ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8

International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

http://TuEngr.com

Modeling the Relationship between Stock Market and Real Estate Market in Vietnam: A Time Series Analysis

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Paper ID: 12A11O

Volume 12 Issue 11

Received 26 June 2021
Received in revised form 19 August 2021
Accepted 27 August 2020
Available online 02 September 2021

Keywords:
Stock market depth; Stock market access; Stock market efficiency; Real estate market; Emerging economy; Net trading value of foreign investors (TFI); Stock market concentration.

Abstract

This paper focuses on the relationship between the stock market (SM) and the real estate market (REM) in Vietnam. This paper utilized the quarterly data of the SM and the REM over a period of more than 14 years. The Autoregressive Distributed Lag (ARDL) method is used to analyse the relationship between the SM and REM in Vietnam. This study concludes that the SM access and the SM efficiency play an important role in promoting the development of the REM in the short and long term. However, the trading value of foreign investors in Vietnam's SM is limited and unstable. This has created a negative impact on the REM in the short term. Nevertheless, this study has not found the impact of the REM on the SM in Vietnam in both short term and long term. This is, perhaps, the first paper to look into the relationship between the SM and the REM in Vietnam. In particular, this study measured the SM through the three criteria including SM depth, SM access, and SM efficiency. Compared to previous studies, the measurement used in this study is more interesting because it reflects the multi-dimensional nature of the SM.

Disciplinary: Economics, Econometrics and Finance.

Cite This Article:

Doan, T.-T. T., and Bui, T. N. (2021). Modeling the Relationship between Stock Market and Real Estate Market in Vietnam: A Time Series Analysis. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 12*(11), 12A11O, 1-10. http://TUENGR.COM/V12/12A11O.pdf DOI: 10.14456/ITJEMAST.2021.225

1 Introduction

The stock market (SM) and the real estate market (REM) have attracted a lot of attention from investors (Liu & Su, 2010; Lin & Lin, 2011; Lin & Fuerst, 2014). From a theoretical perspective, the relationship between the SM and the REM has been mentioned for a long time. In fact, the impact of the SM on the REM can be explained through the wealth effect (Markowitz, 1952; Friedman, 1957; Ando & Modigliani, 1963). Meanwhile, the REM affects the SM through the

credit effect (Ghosh et al., 1997). Therefore, there is a two-way relationship between the SM and the REM. Accordingly, the wealth effect associated with the credit effect will interact with each other and create a credit cycle effect (Petrova, 2010).

The relationship between the SM and the REM has also been of great interest in empirical studies, especially since the onset of the financial crisis in the United States in late 2007 (Tsai, 2015). However, the relationship between the SM and the REM is still very controversial, especially in terms of the impact direction of the two markets (Su, 2011; Su et al., 2011; Nguyen & Bui, 2019). Regarding the measurement of the SM, there are also many different views. Specifically, the IMF's financial development index indicates that the SM is measured through three criteria: SM depth, SM access, and SM efficiency (Svirydzenka, 2016). Meanwhile, most empirical studies measure the SM through the SM index. The measurement in previous studies may show the overall movements of the SM, but it does not reflect the complex multi-dimensional nature of the SM compared to the IMF's measurement, which is a big gap in previous studies. Moreover, most empirical studies on the relationship between the SM and the REM are found in developed economies, and there is a lack of research on this in emerging economies. For that reason, in this paper, we expect to fill the gap in the previous studies. In particular, this paper was conducted in Vietnam, an emerging economy with relatively young stock and REM. Therefore, the research results will promise to bring many interesting things and practical value to Vietnam as well as other emerging countries in the world.

2 Literature Review

The SM is the place where stocks are exchanged, bought, sold and transferred (Riyazahmed & Saravanaraj, 2015). In terms of measurement, most of the previous studies measure the SM through the stock index, which is a composite index representing the SM. In terms of the REM, it is the place where real estate transfer, leasing, consultancy and brokerage are implemented (Thu & Perera, 2011). Most of the previous studies measured the REM through the real estate price index. There are a small number of studies measuring the REM through the growth index of the REM, such as Ni and Liu (2011), Lambertini et al. (2017), Nguyen and Bui (2019).

2.1 The Impact of the SM on the REM

The impact of the SM on the REM is shown through the wealth effect. The wealth effect has been found for a long time in the studies by Markowitz (1952), Friedman (1957), Ando and Modigliani (1963). Accordingly, when the SM grows, the value of financial assets in the portfolios and the investors' profits increase. The investors will feel richer and increase spending and investment. This has led to an increase in housing demand and investment in the REM because real estate is considered both consumer goods and an investment (Kapopoulos & Siokis, 2005). Therefore, the development of the SM will lead to the development of the REM. The impact of the SM on the REM may become stronger due to the portfolio adjustment effect. Accordingly, when the SM develops, the investors will tend to adjust their portfolios by transferring a part of their capital from the SM to other markets, such as the REM (Markowitz, 1952; Kapopoulos & Siokis, 2005),

which will result in the strong growth of the REM. Overall, it can be said that SM has a positive impact on the REM. This result is also found in some empirical studies. For example, Ibrahim (2010) stated that SM has a positive impact on the REM in Thailand. Sharing the same view, Ni and Liu (2011), Ding et al. (2014) found the positive impact of the SM on the REM in China. In addition, Lean and Smyth (2014) also found the positive impact of the SM on the REM in Malaysia.

