THE ROLE OF STOCK VALUATION DIFFERENCES IN EXPLAINING THE DIVERGING STOCK HOLDINGS OF FOREIGN AND LOCAL INVESTORS

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บทบาทของส่วนต่างการประเมินมูลค่าหุ้นในการอธิบายความแตกต่างการถือหุ้นของนักลงทุนต่างประเทศและนักลงทุนในประเทศ

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ปัจจัยที่ส่งผลให้นักลงทุนต่างชาติและนักลงทุนในประเทศมีการเลือกลงทุนในหุ้นที่แตกต่างกันมีหลายปัจจัย วิทยานิพนธ์ฉบับนี้ได้ทำการศึกษาถึงผลกระทบของการที่นักลงทุนต่างชาติและนักลงทุนในประเทศเลือกใช้ตัวชี้วัดที่แตกต่างกันต่อส่งผลให้นักลงทุนทั้งสองประเภทมีสัดส่วนการถือครองหุ้นที่แตกต่างกันใน โดยใช้วิธีการของ Kang, Lee and Park (2010). วิทยานิพนธ์ฉบับนี้ยังได้ทำการศึกษาเพิ่มเติมในอีกหลายแง่มุม การศึกษานี้คาดหมายว่านักลงทุนต่างชาติจะใช้ตัวชี้วัดมูลค่าในระดับสากล ในขณะที่นักลงทุนภายในประเทศซึ่งยึดติดภูมิลำเนาจะใช้ตัวชี้วัดมูลค่าภายในประเทศ กลุ่มนักลงทุนประเมินมูลค่าหุ้นใดมากก็จะถือหุ้นนั้นในสัดส่วนที่มาก เมื่อใช้วิธีการศึกษาเดียวกันกับข้อมูลช่วงยาว (panel data) ของประเทศไทยการศึกษานี้ไม่พบความสัมพันธ์ที่คาดหมายดังผลจากงานวิจัยที่อ้างถึงก่อนหน้านี้ แต่กลับได้ผลตรงกันข้าม

การศึกษานี้ยังได้พบความไม่สมมาตรกัน โดยค่าต่างของการประเมินมูลค่าจะมีผลอย่างมีนัยยะต่อระดับการถือครองของต่างชาติเฉพาะกรณีที่นักลงทุนต่างชาติตีมูลค่าหุ้นสูงกว่านักลงทุนภายในประเทศ หุ้นที่นักลงทุนต่างชาติประเมินมูลค่าสูงกว่ามักจะมีปริมาณการซื้อขายที่ต่ำกว่า ผลตอบแทนหุ้นในเวลาต่อมามักจะตกลง ผลการศึกษาของวิทยานิพนธ์ฉบับนี้เหมือนกับ Kang, Lee and Park (2010) เพียงว่ากลุ่มนักลงทุนต่างชาติและกลุ่มนักลงทุนในประเทศใช้ตัวชี้วัดมูลค่าที่ต่างกันในการประเมินมูลค่าหุ้น แต่ความสัมพันธ์เป็นไปในทิศทางตรงกันข้ามกับ Kang, Lee and Park (2010)

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There are a number of factors that have been shown to influence the differing stock selection preferences of foreign and domestic investors. Following a rather new approach by *Kang, Lee and Park (2010),* this paper reexamines the influence that differing benchmarks employed for their respective stock valuation can have on the stock allocation of foreign and local investors in a particular market and extends it in several different ways. Foreigners in this regard are expected to employ an international benchmark while local investors, presumed as home-biased, will use a local valuation benchmark instead. The investor group that puts a higher valuation on a certain set of stocks should consequently hold a higher proportion of those shares - which contributes to explain their stock allocation. Contrary to prior findings by the before mentioned authors, this given study does not find evidence of the expected relationship using a similar approach with panel data from Thailand; the results rather indicate an exact opposite relationship.

Additionally, this study also finds that there is an asymmetry in the effect and the valuation difference only has a significant influence on the foreign ownership levels when the foreign valuation exceeds the domestic one. Trading activity is generally lower in the case of relatively favorable foreign valuation and subsequent stock returns generally go down. The results of this study support the findings by Kang et al. only in the way that the two different investor groups seem to relate to differing benchmarks for asset pricing- however not in the expected way. Given the opposing findings, further research seems warranted.

Department : Banking and Finance Student's Signature .....

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* The titles of the tables listed here are shortened. Please refer to the individual tables for a complete description of the respective content.

CHAPTER I.

INTRODUCTION

It has been observed for a long time now that, in a particular domestic market, foreigners and locals often hold on to different sets of stocks. In a perfect market world, assets would be priced globally and each investor would hold on to the same market portfolio in the same proportion. In reality, this is obviously not the case. While global asset pricing can be partly observed in developed markets this is often not the case for emerging markets.[1] Investors are home biased, i.e. they immensely overweight their own domestic stock in their portfolios. Furthermore those investors that do invest abroad do this very selectively.

Incorporating frictions such as regulatory restrictions, transaction costs and informational asymmetries have been shown to affect the differing amount of holdings of foreigners and locals.[2] Focusing more on which stocks foreigners invest in (the stock allocation), firm specific factors such as market value, profitability, growth vs. value firms, leverage, shareholder horizon and international orientation - to name just a few - have been proven empirically as determining factors and often root in informational asymmetries[3]. Several studies have addressed that issue and there is controversy whether foreign investors are better informed than locals,[4] or whether indeed the opposite is true, i.e. that locals are better informed than foreigners.[5] Regardless of which is correct, in the information asymmetry framework the two investor groups are predicted to become similar as the information of the other party is revealed through their respective trading. As we can observe continued differences in the stock holdings of foreign and domestic investors the informational asymmetry view is challenged, warranting a search for other explanations adding to the current understanding.

A rather new approach explaining the continuing distinct holdings of foreigner and locals (i.e. the stock allocation within a domestic market) has been presented by *Kang, Lee and Park (2010):*

Employing an investor heterogeneity approach, the authors show that the difference in valuation between foreigners and locals can add to the existing explanations on their distinct

[1] See for example Korajczyk and Viallet (1989) for developed markets and Harvey (1995) for the case of emerging markets. Also Karolyi and Stulz (2003) provide a good literature review in this regard.
[2] Bailey and Jagtiani (1994), p.84.
[3] Kang and Stulz (1997) and Dahlquist and Robertsson (2001).
[4] See for example Froot and Ramadorai (2008).
[5] Kang and Stulz (1997), Griffin, Nardari, and Stulz, (2004).

stock holdings. Going back to the issue of the global vs. local pricing, the idea is that foreign investors will apply a foreign benchmark when valuating stock while locals are assumed to be home biased – especially in emerging markets – and will use a local benchmark instead. Differences in valuation between the two groups then lead to a stronger or weaker preference for a given stock by the two investors groups respectively, in turn influencing the level of foreign ownership.

While the authors show that this valuation difference does indeed contribute to explain stock allocation between the two groups, there are a number of issues that remain unclear: Firstly, the exact timing and length of the resulting trading activity is unknown. Another question is whether the effect is possibly more pronounced when there is a valuation difference in a particular direction. Furthermore, we do not know whether investors trade more actively caused by these valuation differences, or whether the shift in foreign ownership is just a result of regular trading activity. Lastly it would be interesting to see who of the two investor groups initiates these trades more.

CHAPTER II.
RESEARCH OBJECTIVE AND HYPOTHESES DEVELOPMENT

In this study, I want to examine these further dimensions of how a difference in valuation between local and foreign investors affects their trading behavior and individual stocks holdings. So far the empirical evidence only shows that such an effect on stock holding can be observed (paragraph 1), however researchers have not developed a full understanding of the issue, which I want address with the hypotheses in paragraphs 2-5.

1) Following Kang et.al. and the general idea laid out in the introduction, the **first Hypothesis (H_1)** is that the difference in valuation (foreign valuation minus the domestic valuation), resultant of the individual investor's valuation when applying their respective benchmark, is positively related to and contributes to explain to a rise in foreign ownership during that same time period. This first step is thus to reassess these findings of Kang, Lee and Park's paper using Thai equity data. This will be the basis for the further examinations.
However, there is a slight shortcoming in the original setup which can be partly addressed: The change in foreign ownership is happening on a continuous basis as investors constantly evaluate and reassess their portfolios based on the available information.[6] Due to methodological and data limitations, Kang et. al. were only able to match the difference in valuation to the change in foreign ownership once a year. As foreign investors act as global return chasers,[7] their valuation is likely to rely on the very recent information which gets partly hidden if we average valuation and ownership changes over time periods that are too long. Precisely, Kang et al.'s results show that the described effect of the difference in valuation on the level of foreign ownership can be observed when employing valuation differences based on daily, however not on weekly return data.[8] If the interval used as calculation basis for the investors valuation in this regard is daily (or at least less than weekly), then it is likely that the change in foreign ownership also stems from immediate reactions to the valuation difference. As I will be able to match the change in valuation difference to the change in ownership for quarterly intervals instead of the previous yearly periods applied by Kang et. al. (see the Contribution and Methodology part for more details), I thus expect to see a more pronounced and more reliable relationship.[9]

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[6] See Kang, Lee and Park (2010), p. 2888.
[7] See Bohn and Tesar (1996) or Grinblatt and Keloharju (2000).
[8] See Kang, Lee and Park (2010) p. 2894 f.
[9] This is of course - although a clear improvement to Kang et. al.'s paper - still not fully satisfactory setup.

