Asian Economic and Financial Review
ISSN(e): 2222-6737
ISSN(p): 2305-2147
DOI: 10.18488/journal.aefr.2019.911.1211.1226
Vol. 9, No. 11, 1211-1226.

URL: www.aessweb.com

THE RELATIONSHIP BETWEEN RISK AND RETURN - AN EMPIRICAL EVIDENCE FROM REAL ESTATE STOCKS LISTED IN VIETNAM

Phan Tran Minh Hung[1+]
Tran Thi Trang Dai[2]
Phan Nguyen Bao Quynh[3]
Le Duc Toan[4]
Vo Hoang Diem Trinh[5]

[1,5]*Univeristy of Economics, The University of Danang, Vietnam.*
[1]*Email: Phantranminhhung@gmail.com Tel: +84984240240*
[5]*Email: trinhvhd@due.edu.vn Tel: +84905222383*
[2]*VP Bank Finance Company Limited, Vietnam.*
[2]*Email: daittt1540201@sdh.uel.edu.vn Tel: +84977181759*
[3]*Quang Trung University, Vietnam.*
[3]*Email: pnbquynh@qtu.edu.vn Tel: +84934727467*
[4]*Duy Tan University, Vietnam.*
[4]*Email: leductoan2002@gmail.com Tel: +84917022665*


(+ Corresponding author)

Article History
Received: 12 August 2019
Revised: 20 September 2019
Accepted: 23 October 2019
Published: 21 November 2019

Keywords
Real estate stock
CAPM
Fama-French
Carhart
Return
Risk
five-factor model
Market risk premium.

ABSTRACT

The purpose of this paper is to investigate the relationship between risk and stock returns for Vietnamese real estate stocks. We used the three-factor model and took advantage of the differences in the Vietnamese real estate market to introduce the five-factor model including three factors explained by Fama and French (1993) and two additional factors namely asset liquidity and financial leverage for testing the correlation between risk and stock returns for Vietnamese real estate stocks. Our empirical findings from a comprehensive secondary data set of stocks listed on both the Hochiminh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) between 2011 and 2016 showed that the required rate of return was driven not just by market risk, but also by other factors such as value, liquidity and financial leverage. Specifically, market risk was positively related to the expected rate of return. Liquidity risk premium was positively correlated with stock returns. The relationship between size risk and stock returns was also significantly positive for small sized companies, which is contrary to the negative relationship for large sized companies. Additionally, the HML factor was negatively and positively correlated with the rate of return for large sized and small sized firms, respectively.

Contribution/ Originality: Our novel contribution is that we took advantage of the characteristics of real estate market in a developing country as Vietnam to use the five-factor model to investigate the relationship between risk and stock returns for listed real estate firms.

1. INTRODUCTION

The seminal work of "Portfolio Selection" of Markowitz (1952) is considered the initial basis for the establishment of the modern theoretical framework on the relationship between risk and stock returns. Subsequently, the presence of competing models namely the Capital Asset Pricing Model (CAPM) (Sharpe, 1964); (Lintner, 1965); (Mossin, 1966) and the three-factor model (FF3) (Fama and French, 1993) explain more efficiently the nexus between risk and stock returns.

However, the CAPM still has existed limitations, for instance, the expected rate of return is driven only by the market risk, cited in the beta. Additionally, the theoretical framework is based on unrealistic assumptions. Therefore, focusing on additional random factors that dominate risk and stock returns is important.

The APT model developed by Ross (1976) uses several factors to determine stock returns; stocks with the same beta, but different returns can create arbitrage opportunities and investors can benefit from the risk-free premium due to short selling. Fama and French (1992) indicated that market risk is not a favourable explanation for the cross-sectional variation of stock returns. Thus, to eliminate the shortcomings of the CAPM, Fama and French (1993) proposed the FF3 by incorporating two additional factors into the CAPM, including size and firm value.

Carhart (1997) to improve the FF3, developed the four-factor model (FF4) that considers an inertia component (momentum) as well as other factors in the FF3 that could explain the cross-sectional variation of stock returns better than the FF3. Fama and French (2015) then extended their analysis to introduce two additional factors namely profitability and investment to establish the five-factor model based on the dividend discount model. The empirical evidence in developed or developing stock markets demonstrates that the FF3, in most markets, has consistent results for the relationship between risk and stock returns.

Vietnamese real estate market is known as a young but budding market[1] and hence the variation of the market is large, mainly conditional on macro-economic conditions (Nguyen *et al.* (2014) for a review). Additionally, the market is sensitive to government policies (Quang and Kammeier (2002), Nguyen *et al.* (2019) for a review). Unlike other sectors and countries, Vietnamese real estate firms also encounter more financial and default risks than other ones[2]. Therefore, it is important to determine whether a relationship exists between risk and stock returns in the context of the listed real estate firms in Vietnam's two stock exchanges.

Therefore, our contribution is twofold. The biggest novelty of our study lies in the use of the Vietnamese database of listed firms. Vietnam was chosen so that theories could be tested and empirical evidence secured to allow for future research possibilities. . The existing empirical evidence on the relationship between risk and stock returns in developing markets is not rich compared to developed countries. The differences of legal, institutional and macroeconomic conditions may account for discrepancies among countries, even resulting in no relationship (Fama and French (1993); Walid (2009)) but this would require investigation to confirm hence this and future research.

The second novel contribution is that we take advantage of the characteristics of the Vietnamese real estate market to introduce the five-factor model including three factors from Fama and French (1993) and two additional factors namely asset liquidity and financial leverage.

The remainder of this paper is organized as follows. Section 2 describes the theoretical framework and empirical evidence on the relationship between risk and stock returns and the main hypothesis. Data and methodology are discussed in Section 3. Section 4 reports our main empirical findings and discussions. Section 5 concludes the paper and discusses implications as well as limitations.

[1] The Vietnamese real estate market established and developed in the early 1990s with the adoption of the Doi Moi economic policy. However, it is potential to urban development and more attractive to foreign investor (see Nguyen, van der Krabben and Samsura, (2014), Le (2016) for a review).

[2] The Vietnamese real estate firms tend to use land and properties as collaterals. In good macroeconomic conditions, these firms are more likely to remain the loans. However, in bad macroeconomic conditions with a significant decline in real estate prices due to the global financial crisis, banks require firms to add more collaterals or reduce loans. In general, the Vietnamese real estate firms are not enough assets and profitability to maintain loans, and hence these firms typically face more financial and default risks conditional on the variation of real estate prices. For example, in 2011, the government promulgated a policy to reduce money inflow into the real estate sector. Hence, it had a strong influence and made the real estate market encounter more financial risks. Even a large number of real estate firms was in bankruptcy as a leftover of the policy in 2012.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The relationship between risk and stock returns was initially examined using the CAPM (Sharpe, 1964); (Lintner, 1965); (Mossin, 1966). Accordingly, market risk was the only explanatory factor for the expected rate of return. Although the explanation of market risk for the rate of return is fairly straightforward and based on a solid theoretical basis, market risk is insufficient to explain the cross-sectional variation of stock returns since the expected rate of return is also driven by other factors namely macro-economics and firm-specific characteristics (Kwon *et al.*, 1997); (Basu, 1977).

