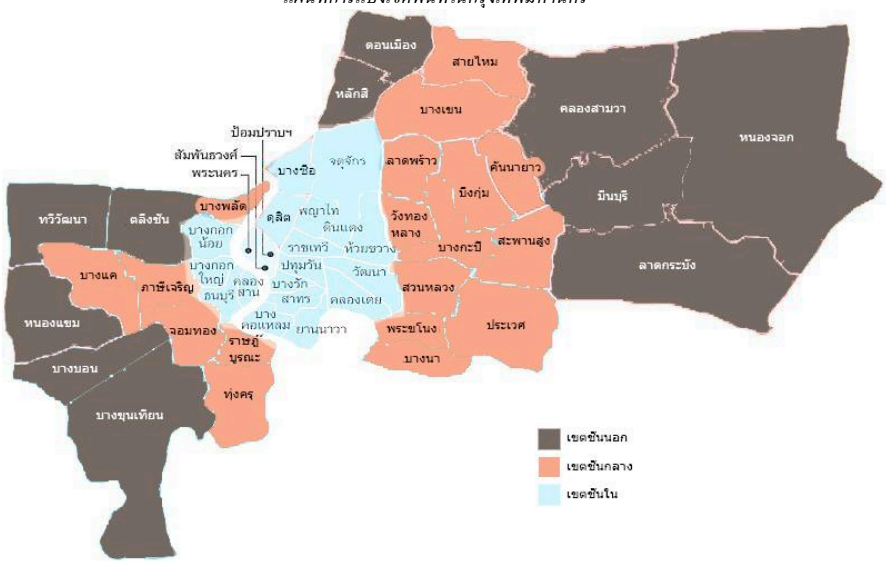
ส่วนที่ 2 ข้อมูลประกอบการตอบแบบสอบถาม

กรุณาศึกษาข้อมูลต่อไปนี้ เพื่อประกอบการตอบคำถามในส่วนที่ 3

5 ปัจจัยที่ส่งผลต่อการเลือกทำเลของคอนโดมิเนียมระดับกลางในกรุงเทพมหานคร

1. **เขต:** ตำแหน่งที่ตั้งของคอนโดมิเนียม

แผนที่การแบ่งเขตพื้นที่ในกรุงเทพมหานคร



2. **การเข้าถึง:** สามารถเดินทางจากคอนโดมิเนียมที่เลือกไปยังสถานที่เหล่านี้ได้ภายใน *15 นาที*

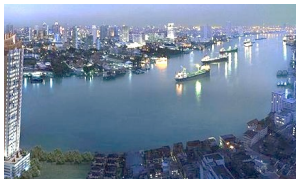
การเข้าถึงที่ระบุในแบบสอบถามส่วนที่ 3 หมายถึง ท่านสามารถเดินทางไปยังสถานที่ที่ระบุเพียงที่ใดที่หนึ่งเท่านั้นภายใน 15 นาที เช่น หากในแบบสอบถามระบุการเข้าถึง คือ รถไฟฟ้า ท่านจะสามารถเดินทางไปยังรถไฟฟ้าได้ภายใน 15 นาที แต่ท่านจะเดินทาง

ไปยังห้างสรรพสินค้าและสถานที่ทำงานของท่าน*มากกว่า 15 นาที*

3. **ทัศนียภาพ:** ลักษณะทิวทัศน์ที่มองเห็นจากห้องชุดในคอนโดมิเนียม

วิวตึกสูง

วิวโล่ง/ไม่มีสิ่งกีดขวาง



วิวแม่น้ำ

4. **อัตราอาชญากรรม:** จำนวนครั้งเฉลี่ยในการเกิดอาชญากรรมต่อวันใน 1 เขต เช่น ข่มขู่ ทำร้ายร่างกาย วิ่งลักชิงปล้นทรัพย์สิน ยาเสพติด การพนัน ค้าประเวณี ในบริเวณที่อยู่อาศัยของท่าน

แย่มาก	แย่	ปานกลาง	ดี	ดีมาก
(11)	(8)	(6)	(4)	(1)

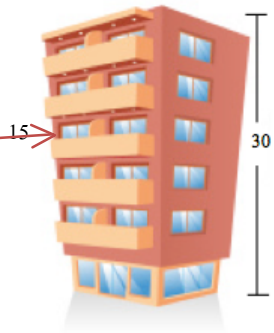
(หน่วย: ครั้ง/วัน/เขต)

5. **ราคา:** อ้างอิงจากราคาขายในปัจจุบันของราคาของคอนโดมิเนียมระดับกลาง มีหน่วยเป็น***ล้านบาทต่อขนาดห้อง 45 ตารางเมตร***

ตัวอย่างของคอนโดมิเนียมระดับกลาง: *ปัจจุบันมีราคาเริ่มต้นตั้งแต่ประมาณ 1.75 ล้านบาท หรือราคาเฉลี่ยประมาณ 70,000 – 160,000 บาทต่อตารางเมตร เช่น The Base, Aspire, Centric, The tree, Life, IDEO, The room, Rhythm, Condolette Light เป็นต้น*

ส่วนที่ 3 แบบสอบถามการทดลองแบบทางเลือก (A)

- สมมติว่าท่านมีความต้องการที่จะซื้อคอนโดมิเนียมระดับกลางในกรุงเทพมหานครเพื่อ***อยู่อาศัย***
- โดยลักษณะของคอนโดมิเนียมที่ท่านเลือก
  - คอนโดมิเนียมใหม่สูง 30 ชั้น
  - ห้องที่ท่านเลือกตั้งอยู่ชั้น 15
  - ***ขนาดห้อง 45 ตารางเมตร***
  - ***1 ห้องนอน 1 ห้องน้ำ 1 ห้องครัว***
  - ***ไม่มีเฟอร์นิเจอร์***
  - มีที่จอดรถ 45% ของจำนวนห้องทั้งหมด
  - สระว่ายน้ำ, ฟิตเนส, ประตู Key card, ลิฟต์, กล้องวงจรปิดในอาคาร, ห้องรับรอง, สวนหย่อม, รปภ, แม่บ้าน