2) Kang et. al.'s results show that the difference in valuation explains the change in ownership over that same one year time period while the hypothesis (and some of their empirical findings[10]) suggests that these time periods used for valuation are likely to be much shorter in reality. A next step is thus to study lead-lag effects where the lead effect is the change in foreign ownership during the time period in which the valuation occurs (similar to the first hypothesis) and the lags show the influence of valuation of previous periods. In line with the argument for the first hypothesis (foreign investors acting as return chasers are likely to rely on the very recent information), my **second hypothesis (H_2)** is thus that the effect of the valuation difference will be most pronounced in the given (lead) period and will become less strong or zero in subsequent (lag) periods.
To be more precise, based on the initial argument and the prior empirical evidence, the average daily valuation difference should have no strong *direct* relationship with the change in the foreign ownership level in succeeding lag periods. However, it is possible that a stock and the benchmarks applied for valuation each individually move in the same respective direction for a prolonged amount of time. In this case, we observe a relationship between the difference in valuation in t_1 and the change in foreign ownership in t_2 simply because the difference in valuation in t_1 and t_2 are generally the same.

3) Furthermore, it would be interesting to see, whether the effect of trading on valuation difference becomes stronger or less strong in magnitude when foreigners value the stock higher than locals as opposed to when the local valuation exceeds the global valuation (i.e. whether there is an asymmetry in the effect). Presuming foreigners to be the more active trader on technical valuation based on their return chasing behavior, it is likely that the entry process of foreigners into a certain domestic stock takes longer because of the more complex process of valuation in finding and picking these stocks. On the other hand, stocks in an existing portfolio are likely to be monitored more closely so that foreign exit could respond to negative valuation faster. The **third hypothesis (H_3)** is thus that the effect of the difference in valuation becomes stronger when the valuation difference is negative.

4) Additionally, it would be interesting to perceive if the valuation difference also translates into a rise in trading volume to see whether investors trade more *actively* when a valuation difference occurs - i.e. whether trading volume of a particular stock also increases accordingly during these times while controlling for other known factors that determine trading activity. If

[10] See again Kang, Lee and Park (2010), p. 2894 f.

trading volume does not change, this would mean that investors only rebalance their portfolio gradually as part of their normal trading activity. However, if foreign investors assign a higher (or lower) value to a certain stock than locals and thus on aggregate more foreigners want to move in (or out) of this respective stock, this trading activity will possibly add to the normal level of trading volume as the foreigners as global return chasers will not necessarily shift their positions from (or to) other equity in the same domestic market. Hence I assume that the valuation difference is positively related with trading volume **(H_4).**

5) Finally, evidence whether any of the two groups reflects trading on valuation difference more would add to the existing theories of investor behavior. So far we have assumed that foreign investors – perceived as global return chasers who reflect trading on past stock behavior more than locals[11] – also play the more active role in the trading resultant of a difference in valuation. However, we do not yet have empirical evidence for this in particular. The way to assess this will be to examine subsequent return behavior of the stocks traded. Foreigners that push in or pull out of a stock in a certain domestic market should move prices persistently beyond a short term liquidity effect:

Foreign inflows are known to predict domestic returns which is commonly explained by a short term effect of price pressure (foreign inflows consuming liquidity)[12] and sometimes a medium term effect of information (foreigners might have better *fundamental* information or can process this information more efficiently).[13] As stated in the introduction, the information effect is controversial and will be irrelevant in this setup, as not the foreign inflow as such, but the effect of difference in a valuation on the returns will be observed. Persistent price movement beyond the short term liquidity effect can thus be interpreted as resultant of the active trading of one party: If foreigners trade more actively as a result of a favorable valuation and locals remain passive, these local investors have to be compensated to give up their current stock holdings and move to other stocks instead. Foreign investors pushing into a local market because of the valuation difference will thus persistently move prices up and vice versa. The **last hypothesis (H_5)** is thus that one should see a positive relationship between valuation difference (foreign valuation minus the domestic valuation) and subsequent stock returns.

[11] See again Bohn and Tesar (1996) or Grinblatt and Keloharju (2000).
[12] This short term effect occurs because of the huge international trades often consuming a lot of available liquidity in the local markets which thus moves prices up in the short term that will revert back after at most a few days.
[13] See for example Froot and Ramadorai (2008).

CHAPTER III.
CONTRIBUTION

The valuation difference as a factor determining the distinct stock holdings between foreign investors and locals has been recently empirically shown by Kang, Lee and Park (2010) to add to and improve the existing explanations. In this paper I want to build up on these findings, reassess and refine them in new dimensions to add to the current understanding. Like the original paper, this study will examine the effects in an emerging market, namely Thailand, which provides a good setting as the home bias is known to be more pronounced in these markets. This should consequently lead to a more pronounced difference in stock holdings of foreigners and locals and the valuation benchmark applied. The available *daily* data on foreign ownership levels for individual stocks in the Stock Exchange of Thailand allows to closer match the observed valuation differences to the change in ownership when compared to the prior study that can only match ownership levels once a year. However, even though the ownership data is updated daily we can only employ it on longer, quarterly intervals in this setup (see part 5 - Methodology for the reasons). This is still four times as frequent as in the study of Kang, Lee and Park (2010*)*. This way it will be possible to examine lead and lag effects and thereby to test whether the timing pattern of the effect is consistent with the basic hypothesis (H1).

Examining the two different settings of a positive vs. negative foreign value difference as well as adding trading activity and examining subsequent returns in this setup has never been done before and will help to contribute to understand who the driving force is in this trading behavior.

CHAPTER IV.
METHODOLOGY

The first step of this study is to assess the effect of a difference in valuation for any given stock in the Thailand Stock Exchange (SET) on its change in foreign ownership. Foreign and local investors are assumed to value stocks on a continual basis and allocate their stock holdings accordingly. While we can observe the change in foreign ownership for any stock in the SET on a daily basis, we need to identify each investor type's respective valuation over a certain time period and thus the difference in valuation first, before we can match it to the change in ownership level during that time. Following *Kang, Lee and Park (2010)*, the valuation for each of the two investor groups, foreigner (F) and domestic (D) is estimated by the following one-factor market model regressions:[14]

$$R_{i,t} = \alpha_i^F + \beta_i^F R_{B_F,t} + \epsilon_{i,t}^F \quad \text{(Eq. 1)}$$

and

$$R_{i,t} = \alpha_i^D + \beta_i^D R_{B_D,t} + \epsilon_{i,t}^D \quad \text{(Eq. 2)}$$

where $R_{i,t}$ denotes the daily stock return of a certain stock in the domestic market, $R_{B_F,t}$ denotes the daily return of the benchmark applied for valuation by the foreign investors (a World Stock Index) and $R_{B_D,t}$ denotes the benchmark applied for valuation by domestic investors (the SET Index). All stock and index returns are observed in excess of the risk free rate. For the foreign investors, USD denominated returns are used in the main regressions to account for the fact that foreign investors are not perfectly hedged against currency movements.[15]

The equations are used to separate the expected return of a certain stock given its level of risk ($\beta_i R_{B,t}$) from the unexpected, abnormal return α_i (Jensen's alpha) which is used as a ex-post summary of the value that the investors of both types put on a certain stock. The observed alphas are then scaled by the volatility of their residuals to account for estimation precision. The difference of the two scaled alphas (scaled foreign alpha – scaled domestic alpha) is the measure of valuation difference applied in the first two main regressions[16]. An alternative

[14] See Bodie et. al (2011), p. 293 for a detailed interpretation of the model.
[15] This approach again follows Kang, Lee and Park (2010), see p. 2889.
[16] The scaled alpha difference will be used as a *proxy* for the difference in valuation that the investors apply. This does not imply that investors actually assess their stocks on this basis (although some might) but should be perceived as a statistical model that captures an ex-post summary of these evaluations. See also Kang, Lee and Park (2010), p. 2888.

method to capture the effect of a difference in valuation will be using orthogonalized alphas. To warrant a sufficient number of observations, I estimate the equations using daily data over a quarterly period.

To test the first and second hypothesis, the difference of valuation for each stock during these quarterly intervals can then be matched with the change in the dependant variable "foreign ownership" during the same and following periods while controlling for the absolute level of valuation and other known factors influencing the level of foreign ownership, such as firm size, profitability, B2M-ratio, leverage, dividend yield, turnover and asset liquidity.[17]

The third hypothesis (H_3) test is to examine whether the effect of valuation difference on foreign ownership levels becomes stronger or less strong when foreign investors put a higher value on a certain stock than locals and vice versa. The setup is using the same methodology as in the first test but includes dummy variables to separate observations of positive and negative valuation differences to see which coefficient has a higher influence on the change in foreign ownership.

The fourth test addresses whether traders trade on this valuation difference actively, i.e. whether the difference in valuation results in higher trading activity during these times. Therefore I regress trading activity on the valuation difference along with control variables such as absolute price changes measured by the absolute value of quarterly returns, the level of foreign ownership, firm size, profitability, the book-to-market-ratio and the stocks dividend yield.
Many other variables have been shown to influence trading activity, however most of them apply on much smaller time scale, such as day-to-day variations.[18] To account for differences arising from market capitalization, the stock turnover is used as the measure of trading volume. Note that trading volume is examined in general here, as we cannot infer on the two investors groups trading behavior without examining the price effects of their trades, since a shift in foreign ownership can only happen with the two investor groups interacting. This issue gets addressed in the fifth hypothesis.

If foreign investors actively push in or pull out of domestic stocks one should thus see a positive relationship between valuation difference and subsequent stock returns (H_5).

[17] See for example Kang and Stulz (1997) or Dahlquist and Robertson (2001).
[18] See Chordia et. al (2007) for a recent examination of determinates of trading activity.

To test the fifth hypothesis of who of the two investor groups initiates the trading on valuation difference more, I examine the effect of a difference in valuation on the returns of the stocks in that period. A significant relationship in that same period would show a persistent price movement that does not revert in the short run. I also include the same set of control variables (firm characteristics) employed in the first part again to gain insight which firms performed well in terms of returns.