The CAPM also still has limitations. For example, (i) the expected rate of return is only driven by the market risk; (ii) the market is deemed to be frictionless; (iii) the stock basket must represent the whole market; and, (iv) the risk-free rate of interest does not exist in reality. Therefore, empirical evidence concludes that the CAPM does not work well in practice due to the presence of unrealistic assumptions. Banz (1981) documents that smaller firms have the higher risk-adjusted return than that of larger firms in the US market and indicates that the CAPM should be further expanded to explain effectively the relationship between risk and stock returns.

The theoretical background of the value factor has been initially provided by Basu (1977) who defined the existence of value risk premium. Accordingly, the portfolios with value stocks have a higher rate of return than those with growth stocks in the US market. Additionally, Basu (1983) revealed that the prevalent stocks of small firms yield higher returns than those of large firms. Meanwhile, the portfolios of stocks with high E/P seem to yield a higher return than low E/P stocks in the US market. Rosenberg *et al.* (1985) pointed out that stocks with the higher B/M ratio lead to a higher average return. In the same vein, Chan *et al.* (1991) reached the same conclusion as Basu (1977) but in the Japan market. In the multinational context, Fama and French (1998) and Chahine (2008) tell the same story that the portfolios with value stocks have the higher rate of return than those with growth stocks.

Fama and French (1992) documented that size and book-to-market are correlated strongly with the rate of return, even in combination with other factors such as market beta, size, leverage, book-to-market equity, and earnings-price ratio. Subsequently, Fama and French (1993) indicated that the CAPM was not sufficient to explain the relationship between risk and stock returns and, thus, incorporated size and value into the CAPM and documented that the FF3 outperforms the CAPM.

Likewise, Chou *et al.* (2004) examined the effectiveness of the FF3 to indicate the explanatory power of size and value factors in the cross-section of stock returns. Faff (2001); Drew *et al.* (2003) and Gaunt (2004) indicated that the FF3 provides a better explanation of observed stock returns than the CAPM in the Australian and Asian Stock Exchanges. Finally, Walid (2009) reached the same conclusion as Fama and French (1993) but not for stocks with low market capitalization. In detail, Walid (2009) indicated a significantly negative relationship between firm size and stock returns in case of small-capital stocks and the positive relation between firm value and stock returns found in the Japanese stock market. Nevertheless, the FF3 was still insufficient to explain the cross-sectional variation in stock returns and leaves a significant space of the cross-sectional variation in stock returns unexplained.

The theoretical framework and subsequent empirical evidence mainly attempted to improve the explanatory power of the FF3 by incorporating additional factors into the FF3. Based on the contention that the FF3 does not fully explain the returns on portfolios formed by sorts on past returns (Fama and French, 1996); (Carhart, 1997) built on the FF3 and tended to the inertia factor (see Jegadeesh and Titman (1993)) for a review) to introduce the four-factor model which explains the cross-sectional variation of stock returns better than the FF3. Bundoo (2008) augmented the FF3 with the time variation in systematic risk in the Stock Exchange of Mauritius and indicated that the augmented model provides a better explanation of observed stock returns than the FF3 in an emerging market.

Fama and French (2012) indicated the shortcomings of Carhart (1997) model in the extremes of momentum that may rarely be a serious problem in applications. As a result, Fama and French (2015) introduced the five

factors model (FF5) based mainly on the FF3 and two additional factors: profitability and investment. The analysis suggested that profitability and investment were more likely to explain the variation of stock returns. Although the model shows a better outcome than the FF3, the presence of investment and profitability factors seem to make value risk premium redundant in explaining the average rate of return (Fama and French, 2015).

The rationale for why liquidity and leverage are chosen as factors in the model relates to the characteristic of the real estate sector. Land and properties are the special and important commodities with high value, and hence, asset holders always expect a high return of assets. However, the process of transaction takes longer time compared to other common assets. Therefore, the ability to convert into cash is less flexible.

Asset liquidity reflects the possibilities of repayment of current liabilities. Firms with higher liquidity are less likely to face deferred payments. In many cases, the liquidity of real estate depends on many factors such as project locations, flexibilities, and reputations. Theoretically, the traditional explanation for why the cross-sectional variation of stock returns is also driven by corporate liquidity is that investors take a risk to purchase stocks with low asset liquidity and they are under pressure due to the uncertainties of no dividend repayments or even loss capital in the case of bankruptcy. Therefore, risk preference investors deserve to be rewarded a higher return compared to risk-averse and risk-neutral holders.

Empirically, Florou and Chalevas (2010) expected to exhibit a positive association between current ratio and stock returns. However, empirical evidence indicated that the current ratio is negatively related to stock returns. In other words, since the current ratio is an indicator of asset liquidity, the negative relationship between asset liquidity and stock returns is well documented. Simutin (2010) revealed that another proxy for liquidity, excess cash holding, is positively correlated with stock returns. Indeed, the difference in returns of portfolios of high and low excess cash firms amounts to 5% annually or 6% after standard three-factor risk adjustment. Neither market nor three- and four-factor asset pricing models can explain this difference in returns.

Accordingly, firms with more excess cash yield a lower return during the period of recession. Firms with high cash flow tend to invest more sharply in the future than those with low cash flow and without experiencing stronger future profit. Overall, the empirical finding is more appropriate for a proxy for risky growth prospect than that for asset liquidity.

In Vietnam, although the ability of payment has existed, the current ratio is at a low level due to the presence of inventories and hence the quick ratio is high. Small sized real estate firms have a higher current ratio than larger ones. Finally, firms with low liquidity have a higher rate of return compared to other firms in the same industry.

The motivation for augmenting the Fama-French model with the leverage factor was based on both the theoretical framework and existing empirical evidence. Theoretically, firms can take advantage of debts to generate profits from the other investments as well as ensure liquidity. Additionally, debts help reduce the conflict of interest between manager and shareholder (Jensen and Meckling, 1976). However, overusing debts results in financial distress and default risk and stocks with high leverage experience very poor returns (Opler and Titman, 1994). Even Beaver (1966) and Altman (1968) indicated that bankrupt firms were more likely to provide considerably negative market-adjusted rates of return right up to exit. Therefore, rational investors typically require a higher premium for holding securities with a higher default risk.

