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## **The determinants of Condominium price in Bangkok.**

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## **The determinants of Condominium price in Bangkok.**

### **Abstract**

The objective of this research paper to study the factors or characteristic pricing that determine the price of a condominium.

This paper applied the Hedonic price theory to find the relationship between characteristics and the change in the price of the condominium by collecting data from [www.thinkofliving.com](http://www.thinkofliving.com). Using 150 observation samples to analyze the relationship and use STATA 15.0 to evaluate data by regression method. The analysis result shows the location attributes are significantly 2 factors, zone of a condominium located (zone) and the distance from condominium to the nearest BTS or MRT (distbm). The structural attributes are significantly 3 factors, the total floor of condominium (floor), the unit room in a condominium (unit) and the percentage of car park available in a condominium (cpark). The neighborhood attributes are not significantly variable. The result in this research paper can refer to people who interested in a condominium in Bangkok area and investor in the property sector. Buyer can use result data to decide the appropriateness of condominium price to get the most benefit and investor can use the result data in this research to make a strategy and planning marketing plan to determine the price of condominium, competitive with the other investor effectively.

## 1. Introduction

Real estate industry is a very important sector of the economic system in Thailand. Because it uses very high investment and affects Thai economy by being a critical driver of economic growth such as working capital, employment and increase in national income so, in 2018, real estate industry product divided 7 percentage of total Thai GDP. (Patchara, 2018)

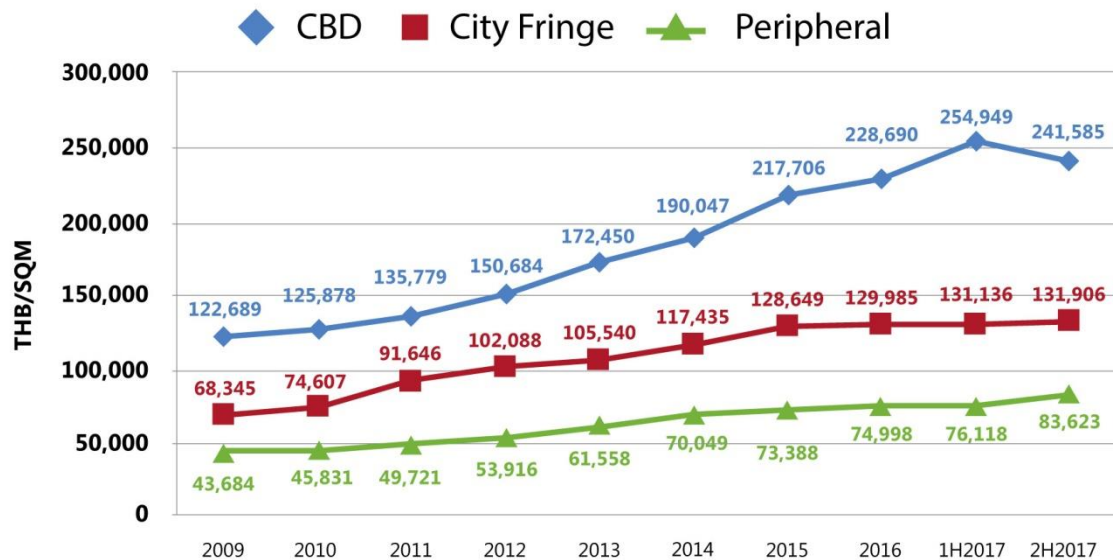
The residential market includes both of self-built housing and housing project disperse in Bangkok and nearby because of the scarcity of land, expansion of BTS/MRT system, the flooding problem etc. All of the factors affect the price of housing and land in Bangkok rise. Nowadays the expansion of transportation system in Bangkok make a competition of condominium market rise, especially along the extension of the electric train green line (Mochit-Khukhot and Bearing-Samrong), the blue line (Taopoon-Hualumphong), the pink line (Kaerai-Minburi), the orange line (Rama9-Ramkumhaeng), and the yellow line (ladpharo-Huamark). Increasing in the price of a condominium in this area are expected and the coming of enormous investment funds that affect the developer to invest condominium project along BTS or MRT zone, to support the increasing demand of condominium.

The condominium market is a good trend at the end of 2017, the new project increase 19 percent per year or 62,751 units, 6,500 units located in Central Business District (CBD) so the percentage of the condominium located in Sukumvit, Chidlom, Rama4 are 51, 22, 12 respectively. (Nightfrank, 2017)

The average price of the condominium is 153,220 baht per square meters, percentage increase 5.9 per year and the end of 2017 average price is 152,371 baht per square meter, percentage increase 16.8 per half year. The average price of condominium in CBD is 241,585 baht per square meter but the average price in the nearby urban area is 131,906 baht per

square meters so the price of condominium continuity rise because of the extension of sky train system, made the price of land increase.

### Bangkok Condominium Average Selling Price, 2012 - 2H 2017



**Figure 1** shows the average selling price of the condominium in Bangkok, NightFrank Thailand, 2017.

Currently most of the project in Bangkok are condominium due to the rising demand of housing in urban area and nearby so that it would be very crucial for investor to understand the relationship between factors and price mechanism of housing market to be able to benefit from this opportunity and the buyer who interested to make a decision to buy a condominium.

## 2. Literature Review

### 2.1 Factors Determining Pricing Strategies.

Theory of pricing indicates that the market price reflects the interaction between two opposing considerations (Avlonitis & Kostis, 2005; Sammut-Bonnici & Channon, 2015). On one end are demand considerations underpinned on marginal utility while on the other side are the supply considerations based on the marginal cost.

Ariyawansa and Udayanthika (2011) posited that there are internal and external influences of pricing strategies. When developing their pricing strategies, businesses need to understand factors which can help them in their pricing decisions. Avlonitis and Kostis (2005) pointed out that while there is the need to take into consideration production costs, a product can still be offered at the low price in order to improve sales.

### 2.2 Condominium Market in Bangkok.

Thailand is one of the fastest growing economies in Asia. In this rapidly growing economy, a market for real estate has also shown a significant growth as evident in the increase in the price levels of real estate assets (Moris, 2017). The condominium market in Bangkok has also witnessed a drastic growth in the past few years with some of the reasons for the demand for condominiums being urbanization and land scarcity. In fact, while comparing to value of real properties, Moris (2017) found that condominiums have high value than other real properties.

### 2.3 Factors Determining Pricing Strategies in Condominium Market.

Shimizu et al. (2010) found that property prices are treated as a bundle of characteristics of various values of that specific property like quality characteristics. According to Shimizu et al. (2010), the two main factors which determined the price of

condominiums are floor space and age of the building. However, other factors like the convenience of public transportation from each housing location which was represented by time travel to the central business district and time to the nearest station. Shimizu et al. (2010) found that other vital factors include the number of units and balcony space. Similar findings were reported by Gordon et al. (2013) when they used hedonic pricing model in analyzing data from condominium sales. The study found that positive externalities associated with corner units and upper-floor has a positive relationship and significant impacts on value. In fact, according to Gordon et al. (2013), corner unit provided even greater positive externalities as sell at premium price particularly because of the panoramic view. Another study conducted in Singapore by Sun et al. (2005) to investigate 15 large residential condominium development from 1988 to 1998 found that the higher the floor unit, the higher the mortgage repayment rates and the higher the sale prices. Another study conducted by Brandt and Maennig (2011) found that buyers preferred houses which are located away from road noise and traffic.

### 3. Methodology

This research paper uses Hedonic Price Model to describes the relation between factors or characteristic of condominium and pricing function such as location, structural and neighborhood attributes. Using the information are collected to analyze and conclude this model.

#### 1. Data Collection

The transacted data of condominium were taken from [www.thinkofliving.com](http://www.thinkofliving.com) that contains overall information about condominium consist of price per square meter, the floor of the condominium, the percentage of car park per room, distant from nearest BTS, MRT or shopping mall, total units of condominium and whether the room is ready to move in or not. The other data were taken from related a website about condominium, journal, research paper and article. The condominium transacted price data were taken at 150 condominium project.

#### 2. Model Specification

The topic is “The determinants of condominium price in Bangkok” to describes the relationship between price and variables. To estimate the hedonic pricing model, the regression analysis is introduced to capture the significant effect of each variable. Precisely, the regression analysis estimates the conditional expectation of the dependent variable given the independent variables are fixed.

Regarding hedonic pricing model, the price of housing can be revealed as:

$$P = f(L, S, N)$$

where  $P$  = price of the condominium

$L$  = location attributes

$S$  = structural attributes

$N$  =neighborhood attributes



In the previous research paper were not appeared the obvious relation between the characteristic and the housing price to form the equation therefore this research. Specify the equation that explain the relation between the price of condominium and the factor that determines the price into 2 model and use the Ordinary Least Mean Square (OLS) estimator is the most suitable method to estimate the hedonic pricing model.

Model I: Linear regression for the price of condominium (price per square meters)

$$\text{equation 1 : } p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + \\ a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + \varepsilon_t$$

$$\text{equation 2 : } p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + \\ a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + a_{10} \text{cpark} + a_{11} \text{unit} + \\ a_{12} \text{land} + a_{13} \text{ready} + a_{14} \text{store} + \varepsilon_t$$

The first model constructs in linear regression form to acknowledge the intrinsic value of how each pricing factor affects the price of the condominium.

Model II: Log-linear regression for the price of condominium (price per square meters)

$$\text{equation 3 : } \ln p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + \\ a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + \varepsilon_t$$

$$\text{equation 4 : } \ln p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + \\ a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + a_{10} \text{cpark} + \\ a_{11} \text{unit} + a_{12} \text{land} + a_{13} \text{ready} + a_{14} \text{store} + \varepsilon_t$$

The second model is in log-linear regression form. This model is introduced to observe the effect of the change in intrinsic value of pricing factor to the change in percentage form the price of the condominium.

Independent variables are the characteristic factors to determine the price of a condominium that can be divided into, 3 groups. Firstly, the location attributes (L) are divided into 2 variables.

1. Location of the condominium (zone) is the variable that indicates the zone that condominium locates. If the condominium locates in an inner area of Bangkok that scarce of land so the price of a condominium is more expensive than the other zone.

