

Market Segmentation and Foreign Price Premium in The Stock Exchange of Thailand

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จุฬาลงกรณ์มหาวิทยาลัย

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ส่วนเกินราคาหุ้นบนกระดานต่างประเทศเปรียบเทียบกับกระดานหลักมีแนวโน้มลดลงในช่วงปี 2002 ถึงปี 2014 การศึกษานี้มีวัตถุประสงค์เพื่ออธิบายแนวโน้มที่ลดลงนี้ด้วยสมมติฐานหลัก 3 ประการ ได้แก่ สมมติฐานที่ว่าด้วยความแตกต่างระหว่างอุปสงค์ต่อหุ้นไทยของนักลงทุนต่างชาติและนักลงทุนในประเทศ สมมติฐานปริมาณข้อมูลในการลงทุนในหุ้นไทย และสมมติฐานที่ว่าด้วยประโยชน์จากการกระจายความเสี่ยงการลงทุน ในการทดสอบสมมติฐานดังกล่าว การวิเคราะห์ข้อมูลแบบ Panel Regression และ Cross-sectional Regression ถูกนำมาใช้เพื่อศึกษาความแปรผันของส่วนเกินราคาหุ้นบนกระดานต่างประเทศในระหว่างช่วงเวลาและแต่ละหน่วยบริษัทตามลำดับ ทั้งนี้ผลการศึกษาแสดงให้เห็นว่า ความแตกต่างระหว่างอุปสงค์ต่อหุ้นไทยของนักลงทุนต่างชาติและนักลงทุนในประเทศมีนัยสำคัญต่อแนวโน้มที่ลดลงของส่วนเกินราคาหุ้นบนกระดานต่างประเทศ เนื่องจากเส้นอุปสงค์ต่อหุ้นไทยของชาวต่างชาติมีความชัน เมื่อหุ้นใดมีเปอร์เซ็นต์การถือครองของต่างชาติคงเหลือน้อยเปรียบเทียบกับเปอร์เซ็นต์การถือครองจำกัดทั้งหมด หุ้นนั้นมีอุปสงค์ของต่างชาติสูง และส่วนเกินราคาหุ้นบนกระดานต่างประเทศจะมีค่าสูงขึ้น รวมทั้งการศึกษาเชิงประจักษ์ยังพบว่า นักลงทุนต่างชาติเปลี่ยนแปลงวิธีการลงทุนในหุ้นไทยอย่างมีนัยสำคัญ โดยมีการซื้อขาย Non-Voting Depository Receipt (NVDR) แทนการซื้อขายหุ้นไทยบนกระดานต่างประเทศแบบเดิม ส่งผลให้ส่วนเกินราคาหุ้นบนกระดานต่างประเทศมีค่าลดลงในระหว่างช่วงเวลา นอกจากนี้สมมติฐานปริมาณข้อมูลการลงทุนในหุ้นไทยสามารถอธิบายเพิ่มเติมได้ว่า นักลงทุนชาวต่างชาตินิยมลงทุนในหุ้นของบริษัทขนาดใหญ่และบริษัทที่มีคำแนะนำจากนักวิเคราะห์จำนวนมาก ผ่านการซื้อขาย NVDR แทนการซื้อขายหุ้นบนกระดานต่างประเทศเดิม เนื่องจากการซื้อขาย NVDR ไม่มีข้อจำกัดเรื่องเปอร์เซ็นต์การถือครองของต่างชาติ อย่างไรก็ตาม นักลงทุนต่างชาติยังมีการลงทุนผ่านกระดานต่างประเทศเพื่อประโยชน์ในการกระจายความเสี่ยง ผลการศึกษาพบว่า หุ้นที่มีความสัมพันธ์กับผลตอบแทนของตลาดน้อยหรือหุ้นที่มีประโยชน์การกระจายความเสี่ยงในการลงทุนมาก จะมีส่วนเกินมูลค่าหุ้นบนกระดานต่างประเทศสูงกว่า

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Foreign share premium in Thai stock market has exhibited the downward trend during 2002 to 2014. This study attempts to explain this phenomenon by three hypotheses which are demand differential, information availability, and diversification benefit. The panel regression and cross-sectional regression are employed to account for variation of foreign share premium over time and across firms. The results of the study show that demand differential between foreign and domestic investors plays important role to explain foreign share premium. As foreign investors' demand for Thai stock is downward sloping, lower foreign room left relative to foreign ownership limit indicates higher foreign demand and higher foreign share premium for that stock. Moreover, foreign investors are likely to shift their investment from traditional foreign share on the Foreign Board to Non-Voting Depository Receipt (NVDR) over time as it is a close substitute investment of domestic share for foreign investors. The existence of NVDR cause foreign investors' demand to become more elastic resulting in lower foreign share premium. Together with information availability hypothesis, foreign investors are interested to invest in larger firms and firms with more analyst coverages, via NVDR rather than foreign share on the Foreign Board, since they need not to concern about foreign ownership limit. Nevertheless, diversification benefit is the motive driven foreign investors to invest in domestic share on the Foreign Board. For any stock, if its return yields lower correlation with market portfolio return, it shows the higher diversification benefit and results in higher foreign share premium.

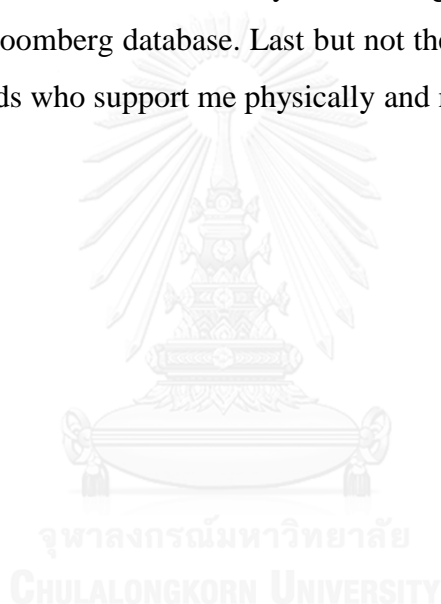
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Chapter 1: Introduction

Background and significance of the problem

Markets for real or financial assets throughout the world are prevented from complete integration due to several barriers including tax differentials, tariffs, quotas, labor immobility, cultural differences, financial reporting differences, significant cost of communicating information across countries, etc. These barriers are not only threats, but also opportunities for participants. Specifically, the domestic financial markets can be an opportunity for foreign investors. As geographical differences between domestic and foreign countries will attract foreign funds to domestic markets for several motives. Firstly, economic conditions in domestic country may be favorable than foreign investors' home countries, also differences in conditions and government policies could encourage the cross-border investment as well. The second motive is the exchange rate expectations of foreign investors. For example, foreign investors are interested to invest in domestic country if they expect that domestic currency will appreciate against their currency in the future. Lastly, international diversification benefit is an important factor to drive international investment. According to the portfolio theory, to invest in multiple assets which have lower correlations to each other can reduce the portfolio risk. Such lower correlations can arise from cross-border differences. For instance, suppose there are two assets consisting in an investor's portfolio which are asset A issued by country A and asset B issued by country B. Country A and country B are of geographical differences, their returns exposure to different risks. Once, asset A yields loss in return due to unfavorable economic condition in country A, he might compensate this loss by the gain in return from asset B which exposures to more

favorable economic condition in country B. To compare this diversified portfolio to the portfolio that solely consists of one asset, imagine that the investor hold only asset A or only asset B, his portfolio return will depend on a single risk exposure, he might experience very high gain or loss during his investment horizon. This cause his portfolio to be largely fluctuated or riskier (Madura, 2011).

Emerging markets is one of well-known destination of investment for those foreign investors from developed economies because their stock markets have different characteristics from those of developed markets. At least four features are different, which are higher sample average return, low correlation with developed market return, more predictable return, and higher volatility (Bekaert & Harvey, 1997). On the one hand, emerging markets as host countries desire to attract foreign capital flows since inflow of foreign currencies benefits emerging markets in various ways of development such as to increase the volume of domestic stock market, to invest as long-term infrastructure, etc. On the other hand, those emerging markets do not want to lose their domestic control to foreigners (Domowitz et. al, 1997). Thus, the foreign ownership restriction is imposed on domestic companies. The restriction leads to the segmentation of the domestic capital market between foreign investors and domestic investors (Domowitz, Glen, & Madhavan, 1997; Lau, McCorry, & McInish, 1997), this yields the price difference between equity classes of identical stock. Most of the unrestricted shares are traded at premium relative to restricted shares such as in the stock market of Thailand (Bailey & Jagtiani, 1994), Switzerland (Stulz & Wasserfallen, 1995), Mexico (Domowitz et. al, 1997), Norway (Ødegaard, 2007), and etc. These previous studies attempt to explain unrestricted premium (foreign premium) of unrestricted share

(foreign share) in both cross-sectional and time-series variation by several theories and hypotheses.

This study focuses on the Thai stock market which is one of those emerging markets and experiences similar issues. The foreign ownership restriction has been regulated in Thai firms to retain the domestic control as well. However, owing to the large flow of foreign direct investment and portfolio investment into Thailand in mid-1980s, most shares have reached their foreign ownership limit and were harder to trade by foreign investors on the Main Board, since if they want to purchase shares that hit foreign limit, they have to queue up until other foreign shareholders sold those shares and result in loosen foreign limit, in order to maintain the foreign ownership limit (Bailey & Jagtiani, 1994). Thus, in 1987, the Stock Exchange of Thailand (SET) introduced the Foreign Board where allows foreign investors to trade the shares that have reached their foreign limit, among foreign investors, they are able to register those shares for their own name by transfer the ownership from one foreign investor to another, this will not violate the foreign ownership limit. They are able to receive full financial benefits including dividend, voting right, and other right offerings, as identical as purchasing domestic shares on the Main Board. Note that for the share that has not reached its foreign limit, the foreign investors can either buy it on the Main Board or the Foreign Board. While, if they purchase domestic share on the Main Board, it allows them to receive the full financial benefits such as dividend and voting right via the representatives which are mostly the broker (www.set.or.th). Generally, for domestic investors, they can trade local share on the Main Board which is separated from the Foreign Board and receive full financial benefits. The cross-market trading is granted for both domestic investors and foreign investors, however, the cross-market traders,

for example, the local investors who purchase shares on the Foreign Board, will be excluded from dividend, voting-right, and other right offerings (Bailey, Mao, & Sirodom, 2012). Additionally, the arbitrage between two markets has been impossible due to the foreign ownership limit and short-sale constraint (Bailey & Jagtiani, 1994). Also, for instance, domestic investors cannot buy share on the Main Board where share price is generally lower, then immediately sell it on the Foreign Board where share price is generally higher and earn arbitrage profit. Since shares traded on the Foreign Board must be shares registered in foreign investors' name. Later, to encourage trading activities on Thai stock market due to the difficulties of the foreign ownership limit regulation, the Non-Voting Depository Receipt (NVDR) was introduced on June 11, 2001 as the new investing instrument issued by Thai NVDR Company. By trading NVDR, it provides identical financial benefits as owning ordinary shares, but the voting-right and the involvement in corporate decision-making are not allowed. Thus, NVDR can be as a close substitute of domestic share for foreign investors. Unlike the traditional purchase of share on the Main Board or the Foreign Board, the purchase of NVDR is able without concern of foreign ownership limit, this facilitates the foreign investors who are not interested in voting-right but other financial benefits. Also, both domestic and foreign investors can buy NVDR on the Main Board, and apply the same trading procedure and price as ordinary share sold on the Main Board (Thai NVDR CO., 2014).

In the Stock Exchange of Thailand (SET), the premium of foreign share on the Foreign Board relative to local share on the Main Board has been primarily exist at 19 percent on average as in the study of Bailey and Jagtiani (1994) during 1988 to 1992. Nevertheless, the circumstance of Thai capital market has been changed much during

several decades. Especially, there was the NVDR introduction in 2001. These are likely to significantly influence the foreign premium. Thus, this study aims to show the recent trend of foreign premium in Thai stock market during 2002 to 2014. It attempts to investigate the variation in foreign share price premium in both time-series and cross-sectional characteristics by various hypotheses. First, the demand differential hypothesis that proposes to different demand between domestic investors and foreign investors. Since there are restriction of foreign ownership limit, but not domestic ownership limit. Foreign limit is as the relative supply of domestic share for foreign investors. Due to the downward sloping of foreign investors' demand (Bailey & Jagtiani, 1994), variation of foreign limit affects the foreign premium. This difference in demand also refers to difference in demand elasticity. Owing to limited access of domestic share, foreign investors have relatively inelastic of demand to domestic investors. However, once the substitute investment of domestic share for foreign investors which is NVDR was introduced, the foreign investors' elasticity demand are changed and this also causes change in foreign premium. Second, the information availability hypothesis is to investigate the effect of information rich of each company to the foreign premium. It is hypothesized that larger firm should have more available information that is more preferable by foreign investors, and been paid more. Proxies for information availability are both market capitalization and analyst coverage of each firm. Third, diversification benefit hypothesis, it is the important motive of cross-border investment. Foreign investors are likely to pay more for assets that offer them the diversification benefits. Each hypothesis will be discussed further in the next section.

Lastly, this study mainly aims to provide the up-to-date empirical evidence that explain the trend in foreign premium in Thai stock market and also to contribute to the

design of new investing instrument for foreign investors in Thai stock market in the future.

Chapter 2: Literature Review

This chapter discusses the market segmentation concept, the empirical study of foreign premium as a result of segmentation, as well as the determinants of foreign premium. Plausible explanation are demand differential, information availability, and diversification benefit.

2.1 Market Segmentation

Identical goods and services which are traded in separately different physical markets, may be traded at different prices across markets due to dissimilar evaluation of market participants, for example, the differences in transaction cost and transportation cost. However, this study will focus on the financial market where are not considered as physically separate market like the market for goods and services, since the cost of moving financial securities are none or nearly to zero. Odegaard (2007) suggests that segmentation in financial market barely arises from the regulation imposed by firm or government. The regulation induces the segmentation in the equity market by different groups of investors including domestic investors and foreign investors which will be concentrated here.

