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## IMPACTS OF INTEREST RATE ON HOUSING PRICES: EVIDENCE FROM HO CHI MINH CITY, VIETNAM

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### ABSTRACT

The paper investigates the impact of interest rate on housing prices in Ho Chi Minh city from 2009:Q1 to 2018:Q4. The author employs the Autoregressive Distributed Lag (ARDL) approach to estimate the research model. The results indicate that housing prices are significantly influenced by the interest rate in the short run and long run. Specifically, the interest rate exerts a positive impact on housing prices in the short run. However, this influence turns into negative in the long run. The study greatly succeeds in finding the impact of interest rate on housing prices in the short run and long run. Further, the results provide first empirical evidence on the correlation between interest rates and housing prices in Ho Chi Minh city as well as Vietnam, thereby being meaningful for Ho Chi Minh city as well as other provinces in Vietnam.

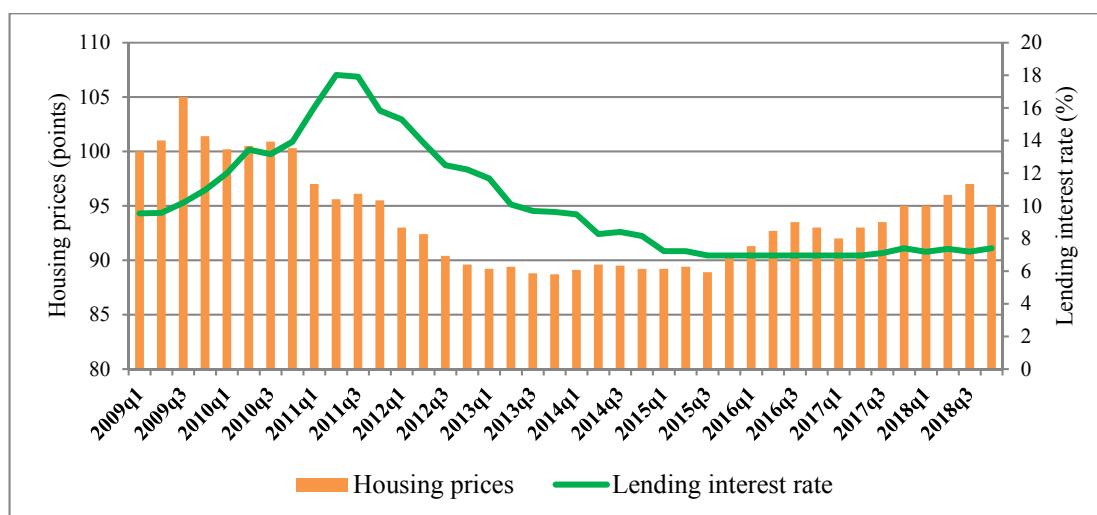
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## 1. INTRODUCTION

As the biggest economic centre of Vietnam, Ho Chi Minh city attracts more and more inter-provincial migrants. This has put more pressure on the city with the rise in infrastructure and housing demands. However, it is not always easy to purchase a house here due to the unpredictable fluctuations in housing prices. Also, considerable fluctuations in interest rate (even with high increase) make it difficult to get loans from banks (Figure 1). More than that, these fluctuations are the main root of changes in residential property prices (Tse et al., 2014).

Thus, to analyze the impact of interest rate on housing prices is essential to Ho Chi Minh city. These results provide a reliable basis for the authorities in stabilizing interest rates and boosting a sustainable housing market. In addition, this facilitates residents in need to buy a house. Nevertheless, despite its necessity, only a few existing studies have examined the influence of interest rate on housing prices in Ho Chi Minh city. Most of them have been conducted in developed countries, not developing ones like Vietnam. This is a big research gap to be filled.



**Figure 1:** Lending interest rate and housing prices in Ho Chi Minh City.

Furthermore, there exist different views on this topic. Indeed, some scholars state that interest rate exerts a negative impact on housing prices (for example, Adams & Fuss, 2010; Xu & Chen, 2012; Kengne et al., 2013; Kivedal, 2013; Engsted & Pedersen, 2014; Zhu et al., 2017). Meanwhile, it is believed that a mild rise in interest rate will enhance the housing market, which in turn raises the property prices. In other words, the interest rate is positively correlated to housing prices (for example, Wadud et al., 2012; Tse et al., 2014; Zhang et al., 2016; Gaspareniene et al., 2017; Tupenaite et al., 2017). This paper investigates the impacts of interest rate on housing prices in Ho Chi Minh City.