The zone is the dummy variable. Classify the location of the condominium in 8 group (zone a- zone h) are used as follows:

zone a = 1 is mean the condominium is located in Silom-Sathorn area, so the other of condominium area set zone = 0.

zone b = 1 is mean the condominium is located in Phayathai-Samyan area, so the other of condominium area set zone = 0.

zone c = 1 is mean the condominium is located in Petchburi-Rama9 area, so the other of condominium area set zone = 0.

zone d = 1 is mean the condominium is located in Chidlom-Rajadamri area, so the other of condominium area set zone = 0.

zone e = 1 is mean the condominium is located in Thonglor-Phrakanong area, so the other of condominium area set zone = 0.

zone  $f = 1$  is mean the condominium is located in Ladpharo area, so the other of condominium area set zone = 0.

zone  $g = 1$  is mean the condominium is located in Onnuch-Punnawithi area, so the other of condominium area set zone = 0.

zone  $h$  is mean the condominium is located in Ratchada-Huykwang area, let zone  $h$  is the benchmark variable.

2. Distance from the transportation system (distbm) is the variable that indicate distance between the condominium and the nearest BTS, MRT or airport link. Unit of distance is meter. Nowadays the higher of the condominium is built near the transportation system. Because of resident who live in condominium can be use the transport train, it saves time and convenience. The relation between price and distance from nearest transportation system are positive relation.

Secondly, the independent variable is structural attributes (S), can be divided into 5 variables.

1. Total floor in the condominium (floor) is the variable that indicate the total floor of condominium. Generally, the high-rise condominium is more expensive than the low rise condominium because of the cost of construction in high-rise condominium is more. However, the low-rise condominium that building have 8 floors, is trendy in Japanese resident who live in Thailand so it makes the price of this condominium is more and more. The relation between the price and total floor of condominium are not clearly.

2. Quantity of room in condominium (unit) is the variable that indicate the total room in condominium. Generally, the big project of condominium is emphasized to be sold for

people who moderately income. The relation between price and unit of condominium are negative relation.

3. Quantity of car park (cpark) is the variable that indicate the total unit in car park that measure in percentage. Generally, the percentage of car park in condominium is not less than 40% of total room in condominium. At this time the higher demand in parking area in condominium that attract the buyer so the relation between the price and percentage of car park in condominium are positive relation.

4. Total area of condominium (land) is the variable that indicate the utility space. Normally, if the condominium more space there will more facilities such as the garden, exercise room etc. So the price of condominium that more land will expensive more the less land.

5. Ready to move in (ready) is the variable that indicate the waiting time of buyer to move in condominium

Thirdly, the independent variable is neighborhood attributes (N) is the environment around the condominium so this research use 1 variable, “store” is the variable that indicate distance between condominium and the nearest department store. Store is the dummy variable that store = 0 when the condominium is far from department store over 2000 meters and store = 1 when the condominium is far from department store within 2000 meters. Nowadays the condominium is located near the trade area to make the resident convenient and attract the buyer who make a decision to buy the condominium. The relation between the price and the distance from department store are positive relation.

### 3. The process

This research collects the data from a website which is the Thai website that review the real estate in Thailand and this is the working process

1. Determine the sample 150 condominium project that locates in Bangkok from Silom–Sathorn, Phayathai-Samyan, Petchburi-Rama9, Chidlom-Rajdamri, Thonglor-Phrakanong, Ladpharo, Onnuch-Punnawithi and Ratchada-Huaykwang area.

2. Define the factor or characteristic of a condominium that affects the price.

3. Specify the model using a regression model to define the relationship

4. Analyze the data using OLS method to test the significance of each variable and show the coefficient of determination that its go the same direction with the assumption or not.

5. Conclusion

## 4. Result

According to descriptive statistics of table 1 and table 2, the average condominium price is 108,240 baht per square meter, in which the lower price is 37,868 and the highest price is 500,000 baht per square meter. Land per square meter ranges from 596 to 38,828 with an average of 4,999.576 square meters. Average of a total unit is 389.9933 unit, in which the lower unit room is 9 units and the highest unit room is 1,992 units. The floor of condominium ranges from 3 to 56 floors with average 19.98 floors. The percentage of car park in condominium ranges from 25 to 300 with average 62.79333 percent.

Data are grouped into 8 sub-area: Silom-Sathon, Phayathai-Samyan, Phetburi-Rama9, Chidlom-Rajadamri, Thonglor-Phrakanong, Ladpharo, Onnuch-Punnawithi and Ratchada-Huaykwang (benchmark variable) with a number of observation 150 sample project.

### 4.1 Summary of descriptive statistics is shown in table 1 and table 2.

Table 1: Description and descriptive statistics of dependent variable.

| Variable | Description of variable                                 | Mean     | Standard Deviation | Min      | Max      |
|----------|---------------------------------------------------------|----------|--------------------|----------|----------|
| p        | Price of condominium<br>(Baht per square meter)         | 108,240  | 59,158.58          | 37,868   | 500,000  |
| lnp      | Price of condominium<br>(Baht per square meter), logged | 11.48925 | 0.433113           | 10.54186 | 13.12236 |

Table 2: Description and descriptive statistics of independent variable.

| Variable | Description of variable                                          | Mean      | Standard<br>Deviation | Min | Max    |
|----------|------------------------------------------------------------------|-----------|-----------------------|-----|--------|
| distbm   | Proximity between condominium and nearest BTS or MRT (meter)     | 1,074.533 | 1,437.331             | 0   | 6,700  |
| floor    | Total floor of condominium                                       | 19.98     | 14.03039              | 3   | 56     |
| cpark    | Percentage car park                                              | 62.79333  | 33.73809              | 25  | 300    |
| unit     | Total unit in condominium (unit)                                 | 389.9933  | 365.5032              | 9   | 1,992  |
| land     | Total area in condominium (square meter)                         | 4,999.576 | 5328.317              | 596 | 38,828 |
| ready    | Ready to move in =1, if not = 0                                  | 0.9666667 | 0.1801069             | 0   | 1      |
| store    | Condominium located near store within 2000 meter = 1, If not = 0 | 0.9       | 0.301005              | 0   | 1      |
| zonea    | Condominium located in Silom-Sathon area = 1, If not = 0         | 0.1133333 | 0.3180618             | 0   | 1      |
| zoneb    | Condominium located in Phayathai-Samyan area = 1, If not = 0     | 0.0733333 | 0.2615562             | 0   | 1      |
| zonec    | Condominium located in Petchburi-Rama9 area = 1, If not = 0      | 0.1266667 | 0.3337134             | 0   | 1      |
| zoned    | Condominium located in Chidlom-Rajadamri area = 1, If not = 0    | 0.0266667 | 0.161647              | 0   | 1      |
| zonee    | Condominium located in Thonglor-Phrakanong area = 1, If not = 0  | 0.24      | 0.4285139             | 0   | 1      |
| zonef    | Condominium located in Ladpharo                                  | 0.1533333 | 0.3615156             | 0   | 1      |

|       |                                                               |           |           |   |   |
|-------|---------------------------------------------------------------|-----------|-----------|---|---|
|       | area = 1, If not = 0                                          |           |           |   |   |
| zoneg | Condominium located in Onnuch-Punnawithi area = 1, If not = 0 | 0.1933333 | 0.3962351 | 0 | 1 |

#### 4.2 Significant of the variable.

There is the total of 16 variables selected as factors to determine the price of the condominium. According to the hedonic pricing model, the factors are divided into three characteristics which are location, structural and neighborhood characteristics. Analyze the data using STATA 15.0 to find the significance of each variable.

#### 4.3 The coefficient of the factors.

Table 3: The coefficient of each factor in model I and model II.

Model I: 
$$p = a_0 + a_1distbm + a_2floor + a_3zonea + a_4zoneb + a_5zonec + a_6zoned + a_7zonee + a_8zonef + a_9zoneg + \varepsilon_t$$

Model II: 
$$p = a_0 + a_1distbm + a_2floor + a_3zonea + a_4zoneb + a_5zonec + a_6zoned + a_7zonee + a_8zonef + a_9zoneg + a_{10}cpark + a_{11}unit + a_{12}land + a_{13}ready + a_{14}store + \varepsilon_t$$



| Independent variable       | Model I     |                | Model II    |                |
|----------------------------|-------------|----------------|-------------|----------------|
|                            | Coefficient | Standard error | Coefficient | Standard error |
| Constant                   | 72,829.39   | 13,865.28      | 51,202.64   | 23,794.33      |
| 1. Location attributes     |             |                |             |                |
| zone                       |             |                |             |                |
| • zonea                    | 42,689.4    | 16,206.4       | 22,390.02   | 14,326.07      |
| • zoneb                    | 54,352.77   | 17,971.87      | 54,408.69   | 15,606.23      |
| • zonec                    | 7,955.793   | 16,426.51      | 8,920.576   | 14,428.67      |
| • zoned                    | 185,360.5   | 25,197.4       | 146,667.1   | 22,386.27      |
| • zonee                    | 37,229.62   | 14,332.82      | 22,710.91   | 12,536.28      |
| • zonef                    | 1,969.786   | 15,481.59      | -3,118.161  | 13,354.92      |
| • zoneg                    | -3,127.654  | 14,752.93      | 4,813.713   | 12,732.04      |
| distbm                     | -6.377854   | 2.606239       | -3.419972   | 2.43335        |
| 2. Structural attributes   |             |                |             |                |
| floor                      | 943.776     | 287.5747       | 1,593.905   | 292.5197       |
| unit                       |             |                | -49.89714   | 14.85702       |
| cpark                      |             |                | 514.4208    | 97.27646       |
| land                       |             |                | 0.8473059   | 0.8946322      |
| ready                      |             |                | -10,462.83  | 16,919.08      |
| 3. Neighborhood attributes |             |                |             |                |
| store                      |             |                | 4,921.666   | 10830.09       |
| R-Square                   | 0.5356      |                | 0.6705      |                |
| Adjusted R-Square          | 0.5057      |                | 0.6364      |                |
| F-Statistic                | 17.94       |                | 19.63       |                |

|                  |  |
|------------------|--|
| DEP.VARIABLE : p |  |
|------------------|--|

Table 4: The coefficient of each factor in model III and model IV.