Empirically, Bhandari (1988) documented that market leverage possibly explains the cross-section of average returns in the US market with the model including leverage, size and market risk factors, and it was concluded that leverage is positively associated with stock returns and his model is better than the CAPM. Fama and French (1992) supported the favourability of the argument that the cross-sectional returns are negatively related to book leverage. Ferguson and Shockley (2003) adopted an alternate multi-factor model including the factors in the FF3 and a default factor and a leverage factor to indicate that the augmented FF3 with the default and leverage factors outperforms the FF3 to provide explanatory power the in the cross section of stock returns. In addition, Ho *et al.* (2008) found that the estimated relationship between leverage and stock returns is significantly positive for all

markets and the up markets in Hong Kong. Gharghori *et al.* (2007) indicated that although the significantly positive factor premium on the leverage factor is priced in stock returns, this factor appeared to provide only a marginal improvement in explanatory power of the augmented FF3.

In Vietnam, the real estate firms typically encounter a larger capital demand compared to other industries to adapt investments and liquidity[3]. Therefore, these firms tend to mobilize more bank loans and use deposits[4]. Consequently, real estate firms are well documented to have a high leverage. Basically, Vietnamese real estate firms do not tend to intensively invest and always incur a higher rate of interest than other firms, resulting in low efficiency. Overall, Vietnamese real estate firms are more likely to face financial and default risks stemming from the inability of the payment of loans (Nguyen *et al.*, 2019).

We followed the theoretical framework and existing empirical evidence in the literature on the relationship between risk and the expected rate of return as well as the Vietnamese real estate market characteristics such as the high debt ratios and the low current ratios to hypothesize as follows:

Hypothesis 1: Market risk premium is positively correlated with stock return.

Hypothesis 2: Size risk premium is positively associated with stock return.

Hypothesis 3: Value risk premium is positively related to stock return.

Hypothesis 4: Liquidity risk premium is positively correlated with stock return.

Hypothesis 5: Leverage risk premium is positively associated with stock return.

3. METHODOLOGY AND DATA

3.1. Empirical Model

The CAPM, FF3, or Carhart's four-factor models are widely used to explain the relationship between risk and stock returns. The presence of shortcomings in the CAPM is well documented. While Fama and French (2015) documented this, the existing empirical evidence also suggested that the cross-sectional variation of average returns related to profitability and investment is left unexplained by the FF3. Additionally, the recent empirical evidence also demonstrated that the Carhart's four-factor model improves the explanatory power of the relationship between risk and stock returns. Therefore, the four-factor model is more effective than the CAPM and FF3.

As mentioned, the current liquidity ratio and financial leverage are described as private characteristics of the Vietnamese real estate industry. On the one hand, the biggest disadvantage of the real estate sector is the huge opportunity cost, while the biggest advantage of financial leverage is to reduce the opportunity cost of cash flow. Thus, using the appropriate loans can increase capital flexibility and minimize liquidity risk. In the long term, investors can turn to other investment alternatives to generate additional profits. On the other hand, the process of real estate transaction takes longer time compared to other assets. Therefore, the liquidity of lands and properties should be seriously considered in the transaction and depends on many factors such as location, utility, and brand name. Thus, in our analysis, we used Fama and French (1993) theoretical framework and incorporated two additional factors (liquidity and financial leverage) into the FF3 to introduce an augmented FF3 for testing the correlation between risk and stock returns for Vietnamese real estate stocks from 2011 to 2016.

The combination of the FF3 and liquidity and financial leverage to test the correlation between risk and stock returns for Vietnamese real estate stocks is as follows:

[3] Real estate prices skyrocketed in Vietnam (Nguyen (2011) and Chung, Seo and Kim, (2018)), making Vietnamese real estate firms face larger capital demand. Empirically, Nguyen, Stewart and Matousek, (2018) indicated that the over-heating of the real estate is the main reason for increased real estate loans.

[4] The Vietnamese financial system is characterized by a bank-based system Nguyen and Ramachandran, (2006). Therefore, in order to adapt investments and liquidity, both listed and unlisted real estate firms typically tend to use loans as a main financing resource and also take advantage deferred revenue. Empirically, Nguyen, Nguyen and Dang (2017) found that real estate companies listed on the Hochiminh Stock Exchange from 2010 to 2015 tend to use debt to finance their projects.

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + s_i(SMB_t) + h_i(HML_t) + l_i(PLL_t) + t_i(LEV_t) + e_{it} \quad (1)$$

Where:

a_i: the intercept term

b_i, s_i, h_i, l_i, t_i: vectors of the corresponding coefficients on $R_{mt} - R_{ft}, SMB_t, HML_t PLL_t LEV_t$

$R_{it} - R_{ft}$ ($R_i R_f$)**:** the difference between the return on portfolio i and the return on the market portfolio.

R_{it}**:** the return on portfolio i,

$$R_{it} = \frac{(\text{Price}_t - \text{Price}_{t-1})}{\text{Price}_{t-1}}$$

R_{ft}**:** the risk-free rate of interest is converted as follows:

$$1 + R = (1 + R_{ft})^{12}$$

R is the average annual interest rate of five-year treasury bonds.

Besides, the independent variables in the model include $R_M R_f$, **SMB**, **HML**, **PLL**, **LEV** and it can be calculated as follows:

$R_M R_f (R_{mt} - R_{ft})$**:** value-weighted excess market returns are defined as the difference between the returns on the value-weight market portfolios and the risk-free rate, in which R_M is measured as follows:

$$R_M = \frac{(R_{HSX} + R_{HNX})}{2}$$

R_{HSX} and R_{HNX} are the returns on the value-weight market portfolios of HSX and HNX, respectively. In particular, R_{HSX} and R_{HNX} are calculated as follows:

$$R_{HSX} = \frac{(\text{VNindex}_t - \text{VNindex}_{t-1})}{\text{VNindex}_{t-1}}$$

$$R_{HNX} = \frac{(\text{HNXindex}_t - \text{HNXindex}_{t-1})}{\text{HNXindex}_{t-1}}$$

SMB: size-related portfolio return spreads also known as the SMB factor were measured as the returns on a diversified portfolios of small stocks minus the returns on a diversified portfolios of big stocks. The market capitalization was a proxy for stock size, calculated as the total number of shares multiplied by the market price per share. Market capitalization was also daily based, and thus, to generate the benchmark for comparison, the simple average of 50 stocks for each year was used. To be included in the large size portfolio, a stock had to pass the benchmark for market capitalization and to be included in the small size portfolio, it had to be less than the benchmark.

HML: book-to-market ratio (B/M)-related portfolio return spreads referred to as the SMB factor were calculated as the difference between the returns on diversified portfolios of high and low B/M stocks. B/M was measured as the ratio of the book value of assets to the book value of assets less book value of equity plus the market value of equity. Stocks were divided into two portfolios. The first included stocks with B/M ratios that were more than the average B/M ratio value of all stocks for each year, and the second included the remaining stocks.

