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Foreign Ownership and Stock Return Volatility: Evidence from Thailand

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This study employs the recent and powerful measure of large foreign ownership suggested by Li, Nguyen, Pham, and Wei (2010) to investigate the impact of foreign investors on stock return volatility of companies listed on the Stock Exchange of Thailand. Our results show the stabilizing role of foreign investors in the market, presenting a significant and negative relationship between foreign investment and stock market volatility. The evidence is consistent across industries. This effect is most evident among foreign investors with a controlling stake, and who are non-financial entities. In general, our results confirm previous findings on the role of foreign investment on stock market volatility in developed and developing countries.

Field of Research: International Finance, Volatility, Foreign Ownership, Thailand

1. Introduction

The increasing level of globalization and financial liberalization in emerging markets attracts more foreign portfolio investment and leads to both improvement in market liquidity and reduction in the cost of capital (see, for example, Bekaert and Harvey 2000 and Henry 2000). However, the experience from the 1997 Asian crisis reveals that foreign portfolio flows are not stable. This prompts concerns related to the destabilizing impact of opening domestic capital markets to cross-border investments.

Two approaches exist that shows the linkage between foreign investments and local stock prices. First, the relationship between foreign capital flows and domestic equity returns is investigated, hypothesizing that foreign capital flows increase volatility in local capital markets. Consequently, this impedes the growth and development of local financial markets in the long run. Second, the behavior of emerging markets subsequent to stock market liberalization is examined. The results from both approaches remain mixed.[1]

The measure of the impact of opening local markets to foreign investors is still debatable. Many studies employ the event study approach (see, for example, Bekaert and Harvey, 1997 and Kim and Singal, 2000), while others employ existing indices measuring the degree of the openness of the local market to foreign capital flows (see, for example, Bae et al., 2004 and Umutlu, Akdeniz, and Altay-Salih, 2010). However, these two methodologies have drawbacks. Since stock market liberalization is a process that occurs gradually, it is difficult to identify the date when foreign investors entered the market. The event date is difficult to identify. Moreover, stock market movements are affected by other economic factors. A potential problem with the indices approach is that most indices only reflect foreign ownership limits rather than the actual interest of foreign investors in local capital markets. Recently, Li, Nguyen,

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Pham, and Wei (2010) create a new proxy for foreign ownership, which allows a direct investigation of the actual ownership pattern of large foreign shareholders. This measure represents the actual presence of large foreign shareholders in domestic firms, whereas the degree of investibility employed in previous studies is based on the upper limit of foreign investment allowed in companies.

Thailand is the root of the 1997 Asian crisis, in which one of the causes was the huge amount of capital inflows from foreign countries. Hirankasi (2007) illustrates that foreign trading in the Stock Exchange of Thailand (SET) accounts around 50% of total market capitalization during the period of 1995-2007, and the 1997 Asian financial crisis marks the peak of foreign investment of around 70% in the market. Pavabutr and Yan (2007) document that foreign investors possess significant percentage of the ownership in some of the largest listed companies in the SET.

In addition, Figure A1 in the Appendix displays a continuing increase in trading values of foreign investors in the SET over the period of 2001-2011. Foreign investment increases from 294 billion baht in 2001 to 1,636 billion baht in year 2011, approximately a 19% average annual increase. The increasing importance of foreign investment in Thailand calls for in-depth studies of the role of foreign investors on the equity market in Thailand. This paper aims to deepen the understanding of the relationship between foreign ownership and stock return volatility in the SET using the recent and powerful measure of foreign ownership suggested by Li et al. (2010).

Our results present on an industry basis due to the fact that firms in different industries behave in different ways. These results are to some degrees an extension of prior literature. We contribute to previous findings as follows. First, extant research shows that stock return volatility varies in different sectors. For instance, Hammoudeh, Yuan, Chiang, and Nandha (2010) examine the impacts of various sector-specific fundamentals, global, and domestic variables on volatility using GARCH models in the 27 U.S. equity sectors. They find different responses in each sector. Second, certain sector-specific government regulations impose additional restrictions. For example, foreign ownership in the telecommunications corporations (fixed-line and mobile/wireless infrastructure and services) is restricted to a maximum of 49 percent by the Telecommunication Act BE 2544/2001. Sectors that are fully open to foreign capital participation in Thailand include light manufacturing, pharmaceutical, and food products. Our results are expected to shed some lights on the association of foreign ownership and stock return volatility in restricted industries in Thailand.

The scope of this study includes foreign ownership in listed firms in the Stock Exchange of Thailand for two years, 2007 and 2011, which are sufficiently separated in order to capture significant and meaningful changes in ownership concentration. The foreign ownership in this study also incorporates foreign investment under nominee accounts. Note that this measure of foreign ownership allows for the recognition of heterogeneity among foreign investors. We distinguish short-term and speculative portfolio investors from long-term and strategic investors, since the latter, being relatively stable shareholders, shows potentially a strong commitment in the companies in which they invest. Such the commitment stemming from large investments creates physical barriers to quick exit or cut-and-run activities. Therefore, these investors are self-motivated to reduce the risk of their investments, which is equivalent to the reduction of return volatility.

This paper documents a strong negative and significant relationship between large foreign ownership and stock return volatility in the equity market in Thailand. The results remain robust even after controlling for domestic ownership concentration. The relationship is strongly statistically significant in the Resources sector in 2007 and the Industrial sector in 2011. Similar to Li et al. (2010), we find that foreign investors, who have a controlling stake in the companies and who are non-financial entities, are more likely to lead to a volatility-reduction effect. This finding suggests that the impact of foreign investors on equity markets is largely the same in both developed and emerging countries. In addition, our results on an industry basis reaffirm the findings of Li et al.

To address a potential endogeneity problem, time variations in the 2007-2011 period are employed. The results from first-difference regressions suggest that unobservable time-constant firm characteristics affect the relationship between large foreign ownership and stock return volatility in Thailand. However, the same is not true, when foreign shareholders have a controlling stake in the companies.

The remainder of the paper is organized as follows. Section 2 presents literature review. Section 3 discusses the methodology employed in this study. Section 4 provides sources and data description. Section 5 discusses an issue of heterogeneity. Section 6 discusses empirical results. The last section is summary and conclusions.

2. Literature Review

Many studies show the relationship between foreign investment and stock market volatility in emerging countries, especially after the 1997 Asian crisis (see, for example, Bekaert and Harvey, 2000, Kim and Singal, 2000, and Pavabutr and Yan, 2007). There are several potential benefits of increasing the exposure of local stock markets to foreign investors. This accessibility represents an important opportunity to attract foreign capitals to finance domestic economic growth. An open market also hastens the development of domestic equity markets (see, for example, Boyd and Smith, 1996, Levine and Zervos, 1996, 1998, and Kim and Singal, 2000). Importantly, using monthly and quarterly data, Bohn and Tesar (1996) find a positive relationship between foreign equity flows and stock returns in emerging markets. This relationship is further supported by Froot, O'Connell, and Seasholes (2001). They examine the dynamic interaction of international flows and local asset returns using both daily and weekly data, and find that foreign equity flows cause excess market volatility.

