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THE FINANCIAL ACCESSIBILITY AND CASH FLOW MOVEMENT BETWEEN THE STOCK MARKET AND REAL ESTATE MARKET: A CASE STUDY OF VIETNAMESE MARKETS

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Abstract

Research on cash flow movements between markets is vital for understanding the impact of capital allocation on economic growth. It helps identify leading and lagging sectors, guiding targeted policy interventions and ensuring effective resource allocation to achieve national goals such as sustainable development and job creation. This study employs an Autoregressive Distributed Lag (ARDL) model combined with a newly introduced variable to investigate the cash flow movements between markets in Vietnam from 2007 to 2021. The results show that when a real estate market grows, investors tend to withdraw capital from the stock market to invest in real estate, but conversely, when the stock market grows, there are no signs of cash flow from real estate to securities. In addition, financial accessibility is shown to have a positive impact on both the real estate market and the stock market. When investors can easily access capital sources, indicated through increases in issuing bonds, borrowing from commercial banks, or the density of bank branches per 100,000 adults, they will prefer real estate investment over securities. The research results are robust across different regression models, such as OLS, Fama-MacBeth, Weighted least squares, and Newey-West.

Keywords: *cash flow movement; stock market; real estate market, financial accessibility.*

1. INTRODUCTION

The ULI Asia Pacific Home Attainability Index 2023 reveals that Vietnamese property prices rank among the world's highest. In Ho Chi Minh City, the disparity index between house prices and income stands at 32.5, surpassing Beijing, Shanghai, and Hong Kong. Meanwhile, Hanoi's index is 18.3, higher than Seoul, Tokyo, and Singapore's commercial housing (Table 1). Real estate investment remains attractive due to market characteristics, but financial constraints impact participation. Improved financial access stimulates real estate activity, fostering investment opportunities and market development.

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Table 1. The Disparity Index Between House Prices and Income

City	Population (thousand people)	Median/Average home price (US$ per unit)	Median annual household income (US$ per year)	Median/Average home price to median annual Household income
Shanghai	24,759	487,889	20,240	24.1
Beijing	21,843	573,271	19,597	29.3
Hong Kong	7,333	1,155,760	43,674	26.5
Tokyo (Ku Area)	9,745	626,502	35,253	17.8
Singapore	5,637	1,200,087	87,900	13.7
Seoul	9,472	528,831	30,588	17.3
Busan	3,324	206,796	26,284	7.9
Hanoi	8,331	182,290	9,967	18.3
Ho Chi Minh	9,167	296,063	9,120	32.5
Hai Phong	2,072	160,297	7,476	21.4

Source: The ULI Asia Pacific Home Attainability Index 2023

According to Bah (2018), access to financial resources determines a household's decision for buying, building or renting a house; on the supply side, real estate companies require financial resources to construct housing projects which meet the social demand for housing. Economists (World Bank, 2009) argue that access to finance plays an important role in the value chain of housing provision; access to finance contributes to the development and diversification of the real estate market, thereby affecting the stability of the financial and economic system of the country.

Similarly, access to finance plays an important role in promoting investment activities in the stock market. People with better access to finance can usually participate in stock trading transactions more flexibly and efficiently. This can create a balanced and positive effect in the supply and demand in the stock market, as well as affect the prices and liquidity of the stocks. The correlation between access to finance and the stock market is also reflected in changes of the value of financial assets. When capital is easily accessible with low interest rates, investors tend to increase their trading activities in the stock market. This can lead to enhanced volatility of stock prices and even increase financial risks.

Many studies have demonstrated the relationship between the stock market and the real estate market (Ling & Naranjo, 1999; Okunev & Wilson, 1997). However, to the best of the author's knowledge, there has not been any study that proves the capital flow shifts of investors between the two markets of stocks and real estate. Furthermore, the outcomes of these studies remain contentious, with certain authors asserting an inverse correlation, while others contend for a positive connection. Nevertheless, a significant number of prior investigations solely assessed financial development based on financial efficiency or the extent and stability of the stock market, omitting any reference to financial access (Sarwar et al, 2021). Meanwhile, literature on the real estate market is predominantly focused on developed countries, leaving a significant gap in understanding emerging markets such as Vietnam. Vietnam presents a unique case of a highly active and expensive real estate market, with its house price-to-income ratio being among the highest in the world (Worldbank 2022). This study addresses the research gaps by introducing a new variable that captures the movements of investors' cash flows between the two markets. Additionally, this study examines the role of financial access in shaping the stock and real estate markets, while also offering fresh insight into an under-researched emerging market, namely Vietnam.

Some of the results found in this study have not been addressed in any previous study. (1) Cash flow moves from the stock market to the real estate market when investors feel that the profitability potential of the real estate market is more attractive. The cash flow that moves from the stock market to the real estate market often comes from protecting against stock market volatility and taking advantage of growth opportunities from real estate assets. (2) There is no evidence that cash flows reverse from the real estate market to the stock market, which is explained by the tradition of investing in real estate as an asset and saving it for future generations. (3) There is a positive impact of financial accessibility on real estate and the stock market. (4) However, under favorable conditions, such as low interest rates, and easy access to finance, investors tend to invest in the real estate market more than in the stock market.