PLL: liquidity-related portfolio return spreads also known as the PLL factor were measured as the difference, each month, between the value-weighted returns on the low liquidity portfolio and the value-weighted returns on the high liquidity portfolio. The current ratio was a proxy for liquidity ratio, calculated as current assets divided by current liabilities. In order to define portfolios, we first calculated the average current ratio. For a stock to be included in the portfolio of highly liquid stocks, we also required the stocks to pass the current ratio's average value for all the stocks and to be grouped in the low liquid stocks, stocks had to have less than this same average value for the current ratio.

LEV: financial leverage-related portfolio return spreads referred to as the LEV factor were calculated as the difference between the value-weighted returns on the high leverage portfolio and the value-weighted returns on the low leverage portfolio. Leverage ratio was defined as the average of total assets divided by the average of equity. Stocks were divided into two groups. The first included the stocks with financial leverage ratios that were more than the leverage ratio's simple average value for all stocks for each year, and the second included all other stocks.

$\mathbf{e}_{it,}$ the error term.

Additionally, we also accounted for the average return on the portfolio, conditional on size. Specifically, R_i was the average plus rate of return on the securities in each of the twelve categories in Table 1 as follows:

Table-1. Stock portfolio on size.

Size \ Portfolio	H	L	HCR	LCR	HLEV	LLEV
S	S/H	S/L	S/HCR	S/LCR	S/HLEV	S/LLEV
B	B/H	B/L	B/HCR	B/LCR	B/HLEV	B/LLEV

As in Table 1, S was a proxy for the portfolio with small size stocks, including six categories as follows: S/H, S/L, S/HCR, S/LCR, S/HLEV, S/LLEV. B was a proxy for the portfolio with large size stocks, combining six categories as follows: B/H, B/L, B/HCR, B/LCR, B/HLEV, B/LLEV.

In order to facilitate the regression analysis, we denoted the above items as SH, SL, SHCR, SLCR, SHLEV, SLLEV, BH, BL, BHCR, BLCR, BHLEV, BLLEV.

Finally, in order to investigate the relationship between risk and stock returns, we estimated thirteen empirical specifications as follows:

$$R_iR_f = a_i + b_iR_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (1)$$

$$SH = a_i + b_iR_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (2)$$

$$SL = a_i + b_iR_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (3)$$

$$SHCR = a_i + b_iR_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (4)$$

$$SLCR = a_i + b_iR_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (5)$$

$$SHLEV = a_i + b_i R_MR_f + s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (6)$$

$$SLLEV=a_i+b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV+ \varepsilon_i \quad (7)$$

$$BL = a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV+ \varepsilon_i \quad (8)$$

$$BH = a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV+ \varepsilon_i \quad (9)$$

$$BHCR = a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV+ \varepsilon_i \quad (10)$$

$$BLCR = a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (11)$$

$$BHLEV=a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL +v_iLEV + \varepsilon_i \quad (12)$$

$$BLLEV=a_i + b_iR_MR_f+ s_iSMB + h_iHML + r_iPLL + v_iLEV + \varepsilon_i \quad (13)$$

3.2. Estimation Method

The Ordinary Least Square (OLS) method is considered as the benchmark for panel data. However, the method is based largely on assumptions. The OLS estimator is extremely useful to estimate panel data when the set of data satisfies all the requirements of assumptions. Nevertheless, this is inconsistent with the features of financial database. The benchmark estimator considers all individuals within a sample as an entity. In other words, unobserved firm heterogeneity is ignored in regression or the time-invariant firm-level unobservable characteristics are assumed by default to have no impact on the dependent variable.

However, this is extremely unrealistic since each firm has firm-specific unobserved effects, such as corporate governance, brand name, and the acceptance of risk that have a significant impact on the dependent variable. The estimator that was adaptive to our financial data had to address endogeneity concerns related to any unobserved firm heterogeneity. Therefore, the fixed effects (FE) estimator was perhaps the most suitable since the estimator suggests that in addition to firm-specific factors, the variation of the dependent variable was also influenced by time-invariant firm-level unobservable characteristics.

3.3. Data

Our database was collected from several sources. Accounting data related to firm characteristics and stock transactions were provided by Stoxplus[5]. Our initial sample included 63 firms in both stock exchanges with 400 firm-year observations for real estate stocks listed on both the Hochiminh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) between 2011 and 2016.

We only retained firms with no missing data. Due to the presence of de-listed and new listed stocks, for a firm to be included in our analysis using panel data models, we also required the firms to have data for all variables for at least two consecutive years to avoid bias in our regression results. These screening procedures resulted in a final panel data sample of 50 firms, with 300 firm-year observations.

In order to efficiently reflect concerns related to split and bonus shares and cash dividends, we used adjusted closing prices of stocks at the end of each trading day. Indeed, if the adjustments were ignored, closing prices would lose their significance due to no inclusion of realistic information related to stocks. Stocks with the frequency of transactions at less than a half year were excluded from our sample. Finally, all continuous variables were winsorized at the 1st and 99th percentiles to eliminate the influence of extreme observations.

At the country level, we collected the average interest rate of five-year government bonds from www.hnx.vn to calculate the risk-free rate.

[5] A company specializes in collecting and analyzing data on firms in Vietnam.

4. RESULTS AND DISCUSSIONS

4.1. Descriptive Statistics and Correlations

Table-2. Descriptive statistics.

Categories	Sample	Min	Max	Mean	Std. error
RiRf	300	-0.016	0.057	-0.154	0.142
SL	300	-0.005	0.064	-0.156	0.157
SH	300	-0.011	0.063	-0.146	0.173
BL	300	-0.021	0.087	-0.195	0.212
BH	300	-0.017	0.08	-0.163	0.213
SLCR	300	0.002	0.082	-0.162	0.247
SHCR	300	-0.001	0.042	-0.088	0.111
BLCR	300	-0.007	0.085	-0.18	0.216
BHCR	300	-0.01	0.08	-0.189	0.212
SLLEV	300	-0.001	0.056	-0.13	0.147
SHLEV	300	0.001	0.064	-0.115	0.183
BLLEV	300	-0.007	0.088	-0.184	0.21
BHLEV	300	-0.011	0.075	-0.163	0.201
RmRf	300	-0.002	0.049	-0.085	0.144
SMB	300	0.011	0.044	-0.09	0.107
HML	300	-0.001	0.027	-0.057	0.068
LCRMHCR	300	-0.003	0.038	-0.131	0.052
LEV	300	-0.002	0.03	-0.087	0.078

Table 2 presents the summary statistics for the entire sample. All portfolios had negative average excess returns. The mean of large sized portfolios had lower average excess returns than that of small sized portfolios. Additionally, the portfolios of stocks with low-market value had the lowest average excess returns (-0.195). The mean of average excess returns for the portfolios of stocks with small sized fluctuated from -0.163 to -0.088, while the rates of return in the portfolios of stocks with large sized ranged from -0.195 to -0.162. Most portfolios had a high standard deviation, leading to higher risk.