Changes in stock return volatility around liberalization have also been empirically studied. However, the results are inconclusive. For example, De Santis and Imrohoroglu (1997), Bekaert and Harvey (1997), Kim and Singal (2000), and Umutlu, Akdeniz, and Altay-Salih (2010) do not find any evidence of a systematic effect of market liberalization on stock return volatility, whereas Bae, Chan, and Ng (2004) show a positive relationship, and argue that foreign investment flows render stock returns more vulnerable to the world market risk. One of the important criticisms of these studies relates to the quality of the foreign ownership measure. Other studies, for example, Quinn (1997), Edison and Warnock (2003), and Umutlu, et al. (2010), employ indices measuring the market openness to foreign capital inflows and restrictions to foreign equity ownership. These indices represent the upper limit in lieu of the actual holdings of foreign investors. Later, Li et al. (2010) construct a large

foreign ownership (LFO) variable, defined as the sum of foreign block shareholdings. A block is an ownership stake of at least five percent of the shares issuance. They compare the LFO variable with the traditional investibility index, obtained from the S&P Emerging Market database and widely employed as a measure of foreign investment restrictions. However, the investibility index does not represent the actual presence of large foreign shareholders. This implies that a firm can be classified as *highly investible*, but have *no or low* foreign ownership. They find that the presence of foreign blockholders in 1,409 firms among 31 emerging markets is strongly negatively associated with the volatility in the stock markets.

Wang (2007) documents a strong contemporaneous relationship between foreign equity tradings and market volatilities in Indonesia and Thailand. Excluding the volatile period during the 1997 Asian crisis, the investment from abroad stabilizes the market volatilities in Indonesia and Thailand. This evidence is consistent with Pavabutr and Yan (2007).

With the exception of Li et al. (2010), previous studies do not distinguish short-term and speculative portfolio investors from long-term and strategic investors. Little research has investigated the *direct* impact of large foreign shareholders on stock return volatility. However, some conclusions are drawn as follows. Mitton (2006) finds that firms that are open to foreign investment have lower leverage. Later, Li et al. (2010) provide some possible explanations. Because of operational and financial support from large foreign shareholders, domestic firms rely less on debt financing, causing lower stock return volatilities. Another explanation for the negative relationship between large foreign shareholders and stock return volatility is foreign investors' incentive to reduce their investment risks. Wiwattanakantang (2000) examines the ownership structures of listed firms in Thailand, and finds that they are significantly concentrated. The largest shareholders are also controlling shareholders in 82.59 percent of the firms in the study. Foreign investors are the second largest group. The large foreign shareholders tend to have strong commitments to their investments in domestic firms, and can directly or indirectly reduce volatility in stock returns. However, there exists no such evidence on an industrial basis in Thailand.

3. Methodology

This study investigates the impact of foreign ownership on stock return volatility of listed companies in the Stock Exchange of Thailand (SET). We follow the model suggested by Li et al. (2010) as follows:

$$V_{i,j} = \alpha_{i,j} + \beta_{i,j} LFO_{i,j} + \theta_{i,j} X_{i,j} + \varepsilon_{i,j}$$

where $V_{i,j}$ denotes the volatility of firm *i* in industry *j*, measured as the annual average of logarithms of squared monthly returns in 2007 and 2011, respectively. $LFO_{i,j}$ represents the main independent variable, LFO5, and the alternative measures of LFO (including LFO25, LFOFIN, and LFONONFIN, which are explained later). The purpose is to consider heterogeneity among foreign investors. $X_{i,j}$ represents all necessary control variables of firm *i* in industry *j*. $\varepsilon_{i,j}$ is an error term.

4. Sources and Data Descriptions

This study analyzes the foreign ownership of listed firms in the Stock Exchange of Thailand (SET) across all industry sectors. The data excludes the financial sector and companies under a rehabilitation plan.[2] Similar to Li et al. (2010), we collect data for two years, 2007 and 2011, which are sufficient to capture significant and meaningful changes in ownership concentration.[3] Initially, there are 343 listed firms in the SET. After considering the availability of ownership information and removing outliers, the sample consists of 310 firm-year.[4] The data sources, variable denotations, and variable descriptions used in this study are summarized in Table A1 in the Appendix.

5. Heterogeneity among Foreign Investors

To further contribute to the extant research on the impact of foreign investors in emerging markets, this study also examines the characteristics of foreign investors by employing data on the actual presence of foreign ownership. Similar to Li et al. (2010), the alternative measures of LFO are constructed to reflect sizes and types of foreign shareholders. The main purposes of this study are as follows.

First, the study tests whether a volatility-reduction effect can be attributed to foreign investors. The variable labeled as LFO25 is constructed to present the aggregate percentage ownership of foreign investors, who each own at least 25% of shares issuance.[5] Different levels of foreign ownership present various impacts on stock return volatility. Bhide (1993) explains that ownership concentration reduces liquidity of stocks. Further, Menyah and Paudyal (1996) find that stock liquidity is a function of the return volatility, trading volume, and stock price.

Second, the type of foreign investors is another important characteristic to examine. The alternative LFO variables, LFOFIN and LFONONFIN, are constructed to represent two major types of foreign shareholders. LFOFIN is defined as the aggregate percentage ownership of foreign blockholders, who are financial institutions including banks, insurance companies, mutual funds, pension funds, and other investment entities. LFONONFIN covers non-financial entities. The main difference between these two types of foreign investors is their objectives of stock trading. While foreign financial institutions focus on financial interests or strategic purposes (e.g. a parent-subsidiary relationship) as opposed to arms-length investments, non-financial entities are relatively more likely to establish a long-term commitment and to participate in a stabilizing role.

6. Empirical Results

6.1 Descriptive Statistics

Table A2 in the Appendix provides summary statistics of all variables used in the study. Panels A and B show the industry-level average for the years 2007 and 2011, respectively. The descriptive statistics of all variables across the entire sample are also reported in Panels C and D.

In 2007, the average large foreign ownership (LFO5) ranges from 3.10% in the Resources sector to 14.77% in the Industrials sector. The highest LFO5 is present in

the Industrials sector for both years 2007 and 2011 at 82.32% and 88.58%, respectively. LFO5 increases from year 2007 to 2011 with the exception of the Property & Construction, Services, and Technology sectors. However, LFO5 in all sectors decreases from 9.21% in 2007 to 8.51% in 2011. The same trend follows for most of the large foreign ownership variables with the exception of LFONONFIN, which shows a slight increase in ownership in 2011. Note that it is *not* evidently clear that the sectors with above average LFO5 have lower average volatility.

The high average of LFONONFIN shows that the majority of large foreign shareholders are non-financial entities, which tend to provide resources rather than monetary capital. The average LFO25 does not seem as high because, of the entire sample, only about 30 firms have large foreign shareholders with more than 25% of issued shares. However, average LFO25 is substantial at 43.48% and 41.52% in years 2007 and 2011, respectively.[6]

Large volatilities are evident in the Property & Construction, Resources, and Technology sectors, which consist of relatively larger and more liquid stocks. While all three sectors show largest volatilities, only Resources and Technology sectors have above average market to book value.