Model III:  $\ln p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + \varepsilon_t$

Model IV:  $\ln p = a_0 + a_1 \text{distbm} + a_2 \text{floor} + a_3 \text{zonea} + a_4 \text{zoneb} + a_5 \text{zonec} + a_6 \text{zoned} + a_7 \text{zonee} + a_8 \text{zonef} + a_9 \text{zoneg} + a_{10} \text{cpark} + a_{11} \text{unit} + a_{12} \text{land} + a_{13} \text{ready} + a_{14} \text{store} + \varepsilon_t$

| Independent variable   | Model III   |                | Model IV    |                |
|------------------------|-------------|----------------|-------------|----------------|
|                        | Coefficient | Standard error | Coefficient | Standard error |
| Constant               | 11.23708    | 0.0945139      | 11.08907    | 0.1646154      |
| 1. Location attributes |             |                |             |                |
| Zone                   |             |                |             |                |
| • zonea                | 0.3675987   | 0.1104723      | 0.2375018   | 0.0991114      |
| • zoneb                | 0.4612404   | 0.1225069      | 0.4479013   | 0.107968       |
| • zonec                | 0.0939072   | 0.1119728      | 0.0987188   | 0.0998213      |
| • zoned                | 0.9445661   | 0.1717603      | 0.7346785   | 0.1579873      |
| • zonee                | 0.3425004   | 0.0977009      | 0.2458382   | 0.0867292      |
| • zonef                | -0.0041163  | 0.1051022      | -0.0510722  | 0.0923928      |
| • zoneg                | -0.063089   | 0.1005646      | -0.0011424  | 0.0880836      |
| Distbm                 | -0.0000806  | 0.000178       | -0.0000531  | 0.000168       |

|                            |           |           |            |            |
|----------------------------|-----------|-----------|------------|------------|
| 2. Structural attributes   |           |           |            |            |
| Floor                      | 0.0078493 | 0.0019603 | 0.0133849  | 0.0020237  |
| Unit                       |           |           | -0.000386  | 0.0001028  |
| Cpark                      |           |           | 0.0024843  | 0.000673   |
| Land                       |           |           | 0.00000215 | 0.00000619 |
| Ready                      |           |           | -0.331189  | 0.1170506  |
| 3. Neighborhood attributes |           |           |            |            |
| Store                      |           |           | 0.697988   | 0.0749254  |
| R-Square                   | 0.5974    |           | 0.7058     |            |
| Adjusted R-Square          | 0.5715    |           | 0.6753     |            |
| F-Statistic                | 23.08     |           | 23.14      |            |
| DEP.VARIABLE :lnp          |           |           |            |            |

Table 3 provides the parameter estimates for two OLS models in linear form, given their coefficient (Beta), Robust standard error in parentheses, the coefficient of determination (R-square), adjusted R-square, and F-statistic. The calculated data to multiply the expected value of the independent variable, the results will show the intrinsic value that affects the price of a condominium. The model I have the basic characteristics of condominium such as distbm, floor and each zone area (zone a to zone g) so all of the variables are significant except zonec zonef and zoneg are not significant. The cause of the variable are not significant perhaps the collected data are not different from the baseline that made the statistics test are not significant. The significant factors that affect the price of a condominium can explain thoroughly as follow:

1. The variable “distbm” is proximately distance between condominium and bts or mrt. The coefficient of distbm = -6.377854 that mean if the condominium far from bts or mrt increase 1 meter, the price will decrease 6.377854 baht per square meter.

2. The variable “floor” is total floor of condominium which divided to high-rise and low-rise condominium. The coefficient of floor = 943.776 that mean if the floor of condominium increase 1 floor, the price will increase 943.776 baht per square meter.

3. The variable “zone” is the area that condominium located, divided by

- zonea is Silom-Sathron area. The coefficient of zonea = 42,689.4 that mean if the condominium located in Silom-Sathron, the price of condominium will increase 42,689.4 baht per square meter.
- zoneb is Phayathai-Samyang area. The coefficient of zoneb = 54,352.77 that mean if the condominium located in Phayathai-Samyang, the price of condominium will increase 54,352.77 baht per square meter.
- zoned is Chidlom-Rajdamri area. The coefficient of zoned = 185,360.5 that mean if the condominium located in Chidlom-Rajdamri, the price of condominium will increase 185,360.5 baht per square meter.
- zone is Thonglor-Phrakanong area. The coefficient of zonee = 37,229.62 that mean if the condominium located in Thonglor-Phrakanong, the price of condominium will increase 37,229.62 baht per square meter.

In model II, the variables are added 5 variables which the related characteristic of condominium such as unit, cpark, land, ready and store. The significant variables are floor, zoneb, zoned, cpark, and unit. Another variables is not significant which the new variables are added may significant more than old variables in model I or both of variables are

correlated (multicollinearity), which mean some variables in model are related that made one of variable not appear relationship between the dependent variable. The omitted of significantly variable. The significant factors that affect the price of condominium can explains thoroughly as follow:

1. The variable “floor” is total floor of condominium which divided to high-rise and low-rise condominium. The coefficient of floor = 1,593.905 that mean if the floor of condominium increases 1 floor, the price will increase 1,593.905 baht per square meter.

2. The variable “cpark” is percentage of car park available in condominium. The coefficient of cpark = 514.4208 that mean if the car park available increase 1 percent, the price will increase 514.4208 baht per square meter.

3. The variable “unit” is a total room in condominium. The coefficient of unit = - 49.89714 that mean if the unit increase 1 room, the price will decrease 49.89714 baht per square meter.

4. The variable “zone” is the area that condominium located, divided by

- zoneb is Phayathai-Samyan area. The coefficient of zoneb = 54,408.69 that mean if the condominium located in Phayathai-Samyan, the price of condominium will increase 54,408.69 baht per square meter.
- zoned is Chidlom-Rajdamri area. The coefficient of zoned = 146,667.1 that mean if the condominium located in Chidlom-Rajdamri, the price of condominium will increase 146,667.1 baht per square meter.

Table 4 provides the parameter estimates for two OLS models in log-linear form, given their coefficient (Beta), Robust standard error in parentheses, the coefficient of determination (R-square), adjusted R-square, and F-statistic. Using an exponential function to

calculate data, the amount of unit change in the independent variable will be multiplied by its coefficient so using its product to be a power of natural logarithm and multiply expected value of the dependent variable, the results will show as the percentage change of dependent variable from dependent variable's unit change.

Model III is log-linear form that consist of basic factor that affect the price of condominium. All of the variables are significant except zonec, zonef and zoneg so the variables can explain thoroughly as follow:

1. The variable “distbm” is proximately distance between condominium and bts or mrt. The coefficient of distbm = -0.0000806 that mean if the condominium far from bts or mrt increase 1 meter, the price will decrease 0.00806 percent.

2. The variable “floor” is total floor of condominium which divided to high-rise and low-rise condominium. The coefficient of floor = 0.0078493 that mean if the floor of condominium increase 1 floor, the price will increase 7.8493 percent.

3. The variable “zone” is the area that condominium located, divided by

- zonea is Silom-Sathorn area. The coefficient of zonea = 0.3675987 that mean if the condominium located in Silom-Sathorn, the price of condominium will increase 36.75987 percent.
- zoneb is Phayathai-Samyan area. The coefficient of zoneb = 0.4612402 that mean if the condominium located in Phayathai-Samyan, the price of condominium will increase 46.12402 percent.

- zoned is Chidlom-Rajdamri area. The coefficient of zoned = 0.9445661 that mean if the condominium located in Chidlom-Rajdamri, the price of condominium will increase 94.45661 percent.
- zonee is Thonglor-Phrakanong area. The coefficient of zonee = 0.3425004 that mean if the condominium located in Thonglor-Phrakanong, the price of condominium will increase 34.25004 percent.

Model IV are also log-linear model that adding 5 new variables. The variables such as distbm, floor, cpark, unit, zonea, zoneb, zoned and zone are significantly variable. Another is not significant so maybe cause of adding new variables that significantly more than the old variable or multicollinearity problem. Explain the significantly variables as follow:

1. The variable “distbm” is proximately distance between condominium and bts or mrt. The coefficient of distbm = -0.0000531 that mean if the condominium far from bts or mrt increase 1 meter, the price will decrease 0.00531 percent.

2. The variable “floor” is total floor of condominium which divided to high-rise and low-rise condominium. The coefficient of floor = 0.0133849 that mean if the floor of condominium increase 1 floor, the price will increase 1.33849 percent.

3. The variable “cpark” is percentage of car park available in condominium. The coefficient of cpark = 0.0024843 that mean if the percentage of car park available increase 1, the price will increase 0.24843 percent.

4. The variable “unit” is total room in condominium. The coefficient of unit = -0.000386 that mean if the unit increase 1 room, the price will decrease 0.0386 percent.

5. The variable “zone” is the area that condominium located, divided by

- zonea is Silom-Sathorn area. The coefficient of zonea = 0.2375018 that mean if the condominium located in Silom-Sathorn, the price of condominium will increase 23.75018 percent.
- zoneb is Phayathai-Samyan area. The coefficient of zoneb = 0.4479013 that mean if the condominium located in Phayathai-Samyan, the price of condominium will increase 44.79013 percent.
- zoned is Chidlom-Rajdamri area. The coefficient of zoned = 0.7346785 that mean if the condominium located in Chidlom-Rajdamri, the price of condominium will increase 73.46785 percent.
- zonee is Thonglor-Phrakanong area. The coefficient of zonee = 0.2458382 that mean if the condominium located in Thonglor-Phrakanong, the price of condominium will increase 24.258382 percent.