The cash flow between the real estate and the stock market has implications for other sectors of the economy. For example, the real estate market stimulates the development of construction and raw materials industries (e.g. cement, iron, steel, stone, machinery, and sand mining). Meanwhile, the stock market facilitates the capital mobilization of manufacturing enterprises, which can expand production, create jobs and increase GDP. Therefore, the research results are significant, as they can help policymakers to regulate the cash flow across industries to achieve national goals in different periods.

2. LITERATURE

While the impact of financial access on the real estate market has not been extensively studied, other research has explored the connection between financial stability and the real estate market. For instance, Zhang et al. (2018) highlighted how the subprime mortgage crisis in the US demonstrated that the real estate market can trigger instability in the banking sector. Excessive lending by commercial banks to the real estate sector resulted in a surge of non-performing loans, leading to financial instability. Similarly, Jiang et al. (2018) asserted that a decline in the real estate market can pose financial risks, including insolvency for investors and financial institutions involved in real estate. However, Liu et al. (2019) who analyzed the relationship in China, found a bidirectional link between financial stability and the real estate market, with financial stability having a greater impact on the market than vice versa. Meanwhile, Claessens & Laeven (2003) demonstrated that interest rates are the main factor driving the development of the real estate market, specifically when finance is available and interest rates are low, buyers can borrow more easily to purchase houses and real estate. This can stimulate the demand for real estate and positively affect the real estate market. Another group of researchers observed the development of the real estate market from the perspective of financial depth (Bunda & Zorzi, 2010; Shen et al., 2016), finding that financial depth has a close relationship with real estate market growth. Specifically: domestic credit to the private sector has a positive relationship with real estate market growth in the long term. Conversely, in the short term, real estate market development (RED) has a positive impact on foreign credit to the private sector. This suggests that when the banking sector increases the supply of credit to the economy, the amount of capital accessible to the private sector (households and non-financial organizations) will increase, thereby stimulating consumption and investment. At the same time, demand for housing and investment in the real estate market will also increase, leading to real estate market development.

Liang and Cao (2007) assert that the stock market significantly impacts real estate prices by shaping macroeconomic conditions. They argue that during periods of stock market and financial sector prosperity, individuals and investors have greater resources and incentives to invest in real estate. Xu and Chen (2012) studied the relationship between credit policy, the stock market, and real estate across 70 Chinese cities, finding a positive correlation among these factors. Similarly, Choi and Park (2017) analyzed 23 countries, revealing that a robust

stock market relative to the banking sector fosters real estate market growth, also confirming the positive effects of economic growth and consumer price index on real estate. Quang et al. (2023) demonstrated a bidirectional causal link between the stock and real estate markets. In the medium term, a decline in the stock market's size and total value ratio correlates with a subsequent real estate market decline. However, this influence is projected to diminish over the long term. Conversely, the impact of the turnover ratio on the real estate market is anticipated to steadily increase in the long run.

Meanwhile, Okunev & Wilson (1997) introduced an alternate approach to examining the potential cointegration of the real estate and stock markets. In their unconventional method, they incorporated a stochastic trend term instead of a predetermined drift term. This nonlinear assessment stands in contrast to conventional cointegration tests. The outcomes of this nonlinear model were then juxtaposed against those derived from traditional cointegration tests. The results of the cointegration analysis aligned with the perspective that the real estate and stock markets exist as distinct entities, indicating segmentation. Conversely, outcomes of the nonlinear model suggest a fractional integration between the markets. This implies a nonlinear interrelation between the real estate and stock markets, characterized by a gradual convergence of the real estate market towards the stock market. The divergence between these two markets could endure for extended periods.

In a different study, Feng el al. (2017) examined the patterns of global capital movement in relation to both the real estate and stock markets in India. The findings revealed that changes in the housing price index could be seen as a predictor of the flow of Foreign Direct Investment (FDI) into India. However, the reverse relationship was not observed – fluctuations in FDI did not serve as predictors of changes in the housing market. Interestingly, when considering the combined effects of FDI and Foreign Indirect Investment (FII), there is a delayed influence on the housing sector. In contrast, the study found that FII flows do not have a predictive influence on stock market returns. Additionally, it was observed that stock market returns do not act as predictors for FII flows into India.

Based on the studies mentioned above, no specific measurement of the capital flow shift between the real estate and stock markets is observed, nor is there any direct assessment of the impact of financial access on the development of these markets. Therefore, the objective of this paper is to address these two issues.

3. METHODOLOGY

3. 1 Data

The monthly time-series data in this paper were collected from 2007 to 2021. The data on real estate market growth and macroeconomic variables were obtained from the General Statistics Office of Vietnam (GSO). The data on financial access was derived from various sources such as Finnpro, IMF, World Bank, and GSO. The stock market-related data were gathered from a source provided by the State Securities Commission (SSC). Furthermore, supplementary data from the annual reports of the State Bank of Vietnam was employed to cross-validate the accuracy level of the data.