4.2. Diagnosis Tests

Guided by the convention in the econometric literature on panel data, we conducted diagnostic tests in order to eliminate potential concerns with the empirical design that the regression results were more likely to be biased and inconsistent. The first test of interest was for multicollinearity.

Table-3. Correlation matrix.

Variable	RmRf	SMB	HML	PLL	LEV
RmRf	1				
SMB	-0.534	1			
HML	-0.128	-0.032	1		
PLL	-0.420	0.150	0.216	1	
LEV	0.012	0.306	0.149	-0.103	1

Contemporaneous correlations between all variables are illustrated in Table 3. The correlation matrix to examine the linear correlation between independent variables was shown by the correlation coefficient between the variable pairs. Most of the absolute values of the pairwise coefficients were very small compared to one, indicating no linear correlation between the independent variables in the model as shown in the table above. In detail, all correlation coefficients in Table 3 were less than 0.8. Following Klein's rule of thumb, it can be concluded that independent variables in the empirical specification were not multi-collinear. We also tested multicollinearity via

the Variance Inflation Factor (VIF). However, these indices were less than five which proved that they were unlikely to have multicollinearity[6].

Other diagnostic tests were also used to identify heteroscedasticity, autocorrelation and unit root concerns prior to regressions. Accordingly, the Augmented Dickey- Fuller test was first used for stationarity. The absolute value of τ was more than those of τ0.01, τ0.05, τ0.1. Therefore, hypothesis H1 was accepted. In other words, there was the presence of stationarity in R_mR_f, SMB, HML, PLL, LEV.

Subsequently, we used the White test for heteroscedasticity. The results indicated that four portfolios had a P-value of less than 0.05. In contrast, there was a P-value of more than 0.05 in nine portfolios. Therefore, we analysed these nine portfolios due to the presence of no heteroscedasticity. Finally, we also conducted the Durbin Watson test for autocorrelation. P-values in all portfolios were more than 0.05. In other words, autocorrelation did not exist in our analysis.

4.3. Results and Discussions

We used the Wald test[7] to investigate the suitability of the models and coefficients. All the P-values in the Wald tests were less than 0.05. Therefore, we concluded that our specification was suitable to examine the relationship between risk and stock returns, and that the independent variables were more likely to influence the dependent variable.

Table 4 reports the regression results on the five-factor asset pricing model for real estate firms listed on both the Hochiminh Stock Exchange and Hanoi Stock Exchange. The average of R-Square from Table 4 of 0,61 indicated that the model explains 61% of the cross-sectional variation of excess stock returns in real estate firms listed on the Vietnamese stock exchanges.

Table-4. Regression results.

No	S	Five factors model	Adjusted R^2	Average adjusted R^2
Panel A				0.614
1	RiRf	RiRf = - 0.017+ 0.778*RmRf + 0.410*PLL	0.609	
2	SH	SH = - 0.016 + 0.874*RmRf + 0.447*SMB + 0.573*HML + 0.680*PLL - 0.472*LEV	0.633	
3	SLCR	SLCR = 0.571*RmRf + 1.412*PLL	0.669	
4	SLLEV	SLLEV = 0.4858*RmRf + 0.256*SMB + 0.625*PLL - 0.964*LEV	0.547	
5	BL	BL = -0.016 + 0.874*RmRf - 0.552*SMB - 0.426*HML + 0.680*PLL - 0.472*LEV	0.805	
6	BHCR	BHCR = 0.464*RmRf - 0.785*SMB + 0.420*PLL	0.516	
7	BLCR	BLCR = 0.326*RmRf - 0.852*SMB + 1.109*PLL - 0.352*LEV	0.736	
8	BHLEV	BHLEV = 0.383*RmRf - 0.802*SMB+ 0.643*PLL	0.617	
9	BLLEV	BLLEV = 0.409*RmRf - 0.838*SMB+ 0.847*PLL - 0.555*LEV	0.659	
Panel B				
10	SL	SL = -0.010 + 0.864*RmRf + 0.431*SMB - 0.430*HML + 0.471*PLL	0.616	
11	SHCR	SHCR = 0.432*RmRf - 0.436*LEV	0.256	
12	SHLEV	SHLEV = 0.511*RmRf + 0.828*PLL + 0.328*LEV	0.568	
13	BH	BH = -0.010 + 0.864*RmRf - 0.568*SMB + 0.569*HML + 0.471*PLL	0.753	

[6] The inferences of VIF and Pearson correlation are based on the rule of thumb. Therefore, only one is sufficient to test multicollinearity, and hence, to conserve space, these VIF indexes are unreported. However, these are available upon request.

[7] In order to conserve space, the results are unreported, however, these are available upon request.

Initially, we regressed thirteen specifications. Our initial regression results revealed that the BL portfolio had the highest explanatory power with R-Square 0.80. SHCR was the mostly likely to be unexplained with R-Squared of 0.25. Therefore, this portfolio was excluded.

Additionally, we did not retain the other three portfolios with the same significance as SHCR in our analysis. Only nine out of the thirteen portfolios met the requirements. Therefore, Panel A of Table 4 illustrates the regression results for nine portfolios. Panel B of Table 4 reports the remainder of the portfolios.

Table 5 reports the F-test results for each coefficient. Accordingly, all the individual corresponding coefficients for the variables in our model were statistically significant, indicating that all the variables were related to the rate of return.

Table-5. F-test results.

No	Dep Var	Results	α_i	β_i	s_i	h_i	l_i	t_i
1	R_iR_f	Coefficient	-0.017***	0.778***			0.410***	
		P-value	0.000	0.000			0.002	
2	SH	Coefficient	-0.016***	0.874***	0.447***	0.573***	0.680***	-0.472**
		P-value	0.001	0.000	0.002	0.003	0.000	0.01
3	SL	Coefficient	-0.010**	0.864***	0.431***	-0.430**	0.471***	
		P-value	0.045	0.000	0.004	0.026	0.002	
4	SHCR	Coefficient		0.432***				-0.436**
		P-value		0.001				0.012
5	SLCR	Coefficient		0.571***			1.412***	
		P-value		0.000			0.000	
6	SHTLEV	Coefficient		0.511***			0.828***	0.328*
		P-value		0.000			0.000	0.094
7	SLTLEV	Coefficient		0.485***	0.256*		0.625***	-0.964***
		P-value		0.000	0.067		0.000	0.000
8	BL	Coefficient	-0.016***	0.874***	-0.552***	-0.426**	0.680***	-0.472**
		P-value	0.001	0.000	0.000	0.023	0.000	0.01
9	BH	Coefficient	-0.010**	0.864***	-0.568***	0.569***	0.471***	
		P-value	0.045	0.000	0.000	0.004	0.002	
10	BHCR	Coefficient		0.464**	-0.785***		0.420**	
		P-value		0.014	0.000		0.043	
11	BLCR	Coefficient		0.326**	-0.852***		1.109***	-0.352*
		P-value		0.027	0.000		0.000	0.087
12	BHTLEV	Coefficient		0.383**	-0.802***		0.643***	
		P-value		0.015	0.000		0.000	
13	BLTLEV	Coefficient		0.409**	-0.838***		0.847***	-0.555**
		P-value		0.018	0.000		0.000	0.022