Let's consider the Swiss stock market where there is a segmentation of equity market discussed above. The issuance of ordinary share in different classes is done by most Swiss firms, although not all firms issue all classes of stock. There are three major equity classes for Swiss companies. First, the Bearer shares which can be viewed as

unrestricted share to all investors since it is truly anonymous. It is no need for company to know that who owns the shares. Second, the Registered shares, unlike the Bearer shares, it is to register with the company for the owner of shares. The regulation allows Swiss firms to refuse to register some investors such as foreign investors for several reasons. For example, to maintain the corporate control of domestic firm, or to maximize the firm value. Stulz and Wasserfallen (1995) found that firm may choose the ownership limit of foreign investors to maximize their firm value. Nevertheless, the foreign investors who is refused of owning registered share are still able to receive dividend, whereas not allowed for voting right. Note that both Bearer shares and Registered shares generally have full voting rights. However, the Nonvoting shares as the third class of equity in the Swiss stock market provide no voting rights, but dividend to the holder. Also, it is unrestricted and completely anonymous. Another differences among various stock classes is dividend payment which will be proportional to the stated par value of the stocks. Consequently, these stock in each class can be traded at different price owing to the differences in voting rights, dividend payment, and restriction of ownership to particular group of investors (Kunz & Angel, 1996).

Next, to consider the Mexican stock market, there are multiple series of stock available for different groups of investors; between national and foreign investors, individual and institutional investors, as well as general and financial issuers. In this study, it will focus on the separation of stock market by nationalities between domestic and foreign investors. This foreign ownership restriction is enforced by government aimed to retain the domestic control in hand of Mexican investors so that there is the independence of local industries. For a nonfinancial company, there are two series of stocks which are A series and B series. A series is restricted to Mexican investors, while

B series open to all investors regardless nationalities. Both of them have full voting rights and have the claim on identical earning of the same company. However, only A series that can collectively represent the majority of voting shares. Moreover, for a financial service company, the separate complicated system of share ownership is implemented. Since these company are considered to be particularly important to the country. There are three series of stocks of financial company, all of them have full voting rights and have the claim on identical earning of the same company. A series and B series are restricted to Mexican investors, but B series cannot represent the majority voting. While C series is unrestricted for all investors, but cannot represent the majority voting (Domowitz et. al, 1997).

Moreover, the segmentation are also found in Chinese stock market. There are two classes of tradable stocks offering the same dividend and voting right. First, A shares is only allowed to own by Chinese investors except Hong Kong and Macau citizens. Another, B shares only open to foreign investors including Hong Kong and Macau citizens. By this, it can be said that there is a tight and strict market segmentation in Chinese stock market since the cross-trading between A shares and B shares is not allowed. Also, to restrict for the domestic control, government regulates that not all of total outstanding shares of domestic firms are publicly traded. Those non-tradable shares are held by state or government agencies, by the company themselves, and by the company employees (Bergström & Tang, 2001). Strategically, Chinese government desires to attract foreign fund but does not want to lose the domestic ownership control to foreign investors (Gao & Tse, 2004).

Also, there was a segmentation in the Norwegian stock market before 1995. According to Odegaard (2007), three equity classes issued by Norwegian company are A, B, and F shares. All classes account for the same right and future claims of dividend. A share allows the holder for full voting rights, while the holder of B share have limited power of voting. Similar to those stock market discussed earlier, to maintain the fraction between domestic ownership and the foreign ownership, the restriction of foreign ownership is levied on the Norwegian firms. Foreign investors as a group cannot hold more than one third of A share which is a voting share. In addition, some company may issue F shares corresponding to the third that can be held by foreign investors. F shares also have full voting rights similar to A share. If there is no F share issued for a particular domestic company, foreign investors can buy up to one third of A share. However, the restriction of foreign ownership was removed from the Norwegian stock market at the end of 1994 since Norway was considered as the member of European Union. Although it did not join the Union, the restriction was disappeared. A shares and F shares were merged as a single class of A shares.

Likewise, Thai stock market has been segmented by the foreign ownership restriction. There are both similarities and differences of Thai stock market to those markets discussed earlier. First, Thai government implements the limit of foreign ownership on the domestic firm for similar reasons to Mexican, Chinese, and Norwegian government. That is to retain domestic control over domestic company and to maintain the independence of local industries especially in the crucial industry such as financial sectors. For example, in Thailand, the percentage of foreign ownership in the industry of financial are less than in other industries since banking system is essential for the economy. However, the restriction of foreign ownership can be done

at corporate level such as in the Swiss stock market. Swiss firms will alter the foreign limit so that it maximizes the firm value. Second, stock market segmentation in Thailand is not as highly strict as Chinese stock market. In fact, domestic shares are traded on the Main Board, and for those shares that have reached the foreign limit percentage will be traded on the separate market called Foreign Board. While the cross-trading is not allowed in Chinese stock market, it is allowed in Thai stock market. However the cross-market traders will not receive those financial benefits such as dividend and voting rights. Note that, arbitrage between the Main Board and the Foreign Board cannot occur owing to the short-sale constraint. Third, there are non-voting equity class in Thai stock market similar to the nonvoting shares in Swiss stock market. Foreign investors who want to purchase Thai stock can alternatively buy NVDR on the Main Board as NVDR is a close substitute of domestic share for foreign investors. By owning NVDR, it provides the same financial benefits of owning foreign share, but not the voting rights.

2.2 Empirical Study of Foreign Premium

Once foreign ownership restriction induces the domestic stock market into a separation between foreign and domestic investors (Domowitz, et al., 1997; Lau, et al., 1997), this consequently leads to a price difference between restricted share available for domestic investors and unrestricted shares available for foreign investors. Those unrestricted shares are mostly found to have higher price than restricted shares, this is called unrestricted share premium or foreign premium. This phenomena exists in the several stock markets such as the stock market of Thailand (Bailey and Jagtiani, 1994), Switzerland (Stulz and Wasserfallen, 1995), Mexico (Domowitz et al., 1997), Norway (Ødegaard, 2007), and etc. According to Figure 1, it illustrates the foreign premium in

Indonesia, Malaysia, Mexico, Norway, Philippine, Singapore, Switzerland, Taiwan, and Thailand stock market (Bailey, Chung, & Kang, 1999). These previous studies attempt to explain the foreign premium in both cross-sectional and time-series variation by several theories and hypotheses.

Bailey and Jagtiani (1994) attempts to explain the foreign premium in Thai capital market during 1988 to 1992. There are difference in share prices on the Main Board for local investors and the Foreign Board for foreign investors. The average foreign premium is 19 percent. Foreign investors are willing to pay a premium for domestic stock due to variations across firms which are foreign ownership limit imposed by government, liquidity, and information availability of each domestic stock. Also, they found that the foreign premium can be explained by the time-series factors which are the difference of risk exposure, as well as the difference in expected risk premium, between foreign and domestic investors. While, the asset pricing model cannot explain the foreign premium in their study.

Similarly, Stulz and Wasserfallen (1995) found the evidence in the stock market of Switzerland that foreign investors pay more expensive for unrestricted share than domestic investors who pay for restricted share. Both unrestricted share and restricted share are of the identical company and yield identical financial benefits, but they are in different classes of stock. This shed the light on demand differential model that foreign investors have different demand for domestic stocks relative to those local investors. Also, foreign investors' demand for domestic stock is downward sloping, the change in foreign limit as a relative supply of domestic share will cause the change in unrestricted share price and hence, unrestricted share premium. For example, tighter foreign

ownership limit will lead to higher price paid by foreign investors for domestic stocks. Since firms in the Swiss stock market can deter the foreign ownership restriction themselves, firms will alter the foreign limit so that it maximizes their firm value. This is consistent with Bailey and Jagtiani (1994) who explore the negative relationship between foreign premium and foreign ownership restriction.

Empirically, the foreign premium is found to vary both across individual firms and over time by evidence from the Mexican stock market (Domowitz et. al 1997). This study supports the negative relationship between the foreign ownership limit as a relative supply of unrestricted share offered to foreign investors and the price that foreign investors are willing to pay for it. Also, they suggest that foreign premium is positively correlated with the firm size, since larger firms attract more foreign investors. However, they found little evidence of liquidity effect here.

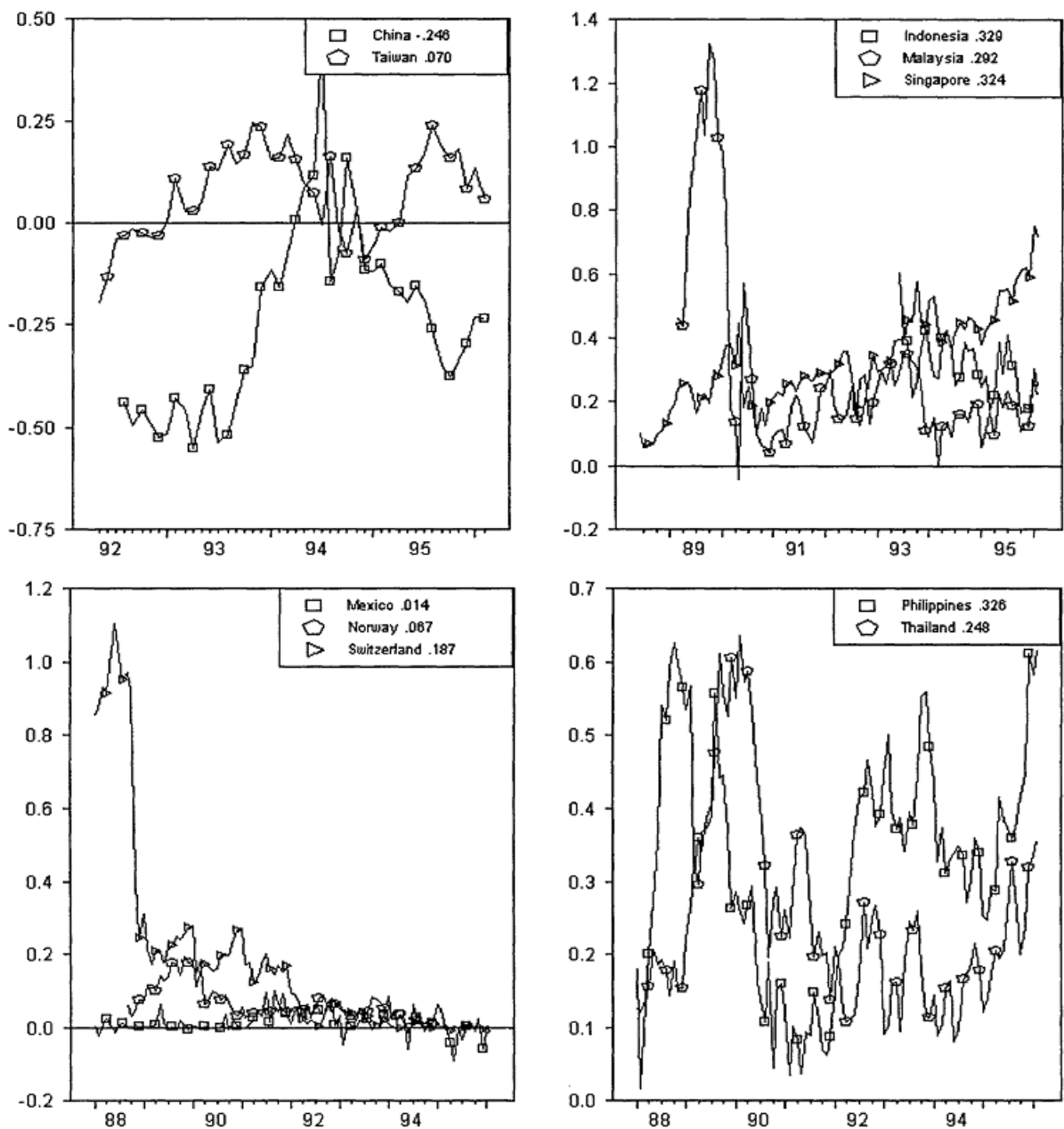
Due to common phenomena of foreign premium in several countries, Bailey et. al (1999) studied the stock price data in 11 countries which are China, Indonesia, Korea, Malaysia, Mexico, Philippines, Taiwan, Thailand, Norway, Singapore, and Switzerland. They mainly focus on the asset pricing theory and other alternative theories to explain these phenomena. While, the former fail to provide the explanation of foreign premium, the latter works properly. They found the evidence that foreign limit of ownership, the information coverage, firm size, international mutual fund flows, sentiment of investment in domestic country, and market liquidity, have positive effect on the foreign premium. In addition, among countries they studied, the foreign premium is observed to be large in Southeast Asian countries.

Besides those previous studies, more recent work of Odegaard (2007) investigates the Norwegian stock market and found that among multiple classes of equity, F share are traded at higher price than A share. While, both classes of stock provide the full corporate voting right, only difference are that F share is available for foreign investors, and A share is available for domestic investors.

Nevertheless, the reverse phenomenon is found in Chinese stock market. The unrestricted share to foreign investors called B share is substantially traded at discount relative to the restricted share called A share. Note that these two classes of stock offers the same financial benefit to the holder. Although, the phenomenon in China is different from those found in other several countries, it can be explain by similar economic principles. Recall to the demand differential between domestic and foreign investors for domestic stock in the study of Stulz and Wasserfallen (1995), it means that they are also different in elasticity of demand for domestic share. Stulz and Wasserfallen (1995) suggests that foreign investors have relative inelastic demand to local investor for identical domestic stock, thus they are willing to pay more for it. Once, there are more substitutes of domestic share for foreign investors, foreign investors' demand will become more elastic than before, as a result, they would be willing to pay less for domestic stock. Consistently, the result of study in Chinese stock market by Sun and Tong (2000) indicates that the existence H shares and red chips listed in Hong Kong stock market as substitute of B share, causes B share price to be lower, and hence larger B share discount relative to A share. Besides this, Bergstrom and Tang (2001) examines that B share discount in the Chinese stock market can be explained by liquidity effect, diversification effect, clientele bias effect, difference in information, difference in risk-

free return between domestic and foreign investors, and exposure to the foreign exchange rate risk.