According to the result of significant factors in four models, the significantly statistic variables are showed as:

Table 5: The summary of significantly variable in model.

| Independent<br>variable | Variable p |           | Variable ln p |            |
|-------------------------|------------|-----------|---------------|------------|
|                         | Model I    | Model II  | Model III     | Model IV   |
| distbm                  | -6.377854  |           | -0.0000806    | -0.0000531 |
| floor                   | 943.776    | 1,593.905 | 0.0078493     | 0.0133849  |
| cpark                   |            | 514.4208  |               | 0.0024843  |
| unit                    |            | -49.89714 |               | -0.000386  |



|       |           |           |           |           |
|-------|-----------|-----------|-----------|-----------|
| zonea | 42,863.4  |           | 0.3675987 | 0.2375018 |
| zoneb | 54,352.77 | 54,408.69 | 0.4612404 | 0.4479013 |
| zoned | 185,360.5 | 146,667.1 | 0.9445661 | 0.7346785 |
| zonee | 37,229.62 |           | 0.3425004 | 0.2458382 |

Table 5 show the summarize of significant factors. Model I and Model II are a linear model. Model III and Model IV are a log-linear model. Both of model linear and log-linear have the same result in term of a direction of the relationship and significant variables such as floor, zoneb, and zoned. Differ result in variable distbm, cpark, unit, zonea, and zonee. The variable distbm, zonea, and zonee are not significant in model II. Cpark and unit are significant in model II and IV.

## 5. Conclusion

This research paper applies the hedonic approach to explore the factors that affect the price of the condominium. The price and characteristics are collected and classified into three sets of attributes, location, structural, and neighborhood. This research explores four models and collects 150 observation of condominium project. Hence, OLS regression can be used to estimate the relationship of factors that affect the price.

According to the results, location attributes have 2 variables that significantly and same expect the direction of the relationship. Zone area such as *zoneb* and *zoned* show significant relationship with price in the whole model. The *distbm*, *zonea*, and *zonee* are not significant in Model II but the other is significant. For structural attributes, *floor* is significant in the whole model, percentage car park and total unit condo are significant in Model II and model IV. The neighborhood attribute is a store, the nearest distance from the store to the condominium is not significant.

From this study can be written the relationship between factors price and the price into the equation. In a linear relationship in model II is

$$p = 51,202.64 + 1,593.905\textit{floor} + 514.4208\textit{cpark} - 49.89714\textit{unit} \\ + 54,408.69\textit{zoneb} + 146,667.1\textit{zoned}$$

and in a log-linear relationship in model III is

$$\ln p = -0.0000806\textit{distbm} + 0.0078493\textit{floor} + 0.3675987\textit{zonea} + \\ 0.4612404\textit{zoneb} + 0.94445661\textit{zoned} + 0.3425004\textit{zonee}$$

This study can be used the data to refer the characteristics and the price to consumer who interested the condominium in Bangkok to make a decision buying condominium to get

the most benefits and the developer in real estate sector to make a strategy and market planner to determine the appropriate price of condominium to support demand and can competitive the other developer effectively

## **6. Limitation**

The data in this research are so hard to collect because the price of the condominium are fluctuated and there is a lot of variables didn't collect because of limitation of data. The price of the condominium is collected from lowest price of the condominium project that not taking any sales promotion that attracts the consumer. Further study can expand the scope of factors, financial transaction data and marketing campaigns such as a free gift or discount that may affect the consumer to make a decision.

## Appendix a

Table 1: The details data of a condominium.

|    | Name of condominium            | Price/Sqm | % Car park | Floor | Land (sqm) | Unit condo | developer          |
|----|--------------------------------|-----------|------------|-------|------------|------------|--------------------|
| 1  | 28 Chidlom                     | 350,000   | 84         | 47    | 4,896      | 427        | SC-Asset           |
| 2  | 98 Wireless                    | 500,000   | 240        | 25    | 3,296      | 77         | Sansiri            |
| 3  | Q-Chidlom-Phetchaburi          | 170,000   | 63         | 42    | 2,723.6    | 354        | Ananda development |
| 4  | Noble Ploenchit                | 160,000   | 70         | 51    | 14,400     | 1,442      | Noble Development  |
| 5  | Hudson Sathorn7                | 130,000   | 150        | 12    | 2,096      | 49         | Other              |
| 6  | M Silom                        | 220,000   | 80         | 53    | 2,112      | 161        | Major Development  |
| 7  | Aspire Sathorn-Ratchapruek     | 82,500    | 38         | 33    | 7,666.4    | 1,087      | AP Thailand        |
| 8  | Maestro 01                     | 150,000   | 90         | 8     | 1,593.2    | 88         | Major Development  |
| 9  | Condolette LIGHT Convent       | 140,000   | 40         | 8     | 1,782.4    | 111        | Prueksa            |
| 10 | Than Living Sathorn-Charoenrat | 86,000    | 57         | 36    | 6,400      | 523        | Other              |
| 11 | Noble REVO Silom               | 125,000   | 50         | 32    | 2,432      | 319        | Noble Development  |
| 12 | The Diplomat Sathorn           | 200,000   | 100        | 38    | 2,448      | 192        | KPN                |
| 13 | Collezio Sathorn-Pipat         | 100,000   | 64         | 8     | 1,600      | 95         | Major Development  |
| 14 | QUAD Sathorn                   | 94,000    | 35         | 5     | 912        | 64         | Other              |
| 15 | Centric Sathorn-St.Louis       | 100,000   | 60         | 28    | 3,192      | 364        | SC-Asset           |
| 16 | The Seed Mingle                | 90,000    | 40         | 31    | 4,600      | 531        | Prueksa            |
| 17 | The Treasure Silom             | 95,000    | 84         | 8     | 1,176      | 71         | Other              |
| 18 | QUAD Silom                     | 140,000   | 100        | 8     | 1,096      | 74         | Other              |
| 19 | IDEO Mobi Sathorn              | 100,000   | 50         | 31    | 4,022      | 530        | Ananda development |
| 20 | Saladaeng residence            | 175,000   | 118        | 25    | 2,944      | 132        | Pace Development   |
| 21 | The Sukhothai Residences       | 260,000   | 199        | 41    | 10,232     | 196        | Pace Development   |
| 22 | The Line Rachatewi             | 250,000   | 67         | 38    | 2,400      | 231        | Sansiri            |
| 23 | Haven Luxe                     | 105,000   | 70         | 8     | 1,472      | 133        | Other              |

|    |                        |         |     |    |         |       |                    |
|----|------------------------|---------|-----|----|---------|-------|--------------------|
| 24 | Ashton Chula           | 200,000 | 40  | 56 | 6,753.2 | 1,182 | Ananda development |
| 25 | IDEO Q Siam-Rachathewi | 176,271 | 47  | 36 | 3,840.4 | 550   | Ananda development |
| 26 | Vertiq Rama4-Siam      | 130,000 | 80  | 23 | 2,468   | 196   | Other              |
| 27 | Noble RE:D             | 135,000 | 60  | 23 | 2,992   | 272   | Noble Development  |
| 28 | IDEO Q Chula           | 140,000 | 40  | 40 | 9,436   | 1,605 | Ananda development |
| 29 | Maestro 12             | 110,000 | 50  | 8  | 1,420   | 115   | Major Development  |
| 30 | M Phyathai             | 174,000 | 70  | 35 | 2,492   | 213   | Major Development  |
| 31 | The Seed Memories Siam | 115,000 | 50  | 8  | 5,268   | 303   | Prueksa            |
| 32 | IDEO Mobi Phyathai     | 128,000 | 40  | 24 | 2,708   | 316   | Ananda development |
| 33 | JRY Condominium        | 84,000  | 45  | 8  | 2,296   | 157   | Other              |
| 34 | The Base Garden Rama9  | 99,000  | 40  | 36 | 5,756   | 639   | Sansiri            |
| 35 | The teak Pattanakarn   | 85,185  | 50  | 8  | 1,140   | 79    | Other              |
| 36 | The Remarkable 2       | 110,000 | 49  | 8  | 1,296   | 87    | Other              |
| 37 | Rhythm Asoke 2         | 130,180 | 40  | 30 | 2,742   | 346   | AP Thailand        |
| 38 | Ashton Asoke           | 210,000 | 47  | 50 | 4,590.4 | 783   | Ananda development |
| 39 | Circle Condomonium 1   | 104,000 | 75  | 30 | 8,012   | 917   | Other              |
| 40 | Kris Garden Rama9      | 57,000  | 41  | 8  | 4,686   | 630   | Other              |
| 41 | Circle 2               | 144,831 | 80  | 52 | 6,908   | 466   | Other              |
| 42 | U Delight Pattanakarn  | 70,000  | 50  | 27 | 7,124   | 676   | Other              |
| 43 | LPN Park Rama9         | 58,000  | 36  | 24 | 14,400  | 1,540 | LPN                |
| 44 | Condolette Midst Rama9 | 110,000 | 40  | 30 | 3,548   | 433   | Prueksa            |
| 45 | Q Asoke                | 142,000 | 80  | 41 | 5,360   | 482   | Q House            |
| 46 | Supalai Park Ekamai    | 53,000  | 50  | 44 | 8,484   | 660   | Supalai            |
| 47 | IDEO Mobi rama9        | 113,000 | 42  | 28 | 5,940   | 703   | Ananda development |
| 48 | Thru                   | 80,000  | 70  | 35 | 5,888   | 515   | Other              |
| 49 | Capital Ekamai         | 86,000  | 70  | 27 | 3,200   | 281   | KPN                |
| 50 | Grand Belle            | 66,000  | 130 | 43 | 13,260  | 1,992 | Other              |
| 51 | Supalai Premier Asoke  | 73,000  | 65  | 38 | 5,140   | 645   | Supalai            |
| 52 | The Bangkok Thonglor   | 340,000 | 122 | 31 | 2,776   | 148   | LH                 |
| 53 | Life Sukhumvit 48      | 98,500  | 49  | 19 | 5,996   | 612   | AP Thailand        |