- ราคาที่ระบุในแต่ละชุดทางเลือกเป็นราคาของคอนโดมิเนียมที่มีลักษณะที่กล่าวไว้ข้างต้น ซึ่งราคาจะเปลี่ยนแปลงขึ้นอยู่กับ 4 ปัจจัยในการ***เลือกทำเล***ของคอนโดมิเนียมระดับกลางตามที่อธิบายไว้ในส่วนที่ 2 ของแบบสอบถาม
- สมมติให้ท่านตัดสินใจเลือกซื้อคอนโดมิเนียมจากทำเลของคอนโดมิเนียม A หรือ คอนโดมิเนียม B โดยพิจารณาจากข้อมูลที่ ระบุในแต่ละชุดทางเลือก จากนั้นทำเครื่องหมาย ✓ ลงในช่องสี่เหลี่ยมใต้คอนโดมิเนียมที่ท่านเลือกเพียง 1 ช่องเท่านั้น

ชุดทางเลือกที่ 1

	คอนโดมิเนียม A	คอนโดมิเนียม B
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)
เขต	ชั้นใน	ชั้นกลาง
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 2

	คอนโดมิเนียม A	คอนโดมิเนียม B
เขต	ชั้นนอก	ชั้นใน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)
ทัศนียภาพ	วิวโล่ง/ ไม่มีสิ่งกีดขวาง	วิวตึกสูง
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 3

	คอนโดมิเนียม A	คอนโดมิเนียม B
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ ไม่สิ่งกีดขวาง
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
เขต	ชั้นนอก	ชั้นใน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)

ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 4

	คอนโดมิเนียม A	คอนโดมิเนียม B
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) แย่ (8) ***ปานกลาง (6)*** ดี (4) ดีมาก (1)	แย่มาก (11) ***แย่ (8)*** ปานกลาง (6) ดี (4) ดีมาก (1)
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
ทัศนียภาพ	วิวโล่ง/ไม่มีสิ่งกีดขวาง	วิวตึกสูง
เขต	ชั้นกลาง	ชั้นนอก
ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 5

	คอนโดมิเนียม A	คอนโดมิเนียม B
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
เขต	ชั้นกลาง	ชั้นนอก
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) ***แย่ (8)*** ปานกลาง (6) ดี (4) ดีมาก (1)	แย่มาก (11) แย่ (8) ปานกลาง (6) ***ดี (4)*** ดีมาก (1)
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 6

	คอนโดมิเนียม A	คอนโดมิเนียม B
เขต	ชั้นนอก	ชั้นใน
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) แย่ (8) ***ปานกลาง (6)*** ดี (4) ดีมาก (1)	แย่มาก (11) ***แย่ (8)*** ปานกลาง (6) ดี (4) ดีมาก (1)
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86

ท่านชอบคอนโดมิเนียมแบบใด? ☐ ☐ ☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 7

	คอนโดมิเนียม A	คอนโดมิเนียม B
เขต	ชั้นใน	ชั้นกลาง
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) แย่ (8) ปานกลาง (6) ***ดี (4)*** ดีมาก (1)	แย่มาก (11) แย่ (8) ***ปานกลาง (6)*** ดี (4) ดีมาก (1)
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	3.33

ท่านชอบคอนโดมิเนียมแบบใด? ☐ ☐ ☐

ไม่เลือกทั้ง2

จำนวนเงินสูงสุดที่ท่านจะเต็มใจจ่ายเพื่อซื้อคอนโดมิเนียมระดับกลาง

☐ น้อยกว่า 70,000 บาท/ตารางเมตร

☐ 70,000 – 90,000 บาท/ตารางเมตร

☐ 90,001 – 120,000 บาท/ตารางเมตร

☐ 120,001 – 160,000 บาท/ตารางเมตร

☐ มากกว่า 160,000 บาท/ตารางเมตร

ส่วนที่ 3 แบบสอบถามการทดลองแบบทางเลือก (B)

ชุดทางเลือกที่ 1

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
เขต	ชั้นใน	ชั้นกลาง
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 2

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
เขต	ชั้นใน	ชั้นกลาง
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
ทัศนียภาพ	วิวโล่ง/ไม่มีสิ่งกีดขวาง	วิวตึกสูง
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 3

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
เขต	ชั้นนอก	ชั้นใน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)

ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 4

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
ทัศนียภาพ	วิวโล่ง/ไม่มีสิ่งกีดขวาง	วิวตึกสูง
เขต	ชั้นนอก	ชั้นใน
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 5

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
เขต	ชั้นนอก	ชั้นใน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2

ชุดทางเลือกที่ 6

	คอนโดมิเนียม A	คอนโดมิเนียม B
เขต	ชั้นกลาง	ชั้นนอก
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
ทัศนียภาพ	วิวโล่ง/ไม่มีสิ่งกีดขวาง	วิวตึกสูง
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐
		ไม่เลือกทั้ง2

ชุดทางเลือกที่ 7

	คอนโดมิเนียม A	คอนโดมิเนียม B
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
เขต	ชั้นใน	ชั้นกลาง
ราคา (ล้านบาท/45 ตารางเมตร)	6.75	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐
		ไม่เลือกทั้ง2

