AN ANALYSIS OF SHORT SALE AND SPEED OF PRICE ADJUSTMENT:

EVIDENCE FROM THE STOCK EXCHANGE OF THAILAND

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A Thesis Submitted in Partial Fulfillment of the Requirements

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กวินทร์ วีรวัฒน์สุนทร : การวิเคราะห์การขายชอร์ต และความเร็วในการปรับตัวของราคา : หลักฐานจากตลาดหลักทรัพย์แห่งประเทศไทย. (AN ANALYSIS OF SHORT SALE AND SPEED OF PRICE ADJUSTMENT: EVIDENCE FROM THE STOCK EXCHANGE OF THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก : อ.ดร. ณัฐวุฒิ เจนวิทยาโรจน์, 112 หน้า.

วิทยานิพนธ์ฉบับนี้ศึกษาการขายชอร์ตในตลาดหลักทรัพย์แห่งประเทศไทยตั้งแต่ปี พ.ศ. 2545 ถึง พ.ศ.2552 โดยมีวัตถุประสงค์การศึกษา 2 ส่วน ส่วนแรกศึกษาถึงรูปแบบระหว่างวันของลักษณะต่างๆที่เกี่ยวข้องกับการขายชอร์ต ได้แก่ ปริมาณ มูลค่า และความถี่ในการขายชอร์ต ผลการศึกษาแสดงให้เห็นว่ารูปแบบดังกล่าวมีลักษณะเป็นตัวดับเบิลยูไม่ว่าจะทำการศึกษากลุ่มนักลงทุนทั้งหมดหรือทำการแบ่งนักลงทุนออกเป็นนักลงทุนบุคคลทั่วไปและนักลงทุนสถาบัน ผลดังกล่าวสอดคล้องกับการศึกษาของ Brock และ Kleidon (1992) และ Miller (1989) ซึ่งอธิบายว่า ปริมาณการซื้อขายที่สูงในช่วงใกล้ตลาดเปิดและปิดเป็นผลมาจากการไม่สามารถซื้อขายได้ในช่วงตลาดปิด นอกจากนี้ผู้ทำการขายชอร์ต และนักลงทุนรายวันระยะสั้นยังมีแนวโน้มที่จะปิดสถานะการซื้อขายของตนวันต่อวัน ในส่วนที่สองแสดงการเปรียบเทียบความเร็วในการปรับตัวของราคาหุ้นเพื่อสะท้อนข้อมูลข่าวสารใหม่ระหว่างหุ้นที่สามารถขายชอร์ตได้และหุ้นที่ไม่สามารถขายชอร์ตได้ เราใช้แบบจำลอง dynamic vector autoregressive ของ Hasbrouck (1991a) ในการเปรียบเทียบความเร็วในการปรับตัวของราคาต่อข้อมูลชนิดเฉพาะเจาะจงของแต่ละบริษัท และใช้ Dimson beta regression และตัววัด DELAY ซึ่งถูกพัฒนาโดย Chordia และ Swaminathan (2000) ในการวัดความเร็วในการปรับตัวของราคาต่อข้อมูลที่เกี่ยวข้องกับตลาดโดยรวม เราพบว่าความสามารถในการขายชอร์ตไม่สามารถเพิ่มความเร็วในการปรับตัวของราคาต่อข้อมูลข่าวสารต่างๆได้ ผลการศึกษาดังกล่าวสอดคล้องกันทั้งในภาวะตลาดขาขึ้นและตลาดขาลงซึ่งแตกต่างจากการค้นพบก่อนหน้าในตลาดประเทศพัฒนาแล้วซึ่งทำการศึกษาโดย Chen และ Rhee (2010) เราสรุปผลการศึกษาว่า หุ้นที่ทำการขายชอร์ตได้ในตลาดหลักทรัพย์แห่งประเทศไทยมีความเร็วในการปรับตัวของราคาไม่สูงกว่าหุ้นที่ทำการขายชอร์ตไม่ได้ เนื่องมาจากข้อจำกัดต่างๆในตลาดประเทศกำลังพัฒนา เช่น ค่าธรรมเนียมที่สูง และการขาดแคลนอุปทานของหลักทรัพย์ในการขายชอร์ต

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KAWIN WEERAWATSUNTHORN : AN ANALYSIS OF SHORT SALE AND SPEED OF PRICE ADJUSTMENT: EVIDENCE FROM THE STOCK EXCHANGE OF THAILAND. ADVISOR : NATTAWUT JENWITTAYAROJE, Ph.D.,