|    |                            |         |     |    |          |     |                    |
|----|----------------------------|---------|-----|----|----------|-----|--------------------|
| 54 | The Niche Pride            | 87,300  | 42  | 33 | 5,884    | 667 | Other              |
| 55 | URBITIA Thonglor           | 139,000 | 60  | 8  | 1,540    | 130 | Other              |
| 56 | The ACE                    | 90,000  | 55  | 8  | 732      | 69  | Other              |
| 57 | Rhythm Sukhumvit36-38      | 171,000 | 43  | 25 | 4,305.2  | 496 | AP Thailand        |
| 58 | Keyne                      | 150,000 | 76  | 28 | 2,704    | 216 | Sansiri            |
| 59 | Le Cote Thonglor 8         | 86,000  | 50  | 8  | 1,244    | 99  | Other              |
| 60 | Tidy Deluxe Condominium    | 137,000 | 60  | 8  | 3,440    | 141 | Other              |
| 61 | Park 24                    | 170,000 | 51  | 51 | 19,200   | 837 | Other              |
| 62 | D 25                       | 122,000 | 60  | 8  | 1,504    | 98  | Other              |
| 63 | LIV @ 49                   | 150,000 | 70  | 8  | 2,932    | 183 | Other              |
| 64 | The Room Sukhumvit 49      | 146,000 | 70  | 27 | 5,224    | 375 | LH                 |
| 65 | La Vie En Rose Place       | 84,000  | 100 | 7  | 4,804    | 78  | Other              |
| 66 | Zenith Place               | 77,000  | 65  | 8  | 2,828    | 280 | Other              |
| 67 | The Art Thonglor           | 95,000  | 55  | 8  | 1,452    | 102 | Other              |
| 68 | Vista Garden Prestige      | 64,000  | 40  | 16 | 10,021.2 | 160 | Other              |
| 69 | Ascent Thonglor            | 89,000  | 70  | 8  | 1,636    | 90  | Other              |
| 70 | Marvel Thonglor            | 140,000 | 300 | 6  | 932      | 9   | Other              |
| 71 | Up Ekamai                  | 83,000  | 65  | 30 | 3,200    | 259 | Noble Development  |
| 72 | Sky Walk & Weltz Residence | 131,000 | 75  | 50 | 14,400   | 816 | Other              |
| 73 | Tree Condo                 | 80,300  | 62  | 8  | 1,536    | 119 | Other              |
| 74 | Bloom Sukhumvit 71         | 80,000  | 60  | 24 | 2,508    | 195 | Other              |
| 75 | MODE Sukhumvit 61          | 139,000 | 69  | 8  | 3,108    | 160 | Other              |
| 76 | Tidy Thonglor              | 110,000 | 43  | 8  | 952      | 73  | Other              |
| 77 | Aspire Sukhumvit 48        | 85,000  | 40  | 25 | 8,393.2  | 838 | AP Thailand        |
| 78 | The Crest Sukhumvit 34     | 168,000 | 86  | 28 | 1,400    | 265 | SC-Asset           |
| 79 | The Room Sukhumvit 40      | 96,000  | 81  | 8  | 2,828    | 128 | LH                 |
| 80 | Socio Reference 61         | 100,000 | 70  | 8  | 1,188    | 99  | Other              |
| 81 | Ivy Thonglor               | 135,000 | 70  | 24 | 5,456    | 447 | Prueksa            |
| 82 | Ashton Morph 38            | 140,000 | 100 | 32 | 5,320    | 201 | Ananda development |
| 83 | The Crest Sukhumvit 49     | 128,000 | 60  | 8  | 1,429.6  | 88  | SC-Asset           |

|     |                                  |         |     |    |         |     |                   |
|-----|----------------------------------|---------|-----|----|---------|-----|-------------------|
| 84  | The Address Sukhumvit 61         | 140,000 | 70  | 8  | 2,152   | 98  | AP Thailand       |
| 85  | Tree Condo Sukhumvit 42          | 75,000  | 74  | 8  | 1,400   | 73  | Other             |
| 86  | Rhythm Sukhumvit 44/1            | 136,000 | 60  | 34 | 1,600   | 486 | AP Thailand       |
| 87  | Ceil                             | 90,000  | 50  | 14 | 5,992   | 376 | Sansiri           |
| 88  | Feel Condominium Ladprao 33      | 75,600  | 55  | 7  | 1,372   | 79  | Other             |
| 89  | The Privacy Ladprao-Sena         | 62,000  | 42  | 8  | 4,851.6 | 376 | Prueksa           |
| 90  | MITI Condominium                 | 68,000  | 60  | 7  | 3,236   | 198 | Other             |
| 91  | CHAMBERS CHAAN                   | 63,000  | 57  | 8  | 6,140   | 317 | SC-Asset          |
| 92  | Whizdom Avenue                   | 148,148 | 60  | 27 | 4,978.4 | 497 | Other             |
| 93  | Chapter One Midtown Ladprao 24   | 104,000 | 45  | 37 | 4,527.6 | 514 | Prueksa           |
| 94  | Levo Ladprao 18-2                | 88,500  | 32  | 8  | 770.8   | 62  | Other             |
| 95  | Levo Ladprao18                   | 84,000  | 46  | 8  | 1,384   | 129 | Other             |
| 96  | Chapter One The Campus Ladprao 1 | 86,500  | 32  | 8  | 2,216   | 180 | Prueksa           |
| 97  | MY STORY Ladprao 71              | 52,600  | 40  | 8  | 12,800  | 658 | Other             |
| 98  | The Peace                        | 78,000  | 80  | 7  | 728     | 27  | Other             |
| 99  | Modiz Ladprao 18                 | 80,000  | 50  | 8  | 1,732   | 179 | Other             |
| 100 | The Unique 10                    | 72,000  | 57  | 8  | 1,456   | 127 | Other             |
| 101 | LIB Ladprao 20                   | 63,000  | 45  | 8  | 1,913.2 | 175 | Other             |
| 102 | LUGANO                           | 74,900  | 61  | 8  | 1,448   | 123 | Other             |
| 103 | Centrio Ladprao 48               | 44,000  | 100 | 5  | 1,316   | 52  | Other             |
| 104 | The Unique 26                    | 78,000  | 44  | 8  | 696     | 62  | Other             |
| 105 | Plum Condo Ladprao 101           | 37,868  | 40  | 5  | 13,484  | 712 | Prueksa           |
| 106 | Ables Condo Ladprao 27           | 58,371  | 50  | 8  | 1,936   | 154 | Other             |
| 107 | Tree Condo Ladprao 27            | 53,100  | 83  | 8  | 1,816   | 79  | Other             |
| 108 | The Room Ratchada Ladprao        | 80,000  | 75  | 19 | 15,284  | 810 | LH                |
| 109 | Haus 23                          | 84,000  | 63  | 27 | 2,453.2 | 236 | Other             |
| 110 | M Ladprao                        | 102,750 | 69  | 44 | 3,148   | 313 | Major Development |
| 111 | mori Haus                        | 130,000 | 59  | 7  | 6,400   | 262 | Sansiri           |
| 112 | The Tree Onnuch                  | 91,200  | 52  | 8  | 2,104   | 166 | Prueksa           |
| 113 | Moniiq 64                        | 75,000  | 50  | 8  | 5,556.4 | 366 | Other             |

|     |                                  |         |    |    |         |       |                    |
|-----|----------------------------------|---------|----|----|---------|-------|--------------------|
| 114 | Rhythm Sukhumvit                 | 101,200 | 40 | 37 | 6,332   | 589   | AP Thailand        |
| 115 | hasu HAUS                        | 93,000  | 47 | 7  | 6,400   | 324   | Sansiri            |
| 116 | The Unique 62/1                  | 87,000  | 72 | 8  | 2,404   | 116   | Other              |
| 117 | The Escape Condominium 101       | 38,000  | 70 | 8  | 17,580  | 794   | Other              |
| 118 | Hue Condo                        | 91,000  | 40 | 8  | 1,500   | 141   | Other              |
| 119 | Lumpini Ville Onnuch-Pattanakarn | 52,444  | 35 | 8  | 24,000  | 1,594 | LPN                |
| 120 | Lumpini Ville 46                 | 39,467  | 33 | 8  | 20,800  | 1,450 | LPN                |
| 121 | Mayfair Place 64                 | 72,000  | 55 | 8  | 5,029.2 | 365   | Other              |
| 122 | Elio 64                          | 60,000  | 25 | 8  | 38,828  | 962   | Ananda development |
| 123 | B Republic 101/1                 | 59,000  | 43 | 8  | 3,476   | 347   | Other              |
| 124 | The Base Park West 77            | 70,000  | 35 | 39 | 5,392.8 | 711   | Sansiri            |
| 125 | The Link 64                      | 72,000  | 42 | 8  | 1,548   | 122   | Other              |
| 126 | Regent Orchid101                 | 51,800  | 40 | 21 | 5,112   | 580   | Other              |
| 127 | Diamond                          | 97,000  | 52 | 31 | 5,272   | 485   | LH                 |
| 128 | U Delight onnuch                 | 70,000  | 50 | 32 | 6,200   | 773   | Other              |
| 129 | UTD Aries 17***                  | 41,250  | 30 | 3  | 800     | 54    | Other              |
| 130 | Lumpini Ville 77-2               | 44,444  | 38 | 18 | 9,600   | 956   | LPN                |
| 131 | Q House Condo 79                 | 103,500 | 68 | 26 | 4,692   | 484   | Q House            |
| 132 | Sari 64                          | 80,000  | 70 | 8  | 3,320   | 192   | Sansiri            |
| 133 | IDEO Mobi Sukhumvit              | 103,000 | 39 | 23 | 9,600   | 932   | Ananda development |
| 134 | CASA Condo 97                    | 68,000  | 40 | 8  | 2,924   | 218   | Q House            |
| 135 | Blocs 77                         | 84,000  | 55 | 28 | 5,276   | 467   | Sansiri            |
| 136 | The Room 62                      | 97,555  | 70 | 23 | 9,292   | 487   | LH                 |
| 137 | IDEO Verve                       | 110,000 | 67 | 30 | 5,330.4 | 490   | Ananda development |
| 138 | Tree Condo Luxe 52               | 70,700  | 67 | 8  | 1,548   | 95    | Other              |
| 139 | The Next Garden Mix 52           | 69,500  | 50 | 8  | 2,012   | 138   | Other              |
| 140 | Vino Ratchada 32                 | 75,000  | 50 | 8  | 864     | 71    | Other              |
| 141 | Life Ratchadapisek               | 110,900 | 61 | 36 | 8,800   | 837   | AP Thailand        |
| 142 | WIRE Ratchada 19                 | 85,000  | 57 | 8  | 596     | 46    | Other              |
| 143 | Fuse MITI                        | 103,000 | 40 | 17 | 2,564   | 281   | Prueksa            |



|     |                            |         |     |    |         |       |                   |
|-----|----------------------------|---------|-----|----|---------|-------|-------------------|
| 144 | Diamond Ratchada city Plus | 72,830  | 60  | 8  | 1,608   | 119   | Other             |
| 145 | The Privacy Ratchada       | 77,800  | 40  | 8  | 3,200   | 199   | Prueksa           |
| 146 | 624 Condolette             | 47,000  | 40  | 8  | 7,312   | 486   | Prueksa           |
| 147 | The Unique 19              | 76,000  | 46  | 8  | 1,016   | 76    | Other             |
| 148 | Noble Revolve 2            | 120,000 | 40  | 42 | 5,464.8 | 755   | Noble Development |
| 149 | QUINN                      | 85,000  | 66  | 25 | 8,399.2 | 363   | Other             |
| 150 | Supalai Wellington         | 65,000  | 100 | 19 | 27,440  | 1,002 | Supalai           |