Table 4 shows that the average adjusted R^2 was 0.614, indicating that our model provided the explanatory power to the cross-sectional variation of stock returns. Specifically, the market, size, value, liquidity, and leverage factors explained up to 61.44% of the cross-sectional variation of stock returns. The BL portfolio was the best with an average adjusted R^2 of 0.806 and the SHCR portfolio was the worst with an average adjusted R^2 of 0.255.

The first remarkable finding was that the coefficients for RmRf, SMB, HML, and LEV were statistically significant, implying that these factors provided explanatory powers for the relationship between risk and stock returns. Therefore, we accepted all the hypotheses. However, the power of explanation of HML and LEV was significantly low compared to those of the others.

Market risk premiums were significantly and positively related to stock returns in all portfolios and the magnitudes fluctuated from 0.32 for BLCR to 0.87 for BL, implying that the variation of market risks strongly impacts stock returns. Again, our analysis indicated the important role played by the market factor in the explanation of stock returns despite the introduction of other factors into the FF3. The results were consistent with

our expectation that stocks with market risk premiums have higher stock returns. In addition, the new finding was in line with Racicot and Rentz (2017) but not consistent with Lin (2017); Kubota and Takehara (2018).

Although the relationship between size risk premiums and stock returns was significant in nine portfolios, the coefficients on SMB were always the highest. This implied that size risk premiums were most likely to explain the cross-sectional variation of stock returns. Specifically, the coefficients on SMB were positive for the portfolios of small sized stocks and negative for the portfolios of large sized stocks. These results were consistent with the argument related to risk and returns that small sized firms frequently face more risks, leading to a higher rate of return than those of large sized firms.

The coefficients on HML were statistically significant in four out of thirteen portfolios. The coefficients on HML were insignificant in nine portfolios. This suggested that the effect of value on stock returns was not extremely strong.

In terms of the sign, the coefficients of -0.43 and -0.42 on HML indicated that value risk premiums were negatively related to stock returns for the SL and BL portfolios. The positive relationship between value risk premiums and stock returns was documented with the magnitude of 0.573 and 0.569 for SH and BH portfolios, respectively. The findings were not in line with our expectation.

Accordingly, stocks with low B/M ratios have the higher rate of return rather than those with high B/M. Compared to stocks with high B/M ratios as firms that have been operating for a long time with stable profits, the majority of stocks with low B/M ratios were those of small firms with growth potential in the foreseeable future or new companies. Overall, although B/M provides additional explanatory power in the cross section of stock returns, the application in Vietnamese real estate stocks remains a great puzzle. Perhaps, B/M was a proxy for equity mispricing or overhang debt rather than growth prospect in this case.

Logically, when B/M is a proxy for growth opportunity, firms with low B/M ratios are small with growth potential in the foreseeable future or new companies. Therefore, investors holding stocks with low B/M ratios require a higher rate of return rather than low stock returns. The Vietnamese Stock Exchange is a young but budding market. Investors are in a shortage of knowledge to analyse and invest stocks. Therefore, swing trading is dominated by investors that do not seriously consider the B/M ratio.

Almost all high positive coefficients on PLL indicated that liquidity risk premium was the best to explain stock returns in the model. The theoretical explanation for the positive relationship between asset liquidity and stock returns was that firms with high liquidity were more likely to pay short-horizon liabilities so that they were less likely to face financial constraints. However, the high possibility of payment means that firms do not efficiently take advantage of financing resources to achieve high profitability. Therefore, investors require a higher stock return to encourage firms to take risks for the more improvement of performance.

Empirically, in the Vietnamese real estate industry, real estate investments typically experience a long time even more than twenty years. Real estate-related loans always have a higher interest rate and are not easily accessible under the Vietnamese legal system. Therefore, firms are incentivized to take advantage of short time financing resources in order to invest long term in real estate, resulting in the risk of liquidity. Therefore, investors seriously consider liquidity risk and deserve to be rewarded a higher stock return for holding stocks with high liquidity since they are more likely to face the risks related to the difference of term structures. The relationship between liquidity and stock returns was in line with our and Florou and Chalevas (2010)'s expectation and but inconsistent with Florou and Chalevas (2010) and Simutin (2010).

The coefficients on LEV were negative and significant for five portfolios, which was not consistent with Bhandari (1988); Gharghori *et al.* (2007) but in line with Fama and French (1992); Opler and Titman (1994). The low possibility of LEV to explain stock returns could stem from theoretical framework and practical perspectives. Theoretically, firms with small loans face low risks, and hence, their stock returns are lower than compared with

firms with large loans. However, the negative regression coefficients were inconsistent with our expectations, meaning that the more firms used financial leverage, the lower the profitability was.

The rationale for the negative relationship stems from the characteristics of Vietnamese real estate industry from 2011 to 2016. Real estate firms encountered substantial difficulties and even experienced a crisis[8]. Indeed, when the rate of interest dramatically rises, high-risk and low liquidity assets are financed by debts. However, investors tend to take advantage of over-leverage in order to benefit from taking risks. Therefore, the wave of bailing out real estates to de-leverage affects other areas and is the main reason for exacerbating the crisis. The projects in the real estate industry also typically last several years. So, in the first or second year, retained earnings are not of particular importance. Asset holders typically deposit about 30% so that in order to finance the remainder of investments, the real estate firms have to use large loans from banks (Nguyen *et al.*, 2019).

The theoretical framework illustrated that firms with a low interest rate typically encountered less risk, leading to a lower rate of return. However, the empirical result indicated that the higher loan rate explains the low return rate. The rationale behind this is that the real estate sector has undergone a difficult crisis. When the rate of interest increases continuously, land and properties financed by the majority of bank loans become less effective and riskier. Therefore, firms with low liquidity and with the high leverage tend to sell real estates in order to de-leverage. The de-leveraging process spreads to other sectors, making the crisis worse. Leverage tends to be considered the main cause of the crisis.