Figure 1: Monthly Capitalization Weighted Foreign Premium



Source: Bailey et. al (1999)

Figure 1 shows the average foreign premium for each country. It plots the cross-sectional average end-of-month foreign premium against time. Foreign premium is calculated as the difference of unrestricted and restricted share price divided by the restricted share price. Korea is excluded because its unrestricted portfolio consisting of convertible bond rather than straight equity.

2.3 Determinants of Foreign Premium

These following issues are studied in the existing literature in the attempt to explain the price difference between equity classes allowed to own by domestic and foreign investors. The demand differential and information availability were once investigated by Bailey and Jagtiani (1994) in the study of foreign premium in Thai stock market. They found that both demand differential and information availability had explanatory power to foreign premium. However, the environment of Thai stock market has changed during decades. For example, there was an introduction of NVDR as new investing instrument in 2001. To provide an up-to-date empirical evidence of foreign premium in Thai capital market, those issues will be examined again in this study. Besides the demand differential and information availability, the diversification benefit arises as the new issue in the study of foreign premium in Thai stock market. As discuss earlier, diversification benefit is one of major motives driven cross-border investment. Consistently, Bergström and Tang (2001) found that it can explain the B share discount in Chinese stock market. Each determinant will be discussed below.

2.3.1 Demand Differential

Different groups of buyers may have different demand function for identical goods. Thus, their price elasticity of demand may differ, as a result, sellers can charge each of them for different price. This is called third degree price discrimination (Pigou, 2013). For example, both buyer A and buyer B want to buy goods X. However, their demand functions are different. Buyer A has less price elasticity of demand relative to buyer B. This means buyer A is less sensitive to the price change than buyer B. Thus, seller of goods X can charge higher price for buyer A than buyer B. However, this study will focus on the equity market which is segmented by the foreign ownership

restriction. There are separate market of domestic share for domestic investors and foreign investors. Stulz and Wasserfallen (1995) states that foreign investors and domestic investors have different elasticities of demand for the identical domestic stock owing to varied deadweight costs across countries such as the political risk, taxes, etc. Several studies suggests that demand differential between foreign and domestic investors can lead to a price discriminate between them. Besides the differential demands between domestic and foreign investors, the demand curve for stock are found to be downward sloping (Shleifer, 1986). Specifically, foreign investors' demand for domestic stock is downward sloping according to Bailey and Jagtiani (1994) in the study of Thai capital market, as well as Stulz and Wasserfallen (1995) in the study of Mexican capital market. These characteristics of foreign investors' demand have brought two issues to this study.

Firstly, since the demand of foreign investors for domestic stock slopes downward, changes in demand and supply empirically influence the stock price. Bailey and Jagtiani (1994) concludes that the foreign demand for Thai stock is downward sloping. Higher foreign demand for domestic shares with tighter foreign ownership limit causes the foreign premium to be higher. In other word, when there are less supply but higher foreign demand for domestic stock, the foreign share price become more expensive, and hence larger foreign premium. Consistently, Stulz and Wasserfallen (1995) similarly proposes that foreign investors' demand for unrestricted share in the Swiss stock market is downward sloping. As a result, after the announcement of foreign ownership relaxation, the unrestricted share premium become lower. To clarify, relaxation of foreign ownership means more relative supply of domestic shares available to foreign investors, if the foreign demand slope downward, an increase in

supply cause the price to be lower according to Figure 2. Moreover, the evidence from Mexican stock market indicates that the inadequate relative supply of unrestricted share to restricted share results in higher unrestricted share premium. Also, the unrestricted share premium is found to vary across individual firms and over time (Domowitz et al., 1997). Besides these, Ødegaard (2007) found the price difference between Norwegian equity classes which are F shares and A Shares. Both of them have full voting rights. But only F shares is unrestricted for foreign investors. Due to the restriction of foreign ownership, the F shares issue is only one third of A shares. This relatively limited supply of F share cause F share to price at premium to A shares. Note that government or company may enforce the foreign ownership restriction on domestic company with the objective to retain corporate control for the residents.

Figure 2: The effect of an increase in foreign limit to foreign stock price

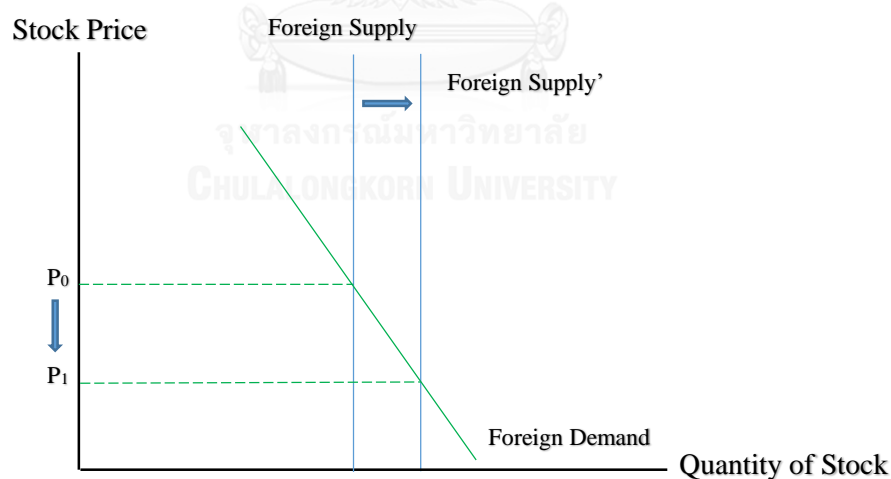


Figure 2 shows the effect of an increase in percentage of foreign ownership limit to foreign stock price. Foreign investors' demand for domestic stock is downward sloping. Foreign supply is vertical as foreign ownership limit is fixed by government. An increase in foreign limit cause foreign supply curve to shift right and result in lower foreign stock price.

Secondly, as domestic and foreign investors are different in price elasticity of demand for domestic shares, arising of substitute of domestic shares for foreign investors will affect foreign elasticity of demand. Since one of determinants of demand elasticity is the number of substitute available. Let's simplify one example in goods market. Imagine to the electricity that is usually supplied by one government in each country. The usage of electricity is generally necessary for everyone. Thus, consumers are not likely to be so sensitive to electricity fee compared to price of other goods such as luxury goods which is less necessary than basic needs. Despite an increase in electricity fee, they approximately maintain their usages. This is to say they have less price elasticity of demand for electricity. However, one private company later releases an alternative electricity as the substitute of previous one, this results in more choices for those consumers to consume electricity. Given low switching cost from government electricity to the new alternative of private company, consumers will be more sensitive or more elastic to the government electricity fee, they may reduce their usage of it and switch to the new alternative one. In other word, they are willing to pay less for it. Consistently, Pigou (2013) indicates that buyers will become more elastic as more substitutes of goods available and hence, they are willing to pay lower for that goods. Similarly, in the domestic stock market, if there are more substitutes of domestic shares for foreign investors, it will cause the foreign investors' demand to be more elastic than before. It means foreign investors would be willing to pay less for domestic share, and the foreign premium will be lower, this can be illustrated by Figure 3. According to Sun and Tong (2000) in the study of B share discount relative to A share in Chinese stock market, there are differential demand in domestic and foreign investors for Chinese stock. They found the negative relationship between the number of H shares and red-

chips stock as the substitute investment of B shares, and the B shares discount. Prior to the presence of H shares and red-chips, if foreign investors want to buy Chinese stocks, they have only one choice that is to buy B shares as it opens to foreign investors including Hong Kong and Macau citizens. While A shares is restricted share and only allowed for Chinese investors except Hong Kong and Macau citizens. Once, there are H shares and red-chips listed in the Stock Exchange of Hong Kong as a substitute investment of B shares for foreign investors, foreign investors have more choices to buy Chinese stock than only B shares. As a result, they become more sensitive to B shares price, and would not pay for B shares as high as usual. Thus, B share price is lower, and B share discount is larger.

Figure 3: The effect an increase in substitute investment of foreign stock to foreign stock price

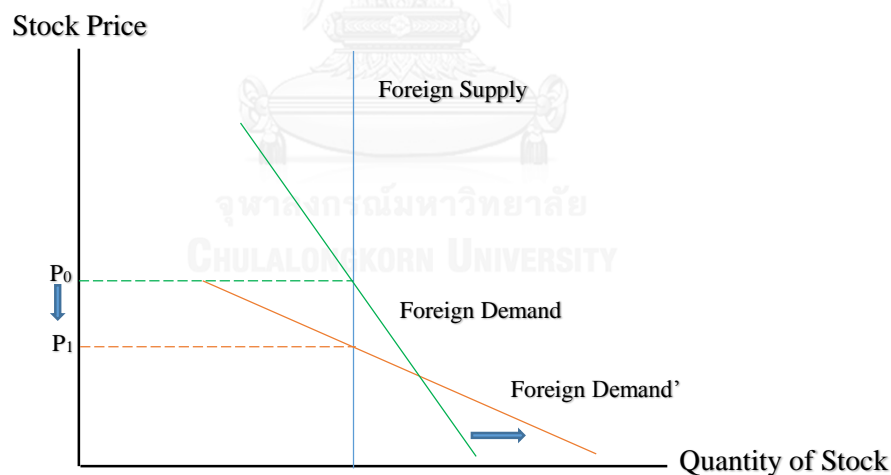


Figure 3 shows the effect of an increase in substitute investment of domestic stock for foreign investors to foreign stock price. Foreign investors' demand for domestic stock is downward sloping. Foreign supply is vertical as foreign ownership limit is fixed by government. An increase in substitute investment of domestic stock for foreign investors cause foreign investors' demand to become more elastic and have flatter curve resulting in lower foreign stock price.

2.3.2 Information Availability

French and Poterba (1991) states that foreign investors will avoid to invest in assets they have limited information and, or experience. As a result, they are willing to place a premium to those risky investments that they are familiar with or more accessible of information. Several studies use similar proxies of information to explain the foreign interest in domestic share. The first proxy is the firm size represented by firm market capitalization. According to the study of stock ownership in Japanese firms by non-Japanese investors during 1975 to 1991, the evidences indicate that foreign investors prefer holding large firm stocks to small firm stocks because they know more about large firms than small firms. Although, overinvesting in large firms cause their portfolio returns to be more volatile than holding Japanese market portfolio (Kang, 1997). Thus, these following finance literature use firm size as an information proxy to explain stock return. Bailey and Jagtiani (1994) found that firm size is positively corresponding with foreign share price premium. Since large well-known firms are likely to have more information rich which is more easily acquire by foreign investors. As a result, they are willing to pay more for those large firm stocks. This is consistent with Domowitz et. al (1997). The evidence from Mexican stock market shows that higher market capitalization firms accounts for higher unrestricted share premium. Since larger firms are followed by more analysts and providing better information. Similar to the broader study of Bailey et. al (1999), firm size can positively explain the phenomenon of foreign share premium in several stock markets which are Norway, Singapore, Switzerland, Indonesia, Korea, Malaysia, Mexico, Philippines, Taiwan, and Thailand. Additionally, it negatively explains B shares discount in Chinese stock market that larger firms is subject to lower discount of B shares. Chakravarty et. al

(1998) also found supportive findings in Chinese stock market that B shares discount is lower for larger market capitalization firms. In fact, it is hard for foreign investors to obtain and access information of local Chinese firms owing to language barriers, different accounting standards, and lack of reliable information. Foreign investors might discover to overcome these difficulties in large firms rather than small firms. Abundant works propose firm size as a good indicator of information availability.

Second, besides the firm market capitalization, the number of information providing for each firm is examined as information proxy. Recall that China is the difficult place for foreign investors to obtain precise information of local Chinese firms, especially because of language barriers. So English media report is important source of information for them. They should rather prefer firms with more accessible information as it is easier to monitor and is able to reduce information asymmetries between them and Chinese investors. Chakravarty et. al (1998) measure the degree of English media coverage by counting the number of times a local firm mentioned and cited. The result shows lower B shares price discount in firms having more English media coverages.

2.3.3 Diversification Benefit

One of the important motives of the cross-border investment is diversification benefit. To extent the concept of diversification benefit, diversification is to invest in a large number of assets such as assets in different classes, assets in different risk rating, assets in geographical differences, etc., rather than to concentrate investment in a small number of assets. Given the same total risk, portfolios consisting of large numbers of higher risk securities earn considerably higher return than portfolios consisting of small number of low risk securities (Wagner & Lau, 1971). Thus, diversification is the

investment strategy designed to improve portfolio performance by reducing total risk of portfolio with the same or higher rate of return, or by achieving higher rate of return without incurring more risks.

Besides the number of assets including in portfolio, the riskiness of each individual security and the degree of their dependencies to each other also determine the portfolio risk. According to the portfolio theory, an asset yields diversification benefit when its return is less than perfectly correlated with market portfolio return. Note that market portfolio return is as representative of all investible asset returns in the market. As higher correlation between the asset return and market return, as lower diversification benefit it offers. Several studies suggest that movements in stock prices in different countries are almost unrelated. Also, there is an evidence of smaller risk of internationally diversified portfolios than domestically diversified portfolios. He measures portfolio risk in term of variability of return, lower variability indicates lower risk (Solnik, 1995). Given the same number of holding, the results show that internationally well-diversified portfolio is only half as risky as a well-diversified portfolio of U.S. stocks, and only one-tenth as risky as a typical security. Specifically, emerging markets are attractive for foreign investors because of more predicible returns, higher average returns, higher volatility, and higher diversification benefit (Bakaert and Harvey, 1997). The study of performance characteristics of emerging capital markets by Barry et. al (1998) has confirmed diversification benefit in emerging markets for investors in developed markets. The results show low correlation between composite index of return in emerging markets and U.S. stock market returns. This implies benefit of global investors from diversification in emerging markets.

