สัญญาเลขที่ CU-Cluster-Human -๒-๑๐๔-๕๓

# รายงานการวิจัยเรื่อง

# โครงการวิจัยนักลงทุนต่างประเทศเพิ่มความเปราะบาง และทำให้ประสิทธิภาพของข่าวสารราคาลดลงในตลาดเกิดใหม่หรือไม่

# Do Foreign Investors Increase Fragility and Undermine Informational Price Efficiency of Emerging Equity Market?


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# กิตติกรรมประกาศ

งานวิจัยนี้ได้รับทุนอุดหนุนวิจัยจากโครงการส่งเสริมการทำงานวิจัยเชิงลึกในสาขาวิชาที่มีศักยภาพสูง กองทุนรัชดาภิเษกสมโภช

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# นักลงทุนต่างประเทศเพิ่มความเปราะบางและทำให้ประสิทธิภาพของข่าวสารราคาลดลงในตลาดตลาดเกิดใหม่หรือไม่?

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## บทคัดย่อ

งานวิจัยฉบับนี้ทำการศึกษาผลกระทบจากการซื้อขายหลักทรัพย์ของนักลงทุนต่างชาติที่มีต่อกระบวนการสะท้อนข้อมูลในราคาหลักทรัพย์และความเปราะบางในตลาดทุนเกิดใหม่โดยใช้ข้อมูลพิเศษที่ประกอบด้วยข้อมูลคำสั่งการซื้อขายโดยละเอียดที่แสดงประเภทของผู้ซื้อและผู้ขายในตลาดหลักทรัพย์แห่งประเทศไทย สัดส่วนการซื้อขายหลักทรัพย์ของนักลงทุนต่างประเทศในตลาดหลักทรัพย์แห่งประเทศไทยนับว่ามีสัดส่วนที่สูงและทำให้ผลการศึกษาจากงานวิจัยนี้สามารถสะท้อนผลกระทบของนักลงทุนต่างประเทศในตลาดเกิดใหม่อื่นๆได้ ผลการวิจัยพบว่าการซื้อและการขายของนักลงทุนต่างประเทศส่งผลต่อกระบวนการสะท้อนข้อมูลในราคาหลักทรัพย์แตกต่างกันออกไป การซื้อหลักทรัพย์ของนักลงทุนต่างประเทศไม่ส่งผลต่อกระบวนการสะท้อนข้อมูลในราคาหลักทรัพย์ แต่การขายหลักทรัพย์ของนักลงทุนต่างประเทศทำให้ประสิทธิภาพในการสะท้อนข้อมูลในราคาหลักทรัพย์ลดลง ผลที่พบในงานวิจัยนี้มีความแตกต่างจากงานวิจัยในตลาดทุนของประเทศสหรัฐอเมริกาที่พบว่าตลาดทุนในประเทศอเมริกามีความเปราะบางต่อสภาพคล่องโดยเฉพาะเหตุการณ์วันจันทร์ทมิพเดือนตุลาคม ปี ค.ศ. 1987 ที่เกิดการเคลื่อนย้ายทุนไปสู่หลักทรัพย์ที่มีคุณภาพสูงกว่า ผลการวิจัยพบว่าในตลาดหลักทรัพย์แห่งประเทศไทยการเปลี่ยนแปลงของสภาพคล่องร่วมระหว่างหลักทรัพย์กับตลาดทุนในหลักทรัพย์ขนาดเล็กไม่มีความแตกต่างอย่างมีนัยสำคัญมากไปกว่าในหลักทรัพย์ขนาดใหญ่ ผลวิจัยนี้ไม่พบหลักฐานสนับสนุนแนวคิดที่ว่าปรากฏการณ์เคลื่อนย้ายทุนไปสู่หลักทรัพย์ที่มีคุณภาพสูงกว่าจะส่งผลกระทบร้ายแรงต่อตลาดหลักทรัพย์แห่งประเทศไทยโดยเฉพาะในช่วงเวลาที่ตลาดเกิดปัญหาสภาพคล่อง นอกจากนี้ผลการวิจัยพบว่าการขายหลักทรัพย์ของนักลงทุนต่างประเทศทำให้เพิ่มการเปลี่ยนแปลงของสภาพคล่องร่วมระหว่างหลักทรัพย์กับตลาดทุนในหลักทรัพย์ขนาดใหญ่

คำสำคัญ: นักลงทุนต่างประเทศ ; ความเปราะบาง ; ราคาหลักทรัพย์; ประสิทธิภาพของตลาด; สภาพคล่อง

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**Abstract**

This study examines the impact of foreign investor trade on the price discovery and the fragility of emerging equity market using a unique dataset containing trade and order with trader type from the Stock Exchange of Thailand (SET). High proportion of foreign investor trading makes the SET an ideal platform to address this issue. Foreign trading has asymmetric impact on the price discovery process. While foreign purchase does not undermine the price discovery process but foreign sales does. Nevertheless, we find no evidence that the stock return responses to the shock in net foreign trade. Unlike the US equity markets that is vulnerable to flight-to-quality as a result of liquidity event such as the Black Monday in October 1987, on the SET, the liquidity commonality of small stocks is not statistically different from those of large stocks. In other words, we find no evidence that the flight-to-quality could exacerbate the SET during the liquidity event crisis. Nevertheless, we find systematic liquidity risk of large stocks increases with foreign sales.

Keywords: foreign investors; fragility; price discovery; market efficiency; commonality; liquidity

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## 1. Introduction

Foreign investment is vital in fostering the prosperity of many developing countries. However, a stock market liberalization and foreign investor were often blamed for the collapse of the currencies and stock markets, especially during the period of Asian financial crisis in 1997. Boyer, Kumagai and Yuan (2006) suggest that the spread of crisis is not driven by the changes in firm fundamentals but in fact it is international investors' asset holding that spreads crises globally. Bekaert and Harvey (2000) point out that speculative activity is an important factor that makes equity market more informational price efficient and foreign speculative activity in emerging markets undoubtedly plays a particularly important role. Despite its significance, most studies are silent on these aspects and we do not know much about how foreign investors affect stock market quality in emerging market.

This study addresses important questions regarding the role of foreign investors' trading activities on two critical aspects of a well-function financial market: price discovery and market fragility. In particular, we focus on the impact of foreign investors on stocks listed on the Stock Exchange of Thailand (SET). The cross-sectional average daily trading proportion of foreign investors from 1999 to 2008 is 16% of total trades on the SET so this makes the SET an ideal platform to investigate the impact of foreign investors trading. Furthermore, our unique trade and order dataset contains trader type identification. Hence we could precisely measure the trading volume of foreign investor across all stocks over a long time period of 10 years.

First, we investigate whether foreign investors undermine the price discovery process. The existence of capital flow barrier is an evident that the regulators are concerned about the side-effect of fund flows from foreign investors. If foreign investors possess superior technology that allows them to discover information that is not yet reflected on the current price, then trading of foreign investors should improve the price discovery process and makes the market more informational efficient. In addition, Schuppli and Bohl (2010) show that foreign investors have a stabilizing effect on Chinese stock markets. On the other hand, foreign investors generally are large institutional investors may exhibit a positive feedback trading. Froot, O'Connell, and Seasholes (2001) show that portfolio flows of foreign investors are highly sensitive to past returns. We find asymmetric impact of foreign trading on price discovery process. The cross-sectional increase in foreign purchase has no impact on

the degree of market inefficiency. However, stocks with slower price discovery process or less efficient stocks have higher proportion of in foreign sales relative to total trading values. Furthermore, while the lagged net foreign trade can predict the stock return, we find no evidence that the stock return reacts to the shock in net foreign trade.

Second, we examine the how foreign investor trading might affect market fragility or the sensitivity to change in market liquidity. "Fragility of financial market" is the ability to diversify systematic risk and aggregate liquidity shock. A divergence of systematic liquidity indicates an increase in the fragility of financial market. Kamara, Lou and Sadka (2008) show the wider gap between liquidity commonality of large and small firms over time in the US equity market. Given an increasing trends of the difference in liquidity commonality across large and small stocks, the US equity market have become more fragile to liquidity shock as a result of institutional trading. In contrast to the evidence in the US market, we find no obvious trend in the difference in liquidity commonality between large and small stocks. Furthermore, liquidity commonality of large and small stocks is not statistically different from each other. In contrast to the US equity markets that is vulnerable to flight-to-quality as a result of liquidity event such as the Black Monday in October 1987, on the SET, the liquidity commonality of small stocks is not statistically different from those of large stocks. In other words, we find no evidence that the flight-to-quality could exacerbate the SET during the liquidity event crisis. We also find foreign trading has limited impact on the liquidity commonality. While there is no evidence of the association between foreign purchase and liquidity commonality, foreign sales affect liquidity commonality in medium and large size stocks.