Table 2: The location of condominium.

|    | Condominium name               | Zone area        | distance from nearest bts/mrt (m) |
|----|--------------------------------|------------------|-----------------------------------|
| 1  | 28 Chidlom                     | Chidlom-Rajdamri | 280                               |
| 2  | 98 Wireless                    | Chidlom-Rajdamri | 250                               |
| 3  | Q-Chidlom-Phetchaburi          | Chidlom-Rajdamri | 800                               |
| 4  | Noble Ploenchit                | Chidlom-Rajdamri | 0                                 |
| 5  | Hudson Sathorn7                | Silom-Sathorn    | 650                               |
| 6  | M Silom                        | Silom-Sathorn    | 400                               |
| 7  | Aspire Sathorn-Ratchapruet     | Silom-Sathorn    | 0                                 |
| 8  | Maestro 01                     | Silom-Sathorn    | 1,200                             |
| 9  | Condolette LIGHT Convent       | Silom-Sathorn    | 500                               |
| 10 | Than Living Sathorn-Charoenrat | Silom-Sathorn    | 1,700                             |
| 11 | Noble REVO Silom               | Silom-Sathorn    | 250                               |
| 12 | The Diplomat Sathorn           | Silom-Sathorn    | 0                                 |
| 13 | Collezio Sathorn-Pipat         | Silom-Sathorn    | 300                               |
| 14 | QUAD Sathorn                   | Silom-Sathorn    | 200                               |
| 15 | Centric Sathorn-St.Louis       | Silom-Sathorn    | 700                               |
| 16 | The Seed Mingle                | Silom-Sathorn    | 1,400                             |
| 17 | The Treasure Silom             | Silom-Sathorn    | 650                               |
| 18 | QUAD Silom                     | Silom-Sathorn    | 100                               |

|    |                          |                  |       |
|----|--------------------------|------------------|-------|
| 19 | IDEO Mobi Sathorn        | Silom-Sathorn    | 80    |
| 20 | Saladaeng residence      | Silom-Sathorn    | 550   |
| 21 | The Sukhothai Residences | Silom-Sathorn    | 500   |
| 22 | The Line Rachatewi       | Phayathai-Samyan | 220   |
| 23 | Haven Luxe               | Phayathai-Samyan | 1,000 |
| 24 | Ashton Chula             | Phayathai-Samyan | 100   |
| 25 | IDEO Q Siam-Rachathewi   | Phayathai-Samyan | 50    |
| 26 | Vertiq Rama4-Siam        | Phayathai-Samyan | 450   |
| 27 | Noble RE:D               | Phayathai-Samyan | 80    |
| 28 | IDEO Q Chula             | Phayathai-Samyan | 300   |
| 29 | Maestro 12               | Phayathai-Samyan | 0     |
| 30 | M Phyathai               | Phayathai-Samyan | 270   |
| 31 | The Seed Memories Siam   | Phayathai-Samyan | 150   |
| 32 | IDEO Mobi Phyathai       | Phayathai-Samyan | 190   |
| 33 | JRY Condominium          | Petchburi-Rama9  | 5,000 |
| 34 | The Base Garden Rama9    | Petchburi-Rama10 | 700   |
| 35 | The teak Pattanakarn     | Petchburi-Rama11 | 500   |
| 36 | The Remarkable 2         | Petchburi-Rama12 | 4,000 |
| 37 | Rhythm Asoke 2           | Petchburi-Rama13 | 400   |
| 38 | Ashton Asoke             | Petchburi-Rama14 | 20    |
| 39 | Circle Condomonium 1     | Petchburi-Rama15 | 1,200 |
| 40 | Kris Garden Rama9        | Petchburi-Rama16 | 2,000 |
| 41 | Circle 2                 | Petchburi-Rama17 | 750   |
| 42 | U Delight Pattanakarn    | Petchburi-Rama18 | 5,000 |
| 43 | LPN Park Rama9           | Petchburi-Rama19 | 2,000 |
| 44 | Condolette Midst Rama9   | Petchburi-Rama20 | 280   |
| 45 | Q Asoke                  | Petchburi-Rama21 | 0     |
| 46 | Supalai Park Ekamai      | Petchburi-Rama22 | 1,800 |
| 47 | IDEO Mobi rama9          | Petchburi-Rama23 | 350   |
| 48 | Thru                     | Petchburi-Rama24 | 1,000 |

|    |                            |                     |       |
|----|----------------------------|---------------------|-------|
| 49 | Capital Ekamai             | Petchburi-Rama25    | 5,000 |
| 50 | Grand Belle                | Petchburi-Rama26    | 400   |
| 51 | Supalai Premier Asoke      | Petchburi-Rama27    | 150   |
| 52 | The Bangkok Thonglor       | Thonglor-Phrakanong | 400   |
| 53 | Life Sukhumvit 48          | Thonglor-Phrakanong | 600   |
| 54 | The Niche Pride            | Thonglor-Phrakanong | 2,200 |
| 55 | URBITIA Thonglor           | Thonglor-Phrakanong | 230   |
| 56 | The ACE                    | Thonglor-Phrakanong | 2,200 |
| 57 | Rhythm Sukhumvit36-38      | Thonglor-Phrakanong | 400   |
| 58 | Keyne                      | Thonglor-Phrakanong | 0     |
| 59 | Le Cote Thonglor 8         | Thonglor-Phrakanong | 690   |
| 60 | Tidy Deluxe Condominium    | Thonglor-Phrakanong | 400   |
| 61 | Park 24                    | Thonglor-Phrakanong | 600   |
| 62 | D 25                       | Thonglor-Phrakanong | 2,000 |
| 63 | LIV @ 49                   | Thonglor-Phrakanong | 100   |
| 64 | The Room Sukhumvit 49      | Thonglor-Phrakanong | 100   |
| 65 | La Vie En Rose Place       | Thonglor-Phrakanong | 300   |
| 66 | Zenith Place               | Thonglor-Phrakanong | 500   |
| 67 | The Art Thonglor           | Thonglor-Phrakanong | 2,000 |
| 68 | Vista Garden Prestige      | Thonglor-Phrakanong | 5,000 |
| 69 | Ascent Thonglor            | Thonglor-Phrakanong | 1,800 |
| 70 | Marvel Thonglor            | Thonglor-Phrakanong | 2,000 |
| 71 | Up Ekamai                  | Thonglor-Phrakanong | 2,200 |
| 72 | Sky Walk & Weltz Residence | Thonglor-Phrakanong | 250   |
| 73 | Tree Condo                 | Thonglor-Phrakanong | 570   |
| 74 | Bloom Sukhumvit 71         | Thonglor-Phrakanong | 550   |
| 75 | MODE Sukhumvit 61          | Thonglor-Phrakanong | 150   |
| 76 | Tidy Thonglor              | Thonglor-Phrakanong | 1,500 |
| 77 | Aspire Sukhumvit 48        | Thonglor-Phrakanong | 700   |
| 78 | The Crest Sukhumvit 34     | Thonglor-Phrakanong | 120   |

|     |                                  |                     |       |
|-----|----------------------------------|---------------------|-------|
| 79  | The Room Sukhumvit 40            | Thonglor-Phrakanong | 570   |
| 80  | Socio Reference 61               | Thonglor-Phrakanong | 400   |
| 81  | Ivy Thonglor                     | Thonglor-Phrakanong | 1,600 |
| 82  | Ashton Morph 38                  | Thonglor-Phrakanong | 350   |
| 83  | The Crest Sukhumvit 49           | Thonglor-Phrakanong | 700   |
| 84  | The Address Sukhumvit 61         | Thonglor-Phrakanong | 530   |
| 85  | Tree Condo Sukhumvit 42          | Thonglor-Phrakanong | 650   |
| 86  | Rhythm Sukhumvit 44/1            | Thonglor-Phrakanong | 0     |
| 87  | Ceil                             | Thonglor-Phrakanong | 1,200 |
| 88  | Feel Condominium Ladprao 33      | Ladprao             | 430   |
| 89  | The Privacy Ladprao-Sena         | Ladprao             | 5,000 |
| 90  | MITI Condominium                 | Ladprao             | 6,700 |
| 91  | CHAMBERS CHAAN                   | Ladprao             | 5,000 |
| 92  | Whizdom Avenue                   | Ladprao             | 0     |
| 93  | Chapter One Midtown Ladprao 24   | Ladprao             | 130   |
| 94  | Levo Ladprao 18-2                | Ladprao             | 220   |
| 95  | Levo Ladprao18                   | Ladprao             | 400   |
| 96  | Chapter One The Campus Ladprao 1 | Ladprao             | 450   |
| 97  | MY STORY Ladprao 71              | Ladprao             | 5,000 |
| 98  | The Peace                        | Ladprao             | 1,200 |
| 99  | Modiz Ladprao 18                 | Ladprao             | 180   |
| 100 | The Unique 10                    | Ladprao             | 800   |
| 101 | LIB Ladprao 20                   | Ladprao             | 450   |
| 102 | LUGANO                           | Ladprao             | 2,000 |
| 103 | Centrio Ladprao 48               | Ladprao             | 5,000 |
| 104 | The Unique 26                    | Ladprao             | 150   |
| 105 | Plum Condo Ladprao 101           | Ladprao             | 5,000 |
| 106 | Ables Condo Ladprao 27           | Ladprao             | 600   |
| 107 | Tree Condo Ladprao 27            | Ladprao             | 600   |
| 108 | The Room Ratchada Ladprao        | Ladprao             | 150   |