6.2 Regression Results Analyses

6.2.1 Regression Results on the Relationship between Stock Return Volatility and Large Foreign Ownership (LFO5)

Panels A and B of Table A3 in the Appendix present the correlation matrices and the variance inflation factors (VIF)[7] between explanatory variables used in regression analyses to explain volatility in years 2007 and 2011, respectively. Applying the cutoff of correlation coefficient values of 0.8 or higher for a potential problem of multicollinearity (suggested by Judge et al. (1980)), the multicollinearity problem seems not to exist. These results correspond to the VIF values suggesting that multicollinearity is not of concern. None of the variables possesses the VIF greater than 10. This value is used as a rule of thumb to indicate a multicollinearity problem (Belsey, 1991). In fact, the highest VIF values shown in Table A3 are 1.95 for lnMKTCAP and 1.83 for LagVOL in years 2007 and 2011, respectively.

Table 1 demonstrates the results of the cross-sectional regression of stock return volatility on LFO5 in 2007 (Panel A) and 2011 (Panel B), respectively. Column (2) of Panels A and B, which report the results of the full regression model, show that the coefficients of LFO5 are negative and statistically significant at the 5% level for both 2007 and 2011. We conclude that large foreign shareholdings are associated with lower stock return volatility. This finding is consistent with Li et al. (2010).

To address the issue of domestic ownership concentration existing in emerging markets, column (1) of Panels A and B reports the results of regression models excluding block shareholdings by domestic financial institutions (DOMFIN) and non-financial blockholders (DOMNONFIN). LFO5 for 2007 and 2011 are negatively significant at 10% and 1% levels, respectively. DOMFIN has a positive impact on volatility, while the impact of DOMNONFIN is inconclusive due to mixed results. However, most of the estimated coefficients are statistically insignificant. This

strengthens the idea that concentrated ownership exists in firms with different levels of volatility. Taking both foreign and domestic block shareholdings into account, the results strongly emphasize that only large foreign ownership generates a volatility-reduction effect in the SET.

Table 1: Relationship Between Stock Return Volatility And Large Foreign Ownership

The dependent variable is the logarithmic transformation of average monthly squared returns. The main independent variable is LFO5, the aggregate percentage ownership of foreign investors with at least 5% shareholding. DOMFIN and DOMNONFIN are the aggregate block (equal to or more than 5%) shareholding of domestic financial institutions and of non-financial domestic entities, respectively. lnMKTCAP is the average of monthly natural logarithms of market capitalization. TURNOVER is the average of the number of shares traded in a month divided by the number of shares outstanding at the beginning of each month. LEV is the ratio of total liabilities to total assets. LagVOL is the one-year lag of volatility. ROE is the company's return on equity. MB is the market-to-book ratio of assets. All regressions include industry-fixed effects. Cluster-adjusted standard errors are shown in parentheses.***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Panel A. Regression Results for 2007		Panel B. Regression Results for 2011	
	(1)	(2)	(1)	(2)
LFO5	-0.0035*	-0.0044**	-0.0066***	-0.0053**
	(0.0020)	(0.0021)	(0.0023)	(0.0026)
DOMFIN		0.0021		0.0029
		(0.0028)		(0.0027)
DOMNONFIN		-0.0015		0.0020
		(0.0023)		(0.0020)
lnMKTCAP	-0.0023	-0.0110	0.0339	0.0363
	(0.0342)	(0.0373)	(0.0256)	(0.0259)
TURNOVER	0.0194***	0.0191***	0.0222***	0.0227***
	(0.0029)	(0.0033)	(0.0022)	(0.0023)
LEV	0.0072***	0.0071***	0.0036*	0.0036*
	(0.0022)	(0.0022)	(0.0021)	(0.0021)
LagVOL	0.1729***	0.1726***	0.2845***	0.2933***
	(0.0525)	(0.0520)	(0.0683)	(0.0704)
LagRTN	-0.0191*	-0.0175*	0.0236*	0.0224*
	(0.0105)	(0.0105)	(0.0134)	(0.0135)
ROE	0.0038	0.0036	-0.0003	-0.0004
	(0.0031)	(0.0031)	(0.0021)	(0.0021)
MB	0.0015	0.0017*	-0.0010*	-0.0010**
	(0.0009)	(0.001)	(0.0005)	(0.0005)
Intercept	1.5650**	1.7936**	1.1440**	0.9707*
	(0.6907)	(0.7910)	(0.5451)	(0.5759)
F-Statistics	12.51	10.82	20.62	18.27
R^2 (%)	32.97	33.30	47.14	47.37
No. of obs.	310	310	310	310

The coefficients of all control variables are mostly significant across the regression models with the exception of lnMKTCAP and ROE. This suggests that small firms and firms with a low ROE do not necessarily have high volatility. As anticipated, firms with high turnover, leverage, and one-year lag volatility have significantly higher volatility. LagRTN and MB present mixed impacts on volatility. Note that all regressions include coefficients of industry-fixed effects, which capture the homogeneity across firms in the same industry. The impacts of homogeneity on the relationship between LFO5 and volatility are difficult to measure.

Table A4 in the Appendix reports the regression results by industry. LFO5 is negative and strongly significant in the Resources and Industrials sectors for 2007 and 2011, respectively. These two sectors represent closely the results for all sectors. TURNOVER is positively significant in most industries.

6.2.2 Regression Results on the Relationship between Stock Return Volatility and Alternative Large Foreign Ownership Measures

To emphasize the importance of heterogeneity among foreign investors, alternative measures of LFO variables are included in the regression as shown in Table 2. Column (1) of Panels A and B shows that foreign shareholders possessing ownership of at least 25% of issued shares are negative and statistically significant on stock return volatility in 2007 and 2011, respectively. In contrast, LFO5 to LFO25 – the variable representing foreign ownership stake from 5% to 25% – is insignificant for both years. This suggests that foreign investors with a controlling stake are more likely to create a volatility-reduction effect resulting from a strong incentive to reduce the risk of their portfolio investments.

The other two alternative LFO variables are included in column (2) of Panels A and B. LFOFIN and LFONONFIN represent foreign blockholders, who are financial institutions and who are non-financial entities, respectively. The coefficients of LFONONFIN are negative and significant for both 2007 and 2011, while those of LFOFIN are mostly insignificant. These results confirm that foreign investors, who are non-financial entities, are interested in long-term investments. Thus, these investors appear to be more committed to aspects of the firms other than financial ones. Consequently, this creates a stabilizing impact on the firm, and reduces its risk.