The remaining of the paper is organized as follows. Section 2 describes the dataset. Section 3 reports empirical results regarding the impact of foreign investors on price discovery process. Section 4 shows how liquidity commonality is affected by foreign investors trades. Section 5 concludes.

**2. Data**

We collect foreign investor trading activity data from the SET trade and order database. (TORD). The TORD contains all trades and orders with trader type identification of all stocks listed on the SET. There are 8 trader type identifications. The first four trader types are

domestic individual investors, domestic institutional investors, broker portfolios and foreign investors that trade through the broker. The rest are four investor types that trade through the sub-broker. We combine foreign trading through broker and sub-broker. For common stocks listed on foreign board, we combine trading value from the foreign board and the main board. We repeat the analysis using the trading activity from the main board only and the results are qualitatively similar. For each stock, we separate foreign trade to foreign purchase and foreign sales and compute the ratio of foreign purchase and sales to total trading value of the stocks in each trading day. The daily proportion of foreign trading is simply the average of foreign purchase and sales. The data span 10 years from January 1999 to December 2008.

We measure price discovery process using the degree of market inefficiency. The price discovery process deteriorates when the degree of market inefficiency increases. We use the variance ratio of 1 and 10 days as a proxy for the market inefficiency. Lo and MacKindlay (1988) suggest the important property of the random walk hypotheses is that the variance of random walk increments must be a liner function of the time interval. The proxy for the degree of market inefficiency is the absolute deviation of the variance ratio from one, |1-VR(1,10)|. The VR(1,10) can be computed as follows.

$$VR(1,10) = \frac{Var[r_t(10)]}{10Var[r_t]} \quad (1)$$

Where $Var[r_t(10)]$ is a variance of ten-day return; $Var[r_t]$ is a variance of one-day return. The daily return and market capitalisation data of all stocks is collected from Thomson Datastream from 1996 to 2009.

We measure the degree of market fragility which is the sensitivity of individual stock liquidity to change in aggregate market liquidity following Chordia, Roll and Subrahmanyam (2000). First we compute the daily proportional time weighted quoted spread, $PQSPR_{i,d}$, of each stock i using the limit order book data starting from 1996 to 2009 period from the Thomson Reuters Tick History (TRTH) as follows. The daily prop PQSPR is defined as follows.

$$PQSPR_{i,t} = (Best\ Ask\ Price_t - Best\ Bid\ Price_t)/(Quote\ Midpoint_t) \quad (2)$$

$$PQSPR_{i,d} = \frac{\sum_{k=1}^{K} t_k PQSPR_{i,k}}{\sum_{k=1}^{K} t_k} \quad (3)$$

Where Quote Midpoint is the average of the best bid and ask prices. $t_k$ is the time outstanding of the best bid and ask prices.

Next, we compute daily aggregate market liquidity using the market capitalisation weighted of daily proportional quoted spread.

$$LM_d = \frac{\sum_{i=1}^{N} MV_i PQSPR_{i,d}}{\sum_{i=1}^{N} MV_i} \quad (4)$$

Where $MV_i$ is the natural logarithm of the market capitalisation of stock i.

The liquidity commonality of each stock is estimated using the change in daily individual stock liquidity, measured by the proportional quoted spread, and the change in daily aggregate market liquidity. We estimate liquidity commonality, $\beta$, using three month of daily data and regress change in daily individual stock liquidity, $DL_{i,d}$, and change in daily aggregate market liquidity, $DLM_d$.

$$DL_{i,d} = \alpha + \beta DLM_d + \varepsilon_d \quad (5)$$

**3. Price Discovery and Foreign Investors Trading**

We compute foreign trading activity and the measure of price discovery using the variance ratio as outlined in the previous section. Table 1 reports quarterly time series of foreign investor purchase and sell as a percentage to total trading value. The foreign trading is above 20% of total trade during 1999 and 2000 but from 2003 to 2008 the foreign trading activity fell to stay at around 17%. Figure 1 shows the time series of the level of market inefficiency as proxy by |1-VR(1,10)|. We do not observe any trend in the market inefficiency over time. This result is somewhat surprising as the SET reduces the tick size in November

2001 and the evidence shown in Chordia, Roll and Subrahmanyam (2008) suggest that the market efficiency on the NYSE improve following the tick size reduction. We investigate the time series relation between aggregate market inefficiency and the cross-sectional average foreign purchase and sales (not shown) and we do not find that the foreign trading activity affect the time-series pattern of market inefficiency. Similarly, Figure 2 shows the time-series of high and low foreign trading stocks. We find no difference in the market inefficiency of high and low foreign trading stocks. This result casts some doubt on to the conventional market wisdom in Thai market that foreign investors possess superior information. In such case, the market inefficiency of high foreign trading stocks should be significantly lower than those of low foreign trading stocks.

Table 1: Time series of foreign investor trading and market inefficiency

| Year | % Foreign Buy | % Foreign Sell | \|1-VR(1,10)\| | Year | % Foreign Buy | % Foreign Sell | \|1-VR(1,10)\| |
|---|---|---|---|---|---|---|---|
| 1999Q1 | 19% | 26% | 0.42 | 2004Q1 | 14% | 14% | 0.38 |
| 1999Q2 | 18% | 18% | 0.43 | 2004Q2 | 15% | 16% | 0.43 |
| 1999Q3 | 22% | 21% | 0.36 | 2004Q3 | 14% | 15% | 0.59 |
| 1999Q4 | 17% | 24% | 0.42 | 2004Q4 | 17% | 16% | 0.44 |
| 2000Q1 | 15% | 22% | 0.39 | 2005Q1 | 18% | 14% | 0.46 |
| 2000Q2 | 18% | 23% | 0.53 | 2005Q2 | 17% | 16% | 0.47 |
| 2000Q3 | 17% | 23% | 0.41 | 2005Q3 | 19% | 15% | 0.43 |
| 2000Q4 | 13% | 20% | 0.44 | 2005Q4 | 20% | 17% | 0.42 |
| 2001Q1 | 15% | 17% | 0.45 | 2006Q1 | 21% | 15% | 0.44 |
| 2001Q2 | 11% | 14% | 0.44 | 2006Q2 | 19% | 18% | 0.44 |
| 2001Q3 | 12% | 13% | 0.37 | 2006Q3 | 18% | 15% | 0.41 |
| 2001Q4 | 13% | 16% | 0.44 | 2006Q4 | 17% | 16% | 0.52 |
| 2002Q1 | 13% | 13% | 0.41 | 2007Q1 | 18% | 17% | 0.43 |
| 2002Q2 | 16% | 17% | 0.44 | 2007Q2 | 19% | 15% | 0.48 |
| 2002Q3 | 13% | 17% | 0.44 | 2007Q3 | 16% | 15% | 0.42 |
| 2002Q4 | 12% | 18% | 0.38 | 2007Q4 | 17% | 19% | 0.45 |
| 2003Q1 | 14% | 17% | 0.41 | 2008Q1 | 17% | 18% | 0.41 |
| 2003Q2 | 13% | 13% | 0.45 | 2008Q2 | 16% | 17% | 0.45 |
| 2003Q3 | 11% | 15% | 0.41 | 2008Q3 | 13% | 19% | 0.42 |
| 2003Q4 | 12% | 13% | 0.40 | 2008Q4 | 12% | 16% | 0.42 |

This Table shows quarterly time series of foreign investor proportion to total trade and market inefficiency. The '% Foreign Buy (Sell)' is the cross-sectional mean of total foreign buy (sell) value to total trading value in the quarter. We proxy market inefficiency using the absolute value of the deviation from one of the variance ratio of 1 and 10 days, |1-VR(1,10)|.