## 2. LITERATURE REVIEW

An interest rate is an essential tool of monetary policy. Accordingly, to control the interest rate should be one of its targets. Also, the procedure to complete a mechanism of interest rate control always ensures a monetary policy target which is economic stability. Moreover, interest rate greatly contributes to stabilizing the housing market (Tse et al., 2014; Bui, 2019b) which represents a market for properties being purchased, sold and rented, thereby forming prices. Therefore, the housing market is frequently indicated by the house price index, a statistically weighted average price of each region at a specific time (Vries et al., 2009).

The impact of interest rate on housing prices has been researched in different economies and regions. In summary, the existing literature could be divided into two following mainstreams:

**The negative impact of interest rate on housing prices:** A significant rise in the interest rate causes a decrease in the housing market. Also, it becomes more difficult for citizens to get a mortgage, which in turn negatively affects the housing prices. The negative effect of interest rate on housing prices has been revealed in many empirical studies. For instance, by analyzing data of 15 countries, Adams and Fuss (2010) reported that a 1% increase in interest rate will decrease housing demands, thereby giving a 0.3% fall to housing prices in the long run. Xu and Chen (2012) found the negative causality between the interest rate and housing prices in 70 China's large and medium cities. In the same vein, Kengne et al. (2013) also stressed that the interest rate exerts a negative influence on housing prices in South Africa. At that time, Kivedal (2013) stated that a rise in interest rate can reduce bubbles in the U.S real estate market, which is the negative effect of interest rate on house price alternatively. Further, Engsted and Pedersen (2014) concluded that interest rate is negatively

related to house prices in 18 OECD countries. In addition, it was deduced that a low-interest rate can lead to the bubble phenomenon in the property market. More recently, Zhu et al. (2017) examined data of 11 European countries and confirmed the negative effect of interest rate on housing prices.

**The positive impact of interest rate on housing prices:** Lending is one of the main activities of commercial banks, especially those in developing countries. Hence, a mild rise in interest rate (lending interest rate particularly) helps banks increase their income, thereby having sufficient financial resources to improve their services and abilities of credit supply for the housing market. This eventually stimulates a better performance of the housing market. Alternatively, the interest rate is positively related to housing prices. This positive impact has been revealed in some empirical studies. For example, Wadud et al. (2012) found the positive effect of interest rate on housing prices in Australia, which reaches a high value in the short term and afterward gradually decreases. In another research, Tse et al. (2014) stated that interest rate is positively correlated to housing prices in England. Sharing the same view, Zhang et al. (2016) also stressed that interest rate exerts a positive influence on housing prices in China's metropolises, and the impact gradually decreases from bigger cities to smaller cities. Recently, Gaspareniene et al. (2017) highlighted that 49.23% of the variation in interest rate could be explained by fluctuations in housing prices in Lithuania, significantly with positive impact. Also, Tupenaite et al. (2017) concluded on this positive causality in Litva.

Therefore, housing prices may be significantly affected by interest rates. However, a majority of empirical studies have analyzed developed countries, not developing countries. Moreover, the level of this influence still attracts different views. Thus, to find empirical evidence on the causality between the interest rate and housing prices in developing economies is essential.

### 3. DATA AND METHODOLOGY

#### 3.1 DATA

The author collects quarterly data from 2009:Q1 to 2018:Q4. In specific, data on interest rates are obtained from the International Monetary Fund (IMF) while those on housing prices of Ho Chi Minh city are collected from sources of Savills Vietnam. As a characteristic of Vietnam, Savills Vietnam is the only source that has released quarterly data on Ho Chi Minh city's housing prices since the first quarter of 2009. As a result, the author can only collect quarterly data in this period.

#### 3.2 METHODOLOGY

This study employs the Autoregressive Distributed Lag (ARDL) approach to analyze the impact of interest rate on housing prices in Ho Chi Minh city. Following earlier studies, the lending interest rate is utilized for the analysis because of its direct influence on housing prices. The model is estimated by employing the ARDL approach in order to reveal the impact of interest rate on housing prices in the short term and long term. Moreover, this approach is suitable for the model with short data series (Pahlavani et al., 2005; Bui, 2019a; Bui, 2019b), which is a characteristic of Vietnam's data.