CHAPTER V.
SAMPLE AND DATA

The sample period examined in this study comprises of a full 10 year of data and includes all firms in the Thai SET Index from the third Quarter 2002 to the second Quarter 2012 for which sufficient return data, trading volume data, data on foreign ownership and control variables are available. This leaves a sample of 513 firms with a total of 11,415 firm-quarter observations from a total of 628 individual firms at least one point listed during that period. The data on the foreign ownership level is obtained through SETSMART while return data and all control variables were obtained through DataStream. All data is matched on a quarterly basis.

5.1 Foreign Ownership Level Computation

To compute the foreign ownership level I make use of the foreign ownership restrictions in place in Thailand which require publicizing the number of shares available for foreigners to trade on a daily basis: From this number one can reverse out the foreign ownership level based on the total number of share outstanding. Kang, Lee and Park instead measure the free-float foreign ownership motivated by the fact that shares held by corporate insiders are not available to trade freely. To this end they divide the foreign ownership based on the total numbers of shares outstanding by (1-insider ownership), with the insider ownership being the number of shares held by controlling shareholders and related parties as well as treasury stock as fraction of total shares outstanding.

I will not follow this approach in this thesis for the following reason:

The free float or insider ownership data available for the Thai market recognizes not only controlling but also other major shareholders. A major shareholder could also be a foreign shareholder who will be recognized in the foreign ownership level based on total shares outstanding but be excluded from the free float. In this case the real free float foreign ownership (foreign owned shares in the free flow as a percentage of the free flow (which is unobservable due to data limitations)) is not the same and might vary quite substantially from the free float foreign ownership as calculated by Kang, Lee and Park.

An extreme example: If the foreign ownership level based on shares outstanding is 49%, which in reality is just one major foreign shareholder with the rest of the shareholders being minor local shareholders (free float = 51%, insider ownership = 49%) than the real free float foreign ownership is zero. The calculation as in the approach of Kang et al. would however lead to:

Free float foreign ownership = $\frac{Foreign\ ownership}{(1-insider\ ownership)} = \frac{0.49}{(1-0.49)} = 1 = 0.9608 = 96.08\%$

Essentially Kang, Lee and Parks calculation method ignores that corporate insiders could also be foreigners. While in their case this is not as relevant because their definition of corporate insiders relies mainly on controlling, rather than all major shareholders (and excludes majority foreign owned firms) this would be a much greater problem and distortion for the Thai dataset with many major shareholders (such as foreign investment funds) being major shareholders and therefore insiders by the Thai definition.[19]

5.2 Foreign Ownership Summary Statistics and Correlation Coefficients

Table 1 reports the sample summary statistics for the main variables and control variables of interest.

On average foreigners held about 18.9% of the stocks although this varies greatly with some stocks (at some time during the 10 year period) held entirely by foreigners and some entirely by locals. Those stocks held entirely by foreigners are exclusively companies under foreign jurisdiction which have no foreign ownership restrictions. I have left these firms in the sample because they have a strong connection to Thailand for which reason they are also listed in the Stock Exchange of Thailand. Potential behavior of differing valuation benchmarks applied for those shares not held by company insiders are just as likely to be applied as for other Thai companies.[20] For most stocks the maximum level of foreign ownership by law is 49%, while certain kind of companies (e.g. financial companies or former or partly government hold companies have a lower limit of 30%. Foreign companies who list on the Stock exchange of Thailand might have no limit at all and few stocks have again differing ownership limits. On average the foreign ownership limit is 46% which is only reached or "hit" on a rare 6.4% of all sample observations. These 6.4% mainly stem from a set of firms whose limit is reached most of the times. Most of these are financial institutions with an ownership restriction of 30%. Only very few firms hit the limit occasionally.

Table 2 reports the correlation between the level of foreign ownership and the explanatory variables

The Foreign ownership limit is highly correlated with the level of foreign ownership, warranting the use in the regressions. As the foreign ownership limit in most cases does not

[19] Ignoring this issue and running the main regressions of this paper for free float foreign ownership following Kang, Lee and Park's method, the main coefficients still have the same signs, however this results in a great loss of explanatory power (R squared) of the model as expected.

[20] Again, deleting those firms from the sample does not affect the significance of the results.

change for a given stock during the time observation this correlation generally stems from differences between different stocks only and is an important variable in explaining the absolute level of foreign ownership for a given stock rather than the change within the time period. This variable will be used in two different approaches, firstly as an explanatory variable and secondly, as a limiting factor in a censored regression.

5.3 Raw Alphas, Scaled Alphas and Orthogonalized Alphas

The firm's quarterly *raw alphas* obtained from using the foreign or local benchmarks (for computation see again Part 4 – Methodology) vary roughly from -4% to + 4%. A maximum of 5 trading days per quarter with no trading volume for each stock is allowed for the computation of the alphas to eliminate outliers with extreme but imprecise alpha values due to irregular trading. The average local alpha is much lower with 0.001% compared to almost 0.03% the foreign alpha and also varies slightly less. The local alpha average being close to zero is very much expected as the local benchmark is calculated using the local set of stocks. If the stocks in the sample were the exact same as used to calculate the benchmark then the average outperformance of the index would therefore be zero. However, as some firm-quarter observations are lost due to missing control or other data, a slight variation occurs. The average foreign alpha is determined by the performance of the respective market benchmark. In this case the MSCI World Index returns were slightly worse than the average return of the Thai stocks denominated in USD, which leads to an overall positive foreign alpha. *Scaling the alphas* by their respective standard errors to account for estimation precision, changes the value of the average local alpha from a small positive to a small negative, indicating that the local negative alphas on average have smaller errors than the positive ones. Resulting of the two calculated scaled alphas, their difference which serves as the measure of valuation difference is a positive .0174763, meaning that a valuation using the international benchmark on average lead to a higher value for the Thai stocks than the one using the domestic benchmark.

Looking at the correlation coefficients (Table 2), another important observation is that the scaled foreign and the scaled local alpha are also highly correlated (ρ=0.858). This is expected as the indices which are the basis for the alpha calculation are also strongly correlated.[21]

[21] Correlation coefficient of ρ=0.724 over the whole 10 year period – data not reported here.

As mentioned earlier, an alternative way to grasp the effect of a difference in valuation is using *orthogonalized alphas.* Following Kang, Lee and Park,[22] I hence include orthogonalized alpha variables which serve as an alternative measure to the difference in valuation in test regressions. The orthogonalized alphas are the residuals of a quarterly cross-sectional regression of one scaled alpha on the other.[23] By orthogonalizing one scaled alpha on the other (i.e. the scaled foreign alpha on the scaled local alpha and vice versa), one captures the portion that is not mirrored in the other variable. The resulting orthogonalized variables have zero correlation to the respective other scaled alpha variable while they are still reasonably correlated to and thus carry the information of their basis variable (ρ about 0.5). While they can be used in the main regressions, their summary values have little interpretable power and are reported just for completeness.

5.4 Control Variables

As mentioned in the introduction, a number of variables have been shown to influence the stock allocation process of foreigners in a local market and therefore the level of foreign ownership of a given stock.[24] In the first three hypothesis tests of this study, I employ **firm size** *ln(mktcap)*, **firm profitability** *EBITDA,* **book-to-market ratio** *BTMV,* **Leverage**, **Dividend yield** *DivYield,* **share turnover** *Turnover* and a **liquidity measure**. I use *interest cover* (calculated as earnings before interest and tax (EBIT) divided by the interest expense on debt less the interest capitalized) as a measure due to the more complete data availability, however I also compare data using **asset liquidity** *Liquidity* (the ratio of current assets to current liabilities) to facilitate comparability with the original study by Kang et al. All variables are matched at quarterly intervals. Again the summary statistics are reported in Table 2 and their correlation coefficients in Table 3. There are a number of stocks in the sample that have a negative book value at some point in time and therefore show a negative value for BTMV. These firm observations have not been eliminated from the data as long as the stocks were still frequently traded.[25] However, eliminating these observations from the data does not change the results of this study in a significant way. Firm size shows a strong positive correlation with foreign ownership confirming that foreigners tend to invest in bigger stocks, most likely because informational asymmetries are smaller for these stocks that tend to report more information. Profitable firms also attract more foreign investors, as do firms

[22] See Kang, Lee and Park (2010) p. 2890
[23] Kang, Lee and Park (2010) p. 2889.
[24] See again Kang and Stulz (1997) and Dahlquist and Robertsson (2001).
[25] This follows the approach by Kang, Lee and Park (2010). For the trading frequency criterion compare section 5.3 above.

which pay higher dividends.[26] BTMV is negatively correlated confirming that foreigners like to invest in growth stocks, as is leverage indicating their preference for low debt firms. The negative sign for Turnover indicates that stocks hold more by foreigners are traded less frequently. Interestingly, the two measures for firm liquidity (Interest cover and Liquidity) show differing signs. All in all, the correlation coefficients of the control data confirm the known empirical findings as regards their relation to the level of foreign ownership and correspond to the findings by Kang et al.

[26] Higher dividend yield is sometimes seen as an indicator for well governed firms and shareholder friendly governance. See La Porta et. al (2000) and Lins and Warnock (2006).

Summary Statistics

Table 1 **:** Summary statistics of Foreign ownership, Foreign ownership limit, the percentage of the Foreign ownership limit hit (dummy variable), the alphas (α) and standard errors (σ) [estimated through Eqs. (1) and (2)] and the explanatory variables employed in the main regressions as well as some base variables:

ln(mktcap) is the natural logarithm of the market capitalization, **EBITDA** stands the earnings before interest, taxes, depreciation and amortization, **BTMV** is the book-to-market value, **Leverage** is the ratio of total debt to shareholders equity, **DivYield** stands for dividend yield, **Turnover** is the Number of shares traded in a quarter, divided by the number of shares outstanding, **Interest Cover** calculated as Earnings Before Interest and Tax (EBIT) divided by the Interest Expense on Debt less Interest Capitalized. **Liquidity** is the ratio of current assets to current liabilities is and an alternative control variable to Interest cover, however not used in the main regressions due to limited data availability. The last five variables are quarterly total stock returns and various absolute values of the variables previously listed.