จำนวนเงินสูงสุดที่ท่านจะเต็มใจจ่ายเพื่อซื้อคอนโดมิเนียมระดับกลาง

☐ น้อยกว่า 70,000 บาท/ตารางเมตร

☐ 70,000 – 90,000 บาท/ตารางเมตร

☐ 90,001 – 120,000 บาท/ตารางเมตร

☐ 120,001 – 160,000 บาท/ตารางเมตร

☐ มากกว่า 160,000 บาท/ตารางเมตร

ส่วนที่ 3 แบบสอบถามการทดลองแบบทางเลือก (C)

ชุดทางเลือกที่ 1

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)
เขต	ชั้นใน	ชั้นกลาง
ทัศนียภาพ	วิวโล่ง/ไม่มีสิ่งกีดขวาง	วิวตึกสูง
ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 2

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
เขต	ชั้นกลาง	ชั้นนอก
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ ไม่มีสิ่งกีดขวาง
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

ไม่เลือกทั้ง2 ☐

ชุดทางเลือกที่ 3

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
เขต	ชั้นกลาง	ชั้นนอก

อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) แย่ (8) ปานกลาง (6) ***ดี (4)*** ดีมาก (1)	แย่มาก (11) แย่ (8) ***ปานกลาง (6)*** ดี (4) ดีมาก (1)
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

☐ ไม่เลือกทั้ง2

ชุดทางเลือกที่ 4

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) ***แย่ (8)*** ปานกลาง (6) ดี (4) ดีมาก (1)	แย่มาก (11) แย่ (8) ปานกลาง (6) ***ดี (4)*** ดีมาก (1)
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
เขต	ชั้นใน	ชั้นกลาง
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	6.75
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

☐ ไม่เลือกทั้ง2

ชุดทางเลือกที่ 5

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
ทัศนียภาพ	วิวตึกสูง	วิวแม่น้ำ
เขต	ชั้นใน	ชั้นกลาง
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) แย่ (8) ปานกลาง (6) ***ดี (4)*** ดีมาก (1)	แย่มาก (11) แย่ (8) ***ปานกลาง (6)*** ดี (4) ดีมาก (1)
การเข้าถึง	สถานที่ทำงาน	ห้างสรรพสินค้า/ร้านสะดวกซื้อ
ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐

☐ ไม่เลือกทั้ง2

ชุดทางเลือกที่ 6

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
เขต	ชั้นกลาง	ชั้นนอก
การเข้าถึง	รถไฟฟ้า	สถานที่ทำงาน
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)	แย่มาก (11) / แย่ (8) / ปานกลาง (6) / ***ดี (4)*** / ดีมาก (1)
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
ราคา (ล้านบาท/45 ตารางเมตร)	4.86	3.33
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐
		ไม่เลือกทั้ง2

ชุดทางเลือกที่ 7

	คอนโดมิเนียม A	**คอนโดมิเนียม B**
เขต	ชั้นกลาง	ชั้นนอก
อัตราอาชญากรรม (ครั้ง/วัน/เขต)	แย่มาก (11) / แย่ (8) / ***ปานกลาง (6)*** / ดี (4) / ดีมาก (1)	แย่มาก (11) / ***แย่ (8)*** / ปานกลาง (6) / ดี (4) / ดีมาก (1)
การเข้าถึง	ห้างสรรพสินค้า/ร้านสะดวกซื้อ	รถไฟฟ้า
ทัศนียภาพ	วิวแม่น้ำ	วิวโล่ง/ไม่มีสิ่งกีดขวาง
ราคา (ล้านบาท/45 ตารางเมตร)	3.33	4.86
ท่านชอบคอนโดมิเนียมแบบใด?	☐	☐ ☐
		ไม่เลือกทั้ง2

จำนวนเงินสูงสุดที่ท่านจะเต็มใจจ่ายเพื่อซื้อคอนโดมิเนียมระดับกลาง

☐ น้อยกว่า 70,000 บาท/ตารางเมตร

☐ 70,000 – 90,000 บาท/ตารางเมตร

☐ 90,001 – 120,000 บาท/ตารางเมตร

☐ 120,001 – 160,000 บาท/ตารางเมตร

☐ มากกว่า 160,000 บาท/ตารางเมตร

Appendix B – Regression results by segmentation

Model 1: regression outcome of female

```
              coef exp(coef) se(coef)       z       p
ASC        2.83256    16.989  0.22079  12.829 0.0e+00
Middle    -0.37441     0.688  0.10695  -3.501 4.6e-04
Outer     -0.94062     0.390  0.11561  -8.136 4.4e-16
Workplace -0.17917     0.836  0.11183  -1.602 1.1e-01
Shopping  -0.55259     0.575  0.11445  -4.828 1.4e-06
Open       0.06132     1.063  0.10798   0.568 5.7e-01
Building  -0.12800     0.880  0.11264  -1.136 2.6e-01
Avg       -0.45175     0.637  0.10108  -4.469 7.9e-06
Bad       -1.51574     0.220  0.12126 -12.500 0.0e+00
Price     -0.00991     0.990  0.00152  -6.525 6.8e-11

Likelihood ratio test=401  on 10 df, p=0  n= 3222, number of
events= 1074

Rho-squared = 0.1699519
Adjusted rho-squared = 0.1614767
Number of coefficients = 10
Log likelihood at start = -1179.91
Log likelihood at convergence = -979.3817
```

Table 1: MWTP of female

```
               MWTP        5%       95%
Middle     -37.7685  -59.7337  -20.1116
Outer      -94.8853 -131.9536  -69.5389
Workplace  -18.0741  -38.8378    0.4159
Shopping   -55.7423  -87.1869  -33.6209
Open         6.1854  -11.9214   25.6622
Building   -12.9119  -33.9567    5.6529
Avg        -45.5701  -69.3512  -27.9320
Bad       -152.9011 -205.4079 -118.7647
```