Most previous studies indicate that SM has a positive impact on the REM. However, some other views argue that the impact of the SM on the REM is negative. This shows that when the SM grows too high, the amount of capital flowing into the REM also increases, leading to the risk of forming a bubble phenomenon in the REM; simultaneously, the REM also faces the risk of a crisis and a sharp decline in the future. In addition, the portfolio adjustment to limit risks in the short term can cause the SM to decline and the REM to increase. Therefore, Tsai et al. (2011) found the negative impact of SM on the REM in the United States. At the same time, Yunus (2012) also found the negative impact of the SM on the REM in the long term in 10 developed countries in North America, Europe, Australia and Asia. Furthermore, for a fledgling SM, the appearance of foreign investors with unstable investment capital can create a negative impact on the REM in the short term. This statement was made in the study of Nguyen and Bui (2019) in analysing the data in Vietnam.

2.2 The Impact of the REM on the SM

The impact of the REM on the SM is reflected through the credit effect. The credit effect has long been mentioned in the studies by Ghosh et al. (1997), Hiang (1999), Kapopoulos and Siokis (2005). Accordingly, when the REM grows, real estate holders will become more profitable. This is because the increased real estate value will help them get easy access to loans through real estate mortgages. As a result, investors will have favourable conditions to increase investment capital into the SM, which boosts the SM. In other words, the REM has a positive impact on the SM. This impact is also found in Lin and Lin (2011) in analysing the data in Singapore and Taiwan. However, when the REM is in crisis, it will have a great impact on the SM. This is clearly demonstrated through the financial crisis in the United States in late 2007 (Bahmani-Oskooee & Ghodsi, 2018).

2.3 The Two-way Relationship between the SM and the REM

There is a two-way relationship between the SM and the REM. This means that the SM affects the REM through the wealth effect. At the same time, there is a negative impact of the REM on the SM through the credit effect. Accordingly, the wealth effect associated with the credit effect will interact with each other and create a credit cycle effect (Petrova, 2010).

Many studies have found a positive relationship between SM and REM. For example, Su (2011) argued that the REM has a positive impact on the SM in Germany, the Netherlands, and the United Kingdom. At the same time, this study also found a positive impact of the SM on the REM in Belgium and Italy. In another study, Su et al. (2011) found a positive relationship between the SM and the REM in Spain and France. Moreover, this paper also found a statistically significant impact of the REM on the SM in the United Kingdom and the Netherlands. At the same time, the SM has a

statistically significant impact on the REM in Belgium. Hui et al. (2011), Hui and Chan (2014) found a positive relationship between the SM and the REM in Hong Kong and the United Kingdom. In particular, Hui and Chan (2014) also stated that the shocks from the financial crisis in the United States will spread to Hong Kong and the United Kingdom, and compared to the REM, this spread to the SM will be higher. In the same opinion, Heaney and Srianantha kumar (2012) said that SM has a positive relationship with the REM in Australia, and this relationship is most evident in the global financial crisis. In addition, Tsai (2015), Bahmani-Oskooee and Ghodsi (2018) also found a positive relationship between the SM and the REM in the United States.

However, some other studies suggested that SM has a negative relationship with REM. Accordingly, when the increased capital from the SM is transferred to the REM, the REM will face the risk of a crisis and a sharp decline in the future. This is also shown in the opposite direction. Indeed, Liu and Su (2010) found a negative relationship between SM and REM in China. The negative relationship between the SM and the REM was also found in the study of Li et al. (2015) in analyzing the data in the United States, or the study of Ali and Zaman (2017) in analyzing the data in many countries. Meanwhile, Shi et al. (2017), when analyzing the data in China, stated that the SM has a positive impact on the REM, but the REM has a negative impact on the SM.

3 Data and Methodology

3.1 Data

In order to carry out this study, we conducted data collection in Vietnam, from 2004:Q3 to 2018:Q4. In particular, the data on the SM were collected from the State Securities Commission of Vietnam (SSC). For the data on the REM, we gathered the data from the General Statistics Office of Vietnam (GSO). Vietnam is an emerging economy, with relatively young stock and REM; thus, we can only collect the data on a quarterly basis during the research period. This is because Vietnam's REM was officially formed when the 2003 Land Law was passed (this law took effect from July 1, 2004). For Vietnam's SM, this market officially came into operation on July 28, 2000. However, in the end of 2004, the size and operational efficiency of Vietnam's SM improved dramatically.