Variable	**n**	**Mean**	**Standard deviation**	**Min**	**Max**
Foreign ownership	11415	18.93%	20.56%	0.00%	100.00%
Foreign ownership limit	11415	46.10%	16.74%	10.00%	100.00%
Foreign ownership limit hit	11415	6.37%	24.42%	0.00%	100.00%
α_D	11415	1.00E-05	0.0037	-0.0379	0.0412
α_F	11415	2.96E-04	0.0043	-0.0478	0.0383
σ(εD)	11415	0.0235	0.0156	0.0028	0.4631
σ(εF)	11415	0.0267	0.0161	0.0037	0.4639
$\alpha_D/\sigma(\varepsilon_D)$	11415	-0.0087	0.1368	-0.6795	0.5572
$\alpha_F/\sigma(\varepsilon_F)$	11415	0.0088	0.1398	-0.6215	0.6169
$\alpha_F/\sigma(\varepsilon_F) - \alpha_D/\sigma(\varepsilon_D)$	11415	0.0175	0.0737	-0.3577	0.4916
$\alpha_D/\sigma(\varepsilon_D)^{Orth}$	11415	0.0000	1.0000	-7.0199	5.07
$\alpha_F/\sigma(\varepsilon_F)^{Orth}$	11415	0.0000	1.0000	-4.7891	5.59
ln(mktcap)	11415	8.0329	1.6972	3.9742	13.87
EBITDA	11415	3091347	12400000	-39000000	249000000
BTMV	11415	0.9329	0.9201	-20.00	25.00
Leverage	11415	0.6928	3.8163	-278.11	41.27
DivYield	11415	3.8496	4.4917	0.0000	82.48
Turnover	11415	1.0032	8.8877	0.0007	533.43
Interest cover	11415	7.3414	290.1184	-92.63	21165.62
Liquidity*	9423	2.5359	10.5401	0.0174	603.56
Quart. total stock returns	11407	0.0230	0.2565	-2.6229	2.2399
abs(Quart. total stock returns)	11407	0.1759	0.1880	0.0000	2.6229
$\text{abs}(\alpha D/\sigma(\varepsilon D))$	11415	0.1108	0.0857	0.0000	0.6215
$\text{abs}(\alpha F/\sigma(\varepsilon F))$	11415	0.1085	0.0837	0.0000	0.6795
$\text{abs}(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D))$	11415	0.0450	0.0485	0.0000	0.4064

Table 2: Correlation coefficients between all variables employed in the numerous regressions. Variables are defined in Table 1.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
(1) Foreign ownership (FO)	1.000																				
(2) FO limit	0.553	1.000																			
(3) FO limit reached	0.277	-0.083	1.000																		
(4) $\alpha_D/\sigma(\varepsilon_D)$	0.019	-0.011	0.016	1.000																	
(5) $\alpha_F/\sigma(\varepsilon_F)$	0.026	-0.013	0.023	0.858	1.000																
(6) $\alpha_F/\sigma(\varepsilon_F) - \alpha_D/\sigma(\varepsilon_D)$	0.015	-0.004	0.015	-0.228	0.305	1.000															
(7) $\alpha_D/\sigma(\varepsilon_D)^{Orth}$	-0.007	0.000	-0.008	0.512	0.000	-0.953	1.000														
(8) $\alpha_F/\sigma(\varepsilon_F)^{Orth}$	0.020	-0.006	0.019	0.000	0.514	0.974	-0.858	1.000													
(9) ln(mktcap)	0.367	-0.057	0.265	0.073	0.100	0.054	-0.024	0.072	1.000												
(10) EBITDA	0.099	-0.100	0.143	-0.001	0.015	0.030	-0.027	0.031	0.504	1.000											
(11) BTMV	-0.052	0.005	-0.036	-0.094	-0.103	-0.021	-0.011	-0.044	-0.209	-0.078	1.000										
(12) Leverage	-0.017	-0.012	-0.015	-0.039	-0.036	0.005	-0.017	-0.004	-0.050	-0.007	0.015	1.000									
(13) DivYield	0.063	0.024	-0.007	0.005	-0.026	-0.058	0.053	-0.059	0.047	0.008	0.056	-0.058	1.000								
(14) Turnover	-0.041	-0.008	-0.022	0.020	0.032	0.023	-0.014	0.029	-0.045	-0.021	0.011	-0.002	-0.059	1.000							
(15) Interest cover	0.010	0.019	-0.006	0.014	0.010	-0.007	0.010	-0.004	-0.003	-0.004	0.000	-0.007	0.015	-0.003	1.000						
(16) Liquidity*	-0.017	0.012	-0.008	-0.014	-0.013	0.002	-0.006	-0.002	-0.028	-0.021	0.021	-0.040	-0.006	-0.003	0.004	1.000					
(17) Quart. total stock returns	0.030	-0.010	0.024	0.711	0.808	0.214	0.034	0.386	0.106	0.014	-0.118	-0.038	-0.069	0.056	-0.013	0.003	1.000				
(18)abs(Quart. total stock returns)	-0.041	-0.004	-0.024	0.143	0.153	0.023	0.024	0.058	-0.068	-0.045	-0.004	0.033	-0.099	0.098	-0.009	-0.008	0.214	1.000			
(19) $\mathrm{abs}(\alpha D/\sigma(\varepsilon D))$	-0.008	-0.018	-0.011	0.100	0.113	0.028	0.007	0.052	0.011	-0.029	-0.008	0.006	0.025	0.016	-0.012	0.005	0.145	0.625	1.000		
(20 $\mathrm{abs}(\alpha F/\sigma(\varepsilon F))$	-0.020	-0.015	-0.017	-0.087	-0.028	0.109	-0.123	0.091	0.017	0.004	-0.033	0.006	-0.001	0.005	-0.009	0.005	0.034	0.474	0.712	1.000	
(21) abs($\alpha_F/\sigma(\varepsilon_F) - \alpha_D/\sigma(\varepsilon_D)$)	0.044	-0.033	0.045	-0.191	0.052	0.452	-0.458	0.419	0.168	0.134	-0.032	0.030	-0.037	0.034	-0.011	-0.009	0.039	0.071	0.060	0.139	1.000

CHAPTER VI.
EMPIRICAL RESULTS

6.1 Main Tests of Hypothesis 1

The first hypothesis (H_1) will be tested using two different setups, each in two different specifications (4 Models in total) which are estimated using two different regression techniques.

Model (1) and (2) is tested by setting up the equation:

$$FO_{i,t} = \alpha_0 + \beta_1 Alpha_{i,t} + \beta_2 AlphaDiff_{i,t} + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 3)}$$

where FO is the foreign ownership level of each stock at the end of quarter t, $Alpha_{i,t}$ is the scaled alpha (either foreign or domestic) for stock i as calculated by equation 1 and 2 (see part 4 -Methodology), $AlphaDiff_{i,t}$ is the difference of the two scaled alphas (foreign minus domestic) and $X_{k,i,t}$ represents the set of control variables each measured at the end of the quarter; f_i are firm fixed effects and q_t time fixed effects. The firm fixed effects[27] will capture the consistent difference in the foreign ownership level between firms that are not explained by the explanatory variables while the time fixed effects attribute general changes in the foreign ownership level over time. White standard errors adjusted for correlation within firm clusters[28] are used here as well as in most regressions in this paper[29] to account for heteroskedasticity.

All regressions are run in to alternative approaches to account for the legal foreign ownership limits. Firstly by including the foreign ownership limit as an explanatory variable in an OLS regression, and secondly by including it as the upper limit of a Tobit regression with a censored foreign ownership outcome. I use both methods to ensure the robustness of the results. The intuition behind the first method is that the foreign ownership limit helps explaining general variations in the foreign ownership between firms for those that are often close or at the limit. Of course this variable is not good in explaining foreign ownership levels for firms which generally do not reach the legal ownership limit and might hence be biased. While the censored regression accounts for this and - in this regard thus leads to more meaningful results - it cannot account for firm fixed effects and clustered standard errors

[27] Firm fixed effects were chosen over random effects based on the Hausman test (see Appendix).
[28] Also called Rogers Standard errors. This follows the approach suggested by Petersen (2009).
[29] An exception are the censored Tobit regressions employed to test H_1 and H_3, which can only be estimated using OIM standard errors and random effects.

which are warranted given this panel setup. Both methods however lead to very similar results:

Contrary to our expectation, the results of model (1) and (2) in Table 3 show a very significantly negative coefficient for the difference in valuation when controlling for the absolute value of alpha (either foreign or domestic) and the set of control variables. This would mean, that stocks valued higher by foreigners than by locals are actually held less by foreigners. This is an unintuitive result which also contradicts the empirical findings by Kang, Lee and Park (2010). The absolute level of alpha also shows an unexpected negative sign, which however is not significant at a 95% confidence level. All variables combined explain more than 42.73% of the variation in the foreign ownership level, thereby showing a good fit of the model.

The results of the Tobit regression in Table 4 confirm these findings. The coefficients in the Tobit regression can be interpretated in a similar way as the OLS estimators; however the linear effect is measured on a *latent,* uncensored variable rather than the actual observed outcome which is limited by the legal ownership restrictions.[30] The coefficients are however not directly comparable with the OLS coefficients estimated in the earlier models. While the OLS estimators simply shows the marginal effect of x_i on y_i, the Tobit estimators carry the information of two different effects: The change in y_i for observations below the limit, weighted by the probability of being below the limit; and the change in the probability of being below the limit weighted by the expected value of y if below.[31] For the purpose of this study, the decomposition of the effect is not of great concern though, as we are only interested in the general relationship between the variables.