To examine the impact of interest rate on housing prices in Ho Chi Minh city, the research model is proposed with the following models. Table 1 gives details of the variables.

**Long-term impact:**

$$HPI_t = \beta_0 + \beta_1 LIR_t + v_t \tag{1}$$

### Short-term impact:

$$\Delta HPI_t = \alpha_0 + \sum_{j=1}^k \lambda_1 \Delta HPI_{t-j} + \sum_{j=0}^k \lambda_2 \Delta LIR_{t-j} + \phi ECM_{t-1} + \varepsilon_t \quad (2).$$

Where:

*Dependent variable:* House price index (HPI).

*Independent variable:* Lending interest rate (LIR).

*Error correction mode:* ECM. The symbol  $\varepsilon$  is the model error term.

**Table 1:** Summary of variables.

Variable name	Code	Source	How to measure
House price index	HPI	Savills Vietnam	The logarithm of the house price index in Ho Chi Minh City
Lending interest rate	LIR	IMF	The lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector.

## 4. EMPIRICAL RESULTS

### 4.1 DESCRIPTIVE STATISTICS

In fact, the house price index in Ho Chi Minh city fluctuates constantly (Figure 1). Table 2, house price index in Ho Chi Minh city reached the top in the third quarter of 2009 (105 points) and the bottom in the last counterpart of 2013 (88.7 points). Meanwhile, the lending interest rate reached the highest value in the second quarter of 2011 (18.02%) and the lowest value in the third counterpart of 2015 (6.96%). Lending interest rate and house price index have gradually been stabilized recently.

**Table 2:** Descriptive statistics of all variables.

Variable	Mean	Min	Max
House price index in Ho Chi Minh city (points)	93.928	88.700	105
Lending interest rate (%)	10.094	6.960	18.020

### 4.2 DICKEY-FULLER TEST

The Augmented Dickey-Fuller test (1979) is adopted to examine the stationarity of the data series. Table 3 gives the Dickey-Fuller test result.

**Table 3:** Dickey-Fuller test.

Variable	At Level	At $\Delta$
	I(0)	I(1)
House price index (HPI)	0.575	0.000***
Lending interest rate (LIR)	0.878	0.010***

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

Table 3 shows that the data series of a house price index (HPI) and lending interest rate (LIR) become stationary after the first difference I(1) at the 1% level of significance.

### 4.3 ARDL BOUND TESTING COINTEGRATION

The lag of variables is calculated based on the Bayesian Information Criterion (BIC). Next, the ARDL bound test developed by Pesaran et al. (2001) is also used to test cointegration among the data series.

**Table 4:** ARDL bound testing cointegration.

F = 17.200									
F	10%		5%		1%		p-value		
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
	4.163	5.018	5.205	6.182	7.699	8.935	0.000***	0.000***	

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

Table 4 indicates that F values at 17.200, which is above the upper bound I(1) and significant at the 1% level. It can be deduced that there exists cointegration among the data series at the 1% level of significance. In other words, the ARDL approach performs well in testing the causality between the interest rate and housing prices in the long run and short run.

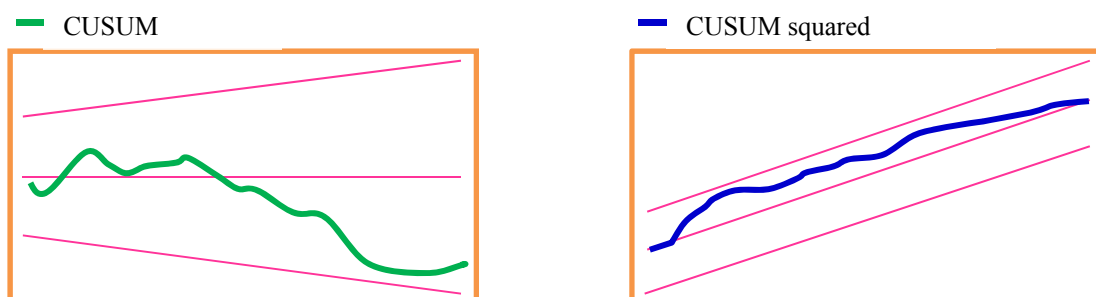
#### 4.4 RESULTS OF THE COEFFICIENT ESTIMATION

It can be seen from Table 5 that the model is significant at the 1% level (Prob>F = 0.000). R-squared is 57.31%, which means that 57.31% of fluctuations in property prices in Ho Chi Minh City could be explained by lending interest rates. The results show that there is no autocorrelation (Prob>chi2 = 0.836) and heteroskedasticity (Prob>chi2 = 0.456) issues in the model. Also, Ramsey reset test reveals that none of any important variables are not omitted (Prob>F = 0.707). The normality test concludes that the model has a standard distribution (Prob>chi2 = 0.421). Consequently, the results are valid.