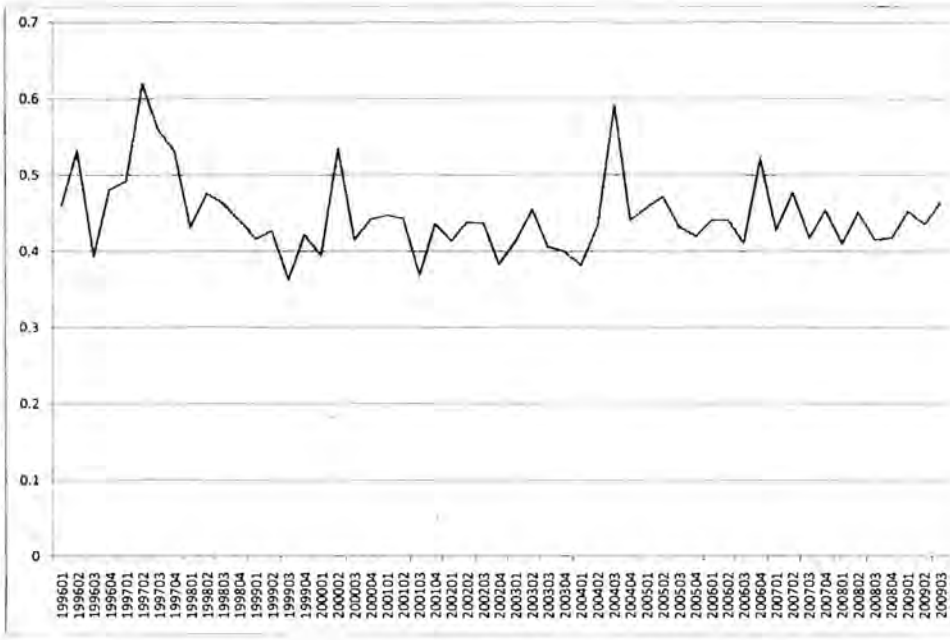


Figure 1:
Quarterly value weighted market inefficiency, |1-VR(1,10)|, for the first quarter of 1996 to the third quarter of 2009. VR(1,10) is the ratio of the 10-day and 1-day variances.

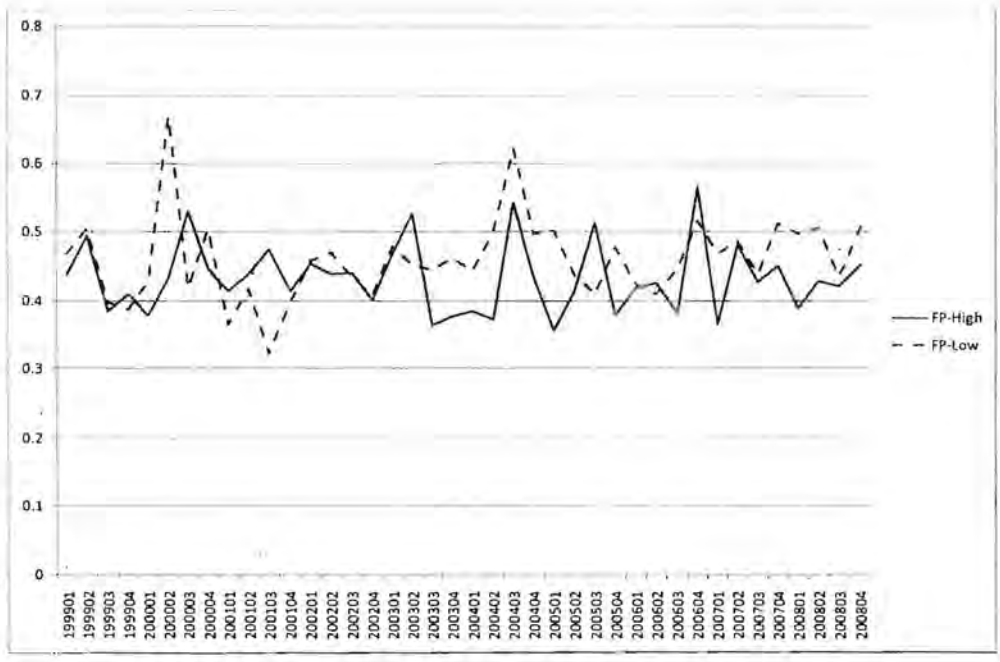


Figure 2:
Quarterly market inefficiency, |1-VR(1,10)|, of high and low foreign investor participation portfolios for the first quarter of 1999 to the last quarter of 2008.

We do not find the connection between time series of foreign trading activity and market inefficiency. We turn our attention to the cross-sectional relation. We examines whether high foreign trading stocks is more or less efficient than low foreign trading stocks. We apply the Fama and MacBeth (1973) two-stage regression between market inefficiency

and foreign trading activity. In the first stage, for each quarter, we run the following cross-sectional regression:

$$\left|1 - VR(1,10)_{i,t}\right| = \alpha_t + \lambda_t F_{i,t} + \gamma_t Size_{i,t} + \varepsilon_{i,t}. \quad (6)$$

where $F_{i,t}$ is the foreign buy (sell) which is the ratio of foreign purchase (sale) to total trading value. Size is a control variable measured by the logarithm of firm's market capitalization in million Baht.

In the second stage we perform the t-test on the time series of coefficients $\lambda_t$ and $\gamma_t$under the null hypothesis: $H_0: \lambda_t = 0$ and $H_0: \gamma_t = 0$. Our samples cover the period from the first quarter of 1999 to the fourth quarter of 2008 (40 quarters) so there are 40 observations. Table 2 reports the impact of foreign purchase and sale on the price discovery process. The negative (positive) relation between foreign activity and market inefficiency suggest trading activity of foreign investors possess superior (no) information content. The findings indicate that the foreign purchase does not affect the degree of market inefficiency. In contrast, we find positive relation between foreign sales and market inefficiency. Stocks with high level of foreign sales relative to total trading value tend to be inefficient stocks. One could interpret the significant and positive relation of market inefficiency and foreign sales as evidence that foreign sale is unlikely to be informative about stock price.

Table 2: Price discovery and trading of foreign investor

| | Foreign Buy | | Foreign Sell | |
|---|---|---|---|---|
| % Foreign Trade | -0.0177 | -0.0119 | 0.0925 | 0.1064 |
| | (-0.61) | (-0.38) | (2.82)*** | (3.39)*** |
| Size | | -0.0092 | | -0.0126 |
| | | (-0.91) | | (-1.19) |

This Table shows the impact of foreign investor trading on the price discovery process, measured by the degree of market inefficiency using the absolute deviation of variance ratio, |1-VR(1,10)|. We apply the Fama and MacBeth (1973) regressions of market inefficiency proxy and foreign investor trading and firm size. Specifically for each quarter, we estimate the following cross-sectional regression: $\left|1 - VR(1,10)_{i,t}\right| = \alpha_t + \lambda_t F_{i,t} + +\gamma_t Size_{i,t} + \varepsilon_{i,t}$. $F_{i,t}$ is the foreign buy (sell) which is the proportion of foreign purchase (sale) to total trading value. Size is a control variable measured by the logarithm of firm's market capitalization in million Baht. Our samples cover the period from the first quarter of 1999 to the fourth quarter of 2008 (40 quarters).

We further examine the lead-lag relation between stock return and net foreign trade. We measure daily stock return using the percentage change in the closing quote midpoint to control for the bid-ask bounce effect. The daily net foreign trade value is the difference between the foreign buy initiated trade and foreign sell initiated trade. We estimate two reduced-form equations as follows. The first equation is the regression between daily stock return and lagged daily net foreign trade and the second equation is the regression between daily net foreign trade and lagged daily stock returns. We use 5 lag variables but the results are robust with the other different number of lags. Table 3 Panel A shows the Vector Auto Regression estimates. It shows that the return predictability based on lagged daily net foreign trade is short-lived. We find only the first lagged net foreign trade that is statistically significant. We also find that net foreign trade is highly persistent. The contemporaneous net foreign trade is associated to itself for at least five lags. We also find an evidence that foreign investor exhibits trend-chasing behavior. Positive past return induces more buy-initiated foreign trade. Table 3 Panel B reports proportions of prediction errors variances by each variable. It shows that most of return prediction errors variances depend mainly on the past return and the previous daily net foreign trade hardly affects the return prediction errors variances. This variance decomposition is consistent with the impulse response function findings shown in Figure 3 and Figure 4 that the shock in net foreign trade does not affect the stock return.