Recall to the portfolio theory, investors will require lower rate of return for assets offering higher diversification benefit, and hence, they are willing to pay higher for it. According to Bergström and Tang (2001), they found that the B shares discount relative to A shares in Chinese stock market is negatively associated with the diversification benefit offering by B shares. As higher diversification benefit of B shares, as higher B shares priced by foreign investors, and thus, smaller B shares discount. They measure the diversification benefit of B shares by obtaining correlation between B shares return and the Morgan Stanley Capital International Index (MSCI) World return (as market portfolio return), lower correlation indicates higher diversification benefit.

Chapter 3: Research Question and Development of Hypotheses

In this section, the research questions are shown how they are brought to the study, together with the development of each hypothesis in order to study the foreign premium in the context of Thai stock market; demand differential hypothesis, information availability hypothesis, and diversification benefit hypothesis.

3.1 Research Question

According to those existing literature in the attempt to explain the price difference between equity classes available to foreign and domestic investors, it brings the research question to this study, “How is the foreign premium explained in Thai Stock market?”. Bailey and Jagtiani (1994) found the existence of foreign premium in Thai stock market during 1988 to 1992. This study mainly aims to provide the more

recent study of foreign premium in Thai stock market during 2002 to 2014. Moreover, the context of Thai stock market has been changed during decades, especially, there has been the existence of NVDR in mid-2001 as the new investing instrument that can be partially substitute for domestic stock for foreign investors. Thus, it is important to study that “How does NVDR affect the foreign premium?”. These two research questions will be investigated by these following hypotheses. The next section will clarify about the development of each of three hypotheses in this study.

3.2 Development of hypotheses

First, the demand differential hypothesis arises from difference between demand of domestic investors and foreign investors for Thai stocks. According to Bailey and Jagtiani (1994), the foreign investors’ demand is different from domestic investors’ demand for Thai stocks and is downward sloping. Since foreign premium may be both a supply and demand phenomenon (Bailey et. al, 1999), changes in relative supply and demand of domestic stocks for foreign investors can affect the share prices.

Recall that there is foreign ownership restriction in Thai company which can be seen as relative supply of domestic stocks for foreign investors. This restriction cause the segmentation in Thai stock market between Thai and foreign investors which are called the Main Board and the Foreign Board, respectively. The Main Board was primarily introduced, however, due to the foreign ownership restriction, it is hard for foreign investors to purchase the domestic shares that reached the foreign limit on the Main Board since they have to queue up until the foreign limit is looser and enable them purchase those shares. The Foreign Board was following introduced to facilitate those foreign investors who want to buy shares that reached the foreign limit. Once, share

reached its foreign limit, it will be subsequently traded on the Foreign Board where transferring foreign ownership from one foreign investors to another will not violate the regulation of foreign ownership limit. Thus, foreign investors can trade these stocks among themselves. According to Bailey and Jagtiani (1994) in the study of foreign premium in Thai stock market, foreign limit as the relative supply of foreign share is likely to have negative effect on the foreign premium. For example, when the foreign limit of a particular stock become looser, it means more relative supply of it, this puts downward pressure on the stock price owing to the downward sloping of foreign investors' demand. As a result, the foreign share premium become lower. This is essential to consider in Thai stock market, since the foreign ownership limit is varied across firms and some are regulated during 2002 to 2014.

On the other hand, foreign room represents the relative demand of foreign investors to Thai stocks. Foreign room is the relative supply left in accord to the foreign limit showing how many percent of share that foreign investors are still able to purchase. For instance, when a stock has lower foreign room left, it means there is high demand for that stock relative to tight foreign limit. According to the law of demand, this should result in higher price paid by foreign investors and thus, high foreign premium. By this, foreign room is likely to have negative relationship with foreign share premium. For the notion discussed above, Hypothesis 1(a) and 1(b) are developed as follows;

Hypothesis 1(a): The foreign ownership limit of domestic stock has negative relationship with the foreign share price premium.

Hypothesis 1(b): The foreign room available of domestic stock has negative relationship with the foreign share price premium.

Also, the differential demand refers to different demand elasticity between domestic and foreign investors for identical domestic stock. This is owing to varied deadweight costs across countries such as the political risk, taxes, etc. (Stulz and Wasserfallen, 1995). Several studies suggests that demand differential between foreign and domestic investors can lead to a price discriminate between them. Furthermore, one of determinants of demand elasticity is the number of substitute available. In the domestic stock market, if there are more substitutes of domestic shares for foreign investors, it will cause the foreign investors' demand to be more elastic than before. It means foreign investors would be willing to pay less for domestic shares, and the foreign premium will be lower. To consider the effect of substitute investment of foreign share in Thai stock market, NVDR was brought into this issue as it was introduced in 2001. Since holding NVDR provides almost the same financial benefits to foreign investors as holding domestic share on the Foreign Board, NVDR can be seen as a close substitute of domestic shares for foreign investors. Note that NVDR does not allow the voting rights to the holder unlike common stock. If this is the case, by the existence of NVDR, the foreigners' demand for Thai stocks is supposed to be more elastic than before as they have more alternative investments than domestic share on the Foreign Board. Therefore, they are willing to pay less for it, and the foreign premium ultimately becomes lower. To address this, it can be hypothesized as follow;

Hypothesis 1(c): The value of NVDR trading has negative relationship with the foreign share price premium.

Second, the information availability hypothesis suggests that firms with more available information can attract the foreign investors and be paid at higher price. Since foreign investors will avoid to invest in assets they have limited information and, or experience (French and Poterba, 1991). To investigate this hypothesis, firm size and total number of analyst coverages are used as information proxy. For firm size, it is measure by the firm market capitalization. Bailey and Jagtiani (1994) explores the explanatory power of firm market capitalization to foreign share premium in Thai stock market. The result shows that large market capitalization firm is corresponding with high foreign share premium as it has more information which is easily acquired by foreign investors. Consistently, several studies propose firm size as a good indicator of information availability. Additionally, analyst coverage is another measure of degree of information availability in each firm. Similar variable is considered in existing literature as it found that the number of English media coverage of Chinese firms negatively explains B shares discount in Chinese stock market. The result shows lower B shares discount in firms with more English media coverages (Chakravarty, Sarkar, & Wu, 1998). According to those reasons, it should be observed that larger firms, and more analyst coverages stocks exhibit higher foreign share premium in Thai stock market. Hence, Hypothesis 2(a) and Hypothesis 2(b) have shown as follows;

Hypothesis 2(a): The firm size has positive relationship with the foreign share price premium.

Hypothesis 2(b): The number of analyst coverage of each stock has positive relationship with the foreign share price premium.

Third, diversification benefit hypothesis suggests that as more diversification benefit offered by the domestic stocks, as higher it is priced by foreign investors and higher foreign premium. Diversification is to invest in a large number of assets and is effectively among assets those have lower relation to each other in order to reduce total portfolio risk. Also, Solnik (1995) suggests that international diversification yields lower portfolio risk than domestic diversification because stock returns in different countries tend to be less related or unrelated. Specifically, emerging markets are well-known among foreign investors to diversify their investments in because of low correlation between emerging market returns and developed market returns (Barry, Peavy Jr, & Rodriguez, 1998). This is in accord to the portfolio theory that an asset yields diversification benefit when its return is less than perfectly correlated with market portfolio return. For example, as lower correlation between the asset return and market return, as higher diversification benefit it offers. Thus, this implies benefit of global investors from diversification in emerging markets. In addition, investors will require lower rate of return for assets offering higher diversification benefit, and hence, they are willing to pay higher for it. Bergstrom and Tang (2001) found that B shares discount is lower in the stock that exhibit lower correlation between its B shares return and MSCI World index return as it illustrates higher diversification benefit. Owing to the reason that Thailand is one of emerging markets, the diversification benefit as a motive of foreign investors to purchase Thai stocks is properly studied in Thai stock market. If this is the case, foreign investors will price Thai stocks by including diversification benefit they offered. It should be observed that firm in which its foreign share return is lower correlated with MSCI World index return, exhibits higher foreign

share premium since it offers more diversification benefit and is paid more by foreign investors. Therefore, it can be hypothesized as follows;

Hypothesis 3: The correlation between foreign stock return and the MSCI index return has negative relationship with the foreign share price premium.

According to those hypotheses discussed above, Table 1 shows the summary of explanatory variables subjected to their hypotheses and the expected sign of coefficients.

Table 1: Summary of explanatory variables and the expected sign of coefficients.

Hypothesis	Explanatory Variable	Expected Sign of coefficient
Demand differential	Foreign Limit	Negative
	Foreign Room	Negative
	NVDR	Negative
Information availability	Market Capitalization	Positive
	Analyst Coverage	Positive
Diversification benefit	Correlation (Foreign Return, MSCI Return)	Negative

Chapter 4: Data and Methodology

This chapter firstly provides the institutional setting of Thai stock market. Subsequently, it is to clarify the data used in the study. Both the determination of variables and primarily characteristics are illustrates. The empirical study also suggests the methodology to be employed in order to investigate those hypotheses as discussed earlier.

4.1 Institutional Setting¹

The Stock Exchange of Thailand (SET) was established by government and started trading on April, 30, 1975. The objectives are to encourage businesses to mobilize additional fund and provide alternative scheme of saving which are beneficial for national economic development. It is currently regulated under the Securities and Exchange Act of 1992 (SEA) by the Securities and Exchange Commission (SEC). Trading methods applied in the market consist of Automatic Order Matching (AOM) and Trade Report (TR). According to the former method, investor will submit his order to the brokerage house, then the broker will electronically pass it to the SET mainframe computer, and queue up until it is matched according to a price-then-time priority. For the latter method, it allows members to negotiate for the price directly to each other and submit the trading detail after the deal to SET for recording purpose. In addition, there are no market maker in Thai stock market.

Primarily, Thai equity market grew gradually from 1975 until the total market capitalization reached a trillion Baht in the beginning of 1990s. It has been quickly

¹ The Institutional Setting of the Stock Exchange of Thailand (SET) are public in the official website (www.set.or.th).

expanding to three trillion Baht in two years later and currently over 10 trillion Baht in 2014. This is due to the increasing in stock prices and the number of listed companies. For investors participate in the market can be classified as local investors, foreign investors, proprietary trading, and local institutions. During the past decades, the local investors are accounted for a half of the total transactions, foreign investors are for one fourth, and the rest are proprietary trading, as well as local institutions.

Specifically, the percentage of foreign ownership limit on domestic stock was regulated to retain domestic control. The percentage limits are varied in each industry and each company. Due to a large flow of foreign direct investment and portfolio investment into Thailand in mid-1980s, most shares have reached their limit of foreign ownership. This involves the foreign investors to be harder at trading on the single Main Board. To buy those stocks that reach foreign limit on the Main Board, they have to queue up until other foreign shareholders sell the stocks and result in loosen foreign ownership limit in order to maintain the regulation of foreign ownership limit. To overcome this difficulty, the Stock Exchange of Thailand introduced the separate board called the Foreign Board in 1987, where allows foreign investors to trade the shares that have reached the foreign limit among themselves, since transferring ownership from foreign investors to foreign investors will not violate the foreign limit. For stock traded on the Foreign Board, their name will be added –F as a suffix, for example, SCC-F. Foreign investors who purchase share on the Foreign Board will be able to register the share for their names and receive full financial benefits such as dividend, voting rights, as well as other right offerings, so do the domestic investors who buy stock on the Main Board. Note that for the stock that has not reached the foreign limit, foreign investors can either buy it on the Main Board or Foreign Board. If foreign investors

purchase share that has not reached the foreign limit on the Main Board, they will be able to receive all financial benefits via their representative which is mostly the broker. Furthermore, the cross-trading market can occur, for example, local investors can purchase share on the Foreign Board but doing so will excluded them from dividend, voting-right, and other right offerings. However, there is no arbitrage opportunity between two separate markets. For example, local investors might be looking to earn an arbitrage profit by purchasing share on the Main Board where the price is likely to be lower, and selling it at higher price on the Foreign Board. In fact, they cannot do so, when local investors buy share on the Main Board, it is immediately registered for their name, they cannot subsequently sell it on the Foreign Board or pass their share from local account to foreign account by themselves. Besides this, the short-sale constraint also prevents the arbitrage opportunity to occur.

Later, to encourage trading activities in the Stock Exchange of Thailand, the Non-Voting Depository Receipt (NVDR) was introduced on June 11, 2001. NVDR is an alternative investment of foreign investors other than –F share, it provides almost identical benefits as –F share such as dividend. Nevertheless, it excludes the voting right and the involvement in corporate decision-making. Hence, NVDR can be as the close substitute of –F share. It advantages for those foreign investors who do not interest in management of the company but other financial benefits as they have not to worry about the foreign ownership limit, and also for the local companies as they can keep their local control. Both domestic and foreign investors can trade NVDR on the Main Board at the same price of local share by the same trading procedure. For those reasons, the value of NVDR trading keeps increasing after the introduction in 2001 and is up to 4.3 million shares in 2014.

4.2 Data

All the data used in this study are obtained from Datastream and SETSMART database. To obtain foreign premium as the dependent variable, it requires the close price at each month end of each foreign and local share in the Stock Exchange of Thailand (SET) during January 2002 to December 2014, 156 months. However, not all listed stocks are traded on the given day, and only stocks providing a pair of contemporaneous share price between the Foreign Board and the Main Board which indicates the positive trading volume are used (Bailey & Jagtiani, 1994), stocks having observations less than the mean number of observation² and outliers will be dropped out from the sample.