|     |                                  |                   |       |
|-----|----------------------------------|-------------------|-------|
| 109 | Haus 23                          | Ladprao           | 190   |
| 110 | M Ladprao                        | Ladprao           | 300   |
| 111 | mori Haus                        | Onnuch-Punnawithi | 1,400 |
| 112 | The Tree Onnuch                  | Onnuch-Punnawithi | 480   |
| 113 | Moniiq 64                        | Onnuch-Punnawithi | 1,000 |
| 114 | Rhythm Sukhumvit                 | Onnuch-Punnawithi | 150   |
| 115 | hasu HAUS                        | Onnuch-Punnawithi | 2,600 |
| 116 | The Unique 62/1                  | Onnuch-Punnawithi | 650   |
| 117 | The Escape Condominium 101       | Onnuch-Punnawithi | 2,700 |
| 118 | Hue Condo                        | Onnuch-Punnawithi | 120   |
| 119 | Lumpini Ville Onnuch-Pattanakarn | Onnuch-Punnawithi | 5,000 |
| 120 | lumpini Ville 46                 | Onnuch-Punnawithi | 5,000 |
| 121 | Mayfair Place 64                 | Onnuch-Punnawithi | 370   |
| 122 | Elio 64                          | Onnuch-Punnawithi | 700   |
| 123 | B Republic 101/1                 | Onnuch-Punnawithi | 5,000 |
| 124 | The Base Park West 77            | Onnuch-Punnawithi | 1,000 |
| 125 | The Link 64                      | Onnuch-Punnawithi | 450   |
| 126 | Regent Orchid101                 | Onnuch-Punnawithi | 300   |
| 127 | Diamond                          | Onnuch-Punnawithi | 250   |
| 128 | U Delight onnuch                 | Onnuch-Punnawithi | 850   |
| 129 | UTD Aries 17***                  | Onnuch-Punnawithi | 3,300 |
| 130 | Lumpini Ville 77-2               | Onnuch-Punnawithi | 1,200 |
| 131 | Q House Condo 79                 | Onnuch-Punnawithi | 100   |
| 132 | Sari 64                          | Onnuch-Punnawithi | 200   |
| 133 | IDEO Mobi Sukhumvit              | Onnuch-Punnawithi | 100   |
| 134 | CASA Condo 97                    | Onnuch-Punnawithi | 150   |
| 135 | Blocs 77                         | Onnuch-Punnawithi | 600   |
| 136 | The Room 62                      | Onnuch-Punnawithi | 0     |
| 137 | IDEO Verve                       | Onnuch-Punnawithi | 10    |
| 138 | Tree Condo Luxe 52               | Onnuch-Punnawithi | 350   |

|     |                            |                    |       |
|-----|----------------------------|--------------------|-------|
| 139 | The Next Garden Mix 52     | Onnuch-Punnawithi  | 350   |
| 140 | Vino Ratchada 32           | Ratchada-Huaykwang | 1,900 |
| 141 | Life Ratchadapisek         | Ratchada-Huaykwang | 430   |
| 142 | WIRE Ratchada 19           | Ratchada-Huaykwang | 300   |
| 143 | Fuse MITI                  | Ratchada-Huaykwang | 1,200 |
| 144 | Diamond Ratchada city Plus | Ratchada-Huaykwang | 300   |
| 145 | The Privacy Ratchada       | Ratchada-Huaykwang | 1,600 |
| 146 | 624 Condolette             | Ratchada-Huaykwang | 800   |
| 147 | The Unique 19              | Ratchada-Huaykwang | 530   |
| 148 | Noble Revolve 2            | Ratchada-Huaykwang | 1,100 |
| 149 | QUINN                      | Ratchada-Huaykwang | 260   |
| 150 | Supalai Wellington         | Ratchada-Huaykwang | 1,000 |

## Appendix b

The appendix b shows all of result that analyze from STATA 15.0.

Figure 1: Model I

| Source   | SS         | df  | MS         | Number of obs | = | 150    |
|----------|------------|-----|------------|---------------|---|--------|
| Model    | 2.7928e+11 | 9   | 3.1031e+10 | F(9, 140)     | = | 17.94  |
| Residual | 2.4219e+11 | 140 | 1.7299e+09 | Prob > F      | = | 0.0000 |
|          |            |     |            | R-squared     | = | 0.5356 |
|          |            |     |            | Adj R-squared | = | 0.5057 |
| Total    | 5.2146e+11 | 149 | 3.4997e+09 | Root MSE      | = | 41592  |

| p      | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval] |           |
|--------|-----------|-----------|-------|-------|----------------------|-----------|
| distbm | -6.377854 | 2.606239  | -2.45 | 0.016 | -11.53053            | -1.225179 |
| floor  | 943.776   | 287.5747  | 3.28  | 0.001 | 375.2255             | 1512.327  |
| zonea  | 42689.4   | 16206.4   | 2.63  | 0.009 | 10648.48             | 74730.32  |
| zoneb  | 54352.77  | 17971.87  | 3.02  | 0.003 | 18821.41             | 89884.13  |
| zonec  | 7955.793  | 16426.51  | 0.48  | 0.629 | -24520.31            | 40431.89  |
| zoned  | 185360.5  | 25197.4   | 7.36  | 0.000 | 135543.9             | 235177.1  |
| zonee  | 37229.62  | 14332.82  | 2.60  | 0.010 | 8892.863             | 65566.37  |
| zonef  | 1969.786  | 15418.59  | 0.13  | 0.899 | -28513.6             | 32453.17  |
| zoneg  | -3127.654 | 14752.93  | -0.21 | 0.832 | -32294.99            | 26039.68  |
| _cons  | 72829.39  | 13865.28  | 5.25  | 0.000 | 45416.98             | 100241.8  |

Figure 2: Model II

| Source   | SS         | df  | MS         | Number of obs | = | 150    |
|----------|------------|-----|------------|---------------|---|--------|
| Model    | 2.9717e+11 | 13  | 2.2860e+10 | F(13, 136)    | = | 13.86  |
| Residual | 2.2429e+11 | 136 | 1.6492e+09 | Prob > F      | = | 0.0000 |
|          |            |     |            | R-squared     | = | 0.5699 |
|          |            |     |            | Adj R-squared | = | 0.5288 |
| Total    | 5.2146e+11 | 149 | 3.4997e+09 | Root MSE      | = | 40610  |

| p      | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval] |           |
|--------|-----------|-----------|-------|-------|----------------------|-----------|
| distbm | -2.504963 | 2.765369  | -0.91 | 0.367 | -7.973648            | 2.963721  |
| floor  | 1998.075  | 325.2067  | 6.14  | 0.000 | 1354.959             | 2641.191  |
| zonea  | -18660.52 | 14595.63  | -1.28 | 0.203 | -47524.26            | 10203.23  |
| zoneb  | 17070.75  | 16487.4   | 1.04  | 0.302 | -15534.09            | 49675.59  |
| zonec  | -30719.11 | 14846.97  | -2.07 | 0.040 | -60079.91            | -1358.319 |
| zonee  | -14617.15 | 12644.86  | -1.16 | 0.250 | -39623.13            | 10388.83  |
| zonef  | -36269.84 | 14021.72  | -2.59 | 0.011 | -63998.63            | -8541.04  |
| zoneg  | -26290.15 | 13404.66  | -1.96 | 0.052 | -52798.67            | 218.3704  |
| cpark  | 679.0285  | 106.8266  | 6.36  | 0.000 | 467.7725             | 890.2846  |
| unit   | -47.56009 | 16.90813  | -2.81 | 0.006 | -80.99693            | -14.12324 |
| land   | .4997508  | 1.016582  | 0.49  | 0.624 | -1.510603            | 2.510104  |
| ready  | -30939.64 | 18915.57  | -1.64 | 0.104 | -68346.34            | 6467.051  |
| store  | 5116.552  | 12328.9   | 0.42  | 0.679 | -19264.6             | 29497.7   |
| _cons  | 88630.97  | 26262.44  | 3.37  | 0.001 | 36695.39             | 140566.5  |



Figure 3: Model III

| Source   | SS         | df  | MS         | Number of obs | = | 150    |
|----------|------------|-----|------------|---------------|---|--------|
| Model    | 16.6970941 | 9   | 1.85523268 | F(9, 140)     | = | 23.08  |
| Residual | 11.2533526 | 140 | .08038109  | Prob > F      | = | 0.0000 |
|          |            |     |            | R-squared     | = | 0.5974 |
|          |            |     |            | Adj R-squared | = | 0.5715 |
| Total    | 27.9504468 | 149 | .187586891 | Root MSE      | = | .28352 |

| lnp    | Coef.     | Std. Err. | t      | P> t  | [95% Conf. Interval] |           |
|--------|-----------|-----------|--------|-------|----------------------|-----------|
| distbm | -.0000806 | .0000178  | -4.54  | 0.000 | -.0001157            | -.0000455 |
| floor  | .0078493  | .0019603  | 4.00   | 0.000 | .0039737             | .0117249  |
| zonea  | .3675987  | .1104723  | 3.33   | 0.001 | .1491889             | .5860084  |
| zoneb  | .4612404  | .1225069  | 3.77   | 0.000 | .2190378             | .7034431  |
| zonec  | .0939072  | .1119728  | 0.84   | 0.403 | -.127469             | .3152834  |
| zoned  | .9445661  | .1717603  | 5.50   | 0.000 | .6049867             | 1.284145  |
| zonee  | .3425004  | .0977009  | 3.51   | 0.001 | .1493405             | .5356604  |
| zonef  | -.0041163 | .1051022  | -0.04  | 0.969 | -.211909             | .2036764  |
| zoneg  | -.063089  | .1005646  | -0.63  | 0.531 | -.2619107            | .1357327  |
| _cons  | 11.23708  | .0945139  | 118.89 | 0.000 | 11.05022             | 11.42394  |

