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Determinants of foreign investors' home bias in the Vietnamese stock market

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ABSTRACT

This paper studies the determinants of foreign investors' home bias in the Vietnamese stock market. The research used a database on foreign ownership and the characteristics of 4698 enterprises listed on the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) over a 10-year period. A multivariate regression model was constructed using two methods: (i) cross-sectional regressions by year, and (ii) panel data regressions to evaluate the relationship between firm characteristics representing barriers to foreign portfolio investment (FPI) and foreign investors' home bias in the Vietnamese stock market. The results revealed the impact of firm characteristics representing FPI barriers on the home bias of foreign investors in the Vietnamese stock market – i.e., which business characteristics are preferred by foreign investors when choosing investment portfolios – as well as the impact of FPI barriers on the portfolio selection of foreign investors on the Vietnamese stock market. The research results can be used to identify why foreign investors prefer certain firms in their investment portfolios in order to enhance the attraction of FPI capital, for which the most radical solution is to solve the problem of the investment barriers hidden behind firm characteristics.

Contribution/Originality: This study is the first to investigate the determinants of foreign investors' home bias in the Vietnamese stock market using a multivariate regression model.

1. INTRODUCTION

Although it has undergone impressive development and attracted a significant level of Foreign Portfolio Investment (FPI) inflows, Vietnam's stock market is still at a very early stage of development with many limitations (Bui & Nguyen, 2019). According to Morgan Stanley Capital International (MSCI), the Vietnamese stock market is currently classified as a frontier market. MSCI's assessment indicates that in terms of 'market access', the Vietnamese stock market has not yet achieved the standards of an emerging market. Specifically, the barriers to FPI are still significant and include foreign ownership limits, 'room' for foreign investors, equal rights for foreign investors, information disclosure, degree of freedom of the foreign exchange market, and market infrastructure (convertibility, securities lending, short selling). To upgrade Vietnam to an emerging market, the government has introduced stock market opening-up policies to meet the emerging market accessibility criteria. However, the question is how these policies affect FPI in the Vietnamese stock market.

The literature on home bias shows that the study of foreign investors' home bias could help answer the above question because the study of home bias also explores the impact of barriers on the investment portfolio selection decisions of foreign investors. Home bias is a typical phenomenon of portfolio investments in the international market, whereby, due to the existence of investment barriers, investors do not take full advantage of opportunities to diversify investments to increase profits or reduce risk through portfolio investing. Although some studies have explored the phenomenon of foreign investors' home bias, no research on this issue has previously been conducted in Vietnam.

This paper studies the factors affecting foreign investors' home bias in the Vietnamese stock market. The research findings could be used to make recommendations to state agencies and listed Vietnamese companies to overcome and mitigate the impacts of barriers to FPI to attract more investment from foreign investors.

2. LITERATURE REVIEW AND HYPOTHESES

2.1. Literature Review

Home bias is a global phenomenon in which investors do not exploit the opportunity to increase their expected return or reduce the risk of their portfolios through international portfolio investment.

The phenomenon of home bias was quite common in the 1970s and 80s, and it still exists in emerging market countries, although there is evidence that it has decreased significantly in developed market countries, especially for equity markets (Coeurdacier & Rey, 2013). Home bias has attracted the attention of many researchers in the fields of financial economics and international economics. Obstfeld and Rogoff (2001) ranked the home bias of stock portfolios as one of the six important phenomena in international economics. Home bias is referred to as a phenomenon because although its existence is widely recognized, there is little consensus on its causes (Philips, Kinniry, & Donaldson, 2012).

The common and conventional definition of home bias is "the tendency to hold more domestic assets in one's investment portfolio" (Shapiro, 1999). Accordingly, a large number of studies on home bias have defined it in the usual way: the difference between the actual holdings of domestic stocks and the weighting of local stocks of the domestic equity market in the global market portfolio (Coeurdacier & Rey, 2013). It can be observed that although there is disagreement on the causes of home bias, most studies on home bias adopt the same research starting point based on the consequences of Modern Portfolio Theory (MPT) – according to which, investors are advised to build their investments in accordance with market portfolios. In a perfect (frictionless) financial market without transaction costs and barriers, Modern Portfolio Theory, including the International Capital Asset Pricing Model (International CAPM), is based on the assumption that homogenous investors in all parts of the world predict (propose) that a representative investor in a country needs to hold a global market portfolio (Ardalan, 2019). Despite controversy over its practical significance, the market portfolio is still considered the best available representation of the optimal portfolio usable in the study because: (i) it is understandable through common financial theory, and (ii) it is easy to construct because the necessary data are readily available and simple to calculate, so long as an approximation of a market portfolio is accepted that replicates the market portfolio. According to Roll (1977) (also known as 'Roll's Critique'), it is impossible to construct a portfolio according to the theoretical true market portfolio; market portfolios (e.g., Standard & Poor's (S&P) 500) are only an approximation of a fully diversified market portfolio.