The difference in valuation again enters the regression again with a strongly significant negative value, while the absolute level of alpha is now also strongly negatively significant. In the observed period, foreigners seemed to prefer stocks with a negative alpha, also seemingly questioning their return chasing behavior that has been found by other studies.[32] This observed relationship could however arise from other factors.

In all regressions, of the control variables only firm size, turnover and the FO limit enter with a significant coefficient, however all variables jointly contribute to the regression.

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[30] See McDonald and Moffitt (1980), p.318f.
[31] See again McDonald and Moffitt (1980), p.318f. who outline this relationship for the case of left-sided (lower limit) censoring but confirm the generalizability of the outlined deomposition for right-sided (upper limit) censoring (p.320).
[32] For example Bohn and Tesar (1996) or Grinblatt and Keloharju (2000).

Models (3) and (4) are tested using the following equation:

$$FO_{i,t} = \alpha_0 + \beta_1 Alpha_{i,t}^{D(F)} + \beta_2 OrthAlpha_{i,t}^{F(D)} + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 4)}$$

where $OrthAlpha_{i,t}^{F(D)}$ is the scaled foreign (domestic) alpha orthogonalized for each firm-quarter observation to the scaled domestic (foreign) alpha. As explained in part 5 (Sample and data), this value is essentially the same as the alpha difference however **unrelated** to the absolute level of alpha through the process of orthogonalization. The orthogonalized scaled domestic Alpha is thus estimated along with the absolute level of the foreign alpha and vice versa. The advantage of this approach is that the orthogonalized values clearly separate the effect of the difference in valuation from the absolute alpha level. The results in Table 3 and 4 again show the same picture as in the previous models:

The coefficient for the orthogonalized local alpha shows a significantly positive relation while the orthogonalized foreign alpha has a significantly negative relationship to the foreign ownership level. Contrary to the first hypothesis and the prior findings by Kang et al., this confirms the results from model (1) and (2) that foreigners show a preference for stocks for which their valuation is actually worse than that of the locals. Using the setup with the orthogonalized alphas also shows that the foreign ownership level is determined by the absolute level of the foreign alpha, however not the domestic alpha. Again the coefficient shows an unexpected negative relationship. While this confirms that the international benchmark is relevant to evaluate stocks, the negative sign seems puzzling:

Based on these findings one could assume that most foreigners engage in a contrarian strategy, buying into stocks that have performed worse in the recent past. However, another explanation comes to the mind. The negative relationship could arise from correlations between certain firm characteristics and alpha and therefore be endogenous: Foreigners generally prefer bigger stocks as well as growth stocks (low book-to-market value),[33] a finding which is confirmed in the regression results here. Firms with these factors generally underperform the market as a whole[34] which in turn could lead to the observed negative relationship between alpha and the level of foreign ownership. This would however not explain why we only observe this relationship only for the foreign alpha and not for the domestic alpha. Testing this possible explanation by alternately regressing the two alphas on

[33] Kang and Stulz (1997) and Dahlquist and Robertsson (2001).
[34] See for example Fama and French (1993)

firm size and BTMV shows that there is actually a positive relationship between size and alpha and a negative relationship between BTMV and alpha, effectively ruling out this explanation.[35]

The negative relationship between alpha and the level of foreign ownership has no implications on the valuation difference though, as the absolute level of alpha is controlled for in the main regression by including it as an independent variable. Also, any explanations for the level of alpha arising from firm characteristics are not likely to explain the difference in valuation as the latter only stems from the use of differing benchmarks in calculating the alphas, as well as possible differing stock returns when translating returns into the foreign currency (USD in this case). To examine possible influences of these determinates, I reassess the findings in two robustness setups[36]:

6.2 Robustness Tests of Hypothesis 1:

The first robustness test for hypothesis 1 employs **a different foreign benchmark** to calculate the alphas. The main regressions have been calculated using alphas generated by employing the MSCI World index, which comprises of 6,000 securities in 24 developed countries.[37] Alternatively, I reassess the findings by calculating the alphas using the MSCI All Country index, which additionally includes several emerging markets and comprises of 45 countries. The results (not reported here) only change marginally and have no effect on signs or significance of the results.

In the main regressions, I have calculated the foreign alphas based on the stocks returns translated into USD, presuming foreigners not to be perfectly hedged against currency movements in the overseas market. In the second robustness test I calculate the foreign stock's alphas simply using the **THB denominated returns** instead. Again the results (not reported) do hardly change at all and no major effect on coefficients or effect on the significance of the results shows. Currency translation can in this case therefore also be ruled out as an influencing factor for the difference in valuation.

So far, the results are rather surprising. Before looking into other possible explanations at the end this first part, I test the second and third hypothesis to see if the results gotten so far will prevail.

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[35] Regression results are not reported here however the relationships can also be seen from the respective correlation coefficients in Table 2.
[36] Both robustness tests are similar to the ones conducted by Kang, Lee and Park (2010).
[37] See the website http://www.msci.com/products/indices/tools/ for an exact definition of the MSCI indices.

Table 3: OLS Regression of the foreign ownership level on the scaled alphas, the alpha difference and various firm characteristics including the foreign ownership limit as an explanatory variable. Variables are defined in Table 1. All regressions include an intercept, firm and quarter-fixed effects (not reported) and account for heteroskedasticity and correlation among same-firm observations.

	Dependent variable: Foreign ownership level							
	(1)		(2)		(3)		(4)	
	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*
$\alpha_F/\sigma(\varepsilon_F)$	-0.01052	*-1.38*			-0.02032	*-2.34*		
$\alpha_D/\sigma(\varepsilon_D)$			-0.01052	*-1.38*			-0.00173	*-0.26*
$\alpha_F/\sigma(\varepsilon_F)$ - $\alpha_D/\sigma(\varepsilon_D)$	-0.06103	*-3.18*	-0.07155	*-3.29*				
$\alpha_F/\sigma(\varepsilon_F)^{Orth}$							-0.00514	*-3.29*
$\alpha_D/\sigma(\varepsilon_D^{Orth}$					0.00429	*3.18*		
Control variables								
FO Limit	0.67257	*4.30*	0.67257	*4.3*	0.67257	*4.3*	0.67257	*4.3*
ln(mktcap)	0.02008	*3.50*	0.02008	*3.5*	0.02008	*3.5*	0.02008	*3.5*
EBITDA	5.43E-11	*0.26*	5.43E-11	*0.26*	5.43E-11	*0.26*	5.43E-11	*0.26*
BTMV	0.00057	*0.33*	0.00057	*0.33*	0.00057	*0.33*	0.00057	*0.33*
Leverage	-1.36E-07	*-0.88*	-1.36E-07	*-0.88*	-1.36E-07	*-0.88*	-1.36E-07	*-0.88*
DivYield	-0.00004	*-0.10*	-0.00004	*-0.1*	-0.00004	*-0.1*	-0.00004	*-0.1*
Turnover	-0.00014	*-0.91*	-0.00014	*-0.91*	-0.00014	*-0.91*	-0.00014	*-0.91*
Interest cover	3.82E-10	*0.29*	3.82E-10	*0.29*	3.82E-10	*0.29*	3.82E-10	*0.29*
R sq.	42.73%		42.73%		42.73%		42.73%	
Obs.	11145		11145		11145		11145	

Table 4: Tobit regression of the foreign ownership level on the scaled alphas, the alpha difference and various firm characteristics. The Tobit regressions controls for censored outcomes and includes the FO limit as the upper boundary for the FO level. Variables are defined in Table 1. All regressions include an intercept, firm level random effects and quarter-fixed effects (not reported) and account for heteroskedasticity.

	Dependent variable: Foreign ownership level							
	(1)		(2)		(3)		(4)	
	Coefficient	*z-Statistic*	Coefficient	*z-Statistic*	Coefficient	*z-Statistic*	Coefficient	*z-Statistic*
$\alpha_F/\sigma(\varepsilon_F)$	-0.02182	*-3.19*			-0.03479	*-4.36*		
$\alpha_D/\sigma(\varepsilon_D)$			-0.02182	*-3.19*			-0.00922	*-1.55*
$\alpha_F/\sigma(\varepsilon_F)$ - $\alpha_D/\sigma(\varepsilon_D)$	-0.08077	*-4.43*	-0.10259	*-4.94*				
$\alpha_F/\sigma(\varepsilon_F)^{Orth}$							-0.00736	*-4.94*
$\alpha_D/\sigma(\varepsilon_D^{Orth}$					0.00567	*4.43*		
Control variables								
ln(mktcap)	0.02692	*17.03*	0.02692	*17.03*	0.02692	*17.03*	0.02692	*17.03*
EBITDA	-7.73E-11	*-0.48*	-7.73E-11	*-0.48*	-7.73E-11	*-0.48*	-7.73E-11	*-0.48*
BTMV	-0.00174	*-1.6*	-0.00174	*-1.6*	-0.00174	*-1.6*	-0.00174	*-1.6*
Leverage	-1.28E-07	*-0.63*	-1.28E-07	*-0.63*	-1.28E-07	*-0.63*	-1.28E-07	*-0.63*
DivYield	-0.00020	*-0.95*	-0.00020	*-0.95*	-0.00020	*-0.95*	-0.00020	*-0.95*
Turnover	-0.00022	*-2.48*	-0.00022	*-2.48*	-0.00022	*-2.48*	-0.00022	*-2.48*
Interest cover	4.98E-10	*0.2*	4.98E-10	*0.2*	4.98E-10	*0.2*	4.98E-10	*0.2*
Obs. (uncensored)	10688		10688		10688		10688	
Obs. (right-censored)	727		727		727		727	

6.3 Test of Hypothesis 2

The second hypothesis (H_2) aims to address the timing of the difference in valuation. To test this hypothesis I will include lagged variables of the absolute level of alpha as well as the alpha difference in regression model. As the various models employed for the test of Hypothesis 1 all lead to similar results I will concentrate on the setup from models (1) and (2) for simplicity, estimated through OLS method as estimating the Tobit regressions is not possible here.

$$FO_{i,t} = \alpha_0 + \beta_1 Alpha_{i,t} + \sum_{l=1}^{L} \delta_{1,l} Alpha_{i,t-l} + \beta_2 AlphaDiff_{i,t} + \sum_{l=1}^{L} \delta_{2,l} AlphaDiff_{i,t-l} + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 5)}$$

where L is the number of Lags. I estimate the regressions using various numbers of lags ranging from one quarter to eight quarters (L=1-8) but only report the data for the case of four lagged periods (i.e. one year of past information) here. Table 5 again shows significantly negative results for the alpha difference as well as for all four of its lags.[38] The results therefore seem to reject the hypothesis that the effect of the difference in valuation is particular strong in the contemporaneous period and fades away the longer the valuation period is past.