Table 2: Relationship Between Stock Return Volatility And Alternative Large Foreign Ownership Measures Classified By Sizes And Types Of Large Foreign Shareholders

The dependent variable is the logarithmic transformation of average monthly squared returns. LFO5to25 (LFO25) is the aggregate percentage ownership of foreign investors, who each owns 5% to less than 25% (more than 25%). DOMFIN and DOMNONFIN are the aggregate block (equal to or more than 5%) shareholding of domestic financial institutions and of non-financial domestic entities, respectively. lnMKTCAP is the average of monthly natural logarithms of market capitalization. TURNOVER is the average of the number of shares traded in a month divided by the number of shares outstanding at the beginning of each month. LEV is the ratio of total liabilities to total assets. LagVOL is the one-year lag of volatility. ROE is the company's return on equity. MB is the market-to-book ratio of assets. All regressions include industry-fixed effects. Cluster-adjusted standard errors are shown in parentheses. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

	Panel A. Regression Results for 2007		Panel B. Regression Results for 2011	
	(1)	(2)	(1)	(2)
LFO5to25	0.0009		-0.0024	
	(0.0042)		(0.0038)	
LFO25	-0.0065***		-0.0069**	
	(0.0021)		(0.0031)	
LFOFIN		0.0041		0.0025
		(0.0049)		(0.0065)
LFONONFIN		-0.0064***		-0.0068**
		(0.0023)		(0.0031)
DOMFIN	0.0025	0.0022	0.0030	0.0026
	(0.0027)	(0.0027)	(0.0027)	(0.0027)
DOMNONFIN	-0.0012	-0.0014	0.0021	0.0019
	(0.0023)	(0.0023)	(0.0020)	(0.0020)
lnMKTCAP	-0.0125	-0.0120	0.03660	0.0348
	(0.0374)	(0.0375)	(0.0262)	(0.0262)
TURNOVER	0.0195***	0.0193***	0.0228***	0.0224***
	(0.0032)	(0.0032)	(0.0023)	(0.0023)
LEV	0.0071***	0.0071***	0.0036*	0.0035*
	(0.0021)	(0.0021)	(0.0021)	(0.0021)
LagVOL	0.1684***	0.1687***	0.2958***	0.2920***
	(0.0520)	(0.0512)	(0.0710)	(0.0706)
LagRTN	-0.0162	-0.0174*	0.0221	0.0233*
	(0.0106)	(0.0104)	(0.0136)	(0.0136)
ROE	0.0037	0.0036	-0.0004	-0.0005
	(0.0031)	(0.0030)	(0.0022)	(0.0022)
MB	0.0016	0.0016	-0.0010**	-0.0010**
	(0.0010)	(0.0010)	(0.0005)	(0.0005)
Intercept	1.7942**	1.8067**	0.9281	0.9970*
	(0.7909)	(0.7941)	(0.5796)	(0.5793)
F-Statistics	11.13	10.66	17.42	17.55
R^2 (%)	33.76	33.93	47.53	47.60
No. of obs.	310	310	310	310

6.2.3 Endogeneity Problem

Taking into account the possibility that decisions of foreign investors may be biased toward firms with lower volatility, this study also conducts first-difference regressions to address the endogeneity problem. This regression model utilizes time variations in the 2007-2011 period, and tests whether changes in LFO affect changes in volatility. Panel E of Table A2 in the Appendix shows that LFO5 has a 0.7% decrease over the two-year period. This average change is small, because the majority of firms either has no LFO5 or has unchanged LFO5 over the period. Table 3 contains results of the first-difference regression models. The coefficient of dLFO5 is insignificant, while that of LFO25 is negative and strongly significant. The findings are different from Li et al. (2010), which document that changes in LFO5 are significantly related to corresponding changes in volatility. This suggests that, to some extent, the relationship between LFO5 and stock return volatility may be affected by unobservable time-constant firm characteristics, i.e., the firm's risk nature. In contrast, the coefficient of dLFO25 in column (2) of Table 3 shows that foreign investors with a potential controlling stake have a volatility-reduction effect on the stock return. This relationship remains intact even after controlling for time-invariant factors.

Table 3: First-Difference Regression: Relationship Between Stock Return Volatility And Large Foreign Ownership

The dependent variable is the change in volatility measured (logarithmic transformation of average monthly squared returns) over the 2007-2011 period. All independent variables are changes measured over the same period. LFO5 (LFO25) is the aggregate percentage ownership of foreign investors with at least 5% shareholding (at least 25% shareholding). DOMFIN and DOMNONFIN are the aggregate block (equal to or more than 5%) shareholding of domestic financial institutions and of non-financial domestic entities respectively. lnMKTCAP is the average of monthly natural logarithms of market capitalization. TURNOVER is the average of the number of shares traded in a month divided by the number of shares outstanding at the beginning of each month. LEV is the ratio of total liabilities to total assets. LagVOL is the one-year lag of volatility. ROE is the company's return on equity. MB is the market-to-book ratio of assets. All regressions include industry fixed effects. Cluster-adjusted standard errors are shown in parentheses. ***, **, and * are significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
dLFO5	-0.0009	
	(0.0061)	
dLFO25		-0.0121***
		(0.0046)
dDOMFIN	-0.0203**	-0.0203**
	(0.0082)	(0.0080)
dDOMNONFIN	-0.0020	-0.0031
	(0.0055)	(0.0050)
dlnMKTCAP	0.2596***	0.2618***
	(0.0898)	(0.0900)
dTURNOVER	0.0201***	0.0203***
	(0.0030)	(0.0029)
dLEV	0.0038	0.0035
	(0.0035)	(0.0034)
dLagVOL	0.0917*	0.0903*
	(0.0490)	(0.0492)
dLagRTN	-0.0068	-0.0060
	(0.0121)	(0.0121)
dROE	-0.0010	-0.0011
	(0.0017)	(0.0017)
dMB	-0.0002	-0.0003
	(0.0011)	(0.0011)
F-Statistics	7.37	8.05
R^2 (%)	27.85	28.19
No. of obs.	310	310

7. Summary and Conclusions

Whether and how foreign participation impacts a stock market is important for local investors, regulators, and decision makers, as foreign investors have always been major players in markets, especially in emerging markets. This paper provides a better understanding of the relationship between foreign ownership and stock return volatility in Thailand. Our analyses are in terms of industrial sectors, which have not been studied in prior papers. Using the superior *direct* measure of large foreign ownership constructed by Li, Nguyen, Pham, and Wei (2010), this study further investigates heterogeneity among foreign investors in the equity market of Thailand.

Our findings in the Stock Exchange of Thailand reinforce existing evidence that large foreign investors play a stabilizing role in equity markets. One possible explanation is the theory of asymmetric information. Foreign investors as blockholders have access to meetings with senior management, and thus gain superior knowledge about the firm. Because of this informational advantage compared with domestic investors, foreign investors may take actions that help stabilize stock prices, especially when prices deviate from fundamental values. The results add to previous findings by looking at industrial sectors. After adding selected control variables and considering a potential multicollinearity problem, the negative and significant large foreign ownership-stock return volatility relationship is still present in all industry sectors in years 2007 and 2011. The Resources sector shows relatively high volatility and significantly low foreign ownership.

Further, foreign investors with a controlling stake, and those who are non-financial entities demonstrate the most evident stabilizing effect. The existing literature suggests that long-term and strategic investors commit to invested firms in aspects other than monetary ones, and thus establish physical barriers to cut-and-run activities potentially rendering the stock more volatile.

In sum, this study bridges the gap between the two main approaches, i.e. focusing on foreign capital flows and observing stock market behavior after stock market liberalization. However, due to the lack of specific data that is difficult to measure or difficult to access, other factors that might affect these relationships should be further investigated, for example, factors concerning the endogeneity problem. Consequently, more in-depth research relating to this issue should be a topic of future research.