Financial leverage was helpful in explaining the cross-sectional variation of stock returns. The real estate price fluctuates abnormally (Le and Nguyen, 2019) and is correlated with financial leverage when real estates are financed by debts[9]. When the price of land and properties falls or the market freezes, using high leverage is completely counterproductive. The selection of loans is an extremely important factor determining the success for real estate firms mainly based on financial leverage since the rate of interest for real estate loans is always higher than for regular loans[10]. If investors make an incorrect decision, it will make it difficult to buy and sell real estate. Each bank has preferential lending policies, so the lack of understanding to take advantage of these loans also reduces profit or increases risks.

Investors consider whether the current liquidity risk premium, the market risk premium or firm size is high or low. Among these three factors, the current liquidity risk premium factor had the greatest impact on the volatility of stock return, shown by the largest regression coefficient. The market risk premium and size came in second and third, respectively. The coefficient of liquidity factor was always superior to other factors, indicating that the fluctuation of this factor had a strong impact on the returns in the portfolio.

5. CONCLUSION

In order to analyse the relationship between risk and stock returns in the context of real estate stocks listed on the Vietnamese Stock Exchanges, we built on the augmented FF3 including five factors: market risk, firm size, firm value, asset liquidity, and financial leverage. The new findings revealed that stock returns can be driven by all factors. In detail, market risk was positively related to the expected rate of return, implying that the market trend is usually chosen by investors to make financial decisions. Liquidity risk premiums showed a positive effect on stock returns. The relationship between size risk and stock returns was also significantly positive for small sized

[8] Nguyen, Nguyen, Le and Nguyen, (2019) defined the period of real estate business in Vietnam from the bottom (2011–2013) to recovery (2013–2015) and growing (2015–2017).

[9] As mentioned, these debts are financed conditional on collaterals. Therefore, the variation of real estate prices is intimately related to the value of collaterals, subsequently influencing financial leverage.

[10] Credit risk mainly stems from loans with the purpose of consumption and real estate investment Thanh and Duong (2009). Therefore, banks require a higher interest rate for these loans.

companies, which was contrary to the negative relation for large sized companies. It can be explained by the fact that investors always require a higher rate of return for new-small firms.

Additionally, the HML factor was negatively and positively correlated with the rate of return for large sized and small sized firms, respectively.

Based on the main findings, we put forth the following implications for investors and managers:

Investors should first take size, market and leverage factors into account. Accordingly, in order to achieve a higher return, investors should tend to stocks with small capitalization and avoid herd behaviour related to transacting stocks with large-capitalization which are dominated by large investors despite of the risk being incurred if the market goes down, or bad information occurs.

As a second implication, investors should not depend on the B/M to make financial decisions since the B/M mostly had no effect on stock return and sometimes the B/M was not a good proxy for growth prospect.

Finally, investors need to exclude companies which have an unusually high level of leverage due to the increased possibility of bankruptcy. The cross-sectional variation of stock returns related to leverage is more likely to stem from asymmetric information and the legal system. Therefore, these factors should be seriously considered in financial behaviours and investors also should consider as information as much as possible to help them prevent the information asymmetry problem. Otherwise, portfolio diversification is a good way to limit risks due to the low level of non-systematic risk.

If investors take risks to yield a higher rate of return, investors should tend to stocks with small capitalization, low B/M, high liquidity and high leverage. However, stocks with small capitalization are prioritized since the effect of the risk of size is highest.

Firms should take advantage of financing sources to achieve more profitability through more investments on long-horizon real estates. However, firms should note the difference in term structure between investment and financing sources. Firms need to increase equity to strengthen intrinsic power, however, performance should be considered in order to avoid the decrease of stock returns.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

Altman, E.I., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. The Journal of Finance, 23(4): 589-609.Available at: https://doi.org/10.2307/2978933.

Banz, R.W., 1981. The relationship between return and market value of common stocks. Journal of Financial Economics, 9(1): 3-18.Available at: https://doi.org/10.1016/0304-405x(81)90018-0.

Basu, S., 1977. Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. The Journal of Finance, 32(3): 663-682.Available at: https://doi.org/10.1111/j.1540-6261.1977.tb01979.x.

Basu, S., 1983. The relationship between earnings' yield, market value and return for NYSE common stocks: Further evidence. Journal of Financial Economics, 12(1): 129-156.Available at: https://doi.org/10.1016/0304-405x(83)90031-4.

Beaver, W., 1966. Financial ratios as predictors of failure. Journal of Accounting Research, 4: 71-111.Available at: https://doi.org/10.2307/2490171.

Bhandari, L.C., 1988. Debt/equity ratio and expected common stock returns: Empirical evidence. The Journal of Finance, 43(2): 507-528.Available at: https://doi.org/10.1111/j.1540-6261.1988.tb03952.x.

Bundoo, S.K., 2008. An augmented Fama and French three-factor model: New evidence from an emerging stock market. Applied Economics Letters, 15(15): 1213-1218.Available at: https://doi.org/10.1080/13504850601018049.

Carhart, M.M., 1997. On persistence in mutual fund performance. The Journal of Finance, 52(1): 57-82.

Chahine, S., 2008. Value versus growth stocks and earnings growth in style investing strategies in euro-markets. Journal of Asset Management, 9(5): 347-358.Available at: https://doi.org/10.1057/jam.2008.31.

Chan, L.K., Y. Hamao and J. Lakonishok, 1991. Fundamentals and stock returns in Japan. The Journal of Finance, 46(5): 1739-1764.Available at: https://doi.org/10.1111/j.1540-6261.1991.tb04642.x.

Chou, P.-H., R.K. Chou and J.-S. Wang, 2004. On the cross–section of expected stock returns, Fama-French ten years later. Finance Letters, 2(1): 18-22.

Chung, Y., D. Seo and J. Kim, 2018. Price determinants and GIS analysis of the housing market in Vietnam: The cases of Ho Chi Minh City and Hanoi. Sustainability, 10(12): 1-18.Available at: ttps://doi.org/10.3390/su10124720.

Drew, M., T. Naughton and M. Veeraraghavan, 2003. Firm size, book-to-market equity and security returns: Evidence from the Shanghai stock exchange. Australian Journal of Management, 28(2): 119-139.

Faff, R., 2001. An examination of the Fama and French three-factor model using commercially available factors. Australian Journal of Management, 26(1): 1-17.Available at: https://doi.org/10.1177/031289620102600101

Fama, E.F. and K.R. French, 1992. The cross-section of expected stock returns. The Journal of Finance, 47(2): 427-465.

Fama, E.F. and K.R. French, 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33(1): 3-56.Available at: https://doi.org/10.1016/0304-405x(93)90023-5.

Fama, E.F. and K.R. French, 1996. Multifactor explanations of asset pricing anomalies. The Journal of Finance, 51(1): 55-84.Available at: https://doi.org/10.1111/j.1540-6261.1996.tb05202.x.

Fama, E.F. and K.R. French, 1998. Value versus growth: The international evidence. The Journal of Finance, 53(6): 1975-1999.Available at: https://doi.org/10.1111/0022-1082.00080.