Table 3: Stock Return and Foreign Net Trade

Panel A: Vector Auto Regression Estimates

| | MRET | | OIF | |
|---|---|---|---|---|
| | Coefficient | T-stats | Coefficient | T-stats |
| MRET(t-1) | -0.08284 | -51.51 | 0.00018 | 10.61 |
| MRET (t-2) | -0.00468 | -2.90 | 0.00002 | 0.90 |
| MRET (t-3) | 0.01388 | 8.60 | 0.00001 | 0.58 |
| MRET (t-4) | 0.00882 | 5.47 | -0.00003 | -1.89 |
| MRET (t-5) | 0.00652 | 4.06 | -0.00003 | -1.99 |
| OIF(t-1) | 0.71160 | 4.66 | 0.36374 | 226.32 |
| OIF (t-2) | -0.24651 | -1.52 | 0.06287 | 36.78 |
| OIF (t-3) | -0.20697 | -1.27 | 0.03367 | 19.67 |
| OIF(t-4) | -0.07121 | -0.44 | 0.02951 | 17.26 |
| OIF(t-5) | 0.00445 | 0.03 | 0.03671 | 22.86 |

Table 3: Stock Return and Foreign Net Trade (continune)

Panel B: Proportions of Prediction Errors Variances by Variable

| Variable | Lead | MRET | OIF |
|---|---|---|---|
| MRET | 1 | 100.00% | 0.00% |
| | 2 | 99.99% | 0.01% |
| | 3 | 99.99% | 0.01% |
| | 4 | 99.99% | 0.01% |
| | 5 | 99.99% | 0.01% |
| OIF | 1 | 0.49% | 99.52% |
| | 2 | 0.59% | 99.41% |
| | 3 | 0.60% | 99.40% |
| | 4 | 0.61% | 99.39% |
| | 5 | 0.61% | 99.39% |

This Table presents the dynamic relation between daily stock return (MRET) and daily net foreign trade value (OIF). We measure stock return using the percentage change in the closing quote midpoint to control for the bid-ask bounce effect. The foreign net trade value is the difference between the foreign buy initiated trade and foreign sell initiated trade. Panel A shows the Vector Auto Regression estimates. Panel B reports proportions of prediction errors variances by each variable.

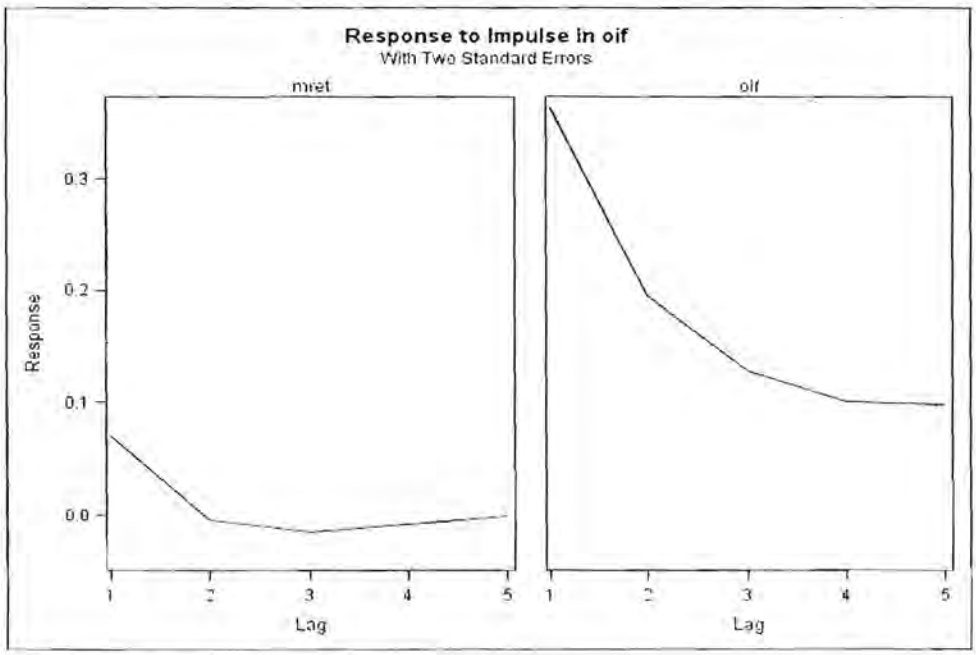


Figure 3:
Simple Response to Impulse in OIF

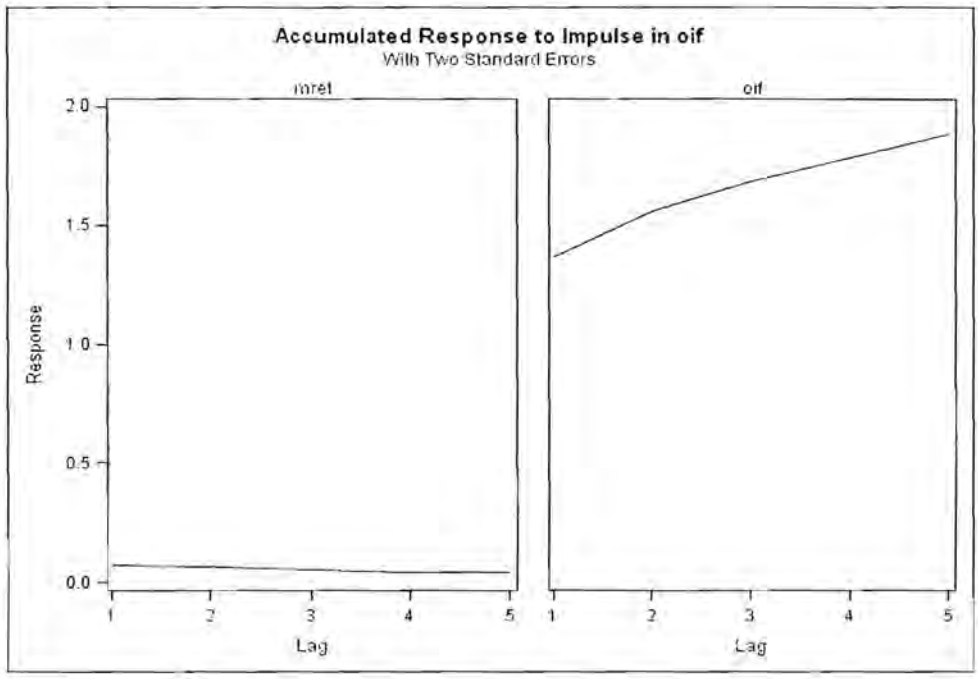


Figure 4:
Accumulated Response to Impulse in OIF

## 4. Liquidity Commonality and Foreign Investors Trading

We further investigate impact of foreign trading activity on market fragility or systematic liquidity risk, estimated from the slope of regression between daily change in individual stock liquidity and daily change in market liquidity. Figure 3 shows the daily change in market liquidity from January 1996 to December 2009. We can see that the change in market liquidity is higher during 1996 and 1997. This comes with no surprise as the Thai economy faced recession and the Bank of Thailand was forces to float the currency in July 1997. The high volatility of change in market liquidity appears to reflect high uncertainty in the stock market during that time.

Table 4: Time series of quarterly liquidity commonality

| Year | Mean | t-stat | % Pos | % Sig | Year | Mean | t-stat | % Pos | % Sig |
|---|---|---|---|---|---|---|---|---|---|
| 1999Q1 | 0.84 | 10.52 | 82% | 36% | 2004Q1 | 0.75 | 8.34 | 71% | 17% |
| 1999Q2 | 0.59 | 7.12 | 69% | 20% | 2004Q2 | 1.18 | 9.67 | 78% | 30% |
| 1999Q3 | 0.75 | 9.48 | 77% | 24% | 2004Q3 | 0.40 | 4.29 | 63% | 12% |
| 1999Q4 | 0.79 | 9.27 | 76% | 29% | 2004Q4 | 0.70 | 6.85 | 74% | 29% |
| 2000Q1 | 0.64 | 8.08 | 75% | 25% | 2005Q1 | 0.79 | 5.43 | 64% | 17% |
| 2000Q2 | 0.61 | 8.09 | 76% | 21% | 2005Q2 | 0.64 | 4.65 | 65% | 15% |
| 2000Q3 | 0.55 | 6.80 | 75% | 20% | 2005Q3 | 0.88 | 6.52 | 70% | 18% |
| 2000Q4 | 0.42 | 5.60 | 73% | 19% | 2005Q4 | 0.59 | 4.67 | 62% | 11% |
| 2001Q1 | 0.37 | 5.73 | 70% | 18% | 2006Q1 | 0.25 | 2.50 | 58% | 19% |
| 2001Q2 | 0.40 | 4.01 | 66% | 15% | 2006Q2 | 0.76 | 6.68 | 72% | 17% |
| 2001Q3 | 0.91 | 10.84 | 84% | 38% | 2006Q3 | 0.70 | 8.47 | 74% | 31% |
| 2001Q4 | 0.51 | 4.57 | 68% | 21% | 2006Q4 | 1.60 | 15.37 | 90% | 68% |
| 2002Q1 | 0.66 | 6.93 | 72% | 26% | 2007Q1 | 0.46 | 5.78 | 71% | 14% |
| 2002Q2 | 0.22 | 3.38 | 60% | 17% | 2007Q2 | 0.41 | 5.19 | 68% | 19% |
| 2002Q3 | 0.61 | 7.09 | 76% | 28% | 2007Q3 | 0.58 | 6.66 | 73% | 24% |
| 2002Q4 | 0.68 | 6.39 | 74% | 31% | 2007Q4 | 0.25 | 2.84 | 58% | 14% |
| 2003Q1 | 0.99 | 8.34 | 81% | 27% | 2008Q1 | 0.69 | 6.14 | 67% | 20% |
| 2003Q2 | 0.67 | 5.13 | 64% | 20% | 2008Q2 | 0.67 | 6.82 | 71% | 21% |
| 2003Q3 | 1.05 | 8.47 | 78% | 28% | 2008Q3 | 1.02 | 10.75 | 78% | 29% |
| 2003Q4 | 0.68 | 6.11 | 71% | 27% | 2008Q4 | 0.92 | 10.05 | 78% | 33% |

This Table summarizes the cross-sectional mean of liquidity commonality from 1999 to 2008. For each firm i in quarter t, we estimate the liquidity commonality by running the time-series regression. $DL_{i,d} = \alpha_i + \beta_i DLM_d + \varepsilon_{i,d}$, where $DL_{i,d}$ is the first difference of the proportional quoted spread of firm i in day d, and $DLM_d$ is the value-weighted market average of $DL_{i,d}$. $\beta_i$ is the estimated liquidity commonality of firm i. Mean is the cross-sectional average of $\beta_i$. T-stat tests whether the cross-sectional $\beta_i$ is different from zero. % Pos is the proportion of positive $\beta_i$. % Sig is the proportion of statistically positive liquidity commonality.