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Endnotes

[1] For example, from the first approach, Bohn and Tesar (1996) and Froot, O'Connell, and Seasholes (2001) document a positive relationship between foreign equity flows and returns in emerging markets, but do not find that foreign investors have destabilizing impacts on stock prices. For example, from the second approach, Bekaert and Harvey (1997) find that although equity market volatility in many of the

20 emerging markets decreased after liberalization, such liberalization often increases the correlation between local market returns and world returns. While Kim and Singal (2000) and Umutlu, Akdeniz, and Altay-Salih (2010) find no significant change in emerging market volatility following liberalization, Bae, Chan, and Ng (2004) show a positive relationship between foreign investment and local firm stock return volatility. They conclude that the return on the more investible and accessible local stocks is likely to be affected by foreign investors' portfolio adjustments and their sentiments.

[2] Financial firms are not included in the analysis for at least two reasons. First, financial institutions may hold large equity stakes for strategic purposes (e.g. as in a parent-subsidiary relationship) rather than as arms-length investments (Li, Moshirian, Pham, and Zein, 2006). Second, financial service firms are often subject to ownership restrictions and limits, which are different among different types of financial firms. Both issues lead to selectivity bias should financial firms be included.

[3] These two years are specifically chosen due to two reasons. First, data in year 2011 presents the latest available information on foreign ownership in the Thai stock market as of the date this study is conducted. Second, as the summary statistics in Panel E of Table A2 in the Appendix show, the maximum change in the main LFO variable, LFO5, is 70.30% and the minimum change is -70.87%. Overall, LFO5 decreases by 0.70% on average. These changes are considered substantial and render the results significant.

[4] With careful discretion, this study identifies outliers as firms whose variable values deviate markedly from other observations in the sample. Starting with a graphical tool (i.e., a scatter plot of each important correlation to check the normality assumption as well as identify potential outliers), a widely accepted method for rejection of flawed data points called Chauvenet's Criterion is utilized. The criterion states that data points can be considered for elimination if the probability of obtaining their deviation from the mean is less than 1/(2N), where N is sample size. Other numerical measures such as leverage statistics, Cook's distance, and dfbeta are also investigated. There is no unanimously accepted theoretical framework for the treatment of outliers (Cousineau and Chartier, 2010). However, in an attempt to eliminate obvious errors resulting from skewness and kurtosis of the estimates, data outliers are carefully removed from the sample in this study.

[5] According to SET regulations, a shareholder is a controlling shareholder or ultimate owner of a firm if one owns directly or indirectly more than 25 percent of the firm's shares. Under the Public Limited Companies Act, at this level of shareholdings, a shareholder has sufficient voting power to have significant influence on the firm in the following ways: 1) nullify any corporate decisions, 2) demand to inspect the business operation and the financial condition of the company, as well as the conduct of the board, 3) call extraordinary general meetings at any time, and 4) submit a notion to the court demanding the dissolution of a company if the shareholder believes that further company operations will bring only losses, and that the company has no chance of recovery. Since deviation from one-share-one-vote rule is not allowed in Thailand, voting rights are proportional to the number of shares owned by a shareholder. In other words, voting rights are equal to cash flow rights.

[6] The results are available upon request.

[7] The use of VIF is considered to be superior to an examination of bivariate correlations in testing for collinearity. According to Berry and Feldman (1985), there are two problems regarding the bivariate correlations. First, an independent variable may be a linear combination of several independent variables, and yet not highly correlated with any one of them. Second, it is difficult to define an appropriate cutoff point.

References

Bae, K, Chan, K & Ng, A 2004, 'Investability and return volatility', *Journal of Financial Economics*, vol. 71, pp. 239-263.

Bekaert, G & Harvey, C 1997, 'Emerging equity market volatility', *Journal of Financial Economics,* vol. 43, pp. 29-77.

Bekaert, G & Harvey, C 2000, 'Foreign speculators and emerging equity markets', *Journal of Finance,* vol. 55, pp. 565-613.

Belsley, D 1991, *Conditioning diagnostics: Collinearity and weak data in regressions,* Wiley, New York.

Berry, W & Feldman, S 1985, *Multiple regression in practice,* Beverly Hills, CA: Sage.

Bhide, A 1993, 'The hidden costs of stock market liquidity', *Journal of Financial Economics,* vol. 34, pp. 31-51.

Bohn, H & Tesar, LL 1996, 'U.S. equity investment in foreign markets: Portfolio rebalancing or return chasing?', *American Economic Review,* vol. 86, pp. 77-81.

Boyd, J & Smith, B 1996, 'The coevolution of the real and financial sectors in the growth process', *World Bank Economic Review,* vol. 10, pp. 371-396.

Cousineau, D & Chartier, S 2010, 'Outliers detection and treatment: A review', *International Journal of Psychological Research,* vol. 3, no. 1, pp. 58-67.

De Santis, G & Imrohoroglu, S 1997, 'Stock returns and volatility in emerging financial markets', *Journal of International Money and Finance,* vol. 16, pp. 561-579.

Edison, H & Warnock, F 2003, 'A simple measure of the intensity of capital controls', *Journal of Empirical Finance*, vol. 10, pp. 81-104.

Froot, K, O' Connell, P & Seasholes, M 2001, 'The portfolio flows of international investors', *Journal of Financial Economics,* vol. 59, pp. 151-193.

Hammoude, S, Yuan, Y, Chiang, T & Nandha, M 2010, 'Symmetric and asymmetric US sector return volatilities in presence of oil, financial and economic risks', *Energy Policy,* vol. 38, pp. 3922-3932.

Henry, PB 2000, 'Stock market liberalization, economic reform, and emerging market equity prices', *Journal of Finance,* vol. 55, pp. 529-64.

Hirankasi, P 2007, 'Foreign capital flows and stock market in developing countries: Some evidence from Thailand', Unpublished manuscript, Cornell University.

Judge, G, Griffith, W, Hill, C & Lee, TC 1980, *The theory and practice of econometrics,* Wiley, New York.

Kim, H & Singal, V 2000, 'Stock market openings: Experience of emerging economies', *Journal of Business*, vol. 73, pp. 25-66.

Levine, R & Zervos, S 1996, 'Stock market development and long-run growth', *World Bank Economic Review,* vol. 10, pp. 323-339.

Levine, R & Zervos, S 1998, 'Stock markets, banks and economic growth', *American Economic Review,* vol. 88, pp. 537-558.

Li, D, Moshirian, F, Pham, PK & Zein, J 2006, 'When financial institutions are large shareholders: The role of macro corporate governance environments', *Journal of Finance*, vol. 61, pp. 2975-3007.

Li, D, Nguyen, QN, Pham, PK & Wei, SX 2010, 'Large foreign ownership and firm-level stock return volatility in emerging markets', *Journal of Financial and Quantitative Analysis*, vol. 46, pp. 1127-1155.

Mitton, T 2006, 'Stock market liberalization and operating performance at the firm level', *Journal of Financial Economics,* vol. 81, pp. 625-647.

Pavabutr, P & Yan, H 2007, 'The impact of foreign portfolio flows on emerging market volatility: Evidence from Thailand', *Australian Journal of Management*, vol. 32, pp. 345-368.