Barriers to international portfolio investment are often considered the main cause of home bias. These can be broken down into explicit barriers and implicit barriers.

Explicit barriers: The explicit barriers to international portfolio investment are the directly identifiable and quantifiable barriers. Currency control, limits on foreign ownership, specific fees and taxes, regulation of foreign investment income, and remittance are the major barriers to international portfolio investment. Such barriers have diminished considerably over time as most countries have abolished currency control and limits on foreign ownership, and tax treaties between countries also help to reduce tax payments from international portfolio investment. Tesar and Werner (1995) found that the turnover of foreign portfolios was much higher than domestic portfolios. This

finding means transaction costs cannot help explain the observed home bias. Warnock (2002) indicated that although the turnover of foreign portfolios was not as high as Tesar and Werner (1995) suggested, transaction costs do not explain the home bias puzzle. Although explicit barriers still exist to varying degrees in countries around the world, French and Poterba (1991) and Cooper and Kaplanis (1994) stated that the existing barriers to international portfolio investment are not significant enough to explain home bias. The authors argued that when the barrier to international portfolio investment is only withholding tax, it is not enough to explain the home bias phenomenon. Kim and Yoo (2009) showed that after Korea's capital market liberalization, foreign investors' preferences changed considerably. In the absence of investment restrictions, foreign investors were no longer concerned with firms' short-term financial stability but more concerned with systematic risk.

Implicit barriers: The implicit barriers to international portfolio investment are those barriers that cannot be perceived directly – that do not show in the brokerage investment reports. Before the 1970s, cross-border portfolio investments were limited because most countries had currency control and foreign ownership limits. However, from the 1970s to the early 1990s, most of the explicit barriers were completely removed in the majority of developed countries and some emerging countries. Restrictions on capital movements were removed and foreign ownership limits were gradually abolished (though a small number of countries, including Vietnam, still maintain certain limits on foreign ownership). Despite the continued existence of some explicit barriers, investors now have more indirect investment choices - investing through mutual funds allows them to overcome explicit barriers. Amadi (2004) revealed a significant decline in home bias due to the increasing popularity of the internet and mutual funds. Mylonidis and Sideris (2008) stated that home bias has diminished due to international integration. Although the explicit barriers to international portfolio investment have been significantly reduced or even eliminated, FPI is still too limited and far below the level proposed by MPT. Studies and surveys by French and Poterba (1991), Cooper and Kaplanis (1994), Tesar and Werner (1995), Frankel (1995), Lewis (1999), and Osabuohien-Irabor (2021) have shown that although the explicit barriers to international portfolio investment have gradually been removed, investors only allocate a small portion of their portfolios to international investments. With the decline of explicit barriers, the majority of research now focuses on implicit barriers to international portfolio investment. The implicit barriers comprise three basic categories: asymmetric information, liquidity, and corporate governance.

2.2. Research Hypotheses

a. Firm size

Firm size is a firm characteristic that represents both asymmetric information and liquidity, which are important hidden barriers to international portfolio investment. Kang (1997) used firm size as an indirect proxy for liquidity, explaining that foreign investors prefer to choose large firms partly because their stocks are usually highly liquid 'blue chip' stocks. The vast majority of studies on corporate investment bias, including Kang (1997), Dahlquist and Robertsson (2001), Lin and Shiu (2003), Liljeblom and Löflund (2005), Kim and Yoo (2009), Diyarbakirlioglu (2011), Blenman and Le (2014), and Batten and Vo (2015), have all shown a statistically significant impact of firm size on foreign investors' home bias and foreign ownership. Most of these studies explained this relationship by suggesting that firm size is a proxy for the degree of information asymmetry: the larger the firm, the more complete and timely the information, minimizing the information gap between domestic investors and foreign investors. In addition, foreign investors are more likely to know about large-scale enterprises than small-scale enterprises – the size of the enterprise is a proxy for the popularity and recognition of the business. Firm size can also be a proxy for liquidity, based on the argument that the larger the firm, the larger the volume. Therefore, this study hypothesized that:

H1: Foreign investors hold more (overweight) shares of firms with high market capitalizations (size) than of firms with low market capitalizations.

b. Liquidity

Liquidity is hypothesized to be a hidden barrier to international portfolio investment. According to previous studies, including Kang (1997) and Dahlquist and Robertsson (2001), stock liquidity can have two effects on foreign investment. First, liquidity reduces transaction costs – the cost of creating or releasing a long/short position for foreign investors. Second, liquidity can help foreign investors avoid country and policy risks. The results of Tesar and Werner (1995) showed that foreign investors often trade with a higher frequency than domestic investors. Research by Liljeblom and Löflund (2005) and Dahlquist and Robertsson (2001) recorded a positive regression coefficient of the relationship between stock liquidity and foreign investors' home bias. Meanwhile, the studies of Kim and Yoo (2009) and Batten and Vo (2015) revealed a negative regression coefficient between stock liquidity and foreign investors' home bias or foreign ownership. In these cases, it is possible that foreign investors are not interested in liquidity and hold stocks with a long-term 'invest and hold' strategy. Therefore, the study hypothesized that:

H2: Foreign investors hold more (overweight) shares of firms with high stock turnover rates (TR) than of firms with low stock turnover rates.

c. Short-Term Financial Risk

The short-term financial risk indicator is included based on the hypothesis that it represents the level of information asymmetry – a hidden barrier to international portfolio investment. This indicator reveals the ability to pay short-term obligations – showing the short-term financial position of the business. Normally, all investors can use these indicators to compare the short-term risk level of businesses when choosing an investment. However, Dahlquist and Robertsson (2001) argued that in cases where foreign investors have less information than domestic investors due to information asymmetry, short-term financial ratios can be of more interest to foreign investors to make investment decisions than to domestic investors because it is one of the most accessible corporate financial indicators. Research by Dahlquist and Robertsson (2001) showed a statistically significant positive relationship between home bias and current ratios. Research by Kim and Yoo (2009) provided contradictory results on this hypothesis; in the research period 1993–1997 (before Korea opened up and reformed its market), the current ratio was an important determinant (positive regression coefficient) of foreign investors' home bias on the Korean stock market; in the research period 1999–2002 (after Korea's market reform), however, the current ratio only had a relationship with low statistical significance and a negative regression coefficient with the foreign investors' home bias. Kim and Yoo (2009) showed that when the level of information asymmetry is high, foreign investors use the current ratio as an important basis for making investment decisions. If the ratio is low, foreign investors will gradually reduce their use of this indicator and shift to other financial indicators or other analytical methods to make investment decisions. In addition, the negative coefficient of this indicator with the foreign investors' home bias suggests that the current ratio can also be a proxy for the return-risk ratio. Too high a short-term financial adequacy ratio can affect profitability. The study, therefore, hypothesized that:

H3: Foreign investors hold more (overweight) shares of firms with high current ratios (CR) than of firms with low current ratios.

d. Financial Leverage

Financial leverage is included based on the hypothesis that this corporate financial indicator represents the level of information asymmetry. This ratio indicates a business's level of debt utilization, which is a proxy for the long-term financial health of the business. Similar to the short-term financial risk indicator, when foreign investors have less information than domestic investors, this indicator can be used as an important measure of the business's level of financial risk. Research by Kang (1997) showed a highly statistically significant negative effect of financial leverage on home bias. Dahlquist and Robertsson (2001) also found similar results but at a lower level of significance. Therefore, the study hypothesized that:

H4: Foreign investors hold fewer (underweight) shares of firms with high financial leverage (Lev) than of firms with low financial leverage.

e. Dividend Yield

Dividend yield is included based on the hypothesis that this firm characteristic represents a barrier to international portfolio investment when there is a dividend tax or a tax on the repatriation of profits. Liljeblom and Löflund (2005) showed that foreign investors prefer companies with low dividend yield when investing in the Finnish stock market where, at the time of the study, there was still a tax on profit transfer overseas that varied from country to country, with the tax rate for United State of America (US) and United Kingdon (UK) investors being around 15%. Regardless of taxes, the relationship between dividend yield and home bias depends on the information asymmetry and the return-risk hypothesis. Like the other financial ratios included in the study, dividend yield is studied based on its connection to information asymmetry. When there is insufficient information, foreign investors can use this criterion as an alternative method to choose investments according to their risk-return preferences. Typically, the risk-return hypothesis for the dividend yield is tested in the following ways: (i) concentrating investments in growth firms leads to a low portfolio dividend yield; (ii) focusing on value investing (in mature businesses) leads to a high dividend yield of the portfolio; (iii) a diversified investment will result in an average dividend yield of the portfolio. The study of Dahlquist and Robertsson (2001) provided similar results to those of Liljeblom and Löflund (2005), although the nature of the study was different. Since the Swedish stock market in the study period did not record the existence of a tax on profits remitted abroad, foreign investors' preference for businesses with low dividends could only be explained based on the risk-reward hypothesis. Therefore, the study hypothesized that:

H5: Foreign investors hold more (overweight) shares of firms with high dividend yields (DY) than of firms with low dividend yields.