Fama, E.F. and K.R. French, 2012. Size, value, and momentum in international stock returns. Journal of Financial Economics, 105(3): 457-472.

Fama, E.F. and K.R. French, 2015. A five-factor asset pricing model. Journal of Financial Economics, 116(1): 1-22.Available at: https://doi.org/10.1016/j.jfineco.2014.10.010.

Ferguson, M.F. and R.L. Shockley, 2003. Equilibrium anomalies. The Journal of Finance, 58(6): 2549-2580.

Florou, C. and C. Chalevas, 2010. Key accounting value drivers that affect stock returns: Evidence from Greece. Managerial Finance, 36(11): 921-930.Available at: https://doi.org/10.1108/03074351011081240.

Gaunt, C., 2004. Size and book to market effects and the Fama French three factor asset pricing model: Evidence from the Australian stockmarket. Accounting & Finance, 44(1): 27-44.Available at: https://doi.org/10.1111/j.1467-629x.2004.00100.x.

Gharghori, P., H. Chan and R. Faff, 2007. Are the fama-french factors proxying default risk? Australian Journal of Management, 32(2): 223-249.

Ho, R.Y.W., R. Strange and J. Piesse, 2008. Corporate financial leverage and asset pricing in the Hong Kong market. International Business Review, 17(1): 1-7.Available at: https://doi.org/10.1016/j.ibusrev.2007.05.004.

Jegadeesh, N. and S. Titman, 1993. Returns to buying winners and selling losers: Implications for stock market efficiency. The Journal of Finance, 48(1): 65-91.Available at: https://doi.org/10.1111/j.1540-6261.1993.tb04702.x.

Jensen, M.C. and W.H. Meckling, 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4): 305-360.Available at: https://doi.org/10.1016/0304-405x(76)90026-x.

Kubota, K. and H. Takehara, 2018. Does the Fama and French five-factor model work well in Japan? International Review of Finance, 18(1): 137-146.Available at: https://doi.org/10.1111/irfi.12126.

Kwon, C.S., T.S. Shin and F.W. Bacon, 1997. The effect of macroeconomic variables on stock market returns in developing markets. Multinational Business Review, 5(2): 63.

Le, C.H. and H.L. Nguyen, 2019. Collateral quality and loan default risk: The case of Vietnam. Comparative Economic Studies, 61(1): 103-118.Available at: https://doi.org/10.1057/s41294-018-0072-6.

Le, Q.H., 2016. Foreign direct investment into real estate and macroeconomic instability in Vietnam. Afro-Asian Journal of Finance and Accounting, 6(3): 258-268.Available at: https://doi.org/10.1504/aajfa.2016.079294.

Lin, Q., 2017. Noisy prices and the Fama–French five-factor asset pricing model in China. Emerging Markets Review, 31: 141-163.Available at: https://doi.org/10.1016/j.ememar.2017.04.002.

Lintner, J., 1965. Security prices, risk, and maximal gains from diversification. The Journal of Finance, 20(4): 587-615.Available at: https://doi.org/10.1111/j.1540-6261.1965.tb02930.x.

Markowitz, H., 1952. Portfolio selection. The Journal of Finance, 7(1): 77-91.

Mossin, J., 1966. Equilibrium in a capital asset market. Econometrica, 34(4): 768-783.Available at: https://doi.org/10.2307/1910098.

Nguyen, N.T.P., L.P. Nguyen and H.T.T. Dang, 2017. Analyze the determinants of capital structure for Vietnamese real estate listed companies. International Journal of Economics and Financial Issues, 7(4): 270-282.

Nguyen, T.B., E. van der Krabben and D.A.A. Samsura, 2014. Commercial real estate investment in Ho Chi Minh City–A level playing field for foreign and domestic investors?. Habitat International, 44: 412-421.Available at: https://doi.org/10.1016/j.habitatint.2014.08.002.

Nguyen, T.D.K. and N. Ramachandran, 2006. Capital structure in small and medium-sized enterprises: The case of Vietnam. ASEAN Economic Bulletin, 23(2): 192-211.Available at: https://doi.org/10.1355/ae23-2d.

Nguyen, T.N., 2011. Foreign direct investment in real estate projects and macroeconomic instability. ASEAN Economic Bulletin, 28(1): 74-96.Available at: https://doi.org/10.1355/ae28-1f.

Nguyen, T.N., C. Stewart and R. Matousek, 2018. Market structure in the Vietnamese banking system: A non-structural approach. Journal of Financial Regulation and Compliance, 26(1): 103-119.Available at: https://doi.org/10.1108/jfrc-03-2016-0024.

Nguyen, V.C., T.N. Nguyen, T.T.O. Le and T.T. Nguyen, 2019. Determining the impact of financial performance factors on bankruptcy risk: An empirical study of listed real estate companies in Vietnam. Investment Management & Financial Innovations, 16(3): 307-318.Available at: http://dx.doi.org/10.21511/imfi.16(3).2019.27.

Opler, T.C. and S. Titman, 1994. Financial distress and corporate performance. The Journal of Finance, 49(3): 1015-1040.

Quang, N. and H.D. Kammeier, 2002. Changes in the political economy of Vietnam and their impacts on the built environment of Hanoi. Cities, 19(6): 373-388.Available at: http://dx.doi.org/10.1016/s0264-2751(02)00068-9.

Racicot, F.-E. and W.F. Rentz, 2017. A panel data robust instrumental variable approach: A test of the new Fama-French five-factor model. Applied Economics Letters, 24(6): 410-416.Available at: https://doi.org/10.1080/13504851.2016.1197361.

Rosenberg, B., K. Reid and R. Lanstein, 1985. Persuasive evidence of market inefficiency. The Journal of Portfolio Management, 11(3): 9-16.Available at: https://doi.org/10.3905/jpm.1985.409007.

Ross, S., 1976. The arbitrage theory of capital asset pricing. Journal of Economic Theory, 13(3): 341-360.Available at: https://doi.org/10.1016/0022-0531(76)90046-6.

Sharpe, W.F., 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. The Journal of Finance, 19(3): 425-442.Available at: https://doi.org/10.2307/2977928.

Simutin, M., 2010. Excess cash and stock returns. Financial Management, 39(3): 1197-1222.Available at: https://doi.org/10.1111/j.1755-053x.2010.01109.x.

Thanh, V.T. and N.A. Duong, 2009. Vietnam after two years of WTO accession: What lessons can be learnt?. ASEAN Economic Bulletin, 26(1): 115-135.Available at: https://doi.org/10.1355/ae26-1h.

Walid, E., 2009. New evidence on risk factors, characteristics and the cross-sectional variation of Japanese stock returns. Asia-Pacific Financial Markets, 16(1): 33-50.Available at: https://doi.org/10.1007/s10690-009-9085-5.