3.2 Measurement and Hypothesis

Drawing upon the research conducted by Inoue and Hamori (2016) and Nasreen et al. (2020), this study employed a comprehensive metric to gauge financial market access. This metric encompassed the following dimensions:

Firstly, financial market access was evaluated through the calculation of the ratio of the mean market capitalization during a specified period, excluding the ten largest companies, to the mean market capitalization of the entire market over the same period. In essence, this approach captures the extent to which enterprises outside the realm of the ten most sizable companies contribute to the overall capitalization of the market. More specifically, this ratio can be represented as M10, where M10 is computed as follows:

$$M10 = 1 - \frac{Average\ market\ capitlalizatio\ of\ top\ 10\ companies}{Average\ market\ capitalization\ of\ entire\ marrket} \quad (1)$$

A higher M10 index indicates reduced capitalization disparity between large and small companies, facilitating access to capital for smaller firms. Consequently, a higher M10 index signifies increased financial access for businesses, while a lower index suggests limited financial accessibility.

Furthermore, in this study the assessment of financial accessibility is extended through a multifaceted approach, encompassing the subsequent dimensions: Bond Issuers; Density of Commercial Bank Branches; Per Capita Density of Commercial Bank Branches; Proportion of Outstanding Bank Loans to GDP; Proportion of Outstanding Bank Deposits to GDP; Average Lending Interest Rate of Commercial Banks.

Based on the investigations conducted by Ni and Liu (2011), and Assaf et al. (2014), this study undertakes an evaluation of the real estate market's dynamics through the utilization of the Real Estate Market Development Index (RED), disseminated by the General Statistics Office of Vietnam. The RED index measures quarterly growth in consumption and investment activities in the real estate sector compared to the previous year. The study examines how consumption and investment trends interact with each other and with economic fluctuations over time.

$$RED = I + C \quad (2)$$

Where: I is the total value of investment by enterprises and households in real estate (such as buying real estate, or investing in real estate construction). C is the total consumption expenditure of households on real estate (such as rental costs). RED indicates the growth rate in the market value of real estate through investment and rental activities. In other words, this index reflects the overall transactions in the real estate market, which is more comprehensive than the other indices used in some previous studies (e.g. real estate price index, and real estate price/m^2)

To assess the development of the stock market, the authors employ indicators such as the market capitalization scale, market liquidity, and stock market volatility. The market capitalization scale is gauged through the ratio of the average market capitalization during the period to the total domestic output (Pradhan et al., 2014; Nasreen et al., 2020). Market liquidity is measured by the aggregate value of transactions in the market divided by Gross Domestic Product (GDP) (Bundoo, 2017). Market volatility, also known as stock market volatility, is quantified by the standard deviation of the VN Index (market return) within the given period (Balomenou et al., 2020).

Improving access to finance can facilitate the capital inflow to the real estate market and the stock market, thereby stimulating their growth. In addition, the development of the real estate market can enhance the creditworthiness of businesses that own real estate, enabling them to borrow more from banks and expand their scale. Similarly, the development of the stock market can increase the asset size of businesses, making it easier for them to issue stocks or bonds and to raise capital. Hence, access to finance may have a positive relationship with

both the real estate market and the stock market. Based on this reasoning, the following research hypotheses are proposed:

Hypothesis H1: There is a positive relationship between financial accessibility and real estate market development.
Hypothesis H2: There is a positive relationship between financial accessibility and the stock market development.

We construct the cash flow variable (CFM) between the two markets as the ratio of the total outstanding loans for real estate to the total outstanding loans for securities investment in the banking system. This variable captures the direction and magnitude of cash flow between the stock market and the real estate market. A higher value of CFM indicates that more cash is flowing from the stock market to the real estate market, and vice versa. The following hypotheses are raised accordingly:
Hypothesis H3: The development of the real estate market leads to an increase in cash flow movement (CFM), indicating a shift of capital from the stock market to the real estate market.
Hypothesis H4: The development of the stock market leads to a decrease in cash flow movement (CFM), indicating a shift of capital from the real estate market to the stock market.

In Vietnam, the real estate investment channel is still considered more popular and preferred than other investment channels such as stocks, bonds, and cryptocurrencies as experience shows that the real estate market has increased continuously for the past 30 years (World Bank, 2022). The majority of Vietnamese people believe that "people can give birth, but land cannot lay". People and families buy real estate when they have idle money, and consider real estate as an asset to save (dowry) for posterity. Therefore, the following hypothesis is proposed accordingly:

Hypothesis H5: When access to finance is favorable, cash flow from investors will prioritize the real estate market over the stock market.