We examine newly emerging equity market, the Stock Exchange of Thailand (SET), since 2002 to 2009 in two main topics. First, we investigate time-of-the day short selling characteristics including short volume, short value and frequency of short sale. We find that intraday short selling patterns from SET result in W-shape. These W-shape patterns are the same for both investor types; individual and non-individual investors. This is consistent with the studies of Brock and Kleidon (1992) and Miller (1989) that there is a lot of trading at the open and close due to the inability to trade when market is closed. In addition, short sellers and short-term day trader tend to prevent holding their positions over night to avoid possible risk that occurs when market is closed. In the second part, we compare the speed of price adjustment between shortable and non-shortable stocks to new information. We apply the dynamic vector autoregressive method, introduced by Hasbrouck (1991a), to measure speed of price adjustment to firm-specific information. In addition, we utilize the Dimson beta regression and DELAY measures, introduced by Dimson (1979) and developed by Chordia and Swaminathan (2000), to evaluate the speed of price adjustment to market-wide information. We find that ability to short does not improve speed of price adjustment to both firm-specific and market-wide information. Our findings are robust in both up and down market conditions. These results are contrast to those found in a developed market (i.e., Hong Kong Stock Exchange) by Chen and Rhee (2010). We conclude that, in the SET, speed of price adjustment to new information for shortable stocks is not significantly higher than that of non-shortable stocks. The ability to short alone is not sufficient to improve the speed of price adjustment to new information. The frictions in the SET, such as high fees and lack of supply for shorting, possibly slow down the speed of price adjustment of shortable stocks to new information.

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CHAPTER I
INTRODUCTION

Short sale is a transaction which an investor borrows security from brokerage firm and then sell it. The investor, who is in this case called short seller, has an obligation to cover short position by buying the equivalent security back to brokerage. In down market condition, short sellers gain profit equal to the difference between their cost of repurchasing the stocks that they borrow and the price that they sold short. Short sale in difference countries tends to have different features. There are at least two characteristics of short selling that is different across countries which are (1) regulations and restrictions, and (2) securities borrowing and lending (SBL). The summary of these differences is shown in table1.

As well as other transactions, short selling is always regulated by the regulator, i.e. the Securities and Exchange Commission (SEC). Jain et al. (2011) find that the degree of regulation on short selling is various across countries. Developed countries, such as US, Australia and Japan, tend to fully allow short selling. In the other hand, developing markets tend to partially permit short sell, such as Thailand and Indonesia, or prohibit short selling, such as Bulgaria and Sri Lanka. Gregoriou (2012) shows that US-short sale regulation was first established in 1938 and mostly remained unchanged for more than 70 years. This framework allowed short sales only at a price not less than the previous market price at which the security was traded, known as the tick test rule[1]. However, in response to development in financial world, nowadays, there are many additional restrictions in short selling activities such as short sale limitation for institutional investors and regulation SHO[2]. Additionally, one of the most common short

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[1] US SEC enforce tick test rule to avoid investors from destabilizing the markets. Tick test rule permit the traders to short sale in only two situations; first, when the price of stocks, which are short, are higher than the last trade price. This situation is also called "uptick". Second, when the last trading price does not changed. The previous trade price had to be higher than the trade price that preceded it. This situation is called a "zero uptick" or "zero plus tick". (Investorpedia, 2012 : online)

[2] Regulation SHO or Reg SHO is the regulation that US SEC adopt under the Securities Exchange Act of 1934 (Exchange Act). For more information please see the following source. (source: Federal Register , Vol. 69, No. 151, Friday, August 6, 2004, Rules and Regulations, Part III SECURITIES AND EXCHANGE COMMISSION, 17 CFR Parts 240, 241 and 242)

sale regulations is naked short sale[3] prohibition. During the financial crisis (i.e. Asia financial crisis in 1997, subprime mortgage crisis in US and European sovereign-debt crisis in late 2000s until now), the regulator tends to blame short sale as the cause that destabilizes the markets. Most of politicians tend to issue restriction to prohibit naked short sale during such financial crisis time. This prohibition is not only found in developed markets but also emerging markets. They include Switzerland's SIX Swiss Exchange, Japan's Tokyo Stock Exchange (TSE), Hong Kong's Hong Kong Stock Exchange (HKEx), and also Thailand's Stock Exchange of Thailand (SET). Beber and Pagano (2011) demonstrate that, during financial crisis, short sale banned law is strictly enforced, especially with stock in financial sectors. The other regulations are such as the requirement of publicly disclose short position and reporting short position when short interests exceed some specific threshold[4].