Model 2: regression outcome of male

```
              coef exp(coef) se(coef)      z       p
ASC        2.66344    14.346  0.26754  9.955 0.0e+00
Middle    -0.02760     0.973  0.13016 -0.212 8.3e-01
Outer     -0.59818     0.550  0.13250 -4.514 6.3e-06
Workplace -0.47270     0.623  0.12986 -3.640 2.7e-04
Shopping  -0.75004     0.472  0.13530 -5.544 3.0e-08
Open      -0.09033     0.914  0.12735 -0.709 4.8e-01
Building  -0.34056     0.711  0.13408 -2.540 1.1e-02
Avg       -0.13987     0.869  0.12233 -1.143 2.5e-01
Bad       -1.06869     0.343  0.14028 -7.619 2.6e-14
Price     -0.00784     0.992  0.00181 -4.320 1.6e-05

Likelihood ratio test=223  on 10 df, p=0  n= 2034, number of
events= 678

Rho-squared = 0.1497791
Adjusted rho-squared = 0.1363538
Number of coefficients = 10
Log likelihood at start = -744.8591
Log likelihood at convergence = -633.2948
```

Table 2: MWTP of male

	MWTP	5%	95%
Middle	-3.520	-33.304	25.483
Outer	-76.311	-134.760	-44.075
Workplace	-60.303	-107.569	-31.413
Shopping	-95.683	-167.370	-58.088
Open	-11.523	-41.788	15.938
Building	-43.446	-88.909	-14.975
Avg	-17.843	-49.487	7.505
Bad	-136.335	-223.393	-91.353

Model 3: regression outcome of low-income

	coef	exp(coef)	se(coef)	z	p
ASC	3.1218	22.688	0.2346	13.309	0.0e+00
Middle	-0.2550	0.775	0.1133	-2.250	2.4e-02
Outer	-0.7829	0.457	0.1198	-6.536	6.3e-11
Workplace	-0.3809	0.683	0.1161	-3.282	1.0e-03
Shopping	-0.6754	0.509	0.1189	-5.681	1.3e-08
Open	-0.0709	0.932	0.1114	-0.637	5.2e-01
Building	-0.3690	0.691	0.1184	-3.117	1.8e-03
Avg	-0.4274	0.652	0.1044	-4.095	4.2e-05
Bad	-1.5583	0.210	0.1275	-12.226	0.0e+00
Price	-0.0121	0.988	0.0016	-7.557	4.1e-14

Likelihood ratio test=383 on 10 df, p=0 n= 3078, number of events= 1026

Rho-squared = 0.1698236
Adjusted rho-squared = 0.1609519
Number of coefficients = 10
Log likelihood at start = -1127.176
Log likelihood at convergence = -935.7551

Table 3: MWTP of low-income

	MWTP	5%	95%
Middle	-21.141	-38.050	-5.735
Outer	-64.904	-89.634	-46.236
Workplace	-31.576	-49.598	-15.567
Shopping	-55.996	-81.913	-37.081
Open	-5.878	-21.513	9.289
Building	-30.588	-50.019	-14.186
Avg	-35.431	-52.522	-20.568
Bad	-129.191	-166.983	-102.558

Model 4: regression outcome of high-income

	coef	exp(coef)	se(coef)	z	p
ASC	2.39490	10.967	0.25343	9.450	0.0e+00
Middle	-0.25744	0.773	0.12276	-2.097	3.6e-02
Outer	-0.81543	0.442	0.12721	-6.410	1.5e-10
Workplace	-0.20930	0.811	0.12477	-1.677	9.3e-02
Shopping	-0.61184	0.542	0.12925	-4.734	2.2e-06
Open	0.10612	1.112	0.12298	0.863	3.9e-01
Building	-0.04804	0.953	0.12757	-0.377	7.1e-01
Avg	-0.24236	0.785	0.11777	-2.058	4.0e-02
Bad	-1.09919	0.333	0.13354	-8.231	2.2e-16
Price	-0.00534	0.995	0.00172	-3.107	1.9e-03

Likelihood ratio test=248 on 10 df, p=0 n= 2178, number of events= 726

Rho-squared = 0.1554571
Adjusted rho-squared = 0.1429193
Number of coefficients = 10
Log likelihood at start = -797.5925
Log likelihood at convergence = -673.6011

Table 4: MWTP of high-income

	MWTP	5%	95%
Middle	-48.208	-126.877	-10.452
Outer	-152.700	-334.676	-90.844
Workplace	-39.193	-106.971	-0.618
Shopping	-114.576	-270.121	-60.340
Open	19.873	-18.621	77.314
Building	-8.996	-61.438	34.674
Avg	-45.385	-116.742	-9.401
Bad	-205.838	-449.595	-127.868

Model 5: regression outcome of small household size

	coef	exp(coef)	se(coef)	z	p
ASC	2.83641	17.054	0.21145	13.414	0.0e+00
Middle	-0.23975	0.787	0.10213	-2.347	1.9e-02
Outer	-0.86900	0.419	0.10993	-7.905	2.7e-15
Workplace	-0.31225	0.732	0.10602	-2.945	3.2e-03
Shopping	-0.65057	0.522	0.10921	-5.957	2.6e-09
Open	-0.06053	0.941	0.10222	-0.592	5.5e-01
Building	-0.23340	0.792	0.10789	-2.163	3.1e-02
Avg	-0.36477	0.694	0.09796	-3.724	2.0e-04
Bad	-1.24245	0.289	0.11310	-10.985	0.0e+00
Price	-0.00948	0.991	0.00145	-6.520	7.0e-11

Likelihood ratio test=371 on 10 df, p=0 n= 3330, number of events= 1110

Rho-squared = 0.152265
Adjusted rho-squared = 0.1440647
Number of coefficients = 10
Log likelihood at start = -1219.46
Log likelihood at convergence = -1033.779