In panel regression, foreign premium will be defined for firm *i* on month *t* denoted by $PREM_{it}$. Compositions of $PREM_{it}$ is of identical firm on the same month. It is calculated by the difference between foreign share close price on the Foreign Board for firm *i* on month *t* (*Foreign Share Price*_{*i,t*}) and close price on the Main Board for firm *i* on month *t* (*Main Board Share Price*_{*i,t*}), divided by close price on the Main Board for firm *i* on month *t* (*Main Board Share Price*_{*i,t*}).

$$PREM_{i,t} = \frac{\text{Foreign Share Price}_{i,t} - \text{Main Board Share Price}_{i,t}}{\text{Main Board Share Price}_{i,t}}$$

According to each hypotheses discussed in this study, these following explanatory variables are obtained and computed on monthly basis. Specifically, in the panel regression, those variables which vary across firms and over time will be considered which are NVDR dummy variable, market capitalization ratio, and total number of

² Stocks having less than 10 observations.

analyst coverage, for each stock. They are matched across individual firms and over time with their foreign premium for firm i on month t and can be calculated as follows.

- $NVDR_{i,t}$, is the value of NVDR trading of firm i on month t . It is measured in domestic currency (million Thai Baht).
- $MCAP_{i,t}$, is the ratio of market capitalization of firm i on month t to the whole market capitalization on month t . It is proxy for firm size and can be calculated as follow.

$$MCAP_{i,t} = \frac{\text{Market Capitalization of firm } i \text{ on month } t}{\text{Whole Market Capitalization on month } t}$$

- $ANALYST_{i,t}$, is the total number of the analyst recommendation from different participants regardless buy, sell, or hold recommendation, of firm i 's stock that is available on month t .

Whereas in cross-sectional regression, foreign premium is calculated as the average end-of-month foreign premium for firm i denoted by $PREM_i$. By this, $PREM_{it}$ of each individual firm i will be averaged through all month t that each of them exhibits foreign premium. Thus, there are 30 observations of $PREM_i$ in total. Note that i denotes each different firm such as firm i , firm j , firm k , ... and so on. For the explanatory variables considered in cross-sectional regression are those which do not varied much over time (Bailey et. Al, 1999), which are foreign ownership limit, foreign room, the ratio of market capitalization, as well as correlation between foreign share return and MSCI return. In addition, the ratio of market capitalization will be studied in both panel regression and cross-sectional regression following Bailey et al. (1999) in the study of

foreign premium in several stock markets. Each explanatory variables is calculated on the similar basis to $PREM_i$ as follow.

- $FLIMIT_i$, is the average end-of-month percentage of foreign ownership limit of firm i as regulated by government.
- $FROOM_{i,t}$ is the average end-of-month percentage of foreign room available of firm i . It is the remaining percentage of firm i shares respected to its foreign ownership limit that foreign investors are still able to purchase.
- $MCAP_i$, is the average end-of-month ratio of market capitalization of firm i to the whole market capitalization.
- $CORR_i (R_i, RMSCI_i)$ is the correlation between end-of-month total return index of foreign share of firm i and end-of-month MSCI AC World³ index return as a market portfolio return. It represents the diversification benefit of investing in foreign shares on Thai stock market.

To comply with each hypothesis, $FLIMIT_i$, $FROOM_{i,t}$ and $NVDR_{i,t}$ are accounted for demand differential hypothesis. Next, $MCAP_{i,t}$, $MCAP_i$ and $ANALYST_{i,t}$ subject to the information availability hypothesis. Last, $CORR_i (R_i, RMSCI_i)$ is to investigate diversification benefit.

³ MSCI AC world is the index captures total return index of all countries, the index covers approximately 85% of the freefloat-adjusted market capitalization in each country (MSCI, 2014).

4.3 Overview of foreign premium

Figure 4 shows monthly average foreign premium during January 1988 to December 2014, 324 months. It exhibits the downward trend of foreign premium. After the introduction of the Foreign Board in 1987, foreign premium had been increasing in 1988 and reached the highest at the beginning of 1990s. During 1990s, foreign premium was lower but highly fluctuated. Subsequently, foreign premium obviously declined in 2001 and thereafter, since NVDR as substitute investment of domestic share for foreign investors was introduced in 2001. Roughly, it can be seen that during the period of higher foreign premium also have higher variation.

Figure 4: Monthly Average Premium

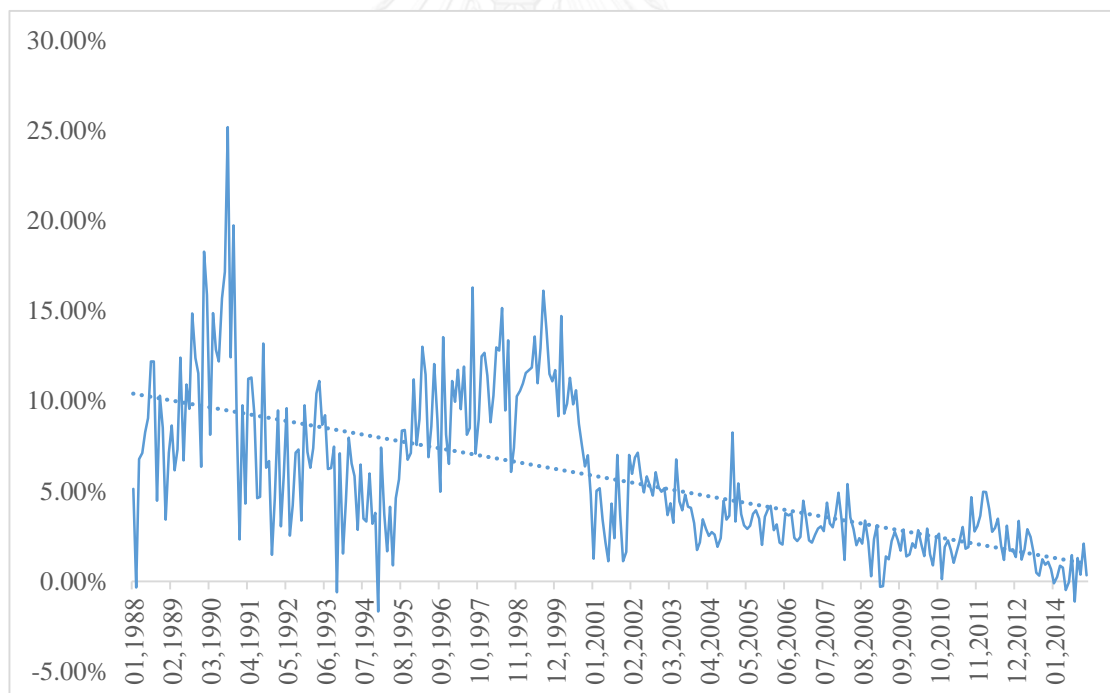


Figure 4 plots the time-series average end-of-month foreign premium during January 1988 to December 2014. Foreign premium is calculated as the difference between Foreign and Main Board share price divided by Main Board share price.

4.4 Descriptive Statistics

Recall that variables which vary across firms and over time are *NVDR Trading Value*, *Market Capitalization ratio*, and *the Number of Analyst Coverages*. Due to these characteristics, they will be included in the panel regression. The preliminary characteristics of these variables are shown in Table 3: Panel A. The sample contains 30 firms during January 2002 to December 2014, 156 months. The average yearly values are calculated from end-of-month value of each stock in a particular year. And the average values for all observations are calculated from end-of-month value of each stock in the whole sample period. Also, similar procedure is applied for standard deviation.

Firstly, *Average Foreign Premium* for the whole sample period is approximately 3.06% with the standard deviation of 5.03%. Meanwhile, not only average yearly foreign premium exhibits downward trend, but also the standard deviation is lower through time. This means foreign premium is lower and less fluctuated during the sample period.

Secondly, *NVDR* is as a substitute investment of domestic share for foreign investors. After it was introduced in 2001, the trading value has been increasing year by year from 6 million Baht in 2003 to 56 million Baht in 2013 and slightly dropped to 45 million Baht in 2014. While, the average trading value is 20 million Baht for the whole sample period. Note that only *NVDR* trading value of sample stocks during sample period is obtained in this study for the purpose of relevant. However, the total *NVDR* trading value of all stocks including those are out of this sample is actually larger (www.set.or.th).

Moreover, the *Market Capitalization* reported in Panel A of Table 2 refers to size of the firm relative to the market. For the whole sample period, the average size of the sample companies is 2.22% relative to Thai stock market. Note that firm size is calculated in ratio of firm market capitalization of a particular firm to the whole market capitalization.

Another, the number of *Analyst Coverage* is used as a proxy of information-rich of the company, regardless kinds of recommendations which may be buy, hold, or sell. Apparently, the average number of analyst coverage keeps increasing over time. While, the mean value is around 18 recommendations for the whole sample period.

However, the other variables which are not varied much over time includes Foreign Limit, Foreign Room, and Correlation between foreign share return and MSCI index return. These will be regressed in the cross-sectional regression. To consider their value across firms, Table 3: Panel B illustrates the Descriptive Statistics.

Among 30 companies in the sample, *Foreign Premium* ranges between -0.51% to 11.5% with the mean value of 2.07%. It can be seen that some firm even exhibits foreign discount and some of them show the high foreign premium.

For the explanatory variables, *Foreign Limit* is the percentage of foreign ownership regulated for each stock. Recall that it is characterized as the supply of domestic share for foreign investors. The maximum ownership allowed for foreign investors is 49% which still remains the domestic control of the firm, since 49% does not represent the majority vote of foreign investors. While the strictest foreign ownership allowed will be not over than 25% of total share outstanding. And the

average foreign limit is approximately 40%, this implies most of sample companies are allowed at nearly to the maximum of foreign limit.

Next, *Foreign Room* is the remaining percentage of ownership that is available to foreign investors respected to foreign ownership limit. It characterizes as a relative demand of foreign investors to the domestic stock. As lower foreign room left, as higher foreign demand is. According to Panel B of Table 2, foreign room is 3% across firms on average. While there are some stocks which have no room available for foreign investors as their average foreign room show 0%. This indicate the highest foreign demand relative to limited supply of those stocks. And for the highest room available is 16% relative to foreign ownership.

Besides Foreign Limit and Foreign room, *Market Capitalization* is considered again across firms. It is the ratio of firm market capitalization to the whole market capitalization. The largest firm contained in the sample accounts for 7.22% of the market. And the smallest firm is only 0.04% of the whole market. Whereas, the average size of them is 1.50% relative to the market.

Lastly, the *Correlation* between foreign share return and MSCI World index return is as the proxy of diversification benefit. To accomplish diversification benefit, securities should exhibit less than negatively perfect correlation. As lower of correlation, as higher of diversification benefit. According Panel B, Table 3, the correlation is quite low at 1% on average. Also, it ranges between low number of 6.94% and -1.46%. This is in favor of diversification benefit.

Table 2: Descriptive Statistics

Panel A

	2002	2003	2004	2005	2006	2007	2008
Average Foreign Premium	0.0583	0.0408	0.0315	0.0351	0.0305	0.0312	0.0258
<i>Std. Dev. of Foreign Premium</i>	<i>0.0782</i>	<i>0.0571</i>	<i>0.0393</i>	<i>0.0343</i>	<i>0.0421</i>	<i>0.0524</i>	<i>0.0516</i>
Average NVDR Trading Value (million Baht) ⁴	-	5.5934	10.0422	11.2917	12.1554	16.7588	16.7864
Std. Dev. of NVDR Trading Value (million Baht)	-	10.2105	17.2871	15.5562	16.4506	20.3629	20.2051
Average Market Cap.	0.0201	0.0217	0.0224	0.0192	0.0170	0.0197	0.0258
<i>Std. Dev. of Market Cap.</i>	<i>0.0177</i>	<i>0.0200</i>	<i>0.0203</i>	<i>0.0179</i>	<i>0.0172</i>	<i>0.0155</i>	<i>0.0208</i>
Analyst Coverage (recommendations)	8	10	9	11	13	19	22
<i>Std. Dev. of Analyst Coverage</i>	<i>3.91</i>	<i>4.05</i>	<i>3.04</i>	<i>4.16</i>	<i>5.10</i>	<i>6.31</i>	<i>7.38</i>

	2009	2010	2011	2012	2013	2014	All
Average Foreign Premium	0.0163	0.0183	0.0235	0.0267	0.0159	0.0047	0.0306
<i>Std. Dev. of Foreign Premium</i>	<i>0.0297</i>	<i>0.0306</i>	<i>0.0463</i>	<i>0.0473</i>	<i>0.0335</i>	<i>0.0206</i>	<i>0.0503</i>
Average NVDR Trading Value (million Baht)	15.6954	23.2170	25.4466	36.6526	55.6882	44.6940	19.7463
Std. Dev. of NVDR Trading Value (million Baht)	18.7178	26.8067	26.4111	48.4421	45.7911	43.2786	29.0830
Average Market Cap.	0.0251	0.0251	0.0251	0.0239	0.0266	0.0257	0.0222
<i>Std. Dev. of Market Cap.</i>	<i>0.0188</i>	<i>0.0172</i>	<i>0.0177</i>	<i>0.0164</i>	<i>0.0142</i>	<i>0.0126</i>	<i>0.0181</i>
Analyst Coverage (recommendations)	24	24	27	28	28	27	17.57
<i>Std. Dev. of Analyst Coverage</i>	<i>5.66</i>	<i>5.07</i>	<i>5.52</i>	<i>5.20</i>	<i>3.42</i>	<i>3.47</i>	<i>8.97</i>

Table 2: Panel A shows the descriptive statistics of foreign premium and various explanatory variables. It illustrates the average yearly value and the standard deviation of variables for the whole sample period. Foreign Premium is the difference in Foreign and Main Board share price divided by Main Board share price. NVDR trading value is in term of million Thai Baht (as domestic currency). Note that only NVDR trading value of sample stocks during sample period is shown in this study. Market capitalization is the ratio of firm market capitalization to the whole market capitalization and is measured in Thai Baht. Analyst coverage is the number of recommendations for each stock regardless hold, buy, or sell.

⁴ Due to limitation of information, NVDR trading value is obtained during 2003 to 2014.