3.2 Methodology

We used the Autoregressive Distributed Lag (ARDL) method to analyse the relationship between the SM and REM in Vietnam. The ARDL method was proposed by Pesaran et al. (2001). This method has also been used in several previous studies, such as Lean and Smyth (2014), Bahmani-Oskooee and Ghodsi (2018), Nguyen and Bui (2019).

In this paper, we measure the REM through the quarterly growth of the real estate business. This index is also found in the studies by Ni and Liu (2011), Lambertini et al. (2017), Nguyen and Bui (2019).

For the SM, we measured it through the SM index (SMI), which is a composite index reflecting the movements of the SM, and this index is also used in most previous studies. In addition, we measured the SM through three criteria: SM depth, SM access, and SM efficiency. This

measurement is based on the IMF's financial development index, which is a new feature of this study compared to previous studies. In particular, the market depth (MD) is measured by dividing the total average market capitalization in the period by GDP. We used the SM concentration index (TOP10) to represent the SM access, which is measured by dividing the total market capitalization of the ten largest enterprises in the SM by the total value of all listed shares in the SM. Therefore, the high TOP10 will indicate the low SM access and vice versa. The SM efficiency (ME) is measured by dividing the total value of shares traded in the period by the average market capitalization in the period. Based on the previous study by Nguyen and Bui (2019), we also included the net trading value of foreign investors (TFI) in the research model to measure SM efficiency from the perspective of international integration. Through these indicators, we expect to reflect the complex multi-dimensional nature of the SM.

In addition, we included the control variable of the global financial crisis (GFC) in the research model. The reality shows that the global financial crisis plays a significant role in the relationship between the SM and the REM in each nation. This is also mentioned in the studies by Heaney and Srianantha kumar (2012), Hui and Chan (2014), Nguyen and Bui (2019). The global financial crisis occurred in the third quarter of 2007 (Kapan & Minoiu, 2018) and lasted until the first quarter of 2013 (Cayon et al., 2017). In particular, it includes the Great Recession in the United States (Kapan & Minoiu, 2018) and the European sovereign debt crisis (Hui & Chan, 2014). Based on this, we measured the GFC through the dummy variable. Specifically, GFC receives a value of 1 for the periods of the global financial crisis (from 2007:Q3 to 2013:Q1) and receives a value of 0 for the remaining periods.

Model 1: The impact of the SM on the REM:

$$REM = f(SM, GFC) \quad (1).$$

Model 2: The impact of the REM on the SM:

$$SM = f(REM, GFC) \quad (2).$$

Whereby the REM is measured by quarterly growth of real estate business. The SM is measured through SM index (SMI), SM depth (SMD), SM concentration (TOP10), SM efficiency (SME), the net trading value of foreign investors (TFI). Therefore, the impact of the REM on the SM is divided into specific models: Model 2a (dependent variable: SMI), Model 2b (dependent variable: SMD), Model 2c (dependent variable: TOP10), Model 2d (dependent variable: SME), Model 2e (dependent variable: TFI). The control variable of the global financial crisis (GFC) represents the global macroeconomic shocks.

4 Empirical Analysis

To test the cointegration between the data series in each research model, we used the bound test method proposed by Pesaran et al. (2001). Table 1 shows that there is a cointegration relationship between the data series in Model 1 at the 10% significance level. However, we have not found a cointegration relationship between the data series in the remaining models. Therefore, we

used the ARDL method to analyse Model 1, thereby finding the impact of the SM on the REM in the short and long term.

Table 1: Results of the cointegration test

Models	p-value	
	I(0)	I(1)
Model 1: The impact of the SM on the REM	0.00***	0.07*
Model 2a: The impact of the REM on the SMI	0.06*	0.15
Model 2b: The impact of the REM on the SMD	0.12	0.26
Model 2c: The impact of the REM on the TOP10	0.11	0.24
Model 2d: The impact of the REM on the SME	0.16	0.31
Model 2e: The impact of the REM on the TFI	0.04**	0.11
Note: *** significant at 1%, ** significant at 5%, *** significant at 10%.		

Table 2: Estimation results of the research model

Variable	Coef.	P>|z|
Long-run results		
SMI	0.03	0.25
SMD	0.01	0.35
TOP10	-0.08**	0.05
SME	0.02**	0.04
TFI	0.04	0.68
GFC	-0.02**	0.03
Short-run results		
ΔSMI	0.02	0.27
ΔSMD	0.01	0.34
Δ TOP10	-0.04*	0.07
ΔSME	0.01*	0.07
ΔTFI	-0.08**	0.02
ΔGFC	-0.01**	0.03
ECM(-1)	-0.42***	0.00
Constant	-0.01	0.96
R-squared	46.45%	
Significance level	0.00***	
White's test	0.13	
Breusch-Godfrey LM test	0.56	
Ramsey reset test	0.97	
Note: *** significant at 1%, ** significant at 5%, *** significant at 10%. ECM is error correction mode.		