Table 5: MWTP of small household size

	MWTP	5%	95%
Middle	-25.303	-45.755	-7.799
Outer	-91.713	-128.896	-66.765
Workplace	-32.954	-55.843	-14.351
Shopping	-68.660	-102.890	-45.483
Open	-6.388	-24.764	11.317
Building	-24.633	-47.833	-6.255
Avg	-38.497	-60.584	-20.699
Bad	-131.126	-178.752	-100.499

Model 6: regression outcome of large household size

	coef	exp(coef)	se(coef)	z	p
ASC	2.58368	13.246	0.28373	9.106	0.0e+00
Middle	-0.23003	0.795	0.13834	-1.663	9.6e-02
Outer	-0.67148	0.511	0.14259	-4.709	2.5e-06
Workplace	-0.24655	0.781	0.13930	-1.770	7.7e-02
Shopping	-0.61451	0.541	0.14418	-4.262	2.0e-05
Open	0.13422	1.144	0.13777	0.974	3.3e-01
Building	-0.16437	0.848	0.14196	-1.158	2.5e-01
Avg	-0.28383	0.753	0.12735	-2.229	2.6e-02
Bad	-1.50565	0.222	0.15452	-9.744	0.0e+00
Price	-0.00805	0.992	0.00193	-4.172	3.0e-05

Likelihood ratio test=240 on 10 df, p=0 n= 1926, number of events= 642

Rho-squared = 0.1703296
Adjusted rho-squared = 0.1561514
Number of coefficients = 10
Log likelihood at start = -705.3091
Log likelihood at convergence = -585.1741

Table 6: MWTP of large household size

	MWTP	5%	95%
Middle	-28.5855	-65.9133	-0.3545
Outer	-83.4430	-147.7239	-49.2030
Workplace	-30.6380	-67.7982	-2.1633
Shopping	-76.3635	-141.1118	-40.6794
Open	16.6790	-12.1013	51.3945
Building	-20.4257	-56.8348	8.8605
Avg	-35.2713	-72.2893	-8.5885
Bad	-187.1037	-307.9572	-129.4225

Model 7: regression outcome of respondents living in inner city

	coef	exp(coef)	se(coef)	z	p
ASC	2.86251	17.505	0.24532	11.67	0.0e+00
Middle	-0.43640	0.646	0.11966	-3.65	2.7e-04
Outer	-0.90925	0.403	0.12583	-7.23	5.0e-13
Workplace	-0.50139	0.606	0.12325	-4.07	4.7e-05
Shopping	-0.70121	0.496	0.12527	-5.60	2.2e-08
Open	-0.15697	0.855	0.11743	-1.34	1.8e-01
Building	-0.23700	0.789	0.12536	-1.89	5.9e-02
Avg	-0.41136	0.663	0.11052	-3.72	2.0e-04
Bad	-1.52332	0.218	0.13358	-11.40	0.0e+00
Price	-0.00651	0.994	0.00165	-3.94	8.3e-05

Likelihood ratio test=339 on 10 df, p=0 n= 2628, number of events= 876

Rho-squared = 0.1762162
Adjusted rho-squared = 0.1658253
Number of coefficients = 10
Log likelihood at start = -962.3844
Log likelihood at convergence = -792.7966

Table 7: MWTP of respondents living in inner city

	MWTP	5%	95%
Middle	-67.078	-124.893	-34.801
Outer	-139.759	-245.280	-91.246
Workplace	-77.067	-142.356	-41.323
Shopping	-107.782	-201.654	-63.563
Open	-24.128	-63.748	5.217
Building	-36.428	-85.393	-4.448
Avg	-63.229	-121.062	-32.257
Bad	-234.146	-403.472	-160.003

Model 8: regression outcome of respondents living in middle city

	coef	exp(coef)	se(coef)	z	p
ASC	2.7650	15.879	0.32426	8.527	0.0e+00
Middle	-0.0270	0.973	0.15667	-0.172	8.6e-01
Outer	-0.8931	0.409	0.17586	-5.079	3.8e-07
Workplace	-0.1917	0.826	0.16076	-1.193	2.3e-01
Shopping	-0.8526	0.426	0.17436	-4.890	1.0e-06
Open	0.4383	1.550	0.15966	2.745	6.1e-03
Building	-0.1886	0.828	0.16598	-1.136	2.6e-01
Avg	-0.1506	0.860	0.15433	-0.976	3.3e-01
Bad	-1.2400	0.289	0.17088	-7.256	4.0e-13
Price	-0.0111	0.989	0.00222	-4.997	5.8e-07

Likelihood ratio test=217 on 10 df, p=0 n= 1512, number of events= 504

Rho-squared = 0.1956133
Adjusted rho-squared = 0.177553
Number of coefficients = 10
Log likelihood at start = -553.7006
Log likelihood at convergence = -445.3894

Table 8: MWTP of respondents living in middle city

	MWTP	5%	95%
Middle	-2.434	-26.352	22.194
Outer	-80.601	-130.407	-49.373
Workplace	-17.301	-42.828	6.629
Shopping	-76.946	-127.333	-45.714
Open	39.552	15.622	71.648
Building	-17.021	-47.097	7.509
Avg	-13.594	-38.731	9.650
Bad	-111.904	-173.976	-76.314