The Autoregressive Distributed Lag (ARDL) model is applied in this paper as it is highly appropriate for analyzing time series data when both short-term dynamics and long-term relationships need to be explored, especially with variables of mixed integration order. Its flexibility and robustness make it a valuable tool in econometrics and various fields which require time series analysis. The recommended models are as follows:

$$RED = f(RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}, M10, TDI, Bbr^{km}, Bbr^{ad}, OL, OD, IR, M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}) \quad \text{(model 1)}$$

$$SMC = f(RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}, M10, TDI, Bbr^{km}, Bbr^{ad}, OL, OD, IR, M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}) \quad \text{(model 2)}$$

$$SML = f(RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}, M10, TDI, Bbr^{km}, Bbr^{ad}, OL, OD, IR, M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}) \quad \text{(model 3)}$$

$$SMV = f(RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}, M10, TDI, Bbr^{km}, Bbr^{ad}, OL, OD, IR, M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}) \quad \text{(model 4)}$$

$$CFM = f(RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}, M10, TDI, Bbr^{km}, Bbr^{ad}, OL, OD, IR, M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}) \quad \text{(model 5)}$$

$$M10 = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 6)}$$

$$TDI = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 7)}$$

$$Bbr^{km} = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 8)}$$

$$Bbr^{ad} = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 9)}$$

$$OL = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 10)}$$

$$OD = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 11)}$$

$$IR = f(M10_{t-1}, TDI_{t-1}, Bbr^{km}_{t-1}, Bbr^{ad}_{t-1}, OL_{t-1}, OD_{t-1}, IR_{t-1}, RED, SMC, SML, SMV, CFM, RED_{t-1}, SMC_{t-1}, SML_{t-1}, SMV_{t-1}, CFM_{t-1}) \quad \text{(model 12)}$$

All variables are explained in table 2.

Table 2. Variable Descriptions

Variables	Description	Source
RED	Real estate market development, is calculated by the total investment value of companies and households in the real estate market + total consumption expenditure of companies in the real estate market	GSO
SMC	Stock market capitalization, calculated by total market value to GDP	State Securities Committee
SML	Stock market liquidity is calculated by dividing the total market trade value by GDP.	Own calculation
SMV	Stock market volatility, measured by the standard deviation of the VN Index (market return).	State Securities Committee
CFM	Cash flow movement, measured by total outstanding loans for real estate divided by total outstanding loans for securities investment in the economy.	Finnpro, GSO
M10	Financial accessibility of firms, measured by the average market capitalization (excluding the 10 largest firms) divided by the average market capitalization (of the entire market). See formula (1).	Own calculation
TDI	Financial accessibility is evaluated through the total number of debt issuers.	State Securities Committee
Bbr^{km}	Financial accessibility is evaluated through the number of commercial bank branches per 1,000 square kilometers.	IMF, WB, STB
Bbr^{ad}	Financial accessibility is evaluated through the number of commercial bank branches per 100,000 adults.	IMF, WB, STB
OL	Financial accessibility is evaluated through outstanding loans from commercial banks (percentage of GDP).	IMF, WB, STB
OD	Financial accessibility is evaluated through outstanding deposits with commercial banks (percentage of GDP).	IMF, WB, STB
IR	Financial accessibility is assessed through the average lending interest rate of commercial banks for a one-year term.	State bank of Vietnam

4. EMPIRICAL RESULTS AND DISCUSSION

Data for the study were gathered on a monthly basis, covering the period from January 2007 to April 2021, resulting in a total of 172 observations. Table 3 provides the statistical outcomes detailing the variables employed in the research models.

Table 3. Descriptive Statistics

Variable	Mean	Max	Min	Std
RED	0.035	0.051	0.026	0.006
SMC	1.315	6.018	0.482	0.799
SML	0.002	0.009	0.000	0.001
SMV	0.000	0.001	0.000	0.000
CFM	0.633	1.230	0.292	0.023
M10	0.916	1.549	0.689	0.178
TDI	120	271	98	9.021
Bbr^{km}	2.511	4.001	1.812	0.022
Bbr^{ad}	2.622	4.023	2.921	0.023
OL	10.02	11.53	9.350	0.013
OD	9.019	10.10	8.540	0.008
IR	7.532	7.721	6,109	0.012

Table 3 provides the initial descriptive statistics for the variables used in the research model. For instance, the "RED" variable ranges from a minimum of 0.026 to a maximum of 0.051, while the "SMC" variable spans from 0.482 to 6.018. Regarding financial accessibility, "M10" ranges from 0.689 to 1,549. The mean count of issuers during the study period is 120, peaking at 271 issuers in a single year. On average, there are 2.5 commercial bank branches per 1,000 km and 2.6 branches per 100,000 adults. Additionally, outstanding loans and deposits from commercial banks constitute 10.02% and 9.01% of the GDP, respectively.