Table 2 : Descriptive Statistics (Continue)*Panel B*

	Mean	Median	Maximum	Minimum	Std. Dev.
Foreign Premium	0.0207	0.0120	0.1159	-0.0051	0.0255
Foreign Limit	39.27%	40.04%	49.00%	25.00%	8.19%
Foreign Room	3.30%	1.73%	16.16%	0.00%	4.09%
Market Capitalization	0.0150	0.0077	0.0722	0.0004	0.0173
Correlation	1.41%	1.37%	6.94%	-1.46%	1.81%

Table 2: Panel B shows the descriptive statistics of foreign premium and various explanatory variables. It illustrates the average cross-sectional value of each stock including maximum, minimum, and standard deviation. Foreign Premium is the difference in Foreign and Main Board share price divided by Main Board share price. Foreign Limit is the percentage of foreign ownership limit on domestic stock. Foreign Room is remaining percentage of ownership that is available to foreign investors respected to foreign ownership limit. Market capitalization is the ratio of firm market capitalization to the whole market capitalization and is measured in Thai Baht. Correlation is between foreign share return and MSCI index return as measure of diversification benefit.

4.5 Methodology

4.5.1 Panel Regression

The pooled time-series cross-sectional regression of the foreign premium is firstly estimated on the NVDR trading value, market capitalization ratio, and the analyst coverage of each firm. As they are varied across firm and over time, the fixed-effects method is used to capture unobservable firm effects which are time-invariant following Domowitz et. al (1997), Bailey et. al (1999), as well as Sun and Tong (2000). Also when Hausman test is applied, p-value is less than 0.05, thus, there is a sufficient evidence to reject the null hypothesis stating that the random effect model is more appropriate. This means the fixed effects is more properly used than random-effects methods (Wooldridge, 2013). According to Equation (1), to investigate the demand differential hypothesis, the effect of NVDR trading value is examined against foreign share premium. Also, firm market capitalization and the number of analyst coverage are included to answer the information availability hypothesis.

$$PREM_{i,t} = \beta_1 NVDR_{i,t} + \beta_2 MCAP_{i,t} + \beta_3 ANALYST_{i,t} + \beta_4 PREM_{i,t-1} + \alpha_i + \varepsilon_{i,t} \quad (1)$$

where; $PREM_{i,t}$ is the difference in foreign share price and the Main Board share price divided by the Main Board share price, of firm i on month t ,

each β_j is coefficients associated with observable explanatory variables, $j = 1, 2, 3$ and 4 .

$NVDR_{i,t}$ is the NVDR trading value of firm i on month t and measured in million Thai Baht.

$MCAP_{i,t}$ is the ratio of firm i market capitalization to the whole market capitalization on month t ,

$ANALYST_{i,t}$ is the number total analyst recommendations for firm i on month t ,

$PREM_{i,t-1}$ is time lag of $PREM_{i,t}$ included to filter out a high degree of auto-correlation as in Domowitz et al. (1997), Bailey et al. (1999), as well as Sun and Tong (2000),

α_i is time-invariant random variable used to capture any other cross-sectional effects so that unobservable firm-specific effect is controlled (Domowitz et al., 1997; Sun & Tong, 2000),

$\varepsilon_{i,t}$ is the disturbance term assumed to have zero mean and uncorrelated with other observable explanatory variables, however, it may be heteroscedastic (Wooldridge, 2013),

subscription i denotes each different firm in the sample, and subscription t denotes each different month in sample period.

The diagnostic checking of serial correlation is implemented. The problem of serial correlation or autocorrelation is when the error terms of different observations are correlated, especially in the data including time dimension (Wooldridge, 2013). Serial correlation in the linear panel-data causes the standard errors to be bias and the result will be less efficient (Drukker, 2003). To correct for the serial correlation problem, the lag term of dependent variable, $PREM_{i,t-1}$ is included to filter out a high degree of auto-correlation as in Domowitz et al. (1997), Bailey et al. (1999), and Sun and Tong (2000).

4.5.2 The Cross-sectional Regression

According to Equation (1) of the fixed effect panel regression, the foreign ownership limit, foreign room, as well as correlation between foreign return and MSCI index return are excluded since they do not vary over time (Bailey et. al, 1999). However, the cross-sectional regression is more proper to investigate these variables. The average end-of-month foreign premium for firm i of each individual firm including those cross-sectional explanatory variables which are foreign ownership limit, foreign room, market capitalization ratio, and the correlation between foreign share return and MSCI index return, are obtained and regressed as in Equation (2). Specifically, foreign ownership limit and foreign room are included in order to investigate whether they can explain the cross-sectional foreign premium according to demand differential hypothesis. Again, the firm market capitalization is to examine the information availability hypothesis. Furthermore, correlation between foreign share return and MSCI world index return is included as a measure of diversification benefit so that diversification hypothesis is considered. Equation (2) and (3) can be shown as follow;

$$PREM_i = \gamma_1 FROOM_i + \gamma_2 MCAP_i + \gamma_3 CORR_i(R_i, RMSCI_i) + u_i \quad (2)$$

$$PREM_i = \gamma_1 FLIMIT_i + \gamma_2 MCAP_i + \gamma_3 CORR_i(R_i, RMSCI_i) + u_i \quad (3)$$

where; $PREM_i$ is the average end-of-month difference in foreign share price and Main Board share price divided by the Main Board share price of firm i ,

each γ_k is coefficients of each independent variable, $k = 1, 2,$ and 3 .

$FLIMIT_i$ is the average end-of-month percentage of foreign ownership limit for firm i ,

$FROOM_i$ is the average end-of-month remaining percentage of firm i 's shares respected to its foreign ownership limit that foreign investors are still able to purchase,

$MCAP_i$ is average end-of-month market capitalization of firm i to the whole market capitalization.

$CORR_i (R_i, RMSCI_i)$ is the correlation between end-of-month total return index of foreign share of firm i and end-of-month MSCI AC world index return as a market portfolio,

u_i is the disturbance term assumed to have zero mean and uncorrelated with other observable explanatory variables (Wooldridge, 2013),

and subscription i denotes each different firm in the sample.

According to the concern of heteroscedasticity problem in cross-sectional regression, it will cause the OLS estimators to be undesired. Although, the estimators are unbiased, the variance are too high. The heteroscedasticity problem is consequently detected by the White Test. Since the p-value is less than 0.05, the null hypothesis is rejected, and there is a sign of heteroscedasticity problem. Thus, it has been corrected by HAC (Newey-West) method so that the regression yields the reliable result (Wooldridge, 2013).

Chapter 5: Results and Discussion

The results of panel regression and cross-sectional regression are both provided in this chapter together with the discussion according to those results and hypotheses which are demand differential hypothesis, information availability hypothesis, and the diversification benefit hypothesis.

5.1 Panel Regression Result

Table 3: Panel Regression Results

Panel A: Whole sample

	Expected Sign	(1)	(2)	(3)	(4)	(5)
Constant term		0.0196 (4.7666)***	0.0121 (10.1150)***	0.0062 (2.2054)**	0.0218 (8.6969)***	0.0236 (8.6067)***
Premium _{i,t-1}		0.5823 (26.6354)***	0.6124 (28.9878)***	0.7014 (39.0617)***	0.6679 (35.6869)***	0.5847 (26.8366)***
NVDR _{i,t}	-	-4.78×10^{-5} (-1.3979)	-9.47×10^{-5} (-2.9246)***			-4.31×10^{-5} (-1.2668)
Market Capitalization _{i,t}	+	0.1721 (1.3166)		0.1051 (0.8633)		
Analyst Coverage _{i,t}	+	-0.0006 (-4.5327)***			-0.0007 (-5.7129)***	-0.0006 (-4.6693)***
Adjusted R ²		0.5611	0.5542	0.6305	0.6380	0.5608
Durbin-Watson		2.2275	2.2580	2.3228	2.2860	2.2285

*Panel B: Lower-than-average foreign room*⁵

	Expected Sign	(1)	(2)	(3)	(4)
Constant term		0.0143 (2.6573)***	0.0120 (9.1062)***	0.0017 (0.4732)	0.0220 (7.5245)***
Premium _{i,t-1}		0.6605 (29.5020)***	0.6904 (32.2753)***	0.7586 (41.5681)***	0.7272 (37.7005)***
NVDR _{i,t}	-	-6.60×10^{-5} (-1.9662)**	-9.82×10^{-5} (-3.0826)***		
Market Capitalization _{i,t}	+	0.3055 (1.8753)*		0.2888 (1.8762)**	
Analyst Coverage _{i,t}	+	-0.0005 (-3.1673)***			-0.0007 (-5.0529)***
Adjusted R ²		0.6302	0.6246	0.6923	0.6977
Durbin-Watson		2.3667	2.3999	2.4372	2.3998

⁵ The result includes only stocks that have foreign room equal or lower than average of 1.88%. These stocks illustrate higher foreign demand than others as their foreign room are low. Note that foreign room is the remaining percentage of domestic stocks that foreign investors are still able to purchase relative to the foreign ownership limit.

Panel C: Higher-than-average foreign rooms⁶

	Expected Sign	(1)	(2)	(3)	(4)
Constant term		0.0136 (1.8293)**	0.0035 (1.4701)	0.0108 (2.4062)**	0.0084 (1.6483)
Premium _{i,t-1}		0.1646 (2.3885)**	0.1704 (2.4729)**	0.1733 (2.7686)***	0.1727 (2.7439)***
NVDR _{i,t}	-	8.9×10^{-5} (0.7005)	3.59×10^{-5} (0.3006)		
Market Capitalization _{i,t}	+	-0.4015 (-1.5054)		-0.3333 (-1.6188)	
Analyst Coverage _{i,t}	+	-0.0001 (-0.2607)			-0.0003 (-0.8893)
Adjusted R ²		0.1006	0.0968	0.1325	0.1267
Durbin-Watson		1.9183	1.9267	1.8827	1.8893

Table 3 reports the panel regression result of foreign premium on the lagged foreign premium, NVDR trading value, firm market capitalization relative to the whole market, and the total number of analyst recommendation. T-statistics reported in parentheses beneath coefficient. The lagged foreign premium is filtered to improve the serial correlation problem (Domowitz et. Al, 1997) Note that *Significance level at 10%, **Significance level at 5%, and ***Significance level at 1%

⁶ The result includes only stocks that have foreign room higher than average of 1.88%. These stocks illustrate lower foreign demand than others as their foreign room are high. Note that foreign room is the remaining percentage of domestic stocks that foreign investors are still able to purchase relative to the foreign ownership limit.

Table 3 shows the panel regression results. Panel A includes the whole sample. Panel B includes only stocks that have foreign room equal or lower than average of 1.88%, while Panel C includes the rest stocks that have foreign room higher than average of 1.88%. To control the unobservable firm specific and time-invariant variables, the fixed effect model is used to regress NVDR trading value, firm market capitalization relative to the whole market, and total recommendation of analyst, on the foreign premium.

Although, the serial correlation problem is corrected by the filtering the lagged term of dependent variables, the multicollinearity among explanatory variables is likely to exist in Panel A for the whole sample. Since there are different signs and significant meanings when including all variables as in Column 1 and when excluding some variables in the other columns. After the robust check, it is found that NVDR trading value and the number of analyst coverage is positively correlated by approximately 42%.

According to Column 2 in Panel A, *NVDR Trading Value* provides the strong explanation of foreign premium in Thai stock market. Since the coefficient of NVDR trading value yields the significantly negative sign as expected. However, this is not true for those stocks which have higher than average foreign room, or in lower demand of foreign investors in accord to Panel C as the coefficient of NVDR yields statistically insignificant sign. In contrary, the negative relationship between NVDR trading value and foreign share premium is robust in Panel B for stocks those their foreign room are equal or lower than average indicating that they are in higher demand of foreign investors compared to other domestic stocks. It means NVDR can be well substituted

for domestic share for foreign investors. Prior to the introduction of NVDR to the market, foreign investors who want to purchase domestic stock have only one choice that is to buy it directly on the Foreign Board where allows trading of foreign share among foreign investors if its foreign limit has reached. In case that foreign limit has not reached, they can either buy it on the Main Board or the Foreign Board. When their choice is limited, foreign investors are willing to pay higher for those share, in other word, they are less sensitive to price or relatively inelastic in demand. Once, NVDR was introduced, foreign investors have more choices of purchasing domestic shares, since NVDR yields almost identical full financial benefits to existing foreign share but not voting right. In other word, NVDR is close substitute of domestic share for foreign investors. Thus, they shifts to buy more NVDR and less domestic stock on the Foreign Board. Consequently, they are more sensitive to share price on the Foreign Board or more elastic in demand than before. As a result, they would be willing to pay less for it, and hence lower foreign premium. According to Figure 5, when the sample firms are considered, their trading value of NVDR during 20003 to 2014 exhibits upward trend. The trading value has been increasing year by year from 6 million Baht in 2003 to 56 million Baht in 2013 and slightly dropped to 45 million Baht in 2014. Note that, the NVDR trading value is increasing much larger for the whole NVDR trading value of all firms including those firms out of this sample (www.set.or.th). However, only NVDR trading value of firms in the sample which is more relevant will be shown. This result is consistent with Sun and Tong (2000) in the study of Chinese stock market. It shows that more existence H shares and red chips as substitute of B share for foreign investors who want to purchase Chinese stock, leads to lower price of B share and larger discount of B shares relative to A share. However, Bailey (1999) found no evidence of

the relationship between the existence of American Depository Receipt (ADR) and the unrestricted share premium in the study of 10 stock markets which are of China, Indonesia, Korea, Malaysia, Mexico, Norway, Philippines, Singapore, Switzerland, Taiwan, and Thailand. ADR is the program that allows US investors to buy non-US stocks via American bank without concern of foreign exchange rate risk since it is denominated in dollar currency. ADR holder is allowed for all identical financial benefits as purchasing non-US stocks directly oversea, thus it is a substitute of those stocks for American investors. Nevertheless, not all non-US stocks are available in ADR program.