Model 9: regression outcome of respondents living in outer city

	coef	exp(coef)	se(coef)	z	p
ASC	2.64610	14.099	0.37182	7.1165	1.1e-12
Middle	-0.18046	0.835	0.18014	-1.0018	3.2e-01
Outer	-0.58815	0.555	0.17866	-3.2921	9.9e-04
Workplace	-0.00883	0.991	0.18079	-0.0488	9.6e-01
Shopping	-0.38003	0.684	0.18454	-2.0594	3.9e-02
Open	-0.17462	0.840	0.18170	-0.9611	3.4e-01
Building	-0.29901	0.742	0.18239	-1.6394	1.0e-01
Avg	-0.30365	0.738	0.16853	-1.8018	7.2e-02
Bad	-1.08870	0.337	0.19717	-5.5216	3.4e-08
Price	-0.01174	0.988	0.00258	-4.5561	5.2e-06

Likelihood ratio test=91.2 on 10 df, p=3.11e-15 n= 1116, number of events= 372

Rho-squared = 0.1115726
Adjusted rho-squared = 0.08710376
Number of coefficients = 10
Log likelihood at start = -408.6838
Log likelihood at convergence = -363.0859

Table 9: MWTP of respondents living in outer city

	MWTP	5%	95%
Middle	-15.37124	-45.50831	10.03361
Outer	-50.09742	-89.37750	-24.06973
Workplace	-0.75192	-27.97233	25.88203
Shopping	-32.37033	-69.54964	-6.25012
Open	-14.87383	-42.32744	11.70085
Building	-25.46928	-58.26746	0.08698
Avg	-25.86390	-55.53308	-2.48155
Bad	-92.73327	-148.06639	-60.73896

Model 10: regression outcome of respondents working in inner city

	coef	exp(coef)	se(coef)	z	p
ASC	2.79755	16.404	0.19676	14.21795	0.0e+00
Middle	-0.29635	0.744	0.09547	-3.10414	1.9e-03
Outer	-0.90407	0.405	0.10250	-8.82032	0.0e+00
Workplace	-0.37424	0.688	0.09826	-3.80875	1.4e-04
Shopping	-0.72942	0.482	0.10214	-7.14146	9.2e-13
Open	-0.00053	0.999	0.09590	-0.00553	1.0e+00
Building	-0.16730	0.846	0.10036	-1.66708	9.5e-02
Avg	-0.35034	0.704	0.08974	-3.90399	9.5e-05
Bad	-1.47440	0.229	0.10756	-13.70735	0.0e+00
Price	-0.00841	0.992	0.00135	-6.24659	4.2e-10

Likelihood ratio test=511 on 10 df, p=0 n= 4050, number of events= 1350

Rho-squared = 0.172147
Adjusted rho-squared = 0.1654045
Number of coefficients = 10
Log likelihood at start = -1483.127
Log likelihood at convergence = -1227.811

Table 10: MWTP of respondents working in inner city

	MWTP	5%	95%
Middle	-35.23560	-58.53739	-16.57162
Outer	-107.49368	-150.85808	-78.92605
Workplace	-44.49707	-70.26834	-24.76914
Shopping	-86.72812	-127.52855	-59.45810
Open	-0.06302	-19.34790	19.13238
Building	-19.89232	-43.12660	-0.15541
Avg	-41.65520	-65.81739	-23.33552
Bad	-175.30622	-240.92292	-135.25200

Model 11: regression outcome of respondents working in middle city

	coef	exp(coef)	se(coef)	z	p
ASC	1.9862	7.288	0.54950	3.615	0.00030
Middle	0.0541	1.056	0.26979	0.201	0.84000
Outer	-0.7779	0.459	0.29401	-2.646	0.00820
Workplace	0.0526	1.054	0.27637	0.190	0.85000
Shopping	-0.5680	0.567	0.29260	-1.941	0.05200
Open	0.4820	1.619	0.28588	1.686	0.09200
Building	-0.0705	0.932	0.28576	-0.247	0.81000
Avg	0.1873	1.206	0.27876	0.672	0.50000
Bad	-0.4394	0.644	0.28605	-1.536	0.12000
Price	-0.0137	0.986	0.00384	-3.561	0.00037

Likelihood ratio test=44.4 on 10 df, p=2.76e-06 n= 486, number of events= 162

Rho-squared = 0.1248201
Adjusted rho-squared = 0.06863245
Number of coefficients = 10
Log likelihood at start = -177.9752
Log likelihood at convergence = -155.7603

Table 11: MWTP of respondents working in middle city

	MWTP	5%	95%
Middle	3.957	-32.352	41.636
Outer	-56.876	-122.952	-20.852
Workplace	3.846	-30.923	44.327
Shopping	-41.528	-102.595	-6.366
Open	35.243	1.115	87.482
Building	-5.154	-46.484	31.142
Avg	13.696	-20.217	58.407
Bad	-32.127	-81.550	1.901

Model 12: regression outcome of respondents working in outer city

	coef	exp(coef)	se(coef)	z	p
ASC	3.03529	20.807	0.46603	6.513	7.4e-11
Middle	-0.08788	0.916	0.22343	-0.393	6.9e-01
Outer	-0.44225	0.643	0.22029	-2.008	4.5e-02
Workplace	-0.08429	0.919	0.22391	-0.376	7.1e-01
Shopping	-0.41654	0.659	0.22709	-1.834	6.7e-02
Open	-0.19329	0.824	0.21415	-0.903	3.7e-01
Building	-0.59880	0.549	0.23140	-2.588	9.7e-03
Avg	-0.43118	0.650	0.20681	-2.085	3.7e-02
Bad	-1.17317	0.309	0.24076	-4.873	1.1e-06
Price	-0.00861	0.991	0.00313	-2.750	6.0e-03

Likelihood ratio test=93.3 on 10 df, p=1.22e-15 n= 702, number of events= 234

Rho-squared = 0.1814256
Adjusted rho-squared = 0.1425265
Number of coefficients = 10
Log likelihood at start = -257.0753
Log likelihood at convergence = -210.4352