In order to see the correlation between the variables, the author conducts the correlation analysis between the variables in the research model. The results of the correlation analysis are presented in Table 4:

Table 4. Correlations of Variables

	RED	SMC	SML	SMV	CFV	M10	TDI	Bbr^{km}	Bbr^{ad}	OL	OD	IR
RED	1											
SMC	0.35^{**}	1										
SML	0.21^{**}	0.29^{**}	1									
SMV	0.31^{**}	0.36^{**}	0.22^{**}	1								
CFV	0.12^{**}	0.23^{**}	0.34^{**}	0.32^{*}	1							
M10	0.20^{*}	0.33^{**}	0.20^{**}	0.28^{*}	0.27^{*}	1						
TDI	0.12^{**}	0.18^{**}	0.20^{**}	0.18^{**}	0.26^{*}	0.22^{*}	1					
Bbr^{km}	0.30^{*}	0.32^{**}	0.10^{**}	0.18^{*}	0.21^{*}	0.08^{**}	0.36^{*}	1				
Bbr^{ad}	0.09^{***}	0.08^{**}	0.13^{**}	0.11^{**}	0.17^{*}	0.10^{**}	0.20^{*}	0.22^{*}	1			
OL	0.38^{*}	0.35^{*}	0.31^{*}	0.29^{*}	0.02^{*}	0.26^{*}	0.10^{*}	0.19^{*}	0.32^{*}	1		
OD	0.21^{**}	0.20^{**}	0.19^{*}	0.09^{**}	0.06^{**}	0.13^{**}	0.21^{*}	0.30^{*}	0.29^{*}	0.36^{*}	1	
IR	-0.43^{**}	-0.31^{**}	-0.20^{**}	-0.26^{**}	-0.03^{*}	-0.42^{*}	-0.12^{*}	-0.02	-0.08	-0.21^{*}	-0.25^{*}	1

Table 4 shows that, variables representing financial access such as M10, TDI, Bbr^{km}, Bbr^{ad}, OL, and OD, are positively correlated with the development level of the real estate

market. Similarly, variables representing stock market development and cash flow are also positively correlated. In contrast, the interest rate variable is negatively correlated with most of the variables in the model. On the other hand, the correlations between variables are relatively low (the highest value is 0.43), so there is no serious multicollinearity issue in the research model.

Econometric methods recommend taking seasonality into account while working with time series that have a monthly frequency. Consequently, it is essential to make the seasonal factor adjustments to the monthly time series for the RED dataset. After removing the seasonal factor, the augmented Dickey-Fuller (ADF) unit root test was used to check the stationarity of the time series. Panel A in Table 5 shows that the time series of variables such as RED, SMC, SML, SMV, and M10 are stationary in the original data. The time series of other variables such as CFV, TDI, Bbr^{km}, Bbr^{ad}, IR, OL, and OD are stationary at the first differences (Table 5, panel B).

Table 5. The Augmented Dickey-Fuller Unit Root Tests

Variable	t-statistic	ADF test statistic			Stationary
		1% level	5% level	10% level	
Panel A: Original time series data					
RED	-14.27	-3.480	-2.884	-2.574	Yes
SMC	-11.91	-3.488	-2.883	-2.550	Yes
SML	-7.652	-3.543	-2.847	-2.667	Yes
SMV	-9.003	-3.828	-2.708	-2.001	Yes
M10	-10.74	-3.551	-2.916	-2.591	Yes
Panel B: Time series data at the first difference					
CFV	-9.299	-3.799	-3.329	-2.138	Yes
TDI	-10.09	-4.010	-2.983	-2.390	Yes
Bbr^{km}	-3.886	-3.548	-2.926	-2.576	Yes
Bbr^{ad}	-4.320	-3.543	-2.903	-2.571	Yes
IR	-15.49	-3.126	-2.916	-2.590	Yes
OL	-13.03	-3.550	-2.855	-2.595	Yes
OD	-11.12	-3.543	-2.915	-2.582	Yes

Table 6 reports the results of the Granger causality tests. The tests indicate that the variables representing stock market development (RED, SMC, SML, SMV) are Granger-caused by all other variables, with significance at least at the 10% level. The Granger causality tests support the hypothesis of increased integration of the stock market, real estate market development, and financial accessibility.

Table 6. Granger Causality Tests

	Variables										
	RED	**SMC**	**SML**	**SMV**	**CFM**	**M10**	$\boldsymbol{Bbr^{km}}$	$\boldsymbol{Bbr^{ad}}$	**OL**	**OD**	**IR**
Chi-Square	20.34	26.35	16.23	20.45	15.91	14.23	15.02	16.01	15.02	18.33	19.09
Pr>Chi-Sq.	0.002	0.000	0.012	0.000	0.001	0.071	0.011	0.010	0.005	0.000	0.001

Table 7 displays the results of employing ARDL model estimation, selecting lag counts based on the smallest Akaike Information Criterion (AIC), resulting in ARDL(1). Various models with RED, SMC, SML, SMV, and CFM as dependent variables are presented. Details of the variables are shown in table 2. All variables are winsorized and standardized (mean value of zero and unit variance value). *, **, *** indicate significance at the 10%, 5% and 1% levels,

respectively. In Model 1, a lagged RED value significantly influences itself at the 5% level. Additionally, all three stock market development variables (SMC, SML, SMV) with a 1-month lag affect RED, displaying negative significance at least at the 5% level. These findings reinforce the growing connections between stock and real estate markets. Specifically, the coefficients for SMC(t-1), SML(t-1), and SMV(t-1), are -0.0293, -0.0821, and -0.1027, respectively, indicating that increasing stock market capitalization and liquidity, alongside stock market volatility, contributes to real estate market decline. This aligns with previous studies, such as Zhang and Fung (2006), which show a negative relationship between stock and real estate markets in various Asian markets. Furthermore, the significant coefficient of 1.8201 for CFM(t-1) in Model 1 suggests that positive cash flow from the stock market to real estate anticipates an uptrend in real estate prices.