Figure 5: NVDR Trading Value during 2003 to 2014

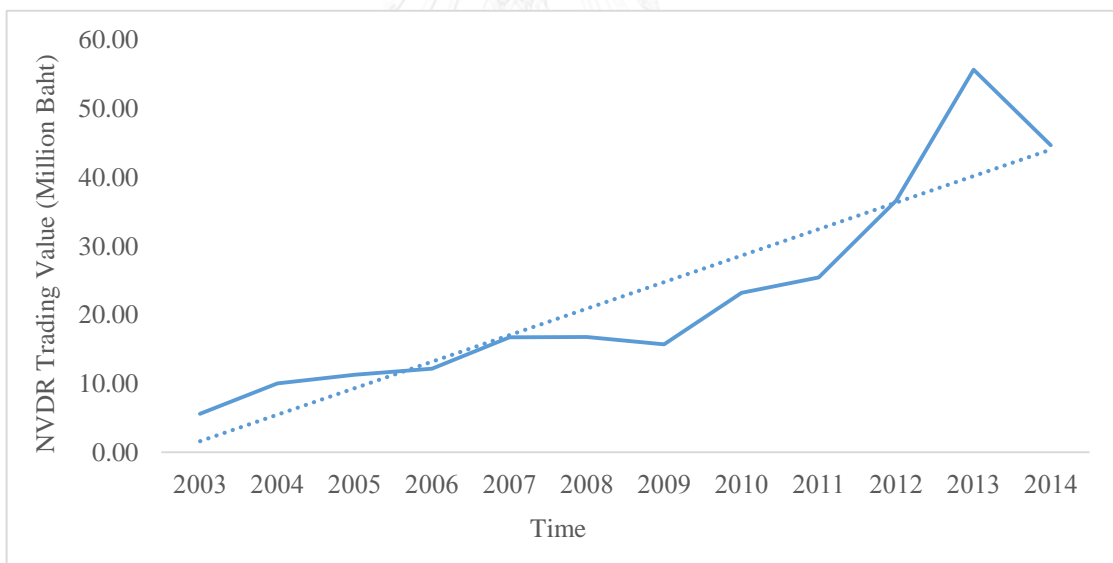


Figure 5 plots the yearly average NVDR trading value during 2003 to 2014 in million Baht. Note that due to the limitation of data, NVDR is obtained during 2003 to 2014.

Besides this, foreign investors might prefer to invest in larger firms which tend to have more information rich, as a result, they are willing to pay more for them. According to Table 3, the coefficient of *Market Capitalization* shows the expected

positive sign and statistically significant only in Panel B for stocks having equal-or-less-than-average foreign room, however it is statistically insignificant for the whole sample in Panel A and for stocks having higher-than-average foreign room in Panel C. This means firm market capitalization can positively explain foreign premium especially in firms those have higher foreign demand (lower foreign room). Recall to Thai stock market during 1988 to 1992, Bailey and Jagtiani (1994) found that firm market capitalization can positively explain the foreign premium. In other word, foreign investors rather buy stock of large company on the Foreign Board. To study further, the effect of firm market capitalization to the NVDR trading value is considered. Table A3 (see Appendix) shows that there is a statistically positive relationship between NVDR trading value and firm market capitalization. This provides new empirical evidence that foreign investors remain their preference to large domestic firm but their trading method significantly shift from foreign share on Foreign Board to NVDR.

Another proxy for information availability is the total number of *Analyst Coverage* including recommendation of buy, hold, or sell. The more analyst recommendation indicates more coverage and richer information of that stock and foreign investors would be willing to pay more for it. According to Figure 6, the number of analyst coverage keep increasing through the sample period, 2002 to 2014. Although, it appears the highly significant result in Panel A for the whole sample and Panel B for stocks having equal-or-lower-than-average foreign room (high-foreign-demand stocks), it yields unexpected negative sign rather than positive sign as expected. It means that more analyst coverage causes foreign premium to be lower. This is contradict with the previous studies (Bergstrom and Tang, 2001). However, when the number of analyst coverage is regressed on the NVDR trading value on Table A2 (see

Appendix), it shows that the coefficient of analyst coverage is statistically significant and positive. The plausible explanation is that more analyst coverage of information might lead to more attractiveness of domestic stocks. Foreign investors can either buy domestic share on the Foreign Board or buy NVDR on the Main Board. Since they can buy NVDR without concerning of foreign ownership limit, they may rather buy NVDR than foreign share. Therefore more analyst coverage causes an increase in NVDR trading value, but a reduction in foreign share trading and premium. Note that for stocks those have higher-than-average foreign room (low-foreign-demand stocks) in Panel C, the total number of *Analyst Coverage* has no power to explain their foreign premium.

Figure 6: Total Analyst Recommendation during 2002 to 2014

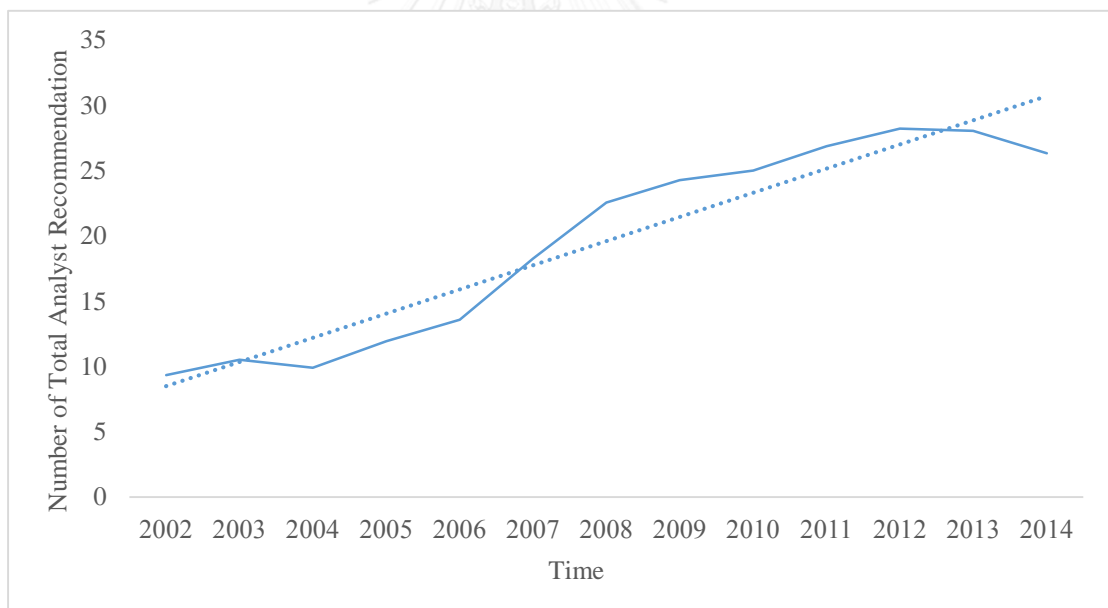


Figure 6 plots the yearly average number of total analyst recommendation regardless kind of buy, hold, or sell recommendation, against time during 2002 to 2014.

To sum up, *NVDR Trading Value*, *Market Capitalization*, and *Total Number of Analyst Coverage*, can well explain the foreign premium especially in stocks having higher foreign demand showing by equal-or-lower-than-average foreign room

according to Panel B. However, they fail to explain the foreign premium in stocks those have lower foreign demand (stocks having higher-than-average foreign room). Also, only foreign room and total number of analyst coverage are statistically significant in the whole sample.

In addition, the constant term is significantly positive in Table 3; Panel A, Panel B, and Panel C, this means there are other related variables else omitted (Bergstrom and Tang, 2001). Also, the lagged term of dependent variable is statistically significant and positive. This indicates strong first-order serial correlation (Domowitz et. al, 1997 ;(Chen, Lee, & Rui, 2001) and persistence in foreign premium series (Bailey et. al, 2000). Thus, this lagged term of foreign premium enters to improve the serial correlation problem (Sun and Tong, 2000) resulting in higher Durbin-Watson statistics.

5.2 Cross-sectional Regression Result

Table 4: Cross-sectional Regression Results

	Expected Sign	(1)	(2)	(3)	(4)	(5)	(6)
Constant term		0.0220 (1.0999)	0.0290 (3.5504)***	0.0250 (1.0985)	0.0285 (5.6588)***	0.0200 (3.2923)***	0.0254 (5.6722)***
Foreign Limit _i	-	0.0071 (0.1167)		-0.0111 (-0.1820)			
Foreign Room _i	-		-0.2240 (-3.5217)***		-0.2356 (-3.3208)***		
Market Capitalization _i	+	0.0446 (0.1508)	0.1382 (0.5961)			0.0430 (0.1466)	
Correlation _i (R _i , R _{MSCI} _i)	-	-0.3416 (-2.4380)**	-0.3542 (-2.6050)**				-0.3344 (-3.2920)***
Adjusted R ²		-0.0508	0.0803	-0.0344	0.1126	-0.0348	0.0229

Table 4 reports the cross-sectional regression result of foreign premium on the foreign limit, foreign room, firm market capitalization relative to the whole market, and the correlation between foreign share return and MSCI index return. All variables are average month-end value of each individual firm in the sample. T-statistics reported in parenthesis beneath coefficient. There are 30 observations (30 firms) in the sample. Note that *Significance level at 10%, **Significance level at 5%, and ***Significance level at 1%

Table 4 illustrates the cross-sectional regression analysis of foreign ownership limit, foreign room, firm market capitalization relative to the whole market as well as correlation between foreign return and MSCI index return, toward foreign premium. Note that besides the panel regression, the firm market capitalization will be considered again across firms (Bailey et. al, 1999). Also, the HAC (Newey-West) is employed to correct the heteroscedasticity problem so that the regression yields the reliable result.

According to Table 4, there is a sign of multicollinearity problem between foreign limit and correlation. The correlation statistic of this pair of variable is

approximately -0.40 meaning that as lower foreign limit, as higher correlation which means lower diversification benefit. The plausible reason arises that domestic stocks with lower percentage of foreign ownership limit are limited in diversification benefit since foreign investors cannot invest as much as they want in that stock, their diversifiable ability is limited. Also, foreign limit and foreign room is likely to be collinear by the correlation of 0.20. It means foreign limit is positively correlated with foreign room. The reason might be that stocks which have higher foreign limit tend to have more foreign room left given similar demand level. For example, Stock A and Stock B may be approximately at the same demand level, but Stock A has higher foreign limit or more supply than Stock B, this increases the probability that foreign room of Stock A may left more than Stock B. According to reasons above, pairs of variables with multicollinearity should not be simultaneously included in the regression in order to obtain the most efficient results. Nevertheless, the adjusted R-square in Column 2 is only 8.03%. It means there are other factors that can explain the cross-sectional foreign premium.

Since foreign premium may be both a supply and demand phenomenon (Bailey et. al, 1999), both foreign limit as a relative supply and foreign room as a relative demand of domestic share will be considered. According to the test result in Table 4, all models show the consistent results that *Foreign Limit* cannot explain the cross-sectional foreign premium, although it yields the expected negative sign in Column 3 of Table 4 but it is statistically insignificant. This result is inconsistent with the previous studies. Bailey and Jagtiani (1994) who study Thai stock market during 1988 to 1992 found that stock with higher foreign ownership limit are likely to have higher foreign premium. Similarly, the result of the study in Swiss stock market indicates lower

premium of unrestricted share after the announcement of foreign ownership relaxation (Stulz and Wasserfallen, 1995). Also, Domowitz et. al (1997) found the evidence of negative relationship between relative supply of unrestricted share and its price in the stock market of Mexico.

Interestingly, *Foreign Room* is statistically significant at high significance level in all models with expected negative sign. It means that lower foreign room is correlated with higher foreign premium. To clarify, foreign room is the relative supply left to the foreign limit showing how many percent of share that foreign investors are still able to purchase. Lower foreign room for a particular share left indicates higher demand of foreign investors for that stock, and the stock with high demand but low supply expresses the higher price, and thus, higher foreign premium. Comparatively, foreign ownership limit is exogenously regulated by government showing the fixed amount of domestic stock to foreign investors. However, lower foreign ownership limit does not always lead to higher pricing of domestic share by foreign investors because they do not perceive all stocks to be identical and have equal demand to each stock. For instance, there are foreign ownership limit of 25% and 49% in Stock A and Stock B, respectively. Although, Stock B has higher foreign limit, it is in high demand of foreign investors resulting lower foreign room left. While, Stock A with lower foreign limit may be at relatively lower demand of foreign investors, in this case, the foreign room of Stock A might left over larger than of Stock B. In this study, the relationship between foreign premium and foreign room of the sample stocks is shown in Figure 7 that stock of higher demand or lower foreign room left is likely to be priced higher, and shows larger foreign premium.

Figure 7: Relationship between Foreign Premium and Foreign Room

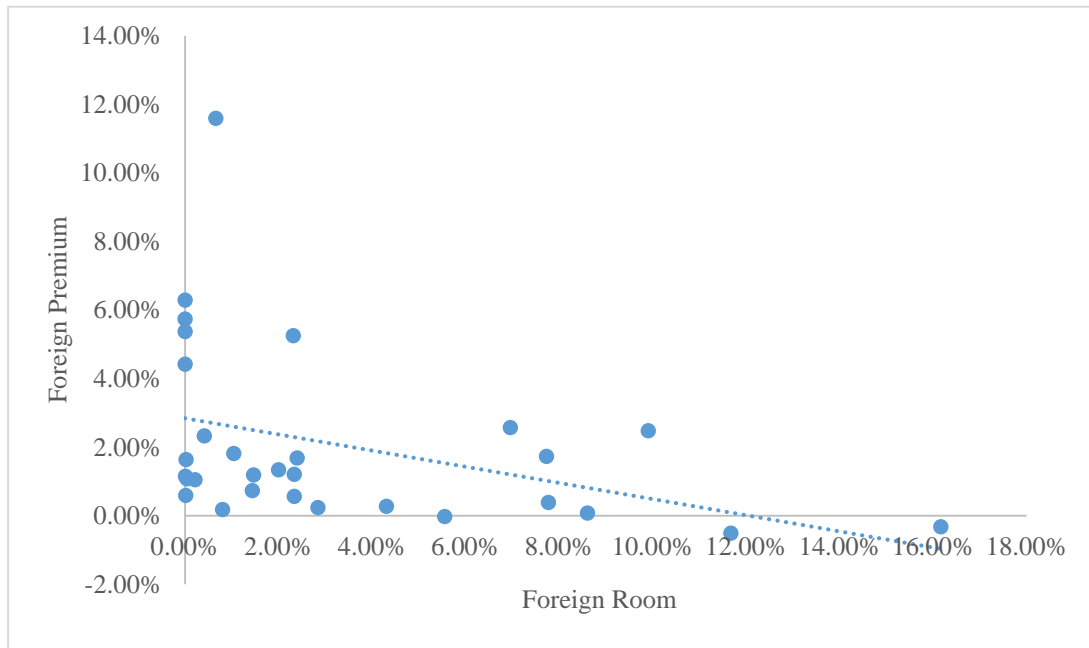


Figure 7 plots the average month-end of foreign premium and foreign room available for individual company during 2002 to 2014. There are 30 firms consisting in the sample.