These results have to be taken with great caution though. As in the main regressions testing Hypothesis 1, the regressions here also accounts for time fixed effects. The time effects for the lagged periods are collinear with the other lagged independent variables and therefore dropped automatically out of the regression which leads to inconsistent estimators. Note also that the explanatory power of the model goes down from 42.73% in the main regression with no lag to 38.48% in the setup including four lagged periods. Tests using different numbers of lagged periods show that the model's explanatory power goes down as more lagged periods are included in the setup. Including more than five lagged periods in the regression leads to all variables except the foreign limit itself suddenly becoming insignificant, underlining the spurious nature of the regression.

[38] All lags are at least significant at a 90% confidence level, however most of them are also significant at 95% level and higher.

Table 5: OLS Regression of the foreign ownership level on the scaled alphas and the alpha difference, their respective lags as well as various firm characteristics including the foreign ownership limit as an explanatory variable. Variables are defined in Table 1. Both regressions include an intercept, firm and quarter-fixed effects (not reported) and account for heteroskedasticity and correlation among same-firm observations.

	Dependent variable: Foreign ownership level			
	(1)		(2)	
	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*
$\alpha_F/\sigma(\varepsilon_F)$	-0.00887	*-1.06*		
L1	-0.00519	*-0.71*		
L2	-0.00724	*-1.19*		
L3	-0.00648	*-1.06*		
L4	-0.00339	*-0.58*		
$\alpha_D/\sigma(\varepsilon_D)$			-0.00887	*-1.06*
L1			-0.00519	*-0.71*
L2			-0.00724	*-1.19*
L3			-0.00648	*-1.06*
L4			-0.00339	*-0.58*
αF/σ(εF) - αD/σ(εD)	-0.04094	*-1.96*	-0.04981	*-2.06*
L1	-0.03705	*-1.81*	-0.04224	*-1.81*
L2	-0.03607	*-1.91*	-0.04331	*-2.06*
L3	-0.04256	*-2.26*	-0.04904	*-2.36*
L4	-0.05350	*-2.49*	-0.05689	*-2.4*
Control variables				
FO Limit	0.80760	*5.14*	0.80760	*5.14*
ln(mktcap)	0.01625	*2.16*	0.01625	*2.16*
EBITDA	3.16E-10	*1.44*	3.16E-10	*1.44*
BTMV	0.00182	*0.56*	0.00182	*0.56*
Leverage	-1.93E-07	*-1.39*	-1.93E-07	*-1.39*
DivYield	-0.00032	*-0.59*	-0.00032	*-0.59*
Turnover	-0.00005	*-0.75*	-0.00005	*-0.75*
Interest cover	3.05E-08	*0.86*	3.05E-08	*0.86*
R sq.	38.48%		38.48%	
Obs.	8058		8058	

6.4 Test of Hypothesis 3

Hypothesis 3 suggests that there is a possible asymmetry in the effect of the difference in valuation when the valuation difference is either positive or negative. The hypothesis is tested by estimating Equation 6, which separates between the two groups of positive and negative observations of the valuation difference by multiplying the difference in valuation with two respective dummy variables. The first Dummy variable *posD* takes on a value of 1 for positive observations of the alpha difference and 0 else, while *negD* takes on a value of 1 for negative observations of the alpha difference and 0 else. In this setup it is possible to run the more meaningful Tobit regressions again, accounting for censored outcomes in the level of foreign ownership due to the legal restrictions.

$$FO_{i,t} = \alpha_0 + \beta_1 Alpha_{i,t} + \beta_2 AlphaDiff_{i,t} * posD + \beta_3 AlphaDiff_{i,t} * negD + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 6)}$$

The results of the two models given in Table 6 correspond to Model 1 and 2 of Table 4.

As in the results of the first hypothesis test, the alpha variable shows a strong negative influence on the level of foreign ownership. The influence of the difference in valuation on the level of foreign ownership when the valuation difference is positive – that is when the foreign valuation is relatively favorable – becomes slightly stronger, both in magnitude and significance: The z-stat in Model (1) rises from -4.43 to -5.14 and in Model (2) from -4.94 to -5.58). However, the influence of the valuation difference on the foreign ownership level when the valuation difference is negative shows no significant influence.

Table 6: Tobit regression of the foreign ownership level on the scaled alphas, the alpha difference for either positive or negative outcomes and various firm characteristics. The Tobit regressions controls for censored outcomes and includes the FO limit as the upper boundary for the FO level. Variables are defined in Table 1. All regressions include an intercept, firm level random effects and quarter-fixed effects (not reported) and account for heteroskedasticity.

	Dependent variable: Foreign ownership level			
	(1)		(2)	
	Coefficient	*z-Statistic*	Coefficient	*z-Statistic*
$\alpha_F/\sigma(\varepsilon_F)$	-0.0219156	-3.21		
$\alpha D/\sigma(\varepsilon D)$			-0.0219156	-3.21
$[(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D)] * posD$	-0.1087601	-5.14	-0.1306758	-5.58
$[(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D)] * negD$	-0.0024682	-0.07	-0.0243838	-0.67
Control variables				
ln(mktcap)	0.0270707	17.12	0.0270707	17.12
EBITDA	-6.58E-11	-0.41	-6.58E-11	-0.41
BTMV	-0.00173	-1.59	-0.00173	-1.59
Leverage	-0.0001319	-0.65	-0.0001319	-0.65
DivYield	-0.000214	-1.01	-0.000214	-1.01
Turnover	-0.0002213	-2.48	-0.0002213	-2.48
Interest cover	3.58E-07	0.14	3.58E-07	0.14
Obs. (uncensored)	10688		10688	
Obs. (right-censored)	727		727	

Hypothesis 3 states that the entry process of foreigners into stocks takes longer than the exit process because they are likely to monitor stocks in an existing portfolio more closely than other investment alternatives. Based on the assumption that foreigners on average move out of a stock when their valuation for this stock is lower than that of the locals, the hypothesis was that the effect of the difference in valuation on the level of foreign ownership becomes stronger when the valuation difference is negative. Obviously the observed result again shows the opposite of the expected effect, the hypothesis has to be rejected.

The test results are however consistent with the test results of the earlier Hypotheses 1 and 2 and add to their understanding. The former tests suggest that foreign investors (for whatever reason)[39] hold *less* stocks for which the *international valuation is relatively higher* and *more stocks for which the international valuation is relatively lower*. The results from Hypothesis 3 show, that a negative valuation difference (i.e. the latter case where the international valuation is relatively lower) alone has no observable influence on the level of foreign ownership. A positive valuation difference however shows a very significant effect on the foreign ownership level, in this case also indicating that not only the sign, but also the magnitude of the valuation difference helps to explain the level of foreign ownership.

6.5 Findings and Explanation Attempts of the First Three Hypotheses Tests

To sum up, the findings of the tests of the first three hypotheses clearly oppose the main idea of this paper and the prior empirical findings. The results indicate that the intuition behind the main hypothesis is plainly wrong or at least does not hold true for the case of Thailand. It is particularly puzzling that the empirical results indicate the exact opposite of the assumed relationship, both for the coefficient of the absolute level of alpha as well as the difference in valuation.

It is unlikely that foreigners generally prefer stocks for which they assign a relatively low value by itself unless they want to engage in a contrarian strategy. As mentioned earlier, this is conflicting with the attribute of foreigners being return chasers that is generally assigned to them.[40] Note however that the alphas by itself are positively correlated to foreign ownership

[39] See the explanation attempts below in section 6.5.
[40] Bohn and Tesar (1996) or Grinblatt and Keloharju (2000).

(compare Table 2). The negative alpha coefficients only show up after controlling for the various firm characteristics.

The effect of the difference in valuation on the level of foreign ownership however is steadily negative and significant in various model specifications. It could well be that the observed effect of the preference for lower return stocks indeed stems from correlations with other factors influencing their investment decision unrecognized so far, or that the foreign investors on average are simply bad at picking the right stocks given their characteristics. It needs to be stressed that we can rule out firm characteristics influencing the difference in valuation between the two groups, as the valuation difference is observed on a fixed firm-time point and only arises from the differing type of benchmarks applied. The robustness tests also ruled out influences of the currency exchange rates or the choice of the international benchmark applied.

One explanation could be that indeed foreigners apply a local benchmark whereas domestic investors apply a foreign benchmark when valuating stocks. This assumption, directly opposite to the main hypothesis however seems unlikely. Slight variations of the assumptions might be more plausible; however they fail to explain the complete picture:

If foreign investors in Thailand do not make any investment decisions based on the excess returns of stock at all, but solely based on firm characteristics or other information, however some (e.g. institutional) local investors do, then the level of foreign ownership would go down as their stock valuation becomes favorable to them. If these investors apply an international benchmark for their valuation – as would be expected for institutional investors who also invest abroad– some of the relationship – the negative relation between the absolute level of alpha and the foreign ownership level - that has been observed in the data could be explained.