Quinn, D 1997, 'The correlates of change in international financial regulation', *American Political Science Review*, vol. 91, pp. 531-551.

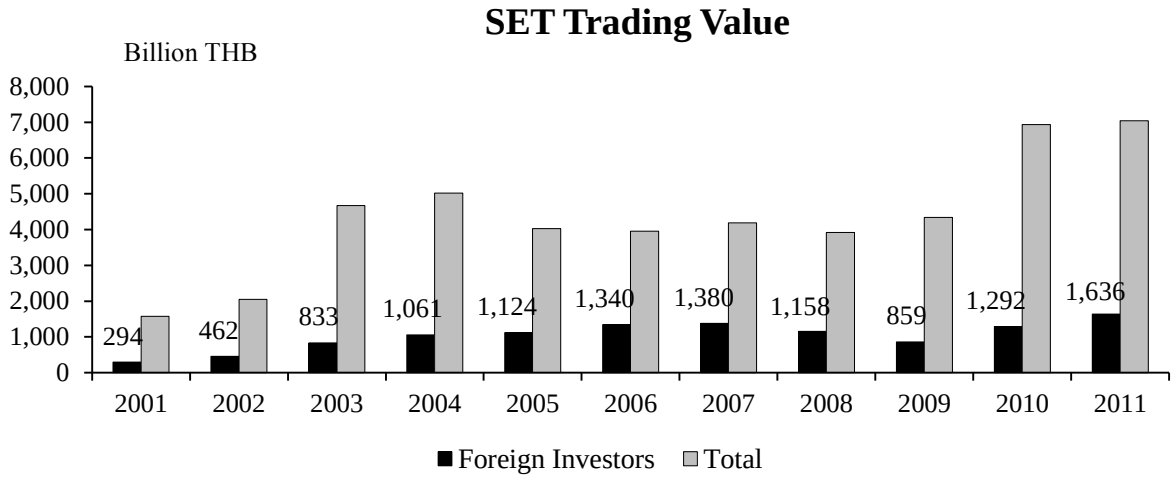
Umutlu, M, Akdeniz, L & Altay-Salih, A 2010, 'The degree of financial liberalization and aggregated stock-return volatility in emerging markets', *Journal of Banking and Finance*, vol. 34, pp. 509-521.

Wang, J 2007, 'Foreign equity trading and emerging market volatility: Evidence from Indonesia and Thailand', *Journal of Development Economics*, vol. 84, pp. 798-811.

Wiwattanakantang, Y 2000, 'The equity ownership structure of Thai firms', Unpublished manuscript, Hitotsubashi University, Japan.

Appendix

Figure A1: Trading Values of the Stock Exchange of Thailand During the Period of 2001-2011



Source: SETSMART

Table A1: Sources of Data and Data Descriptions

Variable	Description	Source
V (Stock Return Volatility)	The stock return volatility in 2007 and 2011 is first calculated and then taking a logarithmic transformation of squared monthly returns for each year and finding the average of this measure for the year. The stock returns are adjusted for dividends and stock splits.	DataStream
LFO5 (Large Foreign Ownership)	A firm's LFO is specified by the aggregate shareholding of foreign investors who each own five percent or more of the issued shares. The variable is labeled as LFO5. At the five percent ownership, a shareholder is a block shareholder that has the ability to block special resolutions such as the board of directors' selection or dividend payout policy. A foreign shareholder is defined as a citizen of another country, a business entity registered (or headquartered) in another country, or an unlisted majority-owned subsidiary of a foreign company (Li et al., 2010).	SET Market Analysis and Reporting Tool (SETSMART) data service
LFO25	Aggregate percentage ownership of foreign investors who hold at least 25 percent of firms' issued shares	SETSMART
LFO5to25	Aggregate percentage ownership of foreign investors with the stake ranging from five percent to less than 25 percent	SETSMART
LFOFIN	Aggregate percentage ownership of foreign blockholders who are financial institutions	SETSMART
LFONONFIN	Aggregate percentage ownership of foreign blockholders who are non-financial entities	SETSMART
DOMFIN	Aggregate block shareholdings of domestic financial institutions	SETSMART
DOMNONFIN	Aggregate block shareholdings of all domestic non-financial entities	SETSMART
lnMKTCAP	Average of the natural logarithms of month-end market capitalization	DataStream
TURNOVER	Average of number of shares traded in a month divided by the number of shares outstanding at the beginning of each month	DataStream
LEV	Ratio of total liabilities to total assets	DataStream
LagVOL	One-year lag of volatility	DataStream
LagRTN	One-year lag return	DataStream
ROE	The company's return on equity	DataStream
MB	Market-to-book ratio of assets is constructed as the market value of equity plus the book value of debt as the market value of assets at the end of year divided by the book value of assets	DataStream

Table A2: Summary Statistics

Panel A reports the within-industry mean of the volatility measure (average of natural logarithms of squared monthly returns), firm-size measure (average of natural logarithms of month-end market capitalization), trading turnover (monthly average of number of shares traded divided by the number of common shares outstanding), leverage (total liabilities divided by total assets), LagVOL (one-year lag of volatility), LagRTN (one-year lag return), ROE (return on equity), and MB (market-to-book ratio of assets). Panel A also provides the within-industry average of LFO5 (aggregate percentage ownership of large foreign shareholders, using 5% ownership threshold); alternative LFO measures including LFO25 (aggregate percentage ownership of large foreign shareholders, using 25% ownership threshold), LFO5to25 (aggregate percentage ownership of large foreign shareholders who each own 5% to less than 25%), LFOFIN (aggregate percentage ownership of foreign blockholders who are also financial institutions), and LFONONFIN (aggregate percentage ownership of foreign blockholders who are non-financial entities); DOMFIN (aggregate block shareholdings of domestic financial institutions); and DOMNONFIN (aggregate block shareholdings of domestic non-financial entities). Note that all variables are reported in percentages with the exception of V, lnMKTCAP, LagVOL, and LagRTN.

Industry	No. of firms	LFO5	LFO25	LFO5 to25	LFO-FIN	LFO-NON-FIN	DOM-FIN	DOM-NON-FIN	V
Panel A: Summary Statistics by Industry for 2007									
Agro & Food Industry	35	6.308	0.000	6.308	3.028	3.280	5.019	42.471	2.467
Consumer Product	34	9.990	5.865	4.125	1.369	8.621	4.690	37.656	2.949
Industrials	59	14.768	9.408	5.360	1.588	13.180	6.587	34.599	2.783
Property & Construction	62	7.350	1.230	6.120	3.937	3.413	4.226	29.320	3.082
Resources	20	3.101	1.250	1.851	0.453	2.648	2.324	34.484	2.941
Services	70	7.808	3.497	4.311	2.050	5.758	4.961	37.381	2.893
Technology	30	11.956	5.336	6.620	4.336	7.620	5.366	34.277	3.162
All sectors	310	9.209	4.067	5.142	2.493	6.715	4.969	35.357	2.897