f. Book to Market

The book-to-market (BtM) ratio is included based on the hypothesis that this firm characteristic represents information asymmetry and profit risk. A statistically significant relationship between this ratio and foreign investors' home bias will support the information asymmetry hypothesis, while the sign of the regression coefficient will depend on the risk-reward hypothesis. The results of Fama and French (1992) and many subsequent studies have shown that firms with a low book-to-market ratio ('growth' firms) often display better performance than businesses with a high ratio. In contrast, businesses with a high BtM ratio ('valued' businesses) often have undervalued stocks; in particular, a BtM ratio greater than 1 indicates the stock is being traded at a lower price than the book ratio. Many studies, including Kang (1997), Dahlquist and Robertsson (2001), and Kim and Yoo (2009), have revealed a statistically significant negative relationship between the BtM ratio and foreign investors' home bias in the studied markets as foreign investors prefer 'growth' businesses with a low BtM ratio. However, Batten and Vo (2015) showed that foreign investors prefer 'value' firms as they found a positive regression coefficient between the BtM ratio and foreign ownership on the Ho Chi Minh Stock Exchange in the period 2009–2012. Therefore, the study hypothesized that:

H6: Foreign investors hold more (overweight) shares of firms with high book-to-market ratios (BtM) than of firms with low book-to-market ratios.

g. Return on Stock Prices

The return on stock price ratio is included based on the hypothesis that this firm characteristic represents information asymmetry and risk reward. Studies on foreign investors' home bias often include return on stock prices as a variable to test whether foreign investors are moving against or in favor of past returns – micro-investment may represent a lack of information to apply basic financial investment analysis methods.

Brennan and Cao (1997) showed that foreign investors tend to buy in periods of high profit and sell during periods of low profit (momentum trading). Froot, O'connell, and Seasholes (2001) also showed that international portfolio flows are significantly influenced by past returns.

Kim and Yoo (2009) showed a highly statistically significant positive relationship between returns on stock prices and foreign investors' home bias in the period before the opening of the Korean market. The studies of Kang (1997), Liljeblom and Löflund (2005), and Kim and Yoo (2009) (for the period after the opening of the Korean market) provided similar results but with lower statistical significance. Therefore, this study hypothesized that:

H7: Foreign investors hold fewer (underweight) shares of firms with high returns on stock prices (R) than of firms with low returns on stock prices.

h. Return on Assets

The return on asset ratio is included based on the hypothesis that this firm characteristic represents information asymmetry and return risk. The studies of Liljeblom and Löflund (2005) and Kim and Yoo (2009) (in the post-opening period of the Korean market) showed a significant positive relationship between return on assets and foreign investors' home bias; Kang (1997) found similar results but with a lower significance level. Therefore, the study hypothesized that:

H8: Foreign investors hold more (overweight) shares of firms with high returns on assets (ROA) than of firms with low returns on assets.

i. Beta Coefficient

The Beta coefficient is included based on the hypothesis that this firm characteristic represents information asymmetry and risk reward. The Beta coefficient measures the systematic risk of a corporate stock relative to the systematic risk of a market portfolio. Stulz (1981) developed a model of barriers to international investment and showed that barriers increase the cost of international investment; therefore, foreign investors choose stocks with high expected returns to offset the costs incurred due to investment barriers. According to this argument, foreign investors will prefer to hold high Beta stocks to achieve high expected returns.

The studies of Diyarbakirlioglu (2011) and Batten and Vo (2015) supported a positive relationship between Beta and foreign ownership, but Blenman and Le (2014) research showed the opposite result. Studies on home bias, such as those of Kang (1997) and Dahlquist and Robertsson (2001), have failed to demonstrate a link between Beta and foreign investors' home bias.

Research by Kim and Yoo (2009) revealed a negative relationship (negative coefficient) between Beta and foreign investors' home bias, but the level of statistical significance of this relationship was different in the two research periods: in the period before market opening, the statistical significance of the relationship between Beta and foreign investors' home bias in the Korean market was low, and in the period after market opening, this relationship had a high level of statistical significance. Therefore, the study hypothesized that:

H9: Foreign investors hold more (overweight) shares of firms with high Betas (Beta) than of firms with low Betas.

2.3. Research Model

The research model based on the above research hypotheses is presented in Figure 1, with the firm characteristics variables denoted as follows:

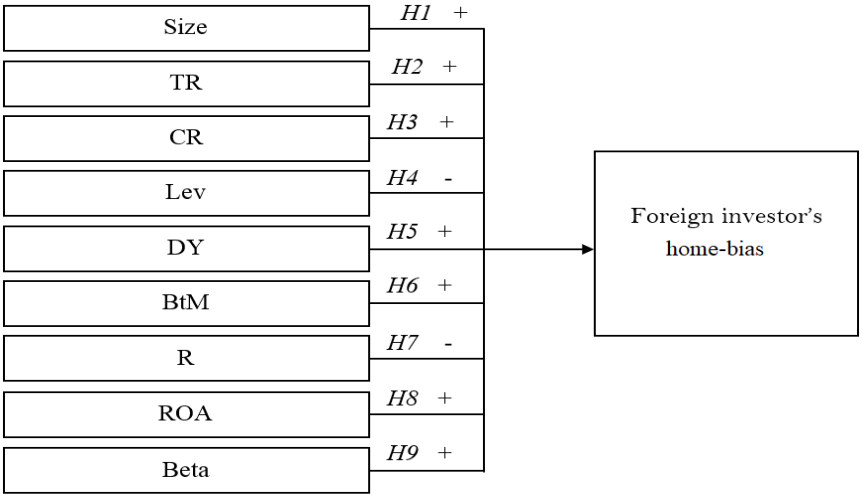

Figure 1. Research model of determinants of foreign investors' home bias in the Vietnamese stock market.
Note: Size is firm size, TR is stock turnover rates, CR is current ratio, LEV is financial leverage, DY is dividend yield, R is returns on stock prices, ROA is returns on assets, BtM is book to market, Beta is beta coefficient.

3. RESEARCH METHODS AND RESEARCH DATA

3.1. Research Method

The research used the following regression model in accordance with the research of Kang (1997) and Dahlquist and Robertsson (2001):

$$y_{it} = \alpha_t + \beta' x_{it} + \varepsilon_{it} \quad (1)$$

Where

- $y_{it} = \frac{w_{it}^F}{w_{it}^M} - 1$ is the dependent variable, showing the level of holdings (more or less) of foreign investors compared to the market portfolio. w_{it}^F and w_{it}^M denote the weight of firm i in year t in the portfolios of all foreign investors (F) and the Market Portfolio (M), respectively. According to MPT, foreign investors will hold each firm *i* according to the market capitalization weight of firm *i* in the Market Portfolio, then $w_{it}^F = w_{it}^M$ and $y_{it} = 0$. The difference between w_{it}^F and w_{it}^M shows the home bias of foreign investors towards firm *i* in year *t*. A positive (or negative) y_{it} implies that foreign investors overweight (underweight) firm *i* in year *t* in their portfolios relative to the Market Portfolio.
- x_{it} is a vector of firm characteristic variables for firm *i* in year *t*.
- β' is a vector of parameters.
- ε_{it} is an error term of firm *i* in year *t*.
- α_t is a constant, including fixed-year effects for the Pooled LSDV Model.

3.2. Research Data

The research used the data set of firm characteristics and foreign ownership of firms listed on the Ho Chi Minh City Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) from 2009 to 2018. The population of firms comprised those currently listed on HOSE and HNX (the research sample did not include unlisted firms registered for trading on the Unlisted Public Company Market (UPCoM) because only listed firms have a complete database, ensuring quality and transparency in accordance with the regulations of the State Securities Commission. The data was collected from different sources: the whole market data was obtained from the stock exchanges, the Vietnam Securities Depository Center, and the State Securities Commission; transactional data and business data were obtained from the database of the FiinPro Platform, and the Beta data was obtained from Bloomberg. Table 1 presents the total number of listed firms and the number of firms included in the sample for each year of the study period.

Table 1. Number of listed firms and observations of the sample.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of listed firms HOSE	170	196	275	301	308	301	305	307	320	344	373
Number of listed firms HNX	168	257	367	393	396	377	365	377	376	384	376
Total number of listed firms	338	453	642	694	704	678	670	684	696	728	749
Change	88	115	189	52	10	-26	-8	14	12	32	21
Sample		220	329	472	514	532	546	564	609	640	689
% Sample/Total of listed firms		49%	51%	68%	73%	78%	81%	82%	88%	88%	92%

Note: HOSE - Ho Chi Minh stock exchange, HNX - Hanoi stock exchange.

Table 2. Descriptive statistics of independent variables.

Variable	Observation number	Lowest value	Highest value	Average value	Standard deviation
Size*	4698	21.0084	33.3746	27.9822	29.9455
TR	4698	0.0002	11.4474	0.7703	1.2632
CR**	4698	0.0159	4.9965	1.7101	0.9092
Lev	4698	0.0264	0.9929	0.5220	0.1997
DY	4698	0.0000	3.2581	0.1214	0.1751
R	4698	-0.9100	14.3744	0.1982	0.6774
ROA	4698	-0.9960	0.7837	0.0548	0.0766
BtM	4698	0.0793	30.9739	2.4065	2.0513
Beta***	4698	-0.2900	1.7800	0.7110	0.3374
MC (Billions dong)	4698	1.3	312.167.0	1420.8	10.119.9
Original CR	5128	0.0159	229.7793	2.7300	6.8334

Note: *: Size is the logarithm of market capitalization (MC).
**: excluded samples with too high CR value (≥5).
***: After removing the samples with CR value CR ≥5. all variables had 4710 observations, except Beta with 4698 observations. The number of observations of the regression based on the number of observations with all variables was 4698.
Size is firm size, TR is stock turnover rates, CR is current ratio, LEV is financial leverage, DY is dividend yield, R is returns on stock prices, ROA is returns on assets, BtM is book to market, Beta is beta coefficient.