Figure 4: Model IV

| Source   | SS         | df  | MS         | Number of obs | = | 150    |
|----------|------------|-----|------------|---------------|---|--------|
|          |            |     |            | F(14, 135)    | = | 23.14  |
| Model    | 19.7279198 | 14  | 1.40913713 | Prob > F      | = | 0.0000 |
| Residual | 8.22252697 | 135 | .060907607 | R-squared     | = | 0.7058 |
|          |            |     |            | Adj R-squared | = | 0.6753 |
| Total    | 27.9504468 | 149 | .187586891 | Root MSE      | = | .24679 |

| lnp    | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval] |           |
|--------|-----------|-----------|-------|-------|----------------------|-----------|
| distbm | -.0000531 | .0000168  | -3.15 | 0.002 | -.0000864            | -.0000198 |
| floor  | .0133849  | .0020237  | 6.61  | 0.000 | .0093826             | .0173872  |
| zonea  | .2375018  | .0991114  | 2.40  | 0.018 | .0414899             | .4335138  |
| zoneb  | .4479013  | .107968   | 4.15  | 0.000 | .2343738             | .6614287  |
| zonec  | .0987188  | .0998213  | 0.99  | 0.324 | -.098697             | .2961346  |
| zoned  | .7346785  | .1579873  | 4.65  | 0.000 | .4222283             | 1.047129  |
| zonee  | .2458382  | .0867292  | 2.83  | 0.005 | .0743144             | .417362   |
| zonef  | -.0510722 | .0923928  | -0.55 | 0.581 | -.2337967            | .1316523  |
| zoneg  | -.0011424 | .0880836  | -0.01 | 0.990 | -.1753446            | .1730598  |
| cpark  | .0024843  | .000673   | 3.69  | 0.000 | .0011533             | .0038152  |
| unit   | -.000386  | .0001028  | -3.76 | 0.000 | -.0005893            | -.0001828 |
| land   | 2.15e-06  | 6.19e-06  | 0.35  | 0.729 | -.0000101            | .0000144  |
| ready  | -.0331189 | .1170506  | -0.28 | 0.778 | -.264609             | .1983711  |
| store  | .0697988  | .0749254  | 0.93  | 0.353 | -.0783805            | .2179781  |
| _cons  | 11.08907  | .1646154  | 67.36 | 0.000 | 10.76351             | 11.41463  |

Figure 5: The correlation between independent variables.

|        | distbm  | floor   | cpark   | unit    | land    | ready   | store   | zonea   | zoneb   | zonec   | zoned   | zonee   | zonef   | zonег  |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| distbm | 1.0000  |         |         |         |         |         |         |         |         |         |         |         |         |        |
| floor  | -0.2904 | 1.0000  |         |         |         |         |         |         |         |         |         |         |         |        |
| cpark  | -0.1081 | 0.0832  | 1.0000  |         |         |         |         |         |         |         |         |         |         |        |
| unit   | 0.0789  | 0.4898  | -0.1929 | 1.0000  |         |         |         |         |         |         |         |         |         |        |
| land   | 0.1894  | 0.2106  | -0.0843 | 0.7345  | 1.0000  |         |         |         |         |         |         |         |         |        |
| ready  | 0.0815  | -0.0853 | -0.0144 | -0.0336 | 0.0312  | 1.0000  |         |         |         |         |         |         |         |        |
| store  | -0.3619 | 0.1044  | 0.0541  | -0.1292 | -0.2318 | -0.0619 | 1.0000  |         |         |         |         |         |         |        |
| zonea  | -0.1334 | 0.0983  | 0.1798  | -0.1179 | -0.1136 | -0.0508 | -0.0210 | 1.0000  |         |         |         |         |         |        |
| zoneb  | -0.1608 | 0.1449  | -0.0584 | 0.0580  | -0.0662 | 0.0522  | 0.0938  | -0.1006 | 1.0000  |         |         |         |         |        |
| zonec  | 0.1418  | 0.2686  | -0.0555 | 0.2543  | 0.0558  | 0.0707  | -0.1403 | -0.1362 | -0.1071 | 1.0000  |         |         |         |        |
| zoned  | -0.0857 | 0.2518  | 0.2533  | 0.0841  | 0.0414  | -0.1998 | 0.0552  | -0.0592 | -0.0466 | -0.0630 | 1.0000  |         |         |        |
| zonee  | -0.0558 | -0.0885 | 0.1450  | -0.1941 | -0.1116 | -0.0696 | 0.1353  | -0.2009 | -0.1581 | -0.2140 | -0.0930 | 1.0000  |         |        |
| zonef  | 0.1968  | -0.2257 | -0.0871 | -0.1478 | -0.0882 | -0.0241 | 0.0185  | -0.1521 | -0.1197 | -0.1621 | -0.0704 | -0.2391 | 1.0000  |        |
| zonег  | 0.0379  | -0.1623 | -0.1943 | 0.1553  | 0.2331  | 0.0909  | -0.1182 | -0.1750 | -0.1377 | -0.1864 | -0.0810 | -0.2751 | -0.2083 | 1.0000 |

## Reference

- Ariyawansa, R.G., & Udayanthika, A. G. P. I., (2011). Living in high-rise: An analysis of demand for condominium properties in Colombo. *International Journal of Sociology and Anthropology*, 4(1), 31- 37
- Avlonitis, G. J. & Kostis A. I. (2005). Pricing objectives and pricing methods in the services sector. *Journal of Services Marketing*, 19 (1), 47–57.
- Brandt, S. & Maennig, W. (2011). Road noise exposure and residential property prices: evidence from Hamburg. *Transportation Research*, 16, 23-30
- Cant, M, C., Wiid, J. & Sephapo, C. M. (2016). Key Factors Influencing Pricing Strategies For Small Business Enterprises (SMEs): Are They Important? *Journal of Applied Business Research*, (32)6, 1737-1750
- Chau, K. W., & Chin, T. L. (2002). A Critical Reveiw of the Literature on the Hedonic Pricing Model and Its aplication to the Housing Market in Penang. The Seventh Asian Real Estate Society Conference, (p. 12). Seoul, Korea
- Conroy, S., Narwold, A. & Sandy, J. (2013). The value of a floor: valuing a floor level in high-rise condominium in San Diego. *International Journal of Housing Markets and Analysis*, 96)2, 197-208
- Gordon, B., Winkler, D., Barret, J. D. & Zumpano, L. (2013). The effect of elevation and corner location on oceanfront condominium value. *The Journal of Real Estate Research*, (35)3, 345-365
- Kotler, p & Armstrong, G. (2010). *Principles of marketing*. Pinelands, Cape Town: Pearson Education South Africa.

- Lin, Z., Allen, M. T. & Carter, C. C. (2013). Pet policy and housing prices: Evidence from the Condominium market. *Journal of Real Estate Finance and Economics*, 94(7)1, 109-122
- Mok, H.M.K., Chan, P.P.K. and Cho, Y.S. (1995). A hedonic price model for private properties in Hong Kong. *Journal of Real Estate Finance & Economics*, 10, 37-48
- Moris, J. (2017). [Thai property market steady but concerns about high end speculation in Bangkok](http://www.thaia Examiner.com/thai-news-foreigners/2017/06/08/thai-property-prices-bangkok-condominiums-thailand/). Accessed on 17<sup>th</sup> April 2018 from <http://www.thaia Examiner.com/thai-news-foreigners/2017/06/08/thai-property-prices-bangkok-condominiums-thailand/>
- Peel, M. (2017). Foreign buyers lift Thai property market from doldrums. Accessed on 17<sup>th</sup> April 2018 from <https://www.ft.com/content/5c3e125a-6de8-11e7-bfeb-33fe0c5b7eaa>
- Sammut-Bonnici, T. & Channon, D. F. (2015). Pricing Strategy. Available on 17<sup>th</sup> April 2018 from [https://www.researchgate.net/publication/272352932\\_Pricing\\_Strategy](https://www.researchgate.net/publication/272352932_Pricing_Strategy)
- Sirmans, G.S., Macpherson, D.A. & Zietz, E.N. (2005). The Composition of Hedonic Pricing Models. *Journal of Real Estate Literature*, (13)1, 3-43
- Shimizu, C., Takatsuji, H., Ono, H. & Nishimura, K. G. (2010). Structural and temporal changes in the housing market and hedonic housing price indices: A case of the previously owned condominium market in the Tokyo metropolitan area. *International Journal of Housing Markets & Analysis*, (3)4, 351-368
- Shimizu, C. & Nishimura, K.G. (2007). Pricing structure in Tokyo metropolitan land markets and its structural changes: pre-bubble, bubble, and post-bubble periods. *Journal of Real Estate Finance and Economics*, 35, 476-95.

- Shimizu, C., Nishimura, K.G. and Asami, Y. (2004). Search and vacancy costs in the Tokyo housing market: attempt to measure social costs of imperfect information. *Regional and Urban Development Studies*, 16, 210-30.
- Sun, H., Tu, Y. & Yu, S. (2005). A spatio-temporal autoregressive model for multi-unit residential market analysis. *Journal of Real Estate Finance & Economics*, (31)2, 155-187
- Thinkofliving.com. Reviews of the condominium. [Online].  
<https://thinkofliving.com/category/reviews>, 15 May 2018.
- Thinkofliving.com. Strategy of real estate markets in Thailand. [Online].  
<https://thinkofliving.com/tag/%E0%B8%95%E0%B8%A5%E0%B8%B2%E0%B8%94%E0%B8%AD%E0%B8%AA%E0%B8%B1%E0%B8%87%E0%B8%AB%E0%B8%B2%E0%B8%9B%E0%B8%B5-2560>, 20 May 2018.