**Table 5:** ARDL The long-run and short-run results.

Variable	Coef.	Prob.
Long-run results		
LIR	-0.009	0.064*
Short-run results		
$\Delta$ LIR	-0.003	0.216
$\Delta$ LIR(-1)	0.006	0.019**
$\Delta$ LIR(-2)	0.005	0.021**
ECM(-1)	-0.167	0.002***
Constant	0.771	0.001***
R-squared	57.31%	
Significance level	Prob > F = 0.000***	
Autocorrelation test	Prob > chi2 = 0.836	
Heteroskedasticity test	Prob > chi2 = 0.456	
Normality test	Prob>chi2 = 0.421	
Ramsey Reset test	Prob > F = 0.707	

Note: \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level, respectively.



**Figure 2:** Stability tests.

Next, the stability is tested by using a cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUM squared). Figure 2 indicates that both CUSUM and CUSUM squared are within the standard bound at the 5% level of significance. It can thus be concluded that the model has its stability.

From Table 5, it can be deduced that the house price index is significantly influenced by the lending interest rate in the long term and short term. Particularly, the lending interest rate exerts negative impact ( $\beta = -0.009$ ) on house price index in the long run at the 10% level of significance. However, in the short run, the influence of the house price index on the lending interest rate is positive

and significant at the 5% level. This impact is obviously expressed by the lag of one quarter ( $\lambda=0.006$ ) and two quarters ( $\lambda=0.005$ ).

Thus, in the short run, an increase in interest rate can stimulate the operation of the housing market, which in turn gives rise to housing prices. In other words, the interest rate is positively related to housing prices in the short term, which is consistent with what Wadud et al. (2012) reported. Nevertheless, in the long run, an excessive increase in interest rate can reduce the investment into the real estate market as well as make it hard for citizens to get a mortgage, leading to a fall in housing prices. The negative correlation between the interest rate and housing prices has been found in previous studies of Adams and Fuss (2010), Xu and Chen (2012), Kengne et al. (2013), Kivedal (2013), Engsted and Pedersen (2014), Zhu et al. (2017). Despite being consistent with earlier studies, an unprecedented finding of this study is revealing the impact of interest rate on housing prices in the long term and short term. More than that, this paper provides first empirical evidence on this impact in Ho Chi Minh city as well as Vietnam. Therefore, this result is meaningful to Ho Chi Minh city's authorities as well as other provinces'.

## 5. CONCLUSION

With the objective of analyzing the impact of interest rate on housing prices from 2009:Q1 to 2018:Q4, the study reveals that interest rate significantly influences housing prices in the long term and short term. Specifically, in the short run, interest rate exerts a positive impact on property prices, which is clearly expressed at the lag of one quarter and two quarters. Meanwhile, this impact turns out to be negative in the long run. The paper greatly succeeds in finding the correlation between the interest rate and housing prices in the short run and long run, which is an unprecedented finding. Further, the study provides first empirical evidence on the causality between the interest rate and property prices in Ho Chi Minh city as well as Vietnam. Based on this result, the authorities in Ho Chi Minh city, as well as those in other regions, can have a reliable foundation to stabilize interest rate in the combination with the sustainable development of the housing market. The stability of the interest rate will facilitate the house purchase of citizens, especially limiting bubbles in the market.

Despite gaining its objective, the paper still has its limitations when some variables which may be correlated to interest rate and housing prices such as economic growth, inflation, financial crisis have not been investigated. More specifically, due to the fact that Ho Chi Minh city's housing market is still nascent, data adopted are quite short and cannot be collected monthly.

## 6. DATA AND MATERIAL AVAILABILITY

Information regarding this study is available by contacting the corresponding author.

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