4. RESEARCH FINDINGS

4.1. Regression Test Results

To study the factors affecting the phenomenon of foreign investors' home bias, a regression test was carried out on the impact of various firm characteristics variables that are representative of barriers to foreign investment on foreign investors' home bias. The regression model was adapted from the models used by Kang (1997) and Dahlquist and Robertsson (2001). The descriptive statistics of the independent variables of the regression model are presented in Table 2. Because a large number of enterprises had current ratios (CR) that were too high, the study excluded samples with CR ≥ 5. In general, because many listed firms were studied over a period of 10 years, and these firms had different sizes and types of activities, the variables displayed a high degree of variation (high standard deviation), and the lowest and highest values diverge considerably.

Table 3 presents the correlations between the research variables for the whole study period 2009–2018.

Table 3. Correlation coefficient matrix.

Variable	W^F/W^M-1	Size	TR	CR	LEV	DY	R	ROA	BtM	Beta
W^F/W^M-1	1.0000									
Size	0.4258	1.0000								
TR	-0.0439	0.0410	1.0000							
CR	0.0204	0.0098	0.0392	1.0000						
Lev	-0.1839	-0.0589	-0.0612	-0.3466	1.0000					
DY	-0.0444	-0.2841	-0.0966	-0.0538	0.0581	1.0000				
R	0.0337	0.0955	0.0726	-0.0304	0.0078	-0.0391	1.0000			
ROA	0.1884	0.1815	-0.0911	0.0278	-0.3432	0.2679	0.2199	1.0000		
BtM	-0.1624	-0.4937	0.0274	-0.0226	0.1116	0.4621	-0.2374	-0.1837	1.0000	
Beta	0.0938	0.2114	0.5214	0.0016	0.0548	0.0319	-0.0001	-0.0779	0.1335	1.0000

Note: Size is firm size, TR is stock turnover rates, CR is current ratio, LEV is financial leverage, DY is dividend yield, R is returns on stock prices, ROA is returns on assets, BtM is book to market, Beta is beta coefficient.

During the whole study period 2009–2018, the dependent variable of foreign investors' home bias is strongly correlated with firm size (Size), financial leverage (Lev), and the return on assets (ROA) ratio. In addition, firm size (Size) and book-to-market Ratio (BtM); stock turnover rates (TR) and Beta ratio (Beta); and dividend yield (DY) and book-to-market ratio (BtM) are also significantly correlated.

4.2. Cross-Sectional Analysis

To investigate the impact of selected firm characteristics on foreign investors' home bias, the researchers estimated the regression equation for each year from 2009 to 2018. To test whether the regression results were affected by special outliers, the study examined the impact of special outliers on the dependent variable (in case foreign investors invested too little or too much relative to the share of the market portfolio). The results of the cross-sectional regression test are shown in Table 4. For each variable, the first line records the regression coefficient, the second line records the t-statistics, and the third line records the p-value of the t-test. The results of the cross-sectional regression test show that there is a positive relationship (positive regression coefficient) between the dependent variable (foreign investors' home bias) and firm size (Size) with a very high level of statistical significance in all survey years (10/10 years have statistical significance level 1%). The results of the cross-sectional regression analysis show that foreign investors' home bias can be explained by firm size in all years – foreign investors are always biased in favor of firms with a high market capitalization (relative to the proportion of the market portfolio). In some years, foreign investors' home bias can be further explained by: (i) financial leverage – foreign investors were overweighted in firms with low debt ratios; (ii) BtM ratio – foreign investors were overweighted in 'value' firms; (iii) turnover rate – foreign investors were overweighted in firms with low stock turnover, and (iv) return – foreign investors were overweighted in undervalued firms. The relationship between home bias and the Beta coefficient is not clear as there was a change in the sign of the regression coefficient during the study period.

Table 4. Cross-sectional regression of foreign investors' home bias by firm characteristics.