Table 12: MWTP of respondents working in outer city

	MWTP	5%	95%
Middle	-10.209	-67.600	37.226
Outer	-51.377	-139.519	-8.279
Workplace	-9.792	-70.606	37.971
Shopping	-48.391	-150.067	-3.449
Open	-22.455	-76.697	21.431
Building	-69.564	-187.343	-22.243
Avg	-50.092	-137.893	-9.033
Bad	-136.290	-321.660	-74.596

Model 13: regression outcome of respondents with short travel time

	coef	exp(coef)	se(coef)	z	p
ASC	2.55726	12.900	0.21464	11.914	0.0e+00
Middle	-0.26528	0.767	0.10438	-2.542	1.1e-02
Outer	-0.78287	0.457	0.11201	-6.989	2.8e-12
Workplace	-0.22847	0.796	0.10825	-2.110	3.5e-02
Shopping	-0.51136	0.600	0.11087	-4.612	4.0e-06
Open	0.05526	1.057	0.10436	0.529	6.0e-01
Building	-0.14029	0.869	0.10970	-1.279	2.0e-01
Avg	-0.37687	0.686	0.09954	-3.786	1.5e-04
Bad	-1.33225	0.264	0.11514	-11.570	0.0e+00
Price	-0.00699	0.993	0.00146	-4.805	1.5e-06

Likelihood ratio test=357 on 10 df, p=0 n= 3114, number of events= 1038

Rho-squared = 0.1567437
Adjusted rho-squared = 0.1479746
Number of coefficients = 10
Log likelihood at start = -1140.36
Log likelihood at convergence = -961.6153

Table 13: MWTP of respondents with short travel time

	MWTP	5%	95%
Middle	-37.925	-71.655	-13.067
Outer	-111.922	-179.429	-75.427
Workplace	-32.662	-65.596	-6.938
Shopping	-73.106	-127.262	-42.259
Open	7.900	-17.504	34.609
Building	-20.056	-52.485	5.283
Avg	-53.879	-93.087	-28.262
Bad	-190.462	-293.539	-137.212

Model 14: regression outcome of respondents with long travel time

	coef	exp(coef)	se(coef)	z	p
ASC	3.0908	21.994	0.27885	11.084	0.0e+00
Middle	-0.1911	0.826	0.13394	-1.427	1.5e-01
Outer	-0.8241	0.439	0.13827	-5.960	2.5e-09
Workplace	-0.3888	0.678	0.13442	-2.893	3.8e-03
Shopping	-0.8282	0.437	0.14088	-5.879	4.1e-09
Open	-0.0984	0.906	0.13400	-0.734	4.6e-01
Building	-0.3088	0.734	0.13835	-2.232	2.6e-02
Avg	-0.2580	0.773	0.12503	-2.063	3.9e-02
Bad	-1.3400	0.262	0.14999	-8.934	0.0e+00
Price	-0.0122	0.988	0.00193	-6.331	2.4e-10

Likelihood ratio test=260 on 10 df, p=0 n= 2142, number of events= 714

Rho-squared = 0.1658731
Adjusted rho-squared = 0.1531247
Number of coefficients = 10
Log likelihood at start = -784.4092
Log likelihood at convergence = -654.2968

Table 14: MWTP of respondents with long travel time

	MWTP	5%	95%
Middle	-15.646	-35.147	2.089
Outer	-67.483	-97.560	-46.333
Workplace	-31.839	-54.967	-13.689
Shopping	-67.817	-103.250	-45.053
Open	-8.056	-26.656	9.600
Building	-25.283	-48.036	-6.387
Avg	-21.124	-40.675	-4.324
Bad	-109.726	-151.745	-81.978

Model 15: regression outcome of respondents using of private vehicle

	coef	exp(coef)	se(coef)	z	p
ASC	2.46407	11.753	0.24073	10.24	0.0e+00
Middle	-0.15110	0.860	0.11710	-1.29	2.0e-01
Outer	-0.66496	0.514	0.12092	-5.50	3.8e-08
Workplace	-0.18183	0.834	0.11941	-1.52	1.3e-01
Shopping	-0.53415	0.586	0.12275	-4.35	1.4e-05
Open	0.04187	1.043	0.11619	0.36	7.2e-01
Building	-0.17159	0.842	0.12131	-1.41	1.6e-01
Avg	-0.25616	0.774	0.10881	-2.35	1.9e-02
Bad	-1.28802	0.276	0.13002	-9.91	0.0e+00
Price	-0.00789	0.992	0.00165	-4.79	1.6e-06

Likelihood ratio test=268 on 10 df, p=0 n= 2538, number of events= 846

Rho-squared = 0.1439546
Adjusted rho-squared = 0.1331952
Number of coefficients = 10
Log likelihood at start = -929.426
Log likelihood at convergence = -795.6309

Table 15: MWTP of respondents using private vehicle

	MWTP	5%	95%
Middle	-19.162	-48.119	4.722
Outer	-84.330	-137.137	-53.728
Workplace	-23.060	-55.349	1.693
Shopping	-67.741	-119.270	-37.814
Open	5.310	-18.570	33.572
Building	-21.761	-52.412	3.408
Avg	-32.487	-63.900	-9.384
Bad	-163.347	-253.261	-117.013

Model 16: regression outcome of respondents not using of private vehicle

	coef	exp(coef)	se(coef)	z	p
ASC	3.0435	20.978	0.24373	12.487	0.0e+00
Middle	-0.3478	0.706	0.11734	-2.964	3.0e-03
Outer	-0.9398	0.391	0.12628	-7.442	9.9e-14
Workplace	-0.4316	0.649	0.12133	-3.557	3.7e-04
Shopping	-0.7415	0.476	0.12422	-5.969	2.4e-09
Open	-0.0139	0.986	0.11799	-0.118	9.1e-01
Building	-0.2465	0.782	0.12354	-1.996	4.6e-02
Avg	-0.4115	0.663	0.11210	-3.671	2.4e-04
Bad	-1.3883	0.249	0.12935	-10.733	0.0e+00
Price	-0.0100	0.990	0.00166	-6.037	1.6e-09

