

A study of factors influencing the price of apartments: Evidence from Vietnam

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ABSTRACT

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The study investigates determinants important factors influencing apartment prices in Ho Chi Minh city, the biggest economic center of Vietnam. More especially, the study is conducted by collecting survey data of 124 apartments successfully traded during the first six months of 2019. Regression analysis results indicate that apartment prices were positively influenced by size of apartment, presence of balcony, presence of swimming pool, presence of shopping malls and periodic rental income or value. Moreover, proximity to the city center exerts a negative impact on apartment prices. The findings provide some empirical evidence employing survey data on apartment prices in Vietnam. The results are essential for not only Ho Chi Minh city but also other provinces in Vietnam.

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1. Introduction

Ho Chi Minh city is considered as the greatest economic center of Vietnam and has attracted a great number of inter-provincial migrants. Together with this, there has been always a stress of a rising demand for housing as well as significant fluctuations in apartment prices (Bui, 2020a). This has always worried residents and participants of housing market (Schulz & Werwatz, 2004), and confused the management in giving suitable policies (Nguyen & Bui, 2019). Hence, it is necessary to determine drivers of apartment prices, establishing the pricing model for apartments. Based on this, the management can design suitable policies and the residents are able to assess the actual value of their intentional apartments. However, it can be seen that only few empirical studies investigating this problem, especially in developing countries like Vietnam in the current literature. More than that, most of them have employed data source of house price index for the overall analysis, not the survey data on apartment prices. For example, Ibrahim and Law (2014) studied the house price index in Thailand. Lean and Smyth (2014) studied the index in Malaysia. Yuksel (2016) studied the house price index in Turkey. Funkea et al. (2018) studied the house price index in New Zealand. Li et al. (2015), Tsai (2015), Bahmani-Oskooee and Ghodsi (2018) presented some typical studies on house price index in the US. In China, many authors have studied the house price index, for example: Ding et al. (2014), Shen et al. (2016), Shi et al. (2017) and Jiang et al. (2018). In addition, several studies have analyzed house price index with data from many countries, for example: Arestis and Gonzalez (2014), Hui and Chan (2014), Lin and Fuerst (2014), Liow and Schindler (2014), Ali and Zaman (2017), Lim (2018). Motivated by this gap, the author expects this study can contribute to the current literature by establishing determinants of apartment prices in Ho Chi Minh city. More specially, the data are obtained by collecting the survey data on apartment prices in the busiest economic city of Vietnam, which is a developing country with a nascent housing market (Bui, 2019; Nguyen et al., 2019; Bui, 2020b; Bui, 2020c; Nguyen et al., 2020), so the paper is expected to reveal more interestingly unprecedented findings.

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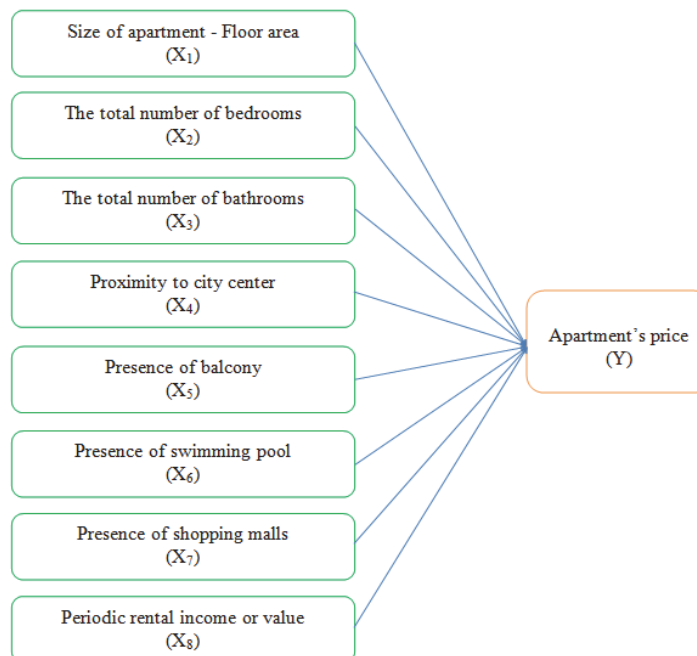
2. Literature review