Variable	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Size	0.2430	0.2143	0.1932	0.1898	0.1740	0.1811	0.1297	0.1173	0.1325	0.1205
	9.8009	11.4967	11.3474	10.6443	8.9552	8.9362	7.2854	6.9109	8.0058	6.6273
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TR	-0.0065	0.0277	0.0040	0.0001	-0.0465	-0.0167	-0.0540	-0.0492	-0.0365	-0.0485
	-0.2526	1.3056	0.1407	0.0058	-1.7889	-0.7760	-2.4859	-2.3198	-1.8976	-1.8701
	0.8009	0.1927	0.8882	0.9954	0.0743	0.4381	0.0132	0.0207	0.0583	0.0619
CR	0.0002	-0.0395	0.0456	-0.0136	0.0475	0.0925	0.1106	0.0355	0.0398	0.0708
	0.0039	-1.0726	1.3765	-0.4263	1.3905	2.6829	3.7109	1.2363	1.2205	2.0814
	0.9969	0.2843	0.1694	0.6701	0.1650	0.0075	0.0002	0.2169	0.2228	0.0378
LEV	-0.6839	-0.4860	-0.3941	-0.6649	-0.5353	-0.3151	-0.0718	-0.3405	-0.1772	-0.0961
	-2.6080	-2.5646	-2.6011	-4.2939	-3.5092	-1.9021	-0.4800	-2.3511	-1.1777	-0.5884
	0.0098	0.0108	0.0096	0.0000	0.0005	0.0577	0.6314	0.0191	0.2394	0.5565
DY	0.0336	-0.0554	0.0277	0.1728	0.1070	0.1573	-0.0155	0.0710	-0.0102	-0.2295
	0.1120	-0.2853	0.3071	1.2496	0.5758	0.5527	-0.0575	0.2255	-0.0457	-0.6844
	0.9110	0.7756	0.7589	0.2121	0.5650	0.5807	0.9541	0.8217	0.9635	0.4940
R	-0.0145	-0.2325	-0.0944	0.0232	0.1312	-0.0630	0.0245	-0.0148	-0.0779	-0.0843
	-0.3205	-3.2027	-1.1797	0.4619	2.9788	-2.2118	0.7052	-0.3726	-2.4788	-1.5336
	0.7489	0.0015	0.2388	0.6444	0.0030	0.0274	0.4810	0.7096	0.0135	0.1256
ROA	1.2777	1.4453	0.5984	0.0013	0.4448	0.4027	0.1644	-0.0434	-0.1972	0.1522
	2.2326	2.8950	1.6380	0.0034	1.0709	0.9732	0.4270	-0.1355	-0.5843	0.4144
	0.0267	0.0041	0.1021	0.9973	0.2847	0.3309	0.6696	0.8922	0.5592	0.6788
BtM	0.0699	0.0619	0.0308	0.0380	0.0406	0.0466	0.0189	-0.0222	-0.0397	-0.0154
	3.1422	3.6183	2.9384	3.0322	2.6667	1.8385	0.7934	-1.0008	-1.4928	-1.0990
	0.0019	0.0003	0.0035	0.0026	0.0079	0.0666	0.4279	0.3174	0.1360	0.2722
Beta	-0.6941	-0.5362	-0.2257	-0.1243	0.1053	-0.0649	0.2321	0.3056	0.2040	0.2373
	-2.5560	-4.9475	-2.2804	-1.4205	0.9169	-0.6101	2.0552	3.0827	2.0421	1.7502
	0.0113	0.0000	0.0231	0.1561	0.3596	0.5421	0.0404	0.0022	0.0416	0.0806
R^2 adjusted	0.4599	0.4050	0.2865	0.2575	0.3119	0.2543	0.2501	0.2412	0.2289	0.1935
Test F	20.680	24.445	20.850	19.575	25.877	19.984	19.970	20.212	19.831	17.551
Sample size	209	311	446	483	495	502	513	545	572	622

Note: Size is firm size, TR is stock turnover rates, CR is current ratio, LEV is financial leverage, DY is dividend yield, R is returns on stock prices, ROA is returns on assets, BtM is book to market, Beta is beta coefficient.

4.3. Panel Data Regression Results

The data of the cross-sectional regressions were combined to perform panel data regression. The results of panel data regression testing for the period 2009–2018 are presented in Table 4, with constants and fixed effects by year-on-year dummies being omitted. For each variable, the first column records the regression coefficient, the second column records the t-statistics, and the third column records the p-value of the t-test. The results of testing according to two regression models, the pooled least-squares dummy variable (LSDV) and fixed effects model (FEM), as well as the results of tests for model defects, are also recorded in Table 5. The results of the pooled (LSDV) regression were supported by the cross-data regression test results; the statistically significant effects on the pooled LSDV model were found to be significant and have the same effect on cross-sectional regression in most of the survey years.

Because the estimated results of the pooled LSDV model did not take the effects of differences between firms into account, the researchers compared the FEM and random effects model (REM) to test the robustness of the baseline model, as well as to adjust and supplement the research results by taking into account the effects of differences between firms. The Hausman test's p-value of less than 0.01 meant that the relationship between the differences among firms (μi) and the independent variables was statistically significant. In this case, the FEM model was the better model. Table 6 shows that the model defect tests indicated no problems with the FEM model: the F-test was statistically significant, meaning that the used variable was appropriate; the multicollinearity test resulted in variance inflation factor (VIF) coefficients of less than 3, so it was unlikely to have multicollinearity; finally, the Durbin Watson autocorrelation test showed no autocorrelation problem.