Industry	No. of firms	lnMKTCAP	TURN-OVER	LEV	Lag-VOL	Lag-RTN	ROE	MB
Panel A: Summary Statistics by Industry for 2007								
Agro & Food Industry	35	21.424	1.409	38.895	2.854	2.280	5.977	127.763
Consumer Product	34	20.442	2.822	30.020	2.672	0.445	2.741	81.728
Industrials	59	20.934	6.848	40.336	2.948	0.250	8.561	100.712
Property & Construction	62	21.834	11.015	50.602	3.717	1.935	5.045	120.179
Resources	20	23.108	7.912	43.472	3.141	0.230	14.780	148.975
Services	70	21.631	7.487	39.269	3.148	1.352	6.852	136.613
Technology	30	21.890	15.882	48.057	3.435	0.254	16.157	134.461
All sectors	310	21.505	7.713	41.804	3.166	1.086	7.678	120.064

Industry	No. of firms	LFO5	LFO25	LFO5 to25	LFO-FIN	LFO-NON-FIN	DOM-FIN	DOM-NON-FIN	V
Panel B: Summary Statistics by Industry for 2011									
Agro & Food Industry	35	7.169	0.000	7.169	2.584	4.585	4.036	41.508	2.911
Consumer Product	34	10.284	6.607	3.677	1.060	9.224	4.716	37.942	2.886
Industrials	59	13.742	9.144	4.598	1.698	12.044	5.601	35.468	3.114
Property & Construction	62	5.332	1.891	3.441	2.349	2.983	4.725	28.470	3.461
Resources	20	4.628	1.250	3.378	0.784	3.844	0.000	32.404	3.326
Services	70	6.677	3.029	3.648	1.306	5.371	5.278	36.786	3.068
Technology	30	11.190	2.861	8.329	2.254	8.936	5.102	33.198	3.222
All sectors	310	8.508	3.885	4.624	1.765	6.744	4.669	34.902	3.149

Industry	No. of firms	lnMKTCAP	TURN-OVER	LEV	Lag-VOL	Lag-RTN	ROE	MB
Panel B: Summary Statistics by Industry for 2011								
Agro & Food Industry	35	22.116	6.120	37.843	3.015	3.763	17.265	150.971
Consumer Product	34	20.772	4.601	30.938	3.143	2.919	2.271	90.475
Industrials	59	21.226	5.904	39.464	3.169	4.864	8.490	104.777
Property & Construction	62	21.985	11.980	52.822	3.429	3.369	5.382	122.392
Resources	20	23.473	12.242	51.436	2.951	3.821	11.914	133.354
Services	70	21.713	7.996	42.722	2.714	2.054	9.602	145.899
Technology	30	21.934	16.940	60.382	2.933	2.581	0.861	145.340
All sectors	310	21.752	8.950	44.550	3.061	3.305	7.910	127.002

No. of firms	LFO5	LFO25	LFO5 to25	LFO-FIN	LFO-NON-FIN	DOM-FIN	DOM-NON-FIN	V
Panel C: Descriptive Statistics of the Entire Sample for 2007 (Obs.=310)								
Mean	9.209	4.067	5.142	2.493	6.715	4.969	35.357	2.897
Median	0.000	0.000	0.000	0.000	0.000	0.000	33.435	2.850
Max	82.320	82.320	45.300	70.870	82.320	96.260	98.000	5.644
Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.616
SD	15.982	13.439	9.234	7.024	14.451	12.541	23.770	0.815

No. of firms	lnMKTCAP	TURN-OVER	LEV	Lag-VOL	Lag-RTN	ROE	MB
Panel C: Descriptive Statistics of the Entire Sample for 2007 (Obs.=310)							
Mean	21.505	7.713	41.804	3.166	1.086	7.678	120.064
Median	21.257	2.122	42.342	3.155	0.644	8.880	102.910
Max	27.400	112.959	97.791	5.974	34.643	57.880	444.158
Min	17.754	0.005	0.848	0.000	-10.312	-94.380	27.412
SD	1.627	15.029	21.144	0.965	4.511	17.159	62.015

No. of firms	LFO5	LFO25	LFO5 to25	LFO-FIN	LFO-NON-FIN	DOM-FIN	DOM-NON-FIN	V
Panel D: Descriptive Statistics of the Entire Sample for 2011 (Obs.=310)								
Mean	8.508	3.885	4.624	1.765	6.744	4.669	34.902	3.149
Median	0.000	0.000	0.000	0.000	0.000	0.000	34.190	3.200
Max	88.580	82.310	75.490	31.890	68.900	88.060	97.770	5.238
Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.469
SD	16.064	12.709	9.742	5.193	14.254	12.678	23.729	0.854

No. of firms	lnMKTCAP	TURN-OVER	LEV	Lag-VOL	Lag-RTN	ROE	MB
Panel D: Descriptive Statistics of the Entire Sample for 2011 (Obs.=310)							
Mean	21.752	8.950	44.550	3.061	3.305	7.910	127.002
Median	21.526	2.939	44.661	3.102	2.540	9.725	106.820
Max	27.567	133.015	160.018	5.306	22.271	216.707	613.534
Min	17.745	0.004	0.384	0.000	-7.302	-143.030	31.821
SD	1.695	17.578	24.320	0.906	4.002	24.996	74.884

No. of firms	LFO5	LFO25	LFO5 to25	LFO-FIN	LFO-NON-FIN	DOM-FIN	DOM-NON-FIN	V
Panel E: Descriptive Statistics of the Changes in Variables from 2007 to 2011 (Obs.=310)								
Mean	-0.701	-0.182	-0.519	-0.729	0.028	-0.300	-0.455	0.252
Median	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.280
Max	70.300	41.080	70.300	31.890	67.760	56.400	53.710	2.557
Min	-70.870	-70.870	-36.200	-70.870	-31.900	-46.470	-57.630	-3.763
SD	8.139	5.193	7.375	6.208	6.106	5.968	10.523	0.983

No. of firms	lnMKTCAP	TURN-OVER	LEV	Lag-VOL	Lag-RTN	ROE	MB
Panel E: Descriptive Statistics of the Changes in Variables from 2007 to 2011 (Obs.=310)							
Mean	0.247	1.237	2.746	-0.105	2.219	0.232	6.938
Median	0.222	0.096	1.519	-0.084	2.236	1.055	5.108
Max	4.422	97.553	95.834	4.253	22.149	208.877	411.258
Min	-2.749	-111.134	-52.827	-4.039	-32.889	-149.730	-282.031
SD	0.745	18.318	16.379	1.215	6.229	28.135	68.500

Table A3: Correlation Matrices And Variance Inflation Factors of Explanatory Variables In Years 2007 and 2011