The variables that measure financial access (model 1) do not have an immediate effect on real estate market growth, as shown by the low t-statistics in the original data series. However, with a one-month lag, some variables such as $M10_{(t-1)}$, $TDI_{(t-1)}$, $Bbr^{km}_{(t-1)}$, $OL_{(t-1)}$, and $IR_{(t-1)}$ become significant, influencing real estate market expansion. Among these, the variable TDI (2.3002) stands out with the most pronounced impact compared to the other variables. This observation aligns with the contemporary attributes of Vietnam's real estate market, wherein a substantial number of real estate enterprises have amassed significant capital through bond issuance to fuel investments within the real estate sector.

The variable $M10_{(t-1)}$ has a coefficient of 1.4112, indicating that higher financial access reduces the gap between the top 10 largest companies and the rest of the market. This enables more small companies to access finance and creates a more "equal" market. This enhances the capacity to meet the capital needs of customers and increases capital flow from the stock market to the real estate market. Moreover, financial access boosts the income of stock market investors, who become wealthier and demand more housing and real estate investment. This fosters real estate market development.

The variables $OL_{(t-1)}$ and $Bbr^{km}_{(t-1)}$ show statistically significant coefficients of 2.2638 and 0.2544, respectively, at the 1% and 5% levels. This implies that outstanding loans from commercial banks and the density of commercial bank branches per 1,000 km² significantly impact real estate market growth. This could be because easy access to loans and banks facilitates real estate purchases and encourages expansion and development by real estate companies. The variable IR(t-1) has a coefficient of -1.4533, significant at the 1% level, indicating that lower average lending interest rates positively affect real estate market development. This may be due to reduced home loan costs and increased repayment capacity, stimulating both individual and corporate investment in new real estate projects. These findings support Hypothesis 1. However, no evidence was found regarding the influence of the number of commercial bank branches per 100,000 adults and outstanding deposits from commercial banks on real estate market growth.

Table 7 shows the results of models 2, 3, and 4, which examine the influence of various variables on stock market development. The variable $RED_{(t-1)}$ has negative and statistically significant coefficients at the 1% level in models 2 and 3. This implies that the real estate market development adversely affects the capitalization and liquidity of the stock market. A possible explanation for this is that when the real estate market grows, investors divest some securities to invest in the real estate market. The decrease of capital invested in the stock market consequently reduces liquidity in the stock market. In combination with the findings from model 1, it is infered that the relationship between the stock market and the real estate market is reciprocal. A booming real estate market has a negative impact on the stock market, while a booming stock market has a negative impact on the real estate market. However, we do not find any evidence for a connection between the real estate market and stock market volatility, as the variable $RED_{(t-1)}$ in model 4 is not statistically significant.

The variable $CFM_{(t-1)}$ is statistically significant in all models (Table 7), which is consistent with the theoretical expectation that cash flow is a key determinant of liquidity, stock price, and market volatility. This finding is also consistent to the empirical evidence of Kim and Yang (2009), which showed that shocks to capital inflows positively affect stock price and liquidity by attracting new investors, mutual funds, or financial institutions.

We find that $M10_{(t-1)}$, $Bbr^{km}_{(t-1)}$, $OL_{(t-1)}$, and $IR_{(t-1)}$ with a one-month lag are statistically significant in explaining the impact of access to finance on the stock market. This can be interpreted as follows: when firms have more equal access to capital, lower interest rates, a higher density of commercial bank branches, and higher outstanding loans, they can reduce their cost of capital, borrow more to invest in their business, expand production, and increase profits, thus indirectly contributing to the development of the stock market. Another explanation, is that when firms or individual investors have easy access to cheap capital, they may choose to invest directly in the stock market to earn profits rather than in their core business activities, thereby directly affecting the liquidity and size of the stock market. This result supports Hypothesis 2. However, we find that the number of firms licensed to issue bonds has no impact on the stock market, which may be due to the fact that most of the bond-issued capital is invested in the real estate market rather than the stock market.

Model 5 in Table 7 examines cash flow movements across markets. Results indicate that RED affects CFM with a 1-month lag, significant at the 1% level, highlighting the real estate market's influence on cash flow. Specifically, when the real estate market rises, cash tends to flow from the stock market to real estate, aligning with Hypothesis 3. However, coefficients for $SMC_{(t-1)}$, $SML_{(t-1)}$, and $SMV_{(t-1)}$ in Model 5 lack statistical significance, suggesting investors don't typically shift from real estate to stocks during stock market uptrends, contrary to Hypothesis 4. This finding isn't surprising given the preference for real estate as a stable investment in Vietnam, China, and Korea, where it's seen as a legacy asset. Additionally, real estate investment is perceived as less complex and more accessible compared to stocks, further bolstered by continuous real estate price growth in Vietnam over the past decade, enhancing investor confidence relative to stock market volatility.