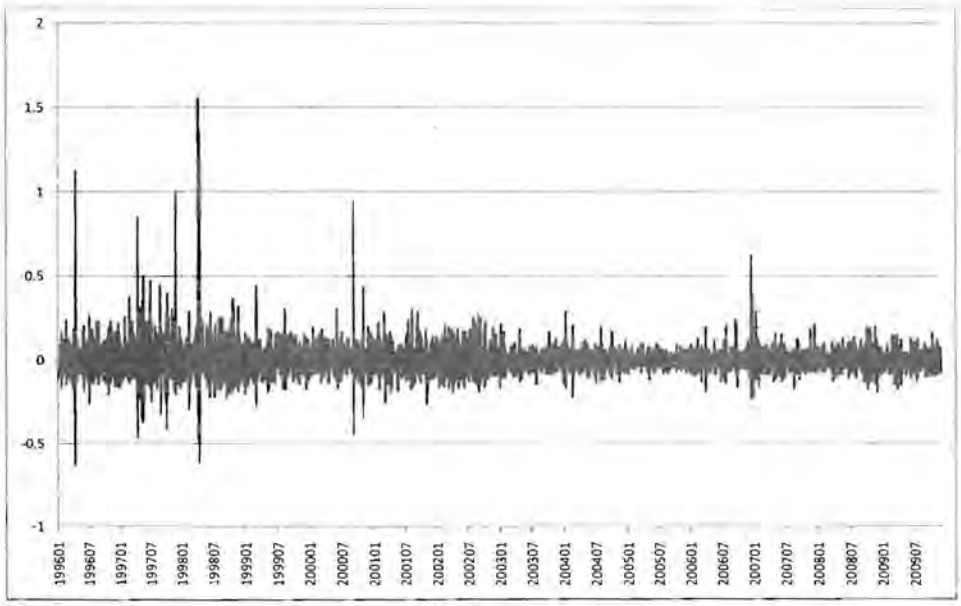


Figure 5:
Change in daily market liquidity, $\Delta ILLIQ_{m,d}$ for the period January 1996-December 2009.

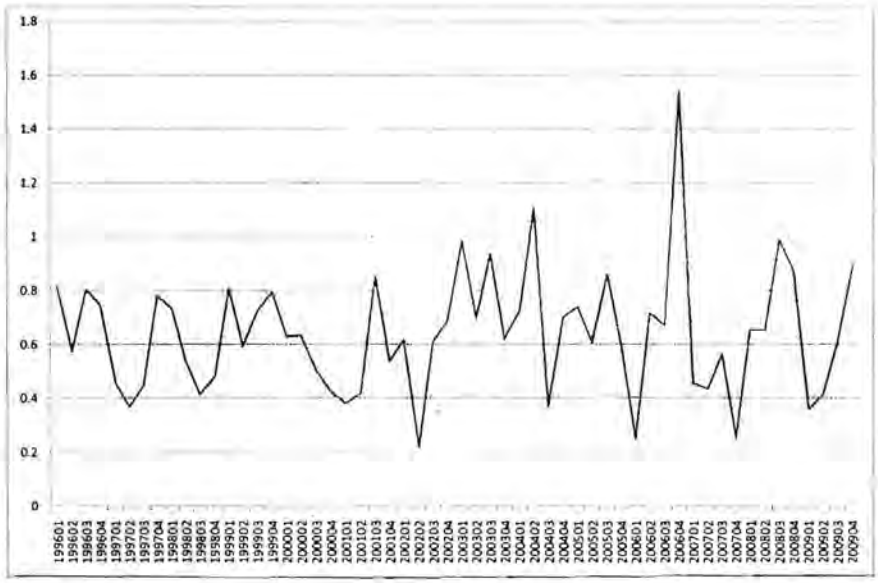


Figure 6:
Quarterly value weighted liquidity commonality beta from market model.

Table 4 shows the cross-sectional mean of liquidity commonality from 1999 to 2008. Consistent with Pukthuanthong and Visaltanachoti (2009), we find a strong commonality in liquidity across all quarters. More than 70% of stocks in the sample show positive liquidity commonality and about 30% are statistically significant. Figure 5 shows the time-series of quarterly value weighted liquidity commonality from the first quarter of 1996 to the last quarter of 2009. We observe no trend in the systematic liquidity risk. Kamara, Luo and Sadka (2008) document the divergence between liquidity commonality of large and small stocks. Therefore, we construct the size-quintile portfolio and report the cross-sectional mean of liquidity commonality of large and small stocks over time in Table 5.

We can see from Table 5 that there is a strong liquidity commonality in both small and large stocks. The proportion of positive liquidity commonality in large and small stocks are approximately similar, so as the proportion of the positive and significant. Figure 7 shows the time series of liquidity commonality of large and small stocks. We observe large stocks having higher liquidity commonality in 1996 and 1997 but in 2004-2006 the relation is opposite and small stocks have higher liquidity commonality than large stocks. We conduct a test in the difference in liquidity commonality of large and small stocks and only in a few quarters liquidity commonality of large and small stocks is statistically different. The result is in sharp contrast to the findings in the US markets where the liquidity commonality of large stocks is higher than those of small stocks and the difference is higher over time. Table 6 conducts a formal analysis to test the trend in liquidity commonality. Panel A of Table 6 tests

the stochastic time trend by conducting the Dickey and Fuller unit-root test with a time trend and a drift for each size quintile and the difference between the small and large quintile. The unit root test is performed by running the following regression:

$$\beta_t = \alpha + \delta t + \gamma \beta_{t-1} + \varepsilon_t \qquad (7)$$

Table 5: Liquidity commonality of small and large stocks

| | Large | | | | Small | | | | L-S | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Mean | t-stat | %Pos | %Sig | Mean | t-stat | %Pos | %Sig | Mean | t-stat |
| 1999Q1 | 0.51 | 2.87 | 79% | 35% | 0.69 | 3.39 | 75% | 32% | -0.18 | -0.68 |
| 1999Q2 | 0.70 | 5.41 | 75% | 29% | 0.59 | 2.61 | 62% | 15% | 0.10 | 0.40 |
| 1999Q3 | 0.85 | 4.65 | 79% | 35% | 1.15 | 4.31 | 75% | 36% | -0.30 | -0.93 |
| 1999Q4 | 0.75 | 6.10 | 85% | 41% | 0.65 | 3.98 | 71% | 17% | 0.10 | 0.49 |
| 2000Q1 | 0.58 | 3.59 | 87% | 32% | 0.85 | 3.47 | 80% | 27% | -0.26 | -0.90 |
| 2000Q2 | 0.75 | 4.38 | 84% | 23% | 0.70 | 3.46 | 72% | 22% | 0.05 | 0.18 |
| 2000Q3 | 0.34 | 3.47 | 77% | 28% | 0.90 | 4.16 | 79% | 12% | -0.57 | -2.38 |
| 2000Q4 | 0.34 | 4.26 | 80% | 25% | 0.36 | 2.36 | 79% | 14% | -0.02 | -0.13 |
| 2001Q1 | 0.25 | 2.66 | 70% | 18% | 0.40 | 2.38 | 71% | 11% | -0.14 | -0.75 |
| 2001Q2 | 0.75 | 3.02 | 69% | 23% | 0.57 | 2.05 | 65% | 13% | 0.18 | 0.49 |
| 2001Q3 | 0.63 | 3.87 | 80% | 31% | 1.25 | 4.68 | 93% | 47% | -0.63 | -2.00 |
| 2001Q4 | 0.69 | 2.74 | 78% | 29% | 0.18 | 0.69 | 56% | 17% | 0.51 | 1.43 |
| 2002Q1 | 0.47 | 2.32 | 73% | 34% | 0.82 | 2.98 | 68% | 21% | -0.35 | -1.02 |
| 2002Q2 | 0.37 | 2.78 | 72% | 17% | 0.20 | 0.66 | 48% | 16% | 0.17 | 0.52 |
| 2002Q3 | 0.50 | 3.51 | 81% | 37% | 0.85 | 3.91 | 74% | 37% | -0.35 | -1.35 |
| 2002Q4 | 0.54 | 4.08 | 81% | 34% | 0.80 | 3.36 | 69% | 25% | -0.27 | -0.98 |
| 2003Q1 | 0.93 | 2.96 | 83% | 31% | 0.99 | 4.19 | 83% | 15% | -0.05 | -0.14 |
| 2003Q2 | 0.87 | 2.81 | 70% | 25% | 0.41 | 1.16 | 53% | 17% | 0.46 | 0.97 |
| 2003Q3 | 0.48 | 3.44 | 80% | 36% | 2.34 | 3.95 | 83% | 20% | -1.86 | -3.04 |
| 2003Q4 | 0.23 | 2.50 | 72% | 27% | 1.16 | 1.94 | 67% | 11% | -0.93 | -1.53 |
| 2004Q1 | 0.59 | 3.04 | 70% | 19% | 0.93 | 3.48 | 71% | 6% | -0.34 | -1.04 |
| 2004Q2 | 0.38 | 3.68 | 76% | 33% | 1.00 | 1.62 | 59% | 9% | -0.62 | -0.99 |
| 2004Q3 | 0.21 | 3.11 | 65% | 10% | 0.82 | 1.86 | 55% | 10% | -0.60 | -1.36 |
| 2004Q4 | 0.82 | 4.56 | 81% | 49% | 0.92 | 2.02 | 68% | 17% | -0.10 | -0.21 |
| 2005Q1 | 0.41 | 2.83 | 73% | 21% | 1.42 | 2.27 | 63% | 20% | -1.01 | -1.56 |
| 2005Q2 | 0.59 | 3.05 | 66% | 22% | 1.03 | 1.74 | 62% | 12% | -0.45 | -0.71 |
| 2005Q3 | 0.59 | 2.99 | 75% | 25% | 0.78 | 1.25 | 63% | 10% | -0.18 | -0.28 |
| 2005Q4 | 0.55 | 2.90 | 71% | 15% | 1.21 | 2.21 | 67% | 13% | -0.66 | -1.13 |
| 2006Q1 | 0.62 | 4.13 | 73% | 39% | 0.83 | 2.81 | 61% | 20% | -0.21 | -0.65 |
| 2006Q2 | 0.54 | 4.27 | 77% | 20% | 1.66 | 4.23 | 77% | 23% | -1.12 | -2.72 |
| 2006Q3 | 0.28 | 2.18 | 70% | 22% | 0.97 | 3.58 | 72% | 26% | -0.69 | -2.31 |
| 2006Q4 | 1.00 | 6.78 | 88% | 75% | 1.82 | 4.40 | 77% | 48% | -0.82 | -1.87 |
| 2007Q1 | 0.38 | 2.17 | 65% | 13% | 0.28 | 0.88 | 71% | 17% | 0.10 | 0.27 |
| 2007Q2 | 0.52 | 3.49 | 68% | 18% | -0.05 | -0.24 | 58% | 19% | 0.58 | 2.18 |
| 2007Q3 | 0.43 | 2.71 | 81% | 36% | 0.77 | 3.01 | 67% | 22% | -0.35 | -1.15 |
| 2007Q4 | 0.34 | 2.35 | 67% | 22% | 0.44 | 2.15 | 60% | 14% | -0.10 | -0.38 |
| 2008Q1 | 0.48 | 2.64 | 72% | 27% | 0.72 | 1.79 | 59% | 21% | -0.24 | -0.54 |
| 2008Q2 | 0.79 | 3.45 | 75% | 27% | 0.75 | 2.61 | 66% | 20% | 0.03 | 0.09 |
| 2008Q3 | 0.86 | 4.85 | 81% | 35% | 1.42 | 4.55 | 83% | 26% | -0.56 | -1.57 |
| 2008Q4 | 0.64 | 5.22 | 77% | 35% | 1.04 | 3.37 | 71% | 31% | -0.40 | -1.21 |

This Table reports the liquidity commonality of large and small size-groups based on the market capitalization quintile at the end of quarter t-1. The large minus small indicates the difference in liquidity commonality between large and small stocks. The t-stat tests the null hypothesis that $H_0: \beta_{large} - \beta_{small} \leq 0$.

Table 6: Trends in liquidity commonality

Panel A: Stochastic time trend: $\beta_t = \alpha + \delta t + \gamma\beta_{t-1} + \varepsilon_t$

| | $\gamma$ | | |
|---|---|---|---|
| | Coef. | t-stat ($H_0$: $\gamma$=1) | p-value ($H_0$: $\gamma$=1) |
| | Size quintile portfolio | | |
| 5 (Large) | 0.0572 | -5.43 | 0.0000 |
| 4 | -0.0211 | -9.16 | 0.0000 |
| 3 | -0.0564 | -11.09 | 0.0000 |
| 2 | 0.0375 | -11.97 | 0.0000 |
| 1 (Small) | -0.0104 | -8.17 | 0.0000 |
| Large minus Small | -0.0386 | -7.31 | 0.0000 |
| | Foreign investor participation quintile portfolio | | |
| 5 (High) | 0.1752 | -5.74 | 0.0000 |
| 4 | -0.0994 | -9.40 | 0.0000 |
| 3 | -0.0070 | -7.88 | 0.0000 |
| 2 | -0.1540 | -9.27 | 0.0000 |
| 1 (Low) | 0.1080 | -6.79 | 0.0000 |
| High minus Low | 0.0624 | -9.39 | 0.0000 |

Panel B: Deterministic time trend: $\beta_t = \alpha + \delta t + \varepsilon_t$

| | $\alpha$ | | | $\beta$ | | |
|---|---|---|---|---|---|---|
| | Coef. | t-stat | p-value | Coef. | t-stat | p-value |
| | Size quintile portfolio | | | | | |
| 5 (Large) | 0.5830 | 5.75 | 0.0000 | -0.0006 | -0.21 | 0.8377 |
| 4 | 0.6382 | 4.98 | 0.0000 | 0.0013 | 0.27 | 0.7865 |
| 3 | 0.5347 | 4.41 | 0.0001 | 0.0039 | 0.95 | 0.3461 |
| 2 | 0.5931 | 3.66 | 0.0008 | 0.0048 | 1.00 | 0.3260 |
| 1 (Small) | 0.6513 | 3.95 | 0.0003 | 0.0068 | 1.13 | 0.2659 |
| Large minus Small | -0.0685 | -0.48 | 0.6341 | -0.0074 | -1.41 | 0.1658 |
| | Foreign investor participation quintile portfolio | | | | | |
| 5 (High) | 0.7861 | 5.27 | 0.0000 | -0.0029 | -0.65 | 0.5191 |
| 4 | 0.9095 | 7.61 | 0.0000 | -0.0077 | -2.04 | 0.0483 |
| 3 | 0.3460 | 1.96 | 0.0570 | 0.0082 | 1.62 | 0.1140 |
| 2 | 0.4808 | 3.62 | 0.0009 | 0.0070 | 1.49 | 0.1444 |
| 1 (Low) | 0.7763 | 4.11 | 0.0002 | -0.0025 | -0.43 | 0.6674 |
| High minus Low | 0.0137 | 0.06 | 0.9558 | -0.0005 | -0.08 | 0.9343 |

This Table examines the time-trend in liquidity commonality. Panel A presents the Augmented Dickey-Fuller unit root tests for equally weighted liquidity commonality of firms in each of the five size quintiles. We run the liquidity commonality on its first lag, a drift and a time trend: $\beta_t = \alpha + \delta t + \gamma\beta_{t-1} + \varepsilon_t$. The Table shows the estimated coefficient $\gamma$, test statistics and the value for the null hypothesis $\gamma = 1$. The regression is based on the 15 years data period from 1995-2009 (60 quarterly observations). Panel B examines the deterministic time-trend test results for average liquidity commonality of firms in each of the five size quintiles. We regress the liquidity commonality on a constant and a time trend: $\beta_t = \alpha + \delta t + \varepsilon_t$. We report the coefficient estimate of the time-trend, its t-statistic and the corresponding p-value. We adjust the t-statistic for heteroskedasticity and autocorrelation using Newey and West (1987) standard errors.