Table 5. Panel data regression of foreign investors' home bias by firm characteristics.

Variable	Sample: 1 5128 IF CR<5			Sample: 2009–2018 IF CR<5			
				Number of periods: 10. Cross-section number: 676			
	Number of observations: 4698			Number of observations (unbalanced): 4698			
	Adjusted pooled LSDV			FEM			VIF
	Coef.	t-stat.	Prob.	Coef.	t-stat.	Prob.	
Size	0.1645	25.1497	0.0000	0.0896	10.7785	0.0000	1.8393
TR	-0.0355	-6.0036	0.0000	-0.0186	-3.6237	0.0003	1.6382
CR	0.0445	3.8660	0.0001	-0.0066	-0.7220	0.4703	1.6241
Lev	-0.3457	-6.7324	0.0000	-0.1937	-3.5547	0.0004	2.1996
DY	0.0884	1.8010	0.0718	-0.0521	-1.4973	0.1344	2.1345
R	-0.0182	-1.3996	0.1617	-0.0227	-3.4806	0.0005	1.5189
ROA	0.2888	1.5757	0.1152	-0.0968	-1.2102	0.2263	2.4697
BtM	0.0219	5.3151	0.0000	0.0036	0.8737	0.3823	1.9561
Beta	0.0042	0.1215	0.9033	-0.0238	-1.2978	0.1944	2.8599
R^2	0.2586			0.8242			
R^2 adjusted	0.2557			0.7942			
F test	90.6663		0.0000	27.5060		0.0000	
Wald test	60.2194		0.0000				
Durbin Watson test	0.4793			1.0101			

Note: Size is firm size, TR is stock turnover rates, CR is current ratio, LEV is financial leverage, DY is dividend yield, R is returns on stock prices, ROA is returns on assets, BtM is book to market, Beta is beta coefficient.

Table 6. Hausman test.

Test summary	Chi² statistic	Chi² d.f.	Prob.
Random horizontal cut	79.996329	9	0.0000

The regression testing of the FEM model supported the results of the baseline pooled LSDV model because there were similarities, no conflicting results, and only adjustments to the baseline model. The FEM model provided similar results to the pooled LSDV model in the relationship between foreign investors' home bias and firm size (Size, +), stock turnover ratio (TR, -), and financial leverage (Lev, -). Unlike the pooled LSDV model, after taking into account the effect of differences between firms, the FEM model showed that the relationship between the dependent variable and the current ratio (CR) and BtM ratio (BtM) was not statistically significant. On the other hand, the relationship

between the dependent variable and the returns on stock prices (R, -) was significant in the FEM model but not in the pooled LSDV model. The negative relationship between the dependent variable and returns on stock prices (R) in several years was supported by the results of cross-sectional data regression.

The regression test results of the FEM model for the period 2009–2018 revealed foreign investors' home bias caused them to hold more stocks of enterprises with high market capitalization, low financial leverage, low stock turnover, and low returns on stock prices (relative to the proportion of the market portfolio).

5. CONCLUSION

The research results on the impact of firm characteristics representing FPI barriers on foreign investors' home bias in the Vietnamese stock market suggest certain recommendations to attract increased FPI capital in the Vietnamese stock market:

First, the phenomenon of foreign investors' home bias could be observed in Vietnam's stock market during the research period. The important factors influencing this phenomenon were the firm characteristics that represented the investment barriers of information asymmetry and liquidity. In addition, research on the current situation of the Vietnamese stock market has shown that foreign ownership restriction is still a national-level barrier that has a significant impact on FPI in the Vietnamese stock market. Therefore, to attract more FPI, the barriers to FPI need to be addressed at both the national and corporate levels.

Second, size, as measured by market capitalization (representing both information asymmetry and liquidity), is the firm characteristic with the clearest and strongest effect on foreign investors' home bias in the Vietnamese stock market. This shows that enterprises with a small and medium market capitalization (the vast majority of Vietnamese enterprises) face a significant disadvantage in attracting FPI capital. Therefore, to overcome this disadvantage, the smaller the enterprise, the more necessary it is to address the root of the problem: information asymmetry and liquidity barriers. Third, the impact of firm characteristics representing the information asymmetry barrier on foreign investors' home bias has decreased over time. This proves that (i) the Vietnamese stock market has become more efficient, and (ii) institutional changes related to disclosure have had positive results.

The research results can be used to identify the reasons why firms are preferred or avoided by foreign investors in their investment portfolios and subsequently to design solutions to enhance the attraction of FPI capital. The most radical solution is to solve the problem of investment barriers hidden behind firm characteristics. In addition, the study results can be used as an honest assessment (using quantitative methods based on market data) of hidden institutional barriers that are difficult to measure directly, such as information asymmetry and liquidity risk.

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