Again, the effect of firm *Market Capitalization* to the foreign premium is considered in the cross-sectional regression as a proxy for information availability. It is expected that larger firm would have more information rich and preferred by the foreign investors. Thus, its stock will be priced higher resulting in larger foreign premium. According to Table 4, the coefficient of firm market capitalization shows the expected positive sign, however, it is statistically insignificant in all models.

Moreover, Table 4 shows that *Correlation* between return of domestic share on foreign board and MSCI World index is able to explain the foreign premium across company. Since the coefficient of correlation is statistically significant and negative as expected. This means lower correlation or higher diversification benefit leads to higher foreign premium as shown in Figure 8. According to the portfolio theory, to reduce the portfolio risk, investors should invests in multiple assets rather than one asset. And

among those assets which are theoretically defined as all assets or market portfolio, their returns should show less-than-perfect correlation to accomplish the diversification benefit. For example, in the same circumstance, investors might differently account for both gain and loss from assets in their portfolio depending on their correlations, the well-diversified portfolio which is of less-than-perfect correlation will allow those gains to compensate for some loss. In the context of international investment, foreign investors who seeks for international diversification benefit will prefer to invest in the asset that yields diversification benefit representing by the lower correlation between its return and market portfolio. According to the result of this study, it implies that foreign investors who buy domestic share on the Foreign Board are interested in international diversification benefit of that share, and would pay more for it. Furthermore, the result of this study is consistent with Bergstrom and Tang (2001) as they found that the correlation between the B share return and MSCI return impacts the B share discount in Chinese stock market. When the correlation is lower, or in other word, diversification benefit of investing in B share for foreign investors is higher, the B share is higher priced resulting in lower B share discount relative to A share.

Figure 8: Relationship between Foreign Premium and Correlation between Foreign Return and MSCI Index Return

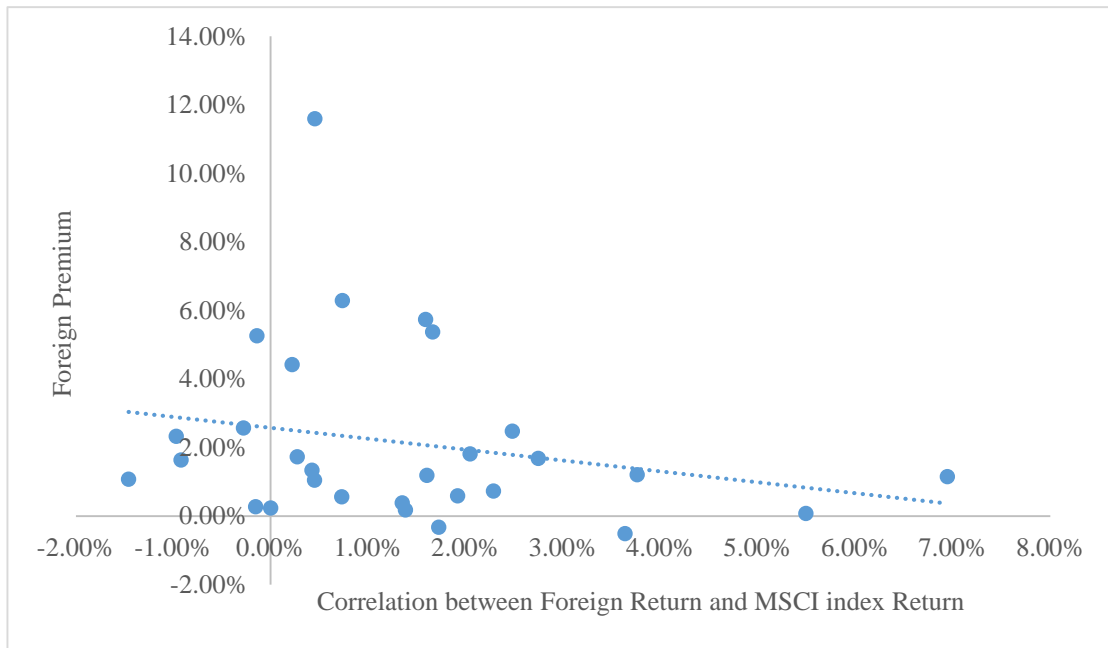


Figure 8 plots the average month-end of foreign premium and diversification benefit represented by the correlation between foreign share return and MSCI index return during 2002 to 2014. There are 30 firms consisting in the sample

Chapter 6: Conclusion

The foreign share premium in Thai stock market is relatively lower during 2002 to 2014 compared to those during 1988 to 1992 in the study of Bailey and Jagtiani (1994). The average foreign premium was 19 percent during 1988 to 1992, whereas it is generally lower to 3 percent during 2002 to 2014. In this study, three hypotheses are in attempt to explain variation of foreign premium through time and across company. First, the demand differential hypothesis plays important role to explain the foreign premium in Thai stock market. It proposes that foreign and domestic investors have different demand for the identical domestic stock, and also foreign investors' demand for Thai stock exhibits downward sloping. Surprisingly, change in foreign limit as relative supply of domestic shares for foreign investors has no effect to the foreign share premium unlike the previous study of Bailey and Jagtiani (1994). However, foreign room indicating relative demand of foreign investors for domestic stocks can economically and negatively explain the foreign share premium across company. A stock which has lower foreign room left shows higher demand with tighter foreign limit, it is priced higher and resulting in larger foreign share premium. Furthermore, differential demand refers to the different demand elasticity between foreign and domestic investors for Thai stocks. Foreign investors' demand is primarily more elastic than domestic investors' demand. Since one of determinants of demand elasticity is the number of substitute available, once NVDR was introduced as a close substitute of foreign share, foreign investors' demand for foreign shares become more elastic than before. Thus, they are willing to pay less for them, as a result, foreign share premium is lower. According to the results of this study, an increasing in trading volume of

NVDR through the sample period considerably explains the downward trend of foreign premium especially for stocks those are in higher foreign demand. Note that NVDR provides the same financial benefits to the holder as common stock but not the voting rights. This is crucial for future design of the investing instrument for foreign investors.

Second, stock which has more accessible information by foreign investors should show the higher foreign share premium according to the information availability hypothesis. In this study, both firm size and the number of analyst coverage are used as information proxy. Existing literature argue that larger firms tend to have more information availability that is more easily acquired by foreign investors and illustrate foreign share premium. Contradict with those previous studies including Bailey and Jagtiani (1994), firm market capitalization is statistically insignificant to explain the variation of foreign premium across firm. However, for stocks having higher foreign demand indicating by lower foreign room, their foreign premium are positively explained by firm market capitalization according to the panel regression model. Interestingly, there is an evidence of foreign investors' preference over large firm stocks in NVDR trading. Since, NVDR trading value is positively correlated with firm market capitalization. Moreover, the result indicates that the higher number of analyst coverage will result in more attractive of domestic firms, it causes an increase in NVDR trading value, but a reduction in foreign share trading and premium. As the coefficient of analyst coverage is significantly negative toward foreign share premium, but significantly positive toward the NVDR trading value. These imply foreign investors shift their investment from traditional foreign share to NVDR instrument. One plausible reason is they do not interest in corporate control, and do not want to concern about foreign ownership limit.

Third, investing in foreign share however yields the diversification benefit to foreign investors. According to diversification benefit hypothesis, as lower correlation between foreign share return and MSCI world index return (a market portfolio), as higher diversification benefit offered by that stock. Foreign investors will require lower rate of return for stock that offers more diversification benefit, and hence be willing to pay a premium it. In this study, the result reports low correlation between foreign share return and MSCI world index return at approximately 1.41 percent across company. Also, this correlation can negatively explain the variation of foreign share premium across firm. Firm which its foreign share return is lower correlated with MSCI world index return, it offers more diversification benefit and is paid higher resulting in larger foreign premium. This shed the light on the purpose of foreign investors to invest in domestic share on the Foreign Board that it is driven by the diversification benefit.

Additionally, other than these issues discussed in this study, there are other factors that can explain the variation of foreign share premium in Thai stock market, since the constant term in both Panel Model and Cross-sectional Model are statistically significant and large.

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APPENDIX



จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Table A1: Foreign Premium by companies

Abbreviations	Company	Industry	Foreign Premium			
			Mean	Maximum	Minimum	Std. Dev.
ADVANC	ADVANCED INFO SERVICE	Technology	0.0119	0.1166	-0.0342	0.0261
AP	AP (THAILAND)	Property & Construction	0.0017	0.0400	-0.0373	0.0159
BANPU	BANPU	Resource	0.0120	0.0563	-0.0243	0.0158
BAY	BANK OF AYUDHYA	Financials	0.0073	0.0805	-0.0846	0.0187
BBL	BANGKOK BANK	Financials	0.0574	0.2700	-0.0086	0.0671
BH	BUMRUNGRAD HOSPITAL	Services	0.0134	0.1520	-0.0667	0.0467
BIGC	BIG C SUPERCENTER	Services	0.0059	0.0331	-0.0181	0.0138
BLAND	BANGKOK LAND	Property & Construction	0.0173	0.1781	-0.1579	0.0862
EGCO	ELECTRICITY GENERATING	Resources	0.0163	0.1168	-0.0188	0.0260
IFCT*	INDUSTRIAL FINANCE CORPORATION OF THAILAND	Financials	0.0007	0.0175	-0.0150	0.0078
INTUCH	INTOUCH HOLDINGS	Technology	0.0168	0.1810	-0.0386	0.0364
ITD	ITALIAN-THAI DEVELOPMENT	Property & Construction	0.0023	0.0631	-0.0588	0.0263
KBANK	KASIKORNBANK	Financials	0.0442	0.2000	-0.0059	0.0492
KKP	KIATNAKIN BANK	Financials	0.0181	0.0857	-0.0143	0.0282
KTB	KRUNG THAI BANK	Financials	0.0027	0.0992	-0.0280	0.0215
LH	LAND AND HOUSES	Property & Construction	0.0537	0.2500	-0.0192	0.0509
LPN	L.P.N. DEVELOPMENT	Property & Construction	0.0104	0.0458	-0.0122	0.0178
MINT	MINOR INTERNATIONAL	Agro & Food	0.0248	0.2195	-0.0373	0.0710
PTTEP	PTT EXPLORATION AND PRODUCTION	Resources	-0.0032	0.0187	-0.0345	0.0126
QH	QUALITY HOUSES	Property & Construction	0.0038	0.0440	-0.0405	0.0213
RCL	REGIONAL CONTAINER LINES	Services	0.0257	0.1058	-0.0821	0.0437
RML	RAIMON LAND	Property & Construction	0.1159	0.2727	-0.0526	0.0841

Table A1: Foreign Premium by companies (Continue)

Abbreviations	Company	Industry	Foreign Premium			Std. Dev.
			Mean	Maximum	Minimum	
SCB	THE SIAM COMMERCIAL BANK	Financials	-0.0003	0.0507	-0.0338	0.0154
SCC	THE SIAM CEMENT	Property & Construction	0.0629	0.2045	-0.0100	0.0520
SCCC	SIAM CITY CEMENT	Property & Construction	0.0056	0.0297	-0.0395	0.0169
SCIB**	SIAM CITY BANK	Financials	0.0108	0.0542	-0.0099	0.0171
TCAP	THANACHART CAPITAL	Financials	0.0525	0.2029	-0.0576	0.0690
TRUE	TRUE CORPORATION	Technology	-0.0051	0.0180	-0.0777	0.0186
TUF***	THAI UNION GROUP	Agro & Food	0.0232	0.1043	-0.1256	0.0343
UCOM****	UNITED COMMUNICATION	Technology	0.0115	0.0583	-0.0145	0.0185

*IFCT was merged with DBS Thai Danu Bank and TMB Bank in 1 September 2004.

**SCIB was merge with TCAP in 1 October 2011.

***TUF changed name to TU in 21 September 2015.

****UCOM was delisted from Thai Stock Market in 4 September 2007.

Table A1 shows the average monthly foreign premium of each firms in the sample. There are 21 firms in six different industries. It provides the company name, abbreviations and industries.

Table A2: Panel Regression Results of NVDR Trading Value

	Expected Sign	(1)	(2)	(3)
Constant term		-6.8311 (-4.4474)***	3.3932 (3.3102)***	-3.8303 (-2.5708)**
NVDR _{i,t-1}		0.3734 (15.5825)***	0.4413 (18.8447)***	0.4241 (18.3607)***
Market Capitalization	+	283.4208 (7.5639)***	352.4145 (9.3110)***	
Analyst Coverage	+	0.6918 (8.7184)***		0.8185 (10.5112)***
Adjusted R ²		0.3451	0.3122	0.3205
Durbin-Watson		2.2630	2.3320	2.3133

Table A2 reports the panel regression result of NVDR trading value on the lagged NVDR trading value, firm market capitalization relative to the whole market, and the total number of analyst recommendation. T-statistics reported in parenthesis beneath coefficient. The lagged NVDR trading value is filtered to improve the serial correlation problem. Note that *Significance level at 10%, **Significance level at 5%, and ***Significance level at 1%.

VITA