In the existing empirical studies, there have been some considering factors that influence housing prices in general, and few analyzing apartment prices in particular. For example, Kain and Quigley (1970) stated that housing prices are significantly affected by the total number of bedrooms, bathrooms and size of the house. By another study, Cebula (2009) recognized the number of bedrooms, bathrooms and presence of swimming pool as influential factors on housing prices in Georgia. At the same time, Selim (2009) confirmed that house prices in Turkey is significantly influenced by presences of swimming pool, the number of bathrooms, size of the house and its location. By analyzing data of Metropolitan Lagos, Aluko (2011) reported that house prices are affected by the location of the house. From another perspective, Chung (2012) recognized rental income and other macroeconomic factors as determinants of house prices in Hong Kong. By the analysis of 100 households in Ghana, Amenyah and Afenyi (2013) concluded that rental house prices are greatly influenced by the location and size of the house, as well as its nearby facilities. In another study, Yayar and Demir (2014) revealed that house prices in Turkey are positively affected by presence of swimming pool, size of the house, proximity to central area and other comprised facilities. Also, in Turkey, Calmasur (2016) confirmed that the number of bedrooms, presence of shopping malls and other comprised facilities exert significant impact on house prices. Recently, Ndegwa (2018) stated that apartment prices in Nairobi metropolitan area are greatly affected by its size. Further, this study recognized presence of shopping malls, proximity to downtown and presence of swimming pool as influential factors of apartment prices. It can be seen that most of the existing studies have conducted an overall analysis on housing market. However, a limited number of studies have considered determinants of apartment prices, which is a big gap to be filled. To be practical, their findings are essential for the author in developing the research model in the following part.

3. Methodology

The study collected survey data of 124 apartments which were successfully traded in Ho Chi Minh city in the last six months of 2019. By the collection of data survey on apartment prices, the study is expected to provide first empirical evidence on influential factors of apartment prices in Ho Chi Minh city, which is one of its novelties. Based on the current literature, it can be recognized that apartment prices are significantly correlated to size of the apartment, the total number of bedrooms, the total number of bathrooms, proximity to central areas, presence of shopping malls and periodic rental income or value, which are comprised in this study. Moreover, presence of balcony is also included as a determinant following the analysis of Ndegwa (2018), despite the fact that its statistically significant impact could not be revealed. Due to the large population of Ho Chi Minh city, it is not popular to find a balcony in an apartment despite the considerable increase in its value with the presence of balcony. In other words, the presence of balcony probably exerts significant influence on the price of apartments in Ho Chi Minh city. Therefore, the research model is estimated as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$



Source: Proposed by the authors.

Fig. 1. Suggested research model

where:

Dependent variable (Y): Apartment's price (price per square meter).

Independent variables:

X₁: Size of apartment - Floor area (square meters).

X₂: The total number of bedrooms.

X₃: The total number of bathrooms.

X₄: Proximity to city center (Ben Thanh market particularly) (kilometers).

X₅: Presence of balcony (dummy variables 0/1).

X₆: Presence of swimming pool (dummy variables 0/1).

X₇: Presence of shopping malls (dummy variables 0/1).

X₈: Periodic rental income or value.

ε : error term.

β_i : coefficients.

β_0 : constant.

4. Empirical results

The correlation among variables are shown in Table 1:

Table 1
Variable correlations

	Y	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈
Y	1.000								
X ₁	0.172	1.000							
X ₂	0.589	0.052	1.000						
X ₃	0.540	0.029	0.744	1.000					
X ₄	-0.596	-0.002	-0.411	-0.427	1.000				
X ₅	0.766	0.129	0.486	0.446	-0.424	1.000			
X ₆	0.695	-0.004	0.540	0.486	-0.425	0.660	1.000		
X ₇	0.767	0.138	0.473	0.410	-0.368	0.511	0.474	1.000	
X ₈	0.518	-0.063	0.355	0.313	-0.265	0.553	0.376	0.359	1.000

Source: Computed by the author.

Table 1 shows that X₄ is negatively correlated to Y while the other independent variables are positively associated with Y. Next, the author conducted the regression analysis of the consumptions.

Table 2
Results of tests on multicollinearity, heteroscedasticity and autocorrelation

Multicollinearity test		Heteroscedasticity test	Autocorrelation test
Variable	VIF		
X ₂	3.92	Chi2(42) = 108.48 Prob>chi2 = 0.000***	Chi2 = 0.047 Prob>chi2 = 0.829
X ₃	3.58		
X ₅	2.46		
X ₆	2.10		
X ₇	1.56		
X ₈	1.52		
X ₄	1.38		
X ₁	1.08		
Mean = 2.20			

Note: *** indicates significance at the 1% level.

Source: Computed by the author.

Table 2 reveals that there are no serious issues of multicollinearity (mean VIF < 10). Further, the autocorrelation does not exist in the model (Prob>Chi-Square = 0.829). Nevertheless, heteroscedasticity really exists at the 1% level of significance (Prob>Chi-Square = 0.000). Ordinary Least Squares regression (OLS) is employed for the analysis. However, due to the existence of heteroscedasticity issues, robustness statistics are utilized for the estimation, following what was performed by White (1980).