Is it likely that local investors engage in such investment strategies whereas international investors do not? As mentioned in the introduction, foreign investments are generally more difficult due to the informational asymmetries encountered in other countries. This could be particularly strong for the case of Thailand, given the strong cultural and language differences and geographical distance to most developed countries. This in turn could leave no room for such valuation practices by foreigners as they need to concentrate merely on companies for which these informational asymmetries are smallest and choose their investments accordingly. Local institutional investors do not face this problem in their home markets and could thus make part of their investment decision based on such technical valuations.

This explanation is clearly in line with a negative relationship between the absolute level of the (international) alpha and the foreign ownership, but does it also explain a relationship with the *alpha difference* given that we do not expect foreigners to base their decisions on a domestic valuation benchmark? From a theoretical point of view the foreign ownership level should then be unrelated to the alpha difference; as a differing valuation based on a domestic benchmark has no implication on the level of foreign ownership if none of the two investor groups relates to it. Any explanation about the influence of the difference in valuation must take into account both benchmarks:

Moving away from individual stock valuation and looking at market performance in general, another explanation attempt could be that domestic institutional investors - who also invest internationally - turn back to their home markets when these markets perform better than the foreign markets. Holding the stock's betas constant, in this case the stock's local alphas would generally be lower than the foreign ones (leading to a positive valuation difference). It is however questionable why, firstly, foreign investors would not follow those domestic investors into their lucrative home markets and why an opposite movement out of the local market cannot be observed when the local market performs worse than international markets (compare results from Hypothesis 3).

The next part covers the tests of the remaining hypotheses 4 and 5.

6.6 Test of Hypothesis 4

I now test Hypothesis 4 to examine a possible influence of the absolute value of the difference in valuation on the trading activity of stocks, as measured by their turnover.

In a first setup, I use a conventional approach and include the absolute value of the stock returns - among others - as an explanatory variable; in a second run I include the absolute value of the foreign and local alpha instead.

Besides the absolute price changes measured by the absolute value of quarterly returns just mentioned, the first setup includes the level of foreign ownership, firm size, profitability, the book-to-market-ratio and the stocks dividend yield as control variables.

$$Turnover_{i,t} = \alpha_0 + \beta_1\, abs(stock\ returns_{i,t}) + \beta_2\, abs(AlphaDiff_{i,t}) + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 7)}$$

The variables firm size, profitability and the book-to-market-ratio proxy a firm's visibility to investors and are in this regard mostly helpful in explaining *between* firm variations of share turnover.[41] Any remaining firm differences are captured by the firm fixed effects.

The level of foreign ownership is included to control for influences of the absolute level of foreign held shares. Because of the higher transaction costs, shares held by foreigners are likely to be traded less frequently. As we want to observe the influence of the difference in valuation on the trading volume on the basis that the level of foreign ownership changes accordingly, this might pose a potential problem in the regression, as we possible measure the same effect twice. Hence I will run the regressions two times, once including the level of foreign ownership as an explanatory variable, (Model 1) and once excluding it (Model 2). Again, the regressions are estimated using a fixed effects model, based on the results of the Hausman test and account for White standard errors adjusted for correlation within firm clusters.

The results (Table 7) show, that the alpha difference is not a significant factor explaining the stock turnover rate. Both models, including and excluding the level of foreign ownership show similar results for all other factors. Not surprisingly, the absolute level of the stock returns is the most significant influencing factor on the stock turnover. Large price changes often root in the availability of new information, which in turn spurs trading activity. Also, the price changes can only occur when stocks are traded accordingly. The level of foreign ownership also shows a strong negative influence on the turnover. Note though, that the direction of this relationship is ambiguous (and indeed we have observed turnover as an explanatory variable for foreign ownership in the previous regressions). The correlation here can show either that foreigner prefer stocks with lower turnover (which could well result because of correlations with other factors), or are traded less frequently because of the higher fraction of foreign owners - as assumed in this case. Of the other control variables, only the firms profitability measured by EBITDA is significant at a 90% confidence level, as is the dividend yield showing a significantly negative relationship in Model (1). All in all, the regressions show a relatively low fit of the model, explaining only just above 2% of the variations of the turnover. This is however not surprising, given the relatively long (quarterly) period observed.

[41] See Chordia et. al (2007) p. 736, based on Merton (1987).

Based on these results, I reject the fourth hypothesis, that the difference in valuation between foreigners and locals for a given stock spurs any trading activity that can be observed in this setup.

Table 7: OLS Regression of the share turnover on the absolute value of the quarterly stock returns [abs (stock returns)], the absolute value of the alpha difference and various control variables. All Variables are defined in Table 1. Both regressions include an intercept, firm and quarter-fixed effects (not reported) and account for heteroskedasticity and correlation among same-firm observations.

	Dependent variable: Turnover			
	(1)		(2)	
	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*
abs(stock returns)	2.676789	8.07	2.695388	8.07
abs$(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D))$	-1.028616	-0.93	-0.836198	-0.76
Control variables				
FO level	-2.444735	-2.76		
ln(mktcap)	0.0348023	0.17	-0.0219013	-0.11
EBITDA	3.16E-08	1.85	3.18E-08	1.86
BTMV	0.2434064	1.11	2.49E-01	1.14
DivYield	-0.0311327	-1.81	-0.0305779	-1.76
R sq.	2.21%		2.07%	
Obs.	11407		11407	

The second setup (Eq.8) now alternately replaces the absolute level of the quarterly returns, by the absolute level of the scaled foreign and scaled local alpha respectively (Model 1 and 2).

Obviously, all three variables are highly correlated *(compare Table 2)* as both alphas are estimated using returns and can therefore not be included in regression together. By including the absolute level of the alphas instead of the absolute price changes I want to gain insight on whether the international or the local benchmark is more helpful in explaining stock turnover

which could help determining the asset pricing model (global or local) applied by investors. The results might help to reflect the findings and possible explanations of the first hypotheses.

$$Turnover_{i,t} = \alpha_0 + \beta_1\, abs(Alpha_{i,t}) + \beta_2\, abs(AlphaDiff_{i,t}) + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq.8)}$$

Table 8 reports the results of the two regressions: It becomes obvious that the absolute level of the foreign alpha, calculated using the international index (MSCI World index) has explanatory power for the stock turnover rate. This is however not the case for the local alpha.

The absolute level of the valuation differences now shows a clear negative relationship with turnover. Contrary to the hypothesis, the trading volume is higher when the valuation difference derived from the application of international vs. the local benchmark is smaller. A possible explanation could be that traders become more confident and therefore trade more when global markets and the local market hosting the respective stock move into similar directions.

All other coefficients keep their signs with the dividend yield now becoming clearly significant. The results from this second setup support the findings of the first part this paper. Only the foreign alpha has explanatory power on the observed variables, the level of foreign ownership in the first part (H_1-H_3) and now the stock turnover in the Hypothesis 4 of the second part, indicating that in general, a global asset pricing model rather than a local model seems to be applied by investors.

Table 8: OLS Regression of the share turnover on the absolute vale of the scaled alpha, the absolute value of the alpha difference and various control variables. All Variables are defined in Table 1. Both regressions include an intercept, firm and quarter-fixed effects (not reported) and account for heteroskedasticity and correlation among same-firm observations.

	Dependent variable: Turnover			
	(1)		(2)	
	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*
$\text{abs}(\alpha F/\sigma(\varepsilon F))$	1.106771	2.01		
$\text{abs}(\alpha D/\sigma(\varepsilon D))$			-0.1631825	-0.19
$\text{abs}(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D))$	-2.495799	-2.23	-2.676995	-2.25
Control variables				
FO level	-2.537136	-2.81	-2.546888	-2.8
ln(mktcap)	0.1337867	0.67	0.1490412	0.76
EBITDA	3.01E-08	1.81	2.98E-08	1.79
BTMV	0.2306572	1.05	0.2326991	1.06
DivYield	-0.0369254	-2.14	-0.0364636	-2.1
R sq.	1.63%		1.61%	
Obs.	11415		11415	

6.7 Test of Hypothesis 5

Testing hypothesis 5 aims to show any influence of the valuation difference on the stock returns in the same period.

Model 1 is tested by estimating the following equation

$$Stock\ returns_{i,t} = \alpha_0 + \beta_1\ AlphaDiff_{i,t} + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t} \quad \text{(Eq. 9)}$$

where *Stock returns* are the total quarterly stock returns, continuously compounded. Contrary to previous regressions, this model does not include the absolute level of alphas as the absolute level of alpha is determined by the stock returns by construction (and not the other way around). The alpha difference however should not be technically related to the stock returns:

Obviously the stock returns (though observed on daily basis) are part of the calculation of the valuation difference, as they are used estimating the absolute level of alpha. However, the effect of the two alphas mostly cancels each other out when taking their difference. The *sign of the alpha difference (which* is most important here) is only determined by the use of the differing benchmarks. We can thus rule out any technical relationship between the sign of the valuation difference and the stock returns in this regard. Another issue is that the *size of the alpha difference* (in absolute terms) might be correlated with the stock returns. If stock returns are high positive or negative, they can possibly give rise to higher positive or negative alphas. If the two benchmarks used for alpha estimation vary at this point in time, this gives possibly also rise to a higher absolute value of the alpha difference. Indeed the absolute value of the alpha difference and the absolute values of the returns are slightly positively correlated *(ρ of 0.0707, compare Table 2).* To ensure the results from Model 1 are not driven by such a technical influence (and we mistake cause and effect). I estimate the following regression in Model 2 which serves as a robustness setup:

$$abs(Stock\ returns)_{i,t} = \alpha_0 + \beta_1\ abs(AlphaDiff_{i,t}) + \sum_{i=1}^{K} \gamma_k X_{k,i,t} + f_i + q_t + \varepsilon_{i,t}$$

(Eq. 10)

The sign of the alpha difference is clearly not technically driven by the size of the returns, however the size of the alpha difference might be. If the latter was the case, than we would expect the coefficient - when regressing the absolute stock returns on the absolute valuation difference (as in Eq. 10) - to become significantly positive related.