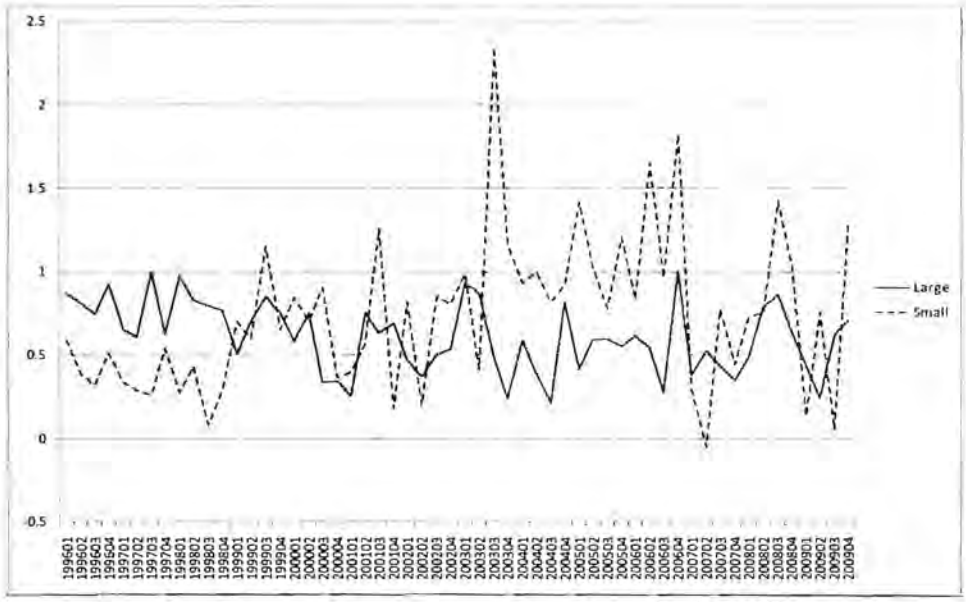


Figure 7:
Quarterly liquidity commonality of the small and large firms from the smallest and largest size quintile from the first quarter of 1996 to the last quarter of 2009.

The null hypothesis ($H_0$: $\gamma$=1) is that there is a unit-root. The results in Panel A of Table suggests we could reject the null hypothesis of a unit-root for all size quintiles and the difference in large and small stocks. Next, we test the presence of a deterministic time trend in the time series of liquidity commonality. Panel B of Table 6 confirms the pattern shown in Figure 7 that there is no trend in liquidity commonality across all size quintiles and difference in large and small stocks. Amihud, Mendelson and Wood (1990) show an unanticipated sharp fall in liquidity is critical to the stock market crash of October 1997. The flight-to-quality from small-cap stocks to large-cap stocks usually happen during the crisis and as argued by Kamara, Luo and Sadka (2008), the relatively high liquidity commonality of large cap stocks compared to small cap stocks indicate the vulnerability of US equity markets. The indifference in liquidity commonality suggests that the impact of flight to quality from small-cap to large-cap on the SET is not as severe as the US equity market.

Furthermore, given the findings in the prior section that foreign sale undermines price discovery process we are interested to see whether foreign trading activity could affect liquidity commonality. Table 7 shows liquidity commonality of high and low foreign trading activity quintile. As expected, we observe a strong liquidity commonality in both high and low foreign trading stocks. We observe a relative small number of quarters that the difference in liquidity commonality of high and low foreign trading stocks is statistically significant. Table 7 shows the time series pattern and we do not observe the time trend for

both high and low foreign trading quintiles. In an unreported table, the Dickey-Fuller test show liquidity commonality of all foreign trading activity quintile does not contain a unit root and we do not observe the statically deterministic time trend. The findings suggest the SET is not vulnerable to the investment flow from low to high foreign trading stocks.

Table 7: Liquidity commonality of high and low foreign investor participation stocks

| | High | | | | Low | | | | H-L | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Mean | t-stat | %Pos | %Sig | Mean | t-stat | %Pos | %Sig | Mean | t-stat |
| 1999Q1 | 0.67 | 2.53 | 69% | 29% | 0.99 | 4.21 | 84% | 47% | -0.31 | -0.88 |
| 1999Q2 | 0.79 | 2.47 | 69% | 27% | 0.65 | 3.03 | 65% | 27% | 0.14 | 0.37 |
| 1999Q3 | 0.48 | 2.00 | 67% | 20% | 0.65 | 5.01 | 79% | 21% | -0.17 | -0.62 |
| 1999Q4 | 0.99 | 4.30 | 73% | 32% | 0.83 | 4.42 | 76% | 29% | 0.16 | 0.55 |
| 2000Q1 | 1.27 | 4.64 | 84% | 30% | 0.67 | 3.42 | 78% | 22% | 0.61 | 1.81 |
| 2000Q2 | 1.26 | 4.05 | 80% | 28% | 0.38 | 2.23 | 70% | 18% | 0.88 | 2.47 |
| 2000Q3 | 0.41 | 1.39 | 68% | 16% | 0.72 | 3.78 | 71% | 29% | -0.31 | -0.87 |
| 2000Q4 | 0.93 | 3.49 | 75% | 36% | 0.13 | 0.64 | 68% | 5% | 0.80 | 2.40 |
| 2001Q1 | 0.61 | 2.59 | 68% | 24% | 0.27 | 3.78 | 76% | 19% | 0.34 | 1.37 |
| 2001Q2 | 0.82 | 2.16 | 64% | 18% | 0.07 | 0.33 | 54% | 15% | 0.75 | 1.71 |
| 2001Q3 | 0.69 | 4.38 | 76% | 22% | 1.60 | 7.14 | 94% | 57% | -0.91 | -3.31 |
| 2001Q4 | 0.54 | 2.84 | 73% | 23% | 0.60 | 2.34 | 64% | 23% | -0.06 | -0.18 |
| 2002Q1 | 0.31 | 2.32 | 69% | 23% | 0.68 | 2.99 | 73% | 16% | -0.37 | -1.41 |
| 2002Q2 | 0.21 | 1.22 | 63% | 18% | 0.18 | 1.25 | 56% | 18% | 0.04 | 0.17 |
| 2002Q3 | 0.84 | 3.77 | 78% | 36% | 0.73 | 3.40 | 78% | 31% | 0.10 | 0.33 |
| 2002Q4 | 0.59 | 3.41 | 68% | 17% | 1.55 | 3.44 | 89% | 47% | -0.96 | -1.99 |
| 2003Q1 | 0.94 | 2.66 | 76% | 26% | 1.20 | 4.59 | 80% | 27% | -0.25 | -0.57 |
| 2003Q2 | 0.79 | 2.04 | 69% | 21% | 0.90 | 2.87 | 62% | 21% | -0.11 | -0.22 |
| 2003Q3 | 0.81 | 3.03 | 79% | 34% | 1.18 | 3.14 | 71% | 29% | -0.37 | -0.79 |
| 2003Q4 | 0.19 | 0.95 | 61% | 21% | 1.07 | 2.57 | 74% | 33% | -0.88 | -1.89 |
| 2004Q1 | 0.83 | 3.41 | 77% | 27% | 0.75 | 4.48 | 70% | 11% | 0.08 | 0.27 |
| 2004Q2 | 0.83 | 4.00 | 73% | 30% | 1.07 | 3.71 | 84% | 34% | -0.24 | -0.67 |
| 2004Q3 | 0.08 | 0.48 | 56% | 7% | 0.29 | 1.30 | 59% | 10% | -0.21 | -0.75 |
| 2004Q4 | 0.63 | 2.93 | 66% | 23% | 0.96 | 4.93 | 85% | 39% | -0.33 | -1.15 |
| 2005Q1 | 0.86 | 2.19 | 68% | 17% | 0.74 | 3.04 | 64% | 17% | 0.12 | 0.26 |
| 2005Q2 | 1.25 | 3.44 | 75% | 32% | 0.58 | 2.35 | 58% | 13% | 0.68 | 1.54 |
| 2005Q3 | 0.84 | 2.26 | 69% | 17% | 0.94 | 2.90 | 72% | 25% | -0.10 | -0.20 |
| 2005Q4 | 0.51 | 1.74 | 62% | 11% | 0.51 | 2.33 | 61% | 11% | 0.00 | 0.01 |
| 2006Q1 | 0.52 | 2.69 | 68% | 37% | 0.10 | 0.87 | 65% | 13% | 0.42 | 1.87 |
| 2006Q2 | 0.66 | 2.03 | 79% | 20% | 0.64 | 3.34 | 69% | 17% | 0.01 | 0.04 |
| 2006Q3 | 0.53 | 2.94 | 66% | 18% | 0.70 | 5.20 | 79% | 37% | -0.18 | -0.78 |
| 2006Q4 | 1.07 | 6.30 | 88% | 65% | 1.75 | 8.73 | 95% | 72% | -0.67 | -2.57 |
| 2007Q1 | 0.60 | 2.22 | 68% | 14% | 0.60 | 4.42 | 77% | 20% | 0.00 | 0.02 |
| 2007Q2 | 0.43 | 2.78 | 73% | 16% | 0.22 | 1.85 | 69% | 15% | 0.20 | 1.04 |
| 2007Q3 | 0.52 | 3.20 | 77% | 28% | 0.74 | 4.08 | 73% | 22% | -0.22 | -0.91 |
| 2007Q4 | 0.33 | 1.94 | 61% | 20% | -0.19 | -1.56 | 44% | 4% | 0.52 | 2.48 |
| 2008Q1 | 0.39 | 1.23 | 77% | 25% | 0.24 | 1.51 | 60% | 15% | 0.15 | 0.43 |
| 2008Q2 | 0.66 | 3.01 | 73% | 21% | 0.37 | 2.15 | 76% | 21% | 0.29 | 1.02 |
| 2008Q3 | 1.06 | 4.50 | 78% | 26% | 1.18 | 4.30 | 82% | 36% | -0.12 | -0.33 |
| 2008Q4 | 1.03 | 3.38 | 74% | 31% | 0.67 | 3.25 | 73% | 39% | 0.36 | 0.98 |