Table 3
Results of the coefficient estimation

Variable	Intercept	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈
Coefficient	17.123**	0.001**	0.010	0.006	-0.027**	0.142**	0.055**	0.012**	0.048*
P> z	0.000	0.003	0.693	0.784	0.000	0.000	0.000	0.000	0.062

of observation 124 R-Square = 85.38 F(8, 115) = 163.11 Prob>F = 0.000**

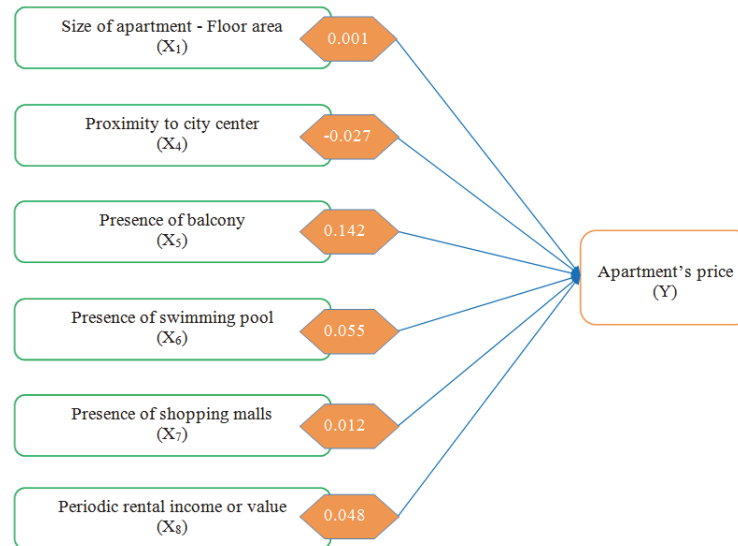
Note: * and *** indicate significance at the 10% and 1% level, respectively.

Source: Computed by the author.

It can be seen from Table 3 that the estimation results are appropriate and valid at the 1% level of significance. R-Squared is 85.38%, which means that 85.38% of variation in apartment prices could be explained by the chosen variables. Accordingly, proximity to city center (X_4) negatively influences apartment's price (Y) at the 1% significance level. Also, size of apartment (X_1), presence of balcony (X_5), presence of swimming pool (X_6), and presence of shopping malls (X_7) are positively correlated with apartment's price (Y) and significant at the 10% level. However, with the collected dataset, the author cannot find the statistically significant influence of the total number of bedrooms (X_2) and the total number of bathrooms (X_3) on apartment's price (Y).

Hence, the results of the model take the following equation:

$$Y = 17.123 + 0.001 X_1 - 0.027 X_4 + 0.142 X_5 + 0.055 X_6 + 0.012 X_7 + 0.048 X_8 + \varepsilon$$



Source: Computed by the author.

Fig. 2. Results of the coefficient estimation

Table 4

Regression results

	Hypothesis	Results
1	$X_1 \Rightarrow Y$	Accepted
2	$X_2 \Rightarrow Y$	Rejected
3	$X_3 \Rightarrow Y$	Rejected
4	$X_4 \Rightarrow Y$	Accepted
5	$X_5 \Rightarrow Y$	Accepted
6	$X_6 \Rightarrow Y$	Accepted
7	$X_7 \Rightarrow Y$	Accepted
8	$X_8 \Rightarrow Y$	Accepted

Source: Computed by the author.

Accordingly, those with wide areas, a balcony, swimming pools, proximity to shopping malls, more likely to be rented with high rental income will be more preferred and valuable. Besides, the apartments which are closer to the downtown enjoy some advantages with higher value. This is in line with what have been reported by Kain and Quigley (1970), Cebula (2009), Selim (2009), Aluko (2011), Chung (2012), Amenyah and Afenyi (2013), Yayar and Demir (2014), Calmasur (2016), and Ndegwa (2018). Nevertheless, most of the existing studies have conducted an overall analysis on house market, unlike this study which employed survey data analysis. Specially, recognizing the presence of balcony as a significant determinant of apartment prices is an unprecedented finding of this study. This highlights the importance of balcony in raising the value of apartment, which should be paid more attention by apartment designers.

5. Conclusions

From the findings of the current study, it can be concluded that apartment prices are positively affected by the presence of balcony, presence of swimming pool, presence of shopping malls and periodic rental income or value. Also, proximity to city center is negatively related to apartment prices. The results are first empirical evidence using survey data in the analysis of determinants of apartment prices in Ho Chi Minh city, and other provinces in Vietnam as well. More than that, the results are a reliable source which helps housing market's managers establish influential factors of apartment prices. They are also valuable for apartment designers in offering design solutions in order to raise the value of apartments and satisfy customer's

demands. The findings are useful for investors and residents in pricing the actual value of an apartment. Despite achieving its objectives, the study has its own limitation when not examining some determinants of apartment prices such as macroeconomic factors, specific facilities of apartment, or detailed structure of apartment. This may be an interesting proposal for future research.

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