Table 7. Autoregressive Distributed lag (ARDL) Model

Variables	**RED (model 1)**	**SMC (model 2)**	**SML (model 3)**	**SMV (model 4)**	**CFM (model 5)**
Constant	0.0212	-0.0103	-0.0028	0.0008	0.0129
$RED_{(t-1)}$	-0.1712*	-0.0026***	-0.9211***	-0.0022	1.2932***
$SMC_{(t-1)}$	-0.0293**	0.0223**	0.0143	0.0623	0.0277
$SML_{(t-1)}$	-0.0821**	0.0133	0.0511**	0.0443	0.0307
$SMV_{(t-1)}$	-0.1027***	0.0113	0.0301	0.0401*	-0.0322
$CFM_{(t-1)}$	1.8201**	0.0216**	0.0543**	0.0111***	0.0031*
M10	1.4302	1.4002*	0.5021	0.3371	0.0174
TDI	2.3002	1.0065	1.0134	1.0065	0.0123***
Bbr^{km}	0.2963	0.0765	0.0185	0.0063	0.1555
Bbr^{ad}	-0.1098	0.0353	0.0455	0.0325	0.0795
OL	2.0915	0.0352	1.0345	0.0015	0.0905**
OD	1.9283	1.2232	1.3345	1.0244	0.0146
IR	-1.4944	-1.4324*	-1.0774	-1.1014	-1.1772***
$M10_{(t-1)}$	1.4112*	1.0332**	1.0002**	1.0393*	0.0684
$TDI_{(t-1)}$	2.3002**	1.1302	1.1200	0.9210	0.0109***
$Bbr^{km}_{(t-1)}$	0.2544**	0.5336**	0.1568**	0.2594*	0.1872
$Bbr^{ad}_{(t-1)}$	-0.2528	-0.0123	-0.2278	-0.5868	0.0203
$OL_{(t-1)}$	2.2638***	2.3400***	2.7583***	2.1003***	0.0566**
$OD_{(t-1)}$	1.9989	1.1209	0.9386	0.9392	0.1207
$IR_{(t-1)}$	-1.4533***	-1.3535***	-1.2338***	-1.6755***	-1.1346***

Regarding the variables that represent financial accessibility in model 5 (Table 7), we find that the number of bond issuers also influences the cash flow movement from securities to real estate. The more bond issuers there are, the greater the capital flow into the real estate market. This confirms the previous finding that most firms use their bond issuance capital to invest in the real estate market rather than the stock market. Furthermore, other factors such as the total outstanding loans from commercial banks and the lending interest rate also significantly affect cash flows movement from the stock market to the real estate market. To sum up, we find that investors tend to invest more in the real estate market than in the stock market or divert funds from the stock market to real estate when they have easier access to capital. These results support Hypothesis 5 proposed earlier.

Table 8 assesses the factors influencing representative variables for financial access. All variables are winsorized and standardized. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively. In Model 6, most financial access variables impact M10 with a 1-month lag, except OD. Real estate market and stock market variables generally do not affect M10. Likewise, in Model 7, financial access variables affect TDI with a 1-month lag. A positive IR coefficient suggests rising interest rates prompt greater bond issuance, seen as an alternative to bank borrowing. Model 7 indicates that real estate and stock market growth increases investor participation in bond issuance. The coefficients for RED = 1.9334 and RED(t-1) = 1.5334 exceed those for the stock market variables (SMC, SML), suggesting a stronger incentive for bond issuance from real estate market growth compared to the stock market.

The results in Model 8 (Table 8) show that the real estate and stock market variables are not related to the density of commercial bank branches per 1,000 km^2. The results from Model 9 (Table 8) show that when the real estate market increases, banks will expand the density of branches per capita to serve people conveniently for real estate transactions. Similarly, when the real estate market increases, people borrow more money (outstanding loans) from commercial banks to invest in real estate (Model 10).