This Table reports the liquidity commonality of high and low foreign trading quintiles. The high minus low indicates the difference in liquidity commonality between high and low foreign investor trading stocks. The t-stat tests the null hypothesis that $H_0: \beta_{high} - \beta_{low} \leq 0$.

Table 8: Liquidity commonality and trading of foreign investor

Panel A: Fama-MacBeth regressions of all stocks

| | Foreign Buy | | Foreign Sell | |
|---|---|---|---|---|
| % Foreign Trade | 0.1672 | 0.2456 | 0.2073 | 0.2407 |
| | (0.69) | (0.96) | (0.98) | (1.01) |
| Size | | -0.0433 | | -0.0497 |
| | | (-0.61) | | (-0.70) |

Panel B: Fama-MacBeth regressions by size quintile

| | Foreign Buy | Foreign Sell |
|---|---|---|
| 5 (Large) | 0.2002 | 0.567 |
| | (1.11) | (2.24)** |
| 4 | 0.3897 | 0.5528 |
| | (1.71)* | (2.14)** |
| 3 | 0.1291 | 0.6868 |
| | (0.40) | (2.09)** |
| 2 | 0.7870 | 0.1026 |
| | (1.67)* | (0.25) |
| 1 (Small) | -0.6700 | -0.8729 |
| | (-0.66) | (-1.04) |

This Table shows the association of foreign investor trading and liquidity commonality. We apply the Fama and MacBeth (1973) regressions of annual liquidity commonality on foreign investor trading and firm size. Specifically for each year t, we estimate the following cross-sectional regression: $\beta_{i,t} = \alpha_t + \lambda_t F_{i,t} + \varepsilon_{i,t}$. $F_{i,t}$ is the foreign buy (sell) which is the proportion of foreign purchase (sale) to total trading value. Size is a control variable measured by the logarithm of firm's market capitalization in million Baht. Our samples cover the period from the first quarter of 1999 to the fourth quarter of 2008 (40 quarters).

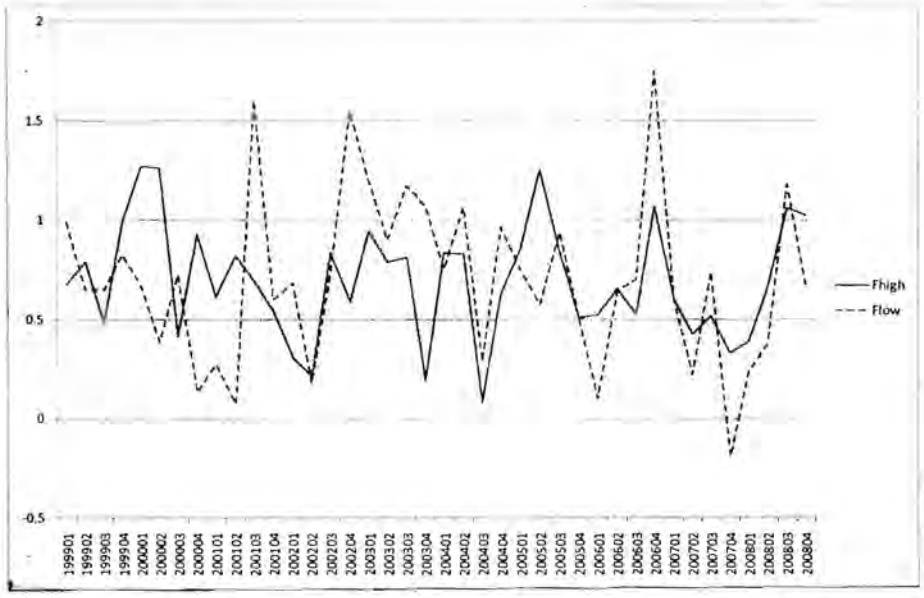


Figure 8:
Quarterly liquidity commonality of high and low foreign investor participation portfolios from firms in the smallest and largest foreign investor participation quintile respectively from the first quarter of 1999 to the last quarter of 2008.

Table 8 shows the association of foreign investor trading and liquidity commonality. We apply the Fama and MacBeth (1973) regressions of annual liquidity commonality on foreign investor trading and firm size. Specifically for each year t, we estimate the following cross-sectional regression: $\beta_{i,t} = \alpha_t + \lambda_t F_{i,t} + \varepsilon_{i,t}$. $F_{i,t}$ is the foreign buy (sell) which is the proportion of foreign purchase (sale) to total trading value. Size is a control variable measured by the logarithm of firm's market capitalization in million Baht. Our samples cover the period from the first quarter of 1999 to the fourth quarter of 2008 (40 quarters). Table 8 Panel A shows no evidence of the relation between proportion of foreign trade and liquidity commonality. We control for the size heterogeneity by grouping stocks into 5 groups and we find that proportion of foreign sales significantly affect liquidity commonality of medium to large stocks. Consistent to the earlier findings, this result suggests that foreign sale has a stronger impact on liquidity commonality than foreign buy. A rise in foreign sales in medium to large stocks increases stock's liquidity sensitivity to market liquidity.

## 5. Conclusions

We examine how cross-sectional variation in foreign trading activity affects the variation in fragility and price discovery of stocks in emerging market. Using the unique dataset, we find no evidence that during the liquidity induced event, the SET would be susceptible to flight-to-quality from small to large stocks or from high to low foreign trading stocks. Nevertheless, we find the foreign sale put pressure on the price discovery process. Stocks with high level of foreign sale are less efficient. Moreover, we show stocks with high proportion of foreign sale have high liquidity commonality for medium and large stocks. Our results should be of interest and practical use to regulators, policy makers, individual investors and money managers who invest in emerging equity markets. Our results shed some light onto the effect of foreign investors on price discovery and fragility of emerging equity markets.

**References**


Amihud, Y., Mendelson, H., Wood, R.A., (1990). Liquidity and the 1987 stock market crash. Journal of Portfolio Management 16(3) 443-494.

Boyer, B., Kumagai, T. and K. Yuan. 2006. How do crises spread? Evidence from accessible and inaccessible stock indices. Journal of Finance 61, 957-1003.

Chordia, T., Roll, R. and Subrahmanyam A. (2000). Commonality in liquidity. Journal of Financial Economics 56, 3-28.

Chordia, T., Roll, R. and Subrahmanyam A. (2008). Liquidity and market efficiency. Journal of Financial Economics 87, 249-268.

Choe, H., Kho, B-C., and Stulz, R. (1999). Do foreign investors destabilize stock markets? The Korean experience in 1997. Journal of Financial Economics 54, 227-264.

Dickey, D.A. and Fuller, W.A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica 49, 1057-1072.

Hasbrouck, J. (1995). One security, many markets: Determining the contribution to price discovery. Journal of Finance 50, 1175-1199.

Kamara, A., Luo, X., and Sadka, R. (2008). The divergence of liquidity commonality in the cross-section of stocks (with, Journal of Financial Economics 89, 444-466.

Schuppli, M. and Bohl, M. T. (2010). Do foreign institutional investors destabilize China's A-share markets? Journal of International Financial Markets, Institutions & Money 20, 36-50.