Table 2 shows that the estimation results in Model 1 are appropriate. Indeed, Model 1 is statistically significant. Furthermore, the White's test and the Breusch-Godfrey LM test show that the research model is not subject to heteroskedasticity and autocorrelation. In addition, the Ramsey reset test also shows that the research model does not miss important variables. The R-squared coefficient of Model 1 is 46.45%. This shows that the SM explains 46.45% of the volatility of the REM.

Overall, the REM is negatively affected by the TOP10 in the short term (λ = -0.04) and the long term (π = -0.08). At the same time, the SME has a positive impact on the REM in the short term (λ = 0.01) and the long term (π = 0.02). In addition, we find the negative impact (λ = -0.08) of the TFI on the REM in the short term. For the control variable representing the GFC, we find the negative impact of the GFC on the REM in the short term (λ = -0.01) and the long term (π = -0.02). With the collected data, we have not found a statistically significant impact of the SMI and the SMD on the REM.

- *The impact of the TOP10 on the REM:* The results of the research model show that TOP10 negatively affects REM in the short and long term. Meanwhile, high TOP10 will reflect the low SM access and vice versa. Therefore, SM access plays a role in stimulating the development of the REM. This is our new finding as compared to previous studies. As TOP10 increases, the difference in size between large enterprises (10 largest enterprises) and the rest of the SM will be big. These large enterprises promote the development of the SM, and this role is clearly shown in a fledgling SM like Vietnam's SM. However, this may create difficulties for new issuers when entering the SM. At the same time, investors also face many potential risks because the influence of large enterprises on the market is high. As the SM access increases (decreased TOP10), the enterprises will be more equal in the SM, and the investors in the SM will have more investment options in order to increase income. According to the wealth effect, as the income and assets of investors increase, their demand for housing also increases. Simultaneously, they will tend to increase investments and adjust their portfolios by transferring a part of the capital from the SM to other investment channels, such as the REM, leading to the development of the REM.

- *The impact of the SME on the REM:* We find the positive impact of SME on REM in the short and long term. This result shows that the efficient SM and increased liquidity will have a positive impact on the REM. Indeed, when the SM develops and brings high efficiency, the capital from the SM to the REM will increase. Meanwhile, the SM efficiency will increase the assets and income of investors, and they will tend to adjust the investment portfolios and transfer a part of the capital from the SM to the REM. This has contributed significantly to stimulating the development of the REM. The positive impact of SME on REM is our new finding as compared to previous studies. However, this impact is also very consistent with the wealth effect and the portfolio adjustment effect that we found in previous studies.

- *The impact of the TFI on REM:* In the short term, REM is negatively affected by TFI. This result is consistent with the previous statement of Nguyen and Bui (2019). Vietnam's SM is still young; hence, the trading value of foreign investors is limited. Simultaneously, the capital from the SM is unstable; thus, it has not brought positive results through the sustainable supply of medium-term and long-term capital for the REM. When foreign investors are net buyers, domestic investors will act as net buyers (Bekaert et al, 2017). However, the trading value of foreign investors in Vietnam's SM is unstable (especially when the economy is facing many difficulties), which has created negative impacts on the SM as well as domestic investors' income. When the income and

assets of investors decrease, they will limit spending and investment, leading to a decrease in the capital flowing into the REM; thus, the REM also decreases.

5 Conclusion

In this paper, we used the ARDL method to examine the relationship between the SM and the REM in Vietnam. In particular, the SM is measured through three criteria: SM depth, SM access, and SM efficiency. By this measurement, we can examine the SM from different perspectives, instead of just using the SM index as in previous studies, which is a new feature of the research paper as compared to previous studies. We have achieved great success in finding the significant impact of the SM on the REM in the short and long term. Specifically, the REM is positively affected by SM access and SM efficiency in the short and long term, which is our new finding as compared to previous studies. In addition, the net trading value of foreign investors creates a negative impact on the REM in the short term. Moreover, we also find the negative impact of the global financial crisis on the REM in the short and long term. However, we have not found the impact of the REM on the SM in Vietnam in the short term and long term. The results of this study are the first empirical evidence to show the impact of the SM on the REM in Vietnam, an emerging economy with relatively young stock and REM. Therefore, in this research, the results are not only important for Vietnam, but also of practical value to other emerging economies around the world. Thanks to this, policymakers will have a more comprehensive view of the relationship between the SM and the REM in Vietnam.

6 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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