Table 8. Autoregressive Distributed Lag (ARDL) Model

Variables	M10 (model 6)	TDI (model 7)	Bbr^{km} (model 8)	Bbr^{ad} (model 9)	OL (model 10)	OD (model 11)	IR (model 12)
Constant	0.0779	0.1283	0.3281	1.1219	1.4778	0.2938	0.2238
$M10_{(t-1)}$	0.1396*	0.1356*	0.1878**	0.3302	0.1132*	1.2093*	1.3453*
$TDI_{(t-1)}$	0.2934***	0.0283**	0.0199	0.0647*	0.0221**	0.0092**	0.0224**
$Bbr^{km}_{(t-1)}$	1,2935**	0.7633**	0.4423***	0.4683**	0.7783**	0.6813*	0.9713*
$Bbr^{ad}_{(t-1)}$	1.0944*	1.2935*	1.4632*	1.5472*	1.0592*	0.0592	0.0436
$OL_{(t-1)}$	0.2934*	1.6253**	1.6223*	1.0023*	1.3003**	1.4903**	1.7663**
$OD_{(t-1)}$	0.8472	1.7728***	1.7988**	1.0173**	1.7610	1.0090	1.0834
$IR_{(t-1)}$	0.0262***	0.2933***	0.3892	0.3562	-1.2092**	1.0284	1.2394
RED	0.9830	1.9334***	1.9944	1.3468***	1.0993***	-1.2093	-1.3443
SMC	0.8473	0.2080**	1.8473	1.4328	1.0018	0.0074	0.0457
SML	1,3933	0.1082**	1,4433	1,2053	1,3336	1,0923	1,0357
SMV	1.5325	0.9200	0.9120	0.1024	0.2481	0.2001	0.5741
CFM	1.0093	1.7273	1.3974	1.2507	0.7509	0.8393	0.8457
$RED_{(t-1)}$	0.6660	1.5334***	0.3574	0.7339**	0.0934**	0.0221	0.0938
$SMC_{(t-1)}$	0.8303	0.2141*	0.5553	0.8323	0.1054	0.3534	0.5743
$SML_{(t-1)}$	1,3933	0.1142*	1,7865	1,7100	1,9830	1,2236	1,4059
$SMV_{(t-1)}$	1.5776	0.7441	1.8663	1.2803	1.7743	1.3944	1.3245
$CFM_{(t-1)}$	1.0092	1.7343	1.0446	1.3581	1.0091	1.0676	1.0353

5. ROBUSTNESS CHECK

To enhance the robustness of the results obtained above, an additional robustness test was conducted. Specifically, four different regression methods were used, namely OLS, Fama-MacBeth, Weighted least squares, and Newey-West. The dependent variables were tested in turn, with all results presented in Table 9. This table reports the results of the regressions between variables using various estimation methods. Details of the variables are shown in table 2. All variables are winsorized and standardized. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively. The results further confirm the evidence that the stock market and the real estate market move in opposite directions. When the real estate market goes up, cash flows tend to shift from the stock market to real estate. Easy access to finance also enables investors to raise capital from various bond sources, borrow from banks, and invest more in real estate than in stocks.

Table 9. Effects of Other Variables on Real Estate Development

Variable	OLS (model 13)	Fama-MacBeth (model 14)	Weighted least squares (model 15)	Newey-West (model 16)
Constant	1.2393	1.2265	1.8933	1.2393
SMC	-0.0176**	-0.0388***	-0.3773**	-0.5464**
SML	-0.1223***	-0.5373***	-0.6540***	-0.1911***
SMV	-0.2039**	-0.3411**	-0.2327*	-0.2637
CFV	1.2341**	1.8334**	1.2901***	1.4454**
M10	1.5042*	1.4332*	1.4328	1.0494
TDI	2.0192**	2.2812***	2.4532**	2.6512***
Bbr^{km}	0.2191**	0.3014***	0.2009**	0.1224*
Bbr^{ad}	-0.8393	-0.7628	-0.8191	-0.6118
OL	2.1883**	2.2277***	2.2103***	2.1002***
OD	1.3688	1.8829	1.7383	1.7423
IR	-1.2093***	-1.6273***	-1.1023***	-1.4022***
Adjusted R^2	0.229	0.310	0.278	0.332

6. CONCLUSION

This is the first study to investigate cash flow movement between the stock market and real estate market by exploiting a totally new variable and the Autoregressive Distributed Lag Model. The data analysis involved testing the stationarity, multicollinearity, and Granger causality of the variables, as well as selecting the model with the lowest Akaike Information Criterion. The results show that the real estate market and the stock market are interrelated and influence each other. Investors in Vietnam prefer the real estate market over the stock market when they have better access to finance. Moreover, when the real estate market rises, they tend to move money from the stock market to real estate. However, the opposite does not happen when the stock market goes up. This is because Vietnamese people view real estate as a safe, profitable and inheritable investment, with the mindset of "people can give birth, but land cannot lay". Various regression analysis methods were performed, such as OLS, Fama-MacBeth, Weighted least squares, and Newey-West, to check the robustness of the research results. The results were consistent across different methods.

Regarding policy implications, this study provides policy makers with a tool to circulate cash flow between industries in the economy. We all know that when money flows into real estate, it will promote this market to develop, leading to the development of related industries such as the construction industry, production of building materials, and financial services to

finance real estate. However, if too much cash flow is poured into real estate, it will reduce investment in other important industries such as the production of goods, technological and technical products, medicine, and entertainment. Therefore, regulating cash flow is an important task of policy makers.

This research study has some limitations, such as the relatively short observation period (15 years) and the inability to include many variables in the model. Future research should also examine other segments of the real estate market, such as resort and industrial properties. The econometric model in this paper could be enhanced with more variables to better capture the dynamics of the stock market and its influence on the real estate market.

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