	LFO5	DOMFIN	DOM-NONFIN	lnMKTCAP	TURN-OVER	LEV	LagVOL	LagRTN	ROE	MB	VIF
Panel A: Correlation Coefficients and Variance Inflation Factors for 2007											
LFO5	1.000										1.500
DOMFIN	0.228	1.000									1.270
DOMNONFIN	0.473	0.357	1.000								1.870
lnMKTCAP	0.076	0.085	0.418	1.000							1.950
TURNOVER	0.130	0.214	0.421	0.544	1.000						1.460
LEV	-0.145	0.015	0.005	-0.080	-0.130	1.000					1.230
LagVOL	0.049	-0.060	-0.168	-0.142	-0.368	0.072	1.000				1.390
LagRTN	-0.048	0.105	0.040	0.334	0.389	-0.168	-0.212	1.000			1.210
ROE	0.014	0.136	0.014	-0.274	-0.174	0.191	0.185	-0.112	1.000		1.460
MB	-0.012	-0.129	-0.286	-0.500	-0.331	-0.021	0.104	-0.400	-0.216	1.000	1.700
Panel B: Correlation Coefficients and Variance Inflation Factors for 2011											
LFO5	1.000										1.460
DOMFIN	0.333	1.000									1.290
DOMNONFIN	0.471	0.459	1.000								1.690
lnMKTCAP	0.029	0.038	0.207	1.000							1.660
TURNOVER	0.059	0.175	0.206	0.291	1.000						1.180
LEV	-0.123	-0.204	-0.172	-0.243	-0.297	1.000					1.280
LagVOL	0.308	0.192	0.196	-0.063	0.056	-0.311	1.000				1.830
LagRTN	-0.156	-0.153	-0.081	0.013	-0.055	0.091	-0.681	1.000			1.720
ROE	-0.065	-0.133	-0.057	-0.268	-0.065	0.417	-0.039	-0.090	1.000		1.200
MB	-0.019	-0.140	-0.210	-0.302	-0.115	0.041	0.009	-0.022	-0.244	1.000	1.460

Table A4: Regression Results By Industry: Relationship Between Stock Return Volatility And Large Foreign Ownership

Industry	Int.	LFO5	DOMFIN	DOMNON-FIN	lnMKT-CAP	TURNOVER	LEV	LagVOL	LagRTN	ROE	MB	R^2 (%)
Panel A: Regression Results for 2007												
Agro & Food	3.466	-0.003	-0.005	-0.001	-0.106	0.078	0.012*	0.033	-0.053**	-0.002	0.006***	49.12
Industry	(2.562)	(0.013)	(0.010)	(0.006)	(0.119)	(0.075)	(0.006)	(0.191)	(0.024)	(0.003)	(0.002)	
Consumer	2.562*	-0.004	0.010	0.006	0.119	0.075	0.006	0.191	0.024	0.003	0.002	42.47
Products	(4.418)	(0.007)	(0.014)	(0.009)	(0.183)	(0.013)	(0.009)	(0.231)	(0.043)	(0.011)	(0.005)	
Industrials	8.571	-0.005	0.001	0.000	-0.297	0.022***	0.009	0.101	-0.0257*	0.016**	-0.002***	62.37
	(1.727)	(0.004)	(0.006)	(0.006)	(0.088)	(0.008)	(0.004)	(0.109)	(0.027)	(0.008)	(0.002)	
Property &	4.418	0.001	0.014	0.009	0.183	0.013	0.009	0.231**	0.043	0.011	0.005	31.82
Construction	(1.964)	(0.007)	(0.009)	(0.006)	(0.099)	(0.007)	(0.007)	0.148)	(0.016)	(0.006)	(0.003)	
Resources	2.423	-0.049***	0.005***	0.000	-0.024	0.035**	0.003	0.051*	0.052	-0.020	0.006	84.86
	(1.627)	(0.013)	(0.008)	(0.007)	(0.079)	(0.016)	(0.013)	(0.222)	(0.057)	(0.018)	(0.003)	
Services	1.727	-0.001	0.006	0.006	0.088	0.008***	0.004*	0.109	0.027	0.008*	0.002**	29.80
	(1.371)	(0.007)	(0.011)	(0.003)	(0.064)	(0.004)	(0.004)	(0.109)	(0.027)	(0.004)	(0.001)	
Technology	0.718	-0.010	-0.006	-0.008	0.046	0.011*	0.001	0.302	-0.025	-0.004*	0.003	57.55
	(3.360)	(0.009)	(0.006)	(0.010)	(0.134)	(0.009)	(0.008)	(0.235)	(0.037)	(0.012)	(0.004)	
All sectors	1.794**	-0.004**	0.002	-0.002	-0.011	0.019***	0.007***	0.173***	-0.018*	0.004	0.002*	33.30
	(0.791)	0.002)	(0.003)	(0.002)	(0.037)	(0.003)	(0.002)	(0.052)	(0.011)	(0.003)	(0.001)	

Industry	Int.	LFO5	DOM FIN	DOMNON-FIN	lnMKT-CAP	TURN OVER	LEV	LagVOL	LagRTN	ROE	MB	R^2 (%)
Panel B: Regression Results for 2011												
Agro & Food	2.107	-0.011	0.027***	-0.0030	0.009	0.027**	0.003	0.203	0.012	-0.010	-0.004	49.93
Industry	(2.082)	(0.015)	(0.005)	(0.0055)	(0.102)	(0.012)	(0.010)	(0.224)	(0.037)	(0.014)	(0.002)	
Consumer	6.685**	0.000	-0.026**	-0.0017	-0.217	0.010*	0.016**	0.029	0.071	0.012	0.000	45.72
Products	(3.207)	(0.010)	(0.012)	(0.0085)	(0.146)	(0.006)	(0.006)	(0.153)	(0.061)	(0.007)	(0.005)	
Industrials	1.996	-0.010***	0.010	0.0016	0.010	0.028***	0.012***	0.118	0.054**	0.002	-0.004**	68.51
	(1.405)	(0.004)	(0.006)	(0.0049)	(0.064)	(0.005)	(0.003)	(0.110)	(0.022)	(0.002)	(0.001)	
Property &	0.862	0.005	0.007*	0.0046	0.024	0.032***	0.001	0.480**	-0.037	0.003	-0.001	48.72
Construction	(1.438)	(0.007)	(0.004)	(0.0040)	(0.053)	(0.008)	(0.005)	(0.185)	(0.030)	(0.007)	(0.001)	
Resources	-2.622	-0.011	-	0.0087	0.193*	0.027**	0.004	0.239	0.067***	-0.018	-0.001	74.50
	2.510	(0.011)	-	(0.0057)	(0.102)	(0.012)	(0.011)	(0.417)	(0.022)	(0.014)	(0.003)	
Services	1.020	-0.009	-0.003	-0.0004	0.043	0.021***	0.002	0.396**	0.023	-0.009**	-0.001	48.29
	(1.296)	(0.008)	(0.008)	(0.0043)	(0.059)	(0.006)	(0.004)	(0.170)	(0.048)	(0.004)	(0.001)	
Technology	-1.619	0.007	0.008	0.0194***	0.120	0.021***	-0.006*	0.602***	-0.021	-0.003	-0.002	76.21
	(2.306)	(0.007)	(0.006)	(0.0067)	(0.114)	(0.003)	(0.003)	(0.202)	(0.027)	(0.004)	(0.002)	
All sectors	0.971*	-0.005**	0.003	0.0020	0.036	0.023***	0.004*	0.293***	0.022*	-0.000	-0.001**	47.37
	(0.576)	(0.003)	(0.003)	(0.0020)	(0.026)	(0.002)	(0.002)	(0.070)	(0.014)	(0.002)	(0.0010)	

***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.