Likelihood ratio test=343 on 10 df, p=0 n= 2718, number of events= 906

Rho-squared = 0.1723435
Adjusted rho-squared = 0.1622967
Number of coefficients = 10
Log likelihood at start = -995.3427
Log likelihood at convergence = -823.8019

Table 16: MWTP of respondents not using private vehicle

	MWTP	5%	95%
Middle	-34.725	-58.660	-15.098
Outer	-93.824	-135.424	-66.537
Workplace	-43.087	-68.770	-22.806
Shopping	-74.033	-112.359	-48.898
Open	-1.386	-22.271	18.434
Building	-24.613	-49.243	-4.081
Avg	-41.083	-65.537	-22.152
Bad	-138.607	-193.977	-104.615

Model 17: regression outcome of already consumers

	coef	exp(coef)	se(coef)	z	p
ASC	2.40268	11.053	0.37191	6.460	1.0e-10
Middle	-0.18923	0.828	0.18219	-1.039	3.0e-01
Outer	-0.68267	0.505	0.19710	-3.464	5.3e-04
Workplace	-0.31361	0.731	0.18147	-1.728	8.4e-02
Shopping	-0.86923	0.419	0.19501	-4.457	8.3e-06
Open	0.28970	1.336	0.18706	1.549	1.2e-01
Building	-0.11153	0.894	0.18506	-0.603	5.5e-01
Avg	0.07003	1.073	0.17880	0.392	7.0e-01
Bad	-1.01006	0.364	0.19288	-5.237	1.6e-07
Price	-0.00783	0.992	0.00248	-3.149	1.6e-03

Likelihood ratio test=122 on 10 df, p=0 n= 1062, number of events= 354

Rho-squared = 0.1572094
Adjusted rho-squared = 0.1314964
Number of coefficients = 10
Log likelihood at start = -388.9088
Log likelihood at convergence = -327.7686

Table 17: MWTP of already consumers

	MWTP	5%	95%
Middle	-24.183	-76.588	16.213
Outer	-87.241	-203.415	-40.395
Workplace	-40.077	-101.498	-1.440
Shopping	-111.082	-250.700	-57.886
Open	37.022	-2.333	100.365
Building	-14.253	-66.730	25.537
Avg	8.950	-31.828	56.943
Bad	-129.080	-278.337	-73.271

Model 18: regression outcome of potential consumers

	coef	exp(coef)	se(coef)	z	p
ASC	2.76287	15.845	0.24700	11.186	0.0e+00
Middle	-0.29705	0.743	0.12020	-2.471	1.3e-02
Outer	-0.76134	0.467	0.12723	-5.984	2.2e-09
Workplace	-0.34663	0.707	0.12318	-2.814	4.9e-03
Shopping	-0.73023	0.482	0.12637	-5.779	7.5e-09
Open	0.13494	1.144	0.11863	1.138	2.6e-01
Building	-0.12318	0.884	0.12588	-0.978	3.3e-01
Avg	-0.38281	0.682	0.11652	-3.286	1.0e-03
Bad	-1.11823	0.327	0.12780	-8.750	0.0e+00
Price	-0.00905	0.991	0.00168	-5.401	6.6e-08

Likelihood ratio test=260 on 10 df, p=0 n= 2376, number of events= 792

Rho-squared = 0.14967
Adjusted rho-squared = 0.1381771
Number of coefficients = 10
Log likelihood at start = -870.1009
Log likelihood at convergence = -739.8729

Table 18: MWTP of potential consumers

	MWTP	5%	95%
Middle	-32.823	-60.125	-10.867
Outer	-84.123	-128.794	-56.304
Workplace	-38.300	-66.619	-15.745
Shopping	-80.686	-126.602	-52.068
Open	14.910	-6.948	39.397
Building	-13.610	-40.728	9.238
Avg	-42.298	-72.742	-20.345
Bad	-123.558	-183.750	-88.517

Model 19: regression outcome of non-consumers

	coef	exp(coef)	se(coef)	z	p
ASC	2.9892	19.871	0.26966	11.09	0.0e+00
Middle	-0.1872	0.829	0.12768	-1.47	1.4e-01
Outer	-0.9156	0.400	0.13831	-6.62	3.6e-11
Workplace	-0.1842	0.832	0.13461	-1.37	1.7e-01
Shopping	-0.4264	0.653	0.13756	-3.10	1.9e-03
Open	-0.2841	0.753	0.13095	-2.17	3.0e-02
Building	-0.3259	0.722	0.13438	-2.42	1.5e-02
Avg	-0.3937	0.675	0.11751	-3.35	8.1e-04
Bad	-1.6365	0.195	0.15256	-10.73	0.0e+00
Price	-0.0106	0.989	0.00187	-5.65	1.6e-08

Likelihood ratio test=285 on 10 df, p=0 n= 2268, number of events= 756

Rho-squared = 0.1714782
Adjusted rho-squared = 0.159438
Number of coefficients = 10
Log likelihood at start = -830.5509
Log likelihood at convergence = -688.1295

Table 19: MWTP of non-consumers

	MWTP	5%	95%
Middle	-17.724	-39.804	1.993
Outer	-86.703	-126.800	-60.511
Workplace	-17.445	-41.786	3.445
Shopping	-40.376	-74.235	-17.111
Open	-26.905	-50.179	-6.592
Building	-30.858	-57.986	-9.721
Avg	-37.284	-62.288	-18.466
Bad	-154.977	-217.123	-117.004