Table 9 reports the results of the two models. Looking at Model 1, the valuation difference shows a very significantly negative influence on the total quarterly stock returns. Given the negative sign we can already rule out a technical relationship (that would work in the opposite direction). Based on this finding we can reject the original hypothesis 5, that foreigners who on average push into stocks due to their favorable valuation cause a rise in stock prices (and vice versa). Note however, that this hypothesis seems not warranted anymore given the results of the earlier tests, especially those of Hypotheses 1-3. The strongly significant negative result is however puzzling, as the negative sign is not in line with any explanation that bases on the influx of investors (be they foreigners or locals) on the basis of a positive valuation that is derived from an international benchmark. This issue requires further attention, which is however beyond the scope of this paper.

The control variables indicate which stocks did perform better or worse during the observed period based on their firm characteristics: It shows that larger stocks and stocks with higher Interest cover on average had higher total returns, as did growth stocks (low BTMV). Firms with higher EBITDA showed lower total returns as did stocks with higher dividend yield.

Model 2 was aimed as ruling out a technical relationship and has no interpretable power beyond this. The coefficient for the absolute alpha difference is significantly negative, however less big then the alpha difference of model 1. This confirms that the influence of the alpha difference on the level of stock returns is not (or at least not solely) technically driven - which would lead to a positive relationship. Any possible technical relationship is thus overruled by another cause, however not the hypothesized effect (compare Results from Model 1).

Table 9: OLS Regressions of the quarterly stock returns (absolute values in Model 2) on the scaled alpha difference (absolute values for Model 2) and various control variables. All Variables are defined in Table 1. Both regressions include an intercept, firm and quarter-fixed effects (not reported) and account for heteroskedasticity and correlation among same-firm observations.

	Dependent variable.: Quarterly (total) stock return		Dep. Var.: Absolute level of quarterly (total) stock return	
	(1)		(2)	
	Coefficient	*t-Statistic*	Coefficient	*t-Statistic*
αF/σ(εF) - αD/σ(εD)	-1.27910	-20.42		
$\text{abs}(\alpha F/\sigma(\varepsilon F) - \alpha D/\sigma(\varepsilon D))$			-0.63602	-12.64
Control variables				
ln(mktcap)	0.08314	12.85	0.04187	7
EBITDA	-1.80E-09	-3.62	-7.15E-10	-1.91
BTMV	-0.00791	-1.56	-0.00412	-1.11
Leverage	2.98E-08	0.08	5.87E-07	1.19
DivYield	-0.00556	-7.23	-0.00198	-4.11
Turnover	0.00131	1.28	0.00111	1.18
Intcover	7.98E-09	6.28	3.15E-09	2.55
R sq.	26.81%		8.86%	
Obs.	11407		11407	

CHAPTER VII.
SUMMARY AND CONCLUSIONS

The empirical findings of this paper regarding tests that examine the relationship between the difference in valuation of the two investor groups and the level of foreign ownership level are in stark contrast to those of the previous study by *Kang, Lee and Park (2010).* The results of this study indicate that a favorable valuation using an international benchmark in comparison to a domestic valuation benchmark leads to a *lower* proportion of foreign owners (rather than an expected higher proportion). These results are highly significant and confirmed using various different approaches and robustness setups. A number of possible explanations for this effect have been discussed, however those that seem likely fail to explain all aspects of the results, and those that do so, seem rather unlikely.

While the tests examining lead and lag effects do not yield useful results due to collinearity problems, other tests show that there is indeed a strong asymmetry in the effect: The valuation difference is only significantly explaining the level of foreign ownership level in cases where the valuation based on an international benchmark exceeds the valuation employing a domestic benchmark (as well as in cases where both cases are observed together) - but not the other way around. Any explanation for this effect must base on or relate to the explanation of the general relationship between the valuation difference and the foreign ownership level, therefore the results are helpful to validate these possible explanations. These results also show that not merely the sign but also the size of the valuation difference helps to explain the level of foreign ownership, at least in the case of positive valuation difference.

The tests regarding a possible influence of the valuation difference on the stock turnover show a mixed picture, with only one of the test setups leading to significant results. This test indicates that the trading activity is lower when the international valuation is relatively favorable. Furthermore, the results again underline the *general notion* of a global asset pricing model, through the coefficients of the absolute value of the foreign alpha variable. The absolute level of the foreign alpha showed to have a significantly negative influence on the foreign ownership level in the earlier hypotheses tests, as well as a positive relationship to the stock turnover - while the alpha calculated using a local benchmark has no such influence.

The difference in valuation also showed to have a strongly negative effect on the quarterly stock returns, indicating that stock returns generally go down when the stocks international

valuation is relatively favorable. This is equally surprising, as it contrasts higher returns due to the higher demand of those investors.

The findings of this study clearly oppose the previous findings by *Kang, Lee and Park (2010)*. Attempts to explain these findings have been given, however the explanations do not seem entirely convincing. Additional tests that have been conducted in this study show some interesting results which are generally consistent with the main findings, yet also fail to explain the unexpected nature of the results. Irrespective of the differing findings, the two studies both find evidence for the use of differing benchmarks to evaluate assets - or stocks in particular - by different investor groups.

Given this and the contrasting findings of the two studies in near identical setup, further empirical research - employing yet a different dataset, preferably comprising of larger number of observed countries or variation in the methodology - could help shading light on the issue of the valuation difference as a factor explaining differing stock holdings levels of foreign and domestic investors.

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APPENDIX

Hausman Test

The Hausman test (Hausman 1978) was applied in all relevant regressions to determine whether the efficient random effects estimator can be applied or whether the fixed effects model has to be used.

Under the tests assumptions, the fixed effects estimator is consistent for both H_0 and H_A whereas the random effects estimator is efficient for H_0 but inconsistent under H_A.

The test determines whether the difference between the estimators is systematic. If this is the case, then random effects model should not be applied.

The following table shows the output of the Hausman test for the Main Hypothesis (H_1) of Model1 as an example:

Table 10: Hausman test for Model 1 of the first regression testing H_1 (as shown in Table 3 above)

	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E.
ScAlphaForUSD	-0.0105225	-0.0120667	0.0015442	.
AlphaDiffUSD	-0.0610268	-0.0621733	0.0011465	.
forlimit	0.6725723	0.6749222	-0.00235	0.0051544
logMV	0.0200777	0.0231264	-0.0030487	0.0004578
EBITDA	5.43E-11	7.17E-11	-1.74E-11	2.33E-11
BTMV	0.0005704	0.0012956	-0.0007252	0.0001171
Lev	-0.0001362	-0.0000802	-0.000056	.
dy	-0.0000422	-7.83E-06	-0.0000343	0.00001
turnover	-0.0001424	-0.0001517	9.28E-06	.
IntCover	3.82E-07	4.25E-07	-4.23E-08	.
QD2	0.0075747	0.0073562	0.0002186	.
QD3	0.0024961	0.0022094	0.0002867	.
QD4	0.0009486	0.0006352	0.0003134	.
QD5	-0.0110217	-0.0124198	0.0013981	.
QD6	-0.0247861	-0.0269972	0.0022112	.
QD7	-0.0412868	-0.0437792	0.0024925	.
QD8	-0.0383045	-0.0405831	0.0022785	.
QD9	-0.0383883	-0.040391	0.0020027	.
QD10	-0.0371452	-0.0393359	0.0021907	.
QD11	-0.0300283	-0.0324244	0.0023961	.
QD12	-0.0353875	-0.0379499	0.0025624	.
QD13	-0.0234626	-0.0257968	0.0023341	.
QD14	-0.0275582	-0.0299466	0.0023883	.
QD15	-0.0151952	-0.0175353	0.0023402	.
QD16	-0.0193231	-0.0214965	0.0021734	.
QD17	-0.0171559	-0.0194078	0.0022519	.

QD18	-0.0180536	-0.0205426	0.002489	.
QD19	-0.0118396	-0.0143981	0.0025585	.
QD20	-0.0061377	-0.00873	0.0025924	.
QD21	-0.0090802	-0.0118741	0.0027939	.
QD22	-0.0151792	-0.0180501	0.0028709	.
QD23	-0.0148537	-0.0176883	0.0028346	.
QD24	-0.0272732	-0.0305788	0.0033057	.
QD25	-0.0234371	-0.0261586	0.0027215	.
QD26	-0.0168387	-0.0188124	0.0019737	.
QD27	-0.0204767	-0.0220383	0.0015616	.
QD28	-0.0177361	-0.0193391	0.001603	.
QD29	-0.0266223	-0.0287363	0.002114	.
QD30	-0.0353158	-0.0378288	0.002513	.
QD31	-0.0312739	-0.0337057	0.0024317	.
QD32	-0.0385908	-0.0410713	0.0024806	.
QD33	-0.0339683	-0.036509	0.0025407	.
QD34	-0.0475513	-0.0507658	0.0032145	0.0001832
QD35	-0.048412	-0.051863	0.0034509	0.0001989
QD36	-0.0481736	-0.0514296	0.003256	0.0002339
QD37	-0.0501248	-0.0535244	0.0033996	0.0002517
QD38	-0.0457178	-0.0493053	0.0035876	0.0001803
QD39	-0.044	-0.0478942	0.0038941	0.0002561
QD40	-0.0504822	-0.0548171	0.0043348	0.0004086

Ho: The difference in the coefficients not systematic

chi2(47) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 95.94
Prob>chi2 = 0.0000

The results show that H_0 has to be rejected (Prob>chi2 = 0.0000). H_A states the random effect estimator is inconsistent in this case, thus the use of the firm fixed effects estimator is warranted. The results are similar for the other model specifications. However, as it is not possible to run the Tobit regression with fixed effects, a firm level random effects estimator is used in these cases.

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