In addition to regulations, SBL in is the other characteristics that is different across the world and possible affect short selling activities. The SBL in developed markets tend to have longer history than emerging markets. For example, SBL in US is established before 1920s while SBL in Thailand have just introduced since 1999. Moreover, in 1999, there were only three function SBL firms in Thailand. The SBL in Thailand still be the developing stage in the current time. Additionally, Saffi and Sigurdsson (2011) shows that the percentage of the average supply is significantly higher for developed markets, such as US and Honk Kong, than developing countries including Thailand. Furthermore, fees of borrowing and lending securities tend to be low for the countries that have high supply. So, the developed markets tend to have lower fee than emerging markets. This possibly leads to the result that developed markets tend to have

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[3] Naked short sale generally refers to the selling short without having borrowed the securities to make delivery or ensuring that the security can be acquired, as is conventionally done in a general short sale. If the short seller fail to deliver the buyer with in standard time settlement (t+3), this short sale activity is called "failure to deriver" (source: Federal Register , Vol. 69, No. 151, Friday, August 6, 2004, Rules and Regulations, Part IIISECURITIES AND EXCHANGE COMMISSION, 17 CFR Parts 240, 241 and 242, page 48,009)

[4] According to Deutshe Bank Research in May, 2010, they found that short seller have to report their short sale activities when their net short interest exceed threshold. In most of all the countries, this threshold is equal to 0.25% of outstanding stocks including US, UK, France, and Japan. However, some countries enforce more strictly regulation and require reporting all short sale activities such as Hong Kong and Thailand.

higher short ratio comparing to emerging markets. The details of SBL are also provided in table 1.

For the SET, short-selling regulations have quite unique features. Short selling activities must do through the representatives with Securities Borrowing and lending (SBL) license. Unlike many developed markets, not every stock in the SET can be short. The short selling is only done by securities in SET50 Index which are latterly expands to be stocks in SET 100 Index since January 2011. Moreover, the percentage of average supply in the SET is also remarkably less than developed markets. This lead the cost of SBL to be quite higher for the SET comparing to other developed market. These differences between developed and developing markets cause researchers are unable to directly apply the results of studying in short sale from developed countries into developing countries. The higher cost and shortage in supply side are possible be the friction for short selling.

We can see that regulations or restrictions of short selling are generally stricter than regular buying and selling. The reason is that the ability to short possible causes strong effect to the market. Currently, both academics and practitioners are interested in studying such effect of short selling. This issue is mainly discussed in two fields: effect of short sale activity to securities price and effect of short sale to speed of price adjustment

Table 1 Market comparison in short selling between developed market and Thailand

Market	%Short Ratio	SBL Fee/ year	SBL in Practice	% Avg. Supply	Shortable stocks	Regulations
US (NYSE and NASDAQ)	23.89% for NYSE 31.33% for NASDAQ (Diether et al.; 2009a)	Fee_{EW} = 0.68% Fee_{VW} = 0.10%	1920s	23.56%	Most of all stocks	• Up-tick rule (abandoned on 2007) • Naked short is banned since 2008 • 102% to 105% of short-sale value as collateral
Australian (ASX)	1.75%	Fee_{EW} = 1.32% Fee_{VW} = 0.33%	Before 1990	15.62%	Most of all stocks	• Naked short is banned since 2001 • 105-110% of short value as collateral (Bris et al.;2007)
Japan (TSE)	6.76% (Takahashi; 2010)	Fee_{EW} = 1.57% Fee_{VW} = 0.40%	Before 1990	4.49%	Most of all stocks	• Up-tick rule after March 2002 • Naked short is prohibited since 2008 until April 2012
Hong Kong (HKEx)	8.67% (Chen and Rhee; 2010)	Fee_{EW} = 1.54% Fee_{VW} = 0.33%	1994	6.96%	Stocks in D-list	• Up-tick rule after January 1994 • Naked short is not allowed • 105% of short-sale value as collateral
Thailand (SET)	1.29% (Stocks in SET50 index)	Fee_{EW} = 2.51% Fee_{VW} = 1.42%	2004	2.55%	Stocks in SET100 (since 1 Jan 2011)	• Zero plus tick rule • Naked short is not allowed •Initial collateral[5] 150% of short -sale value •Maintenance collateral[6] 140% of short -sale value •Minimum collateral[7] 120% of short -sale value •Lenders (mutual fund) require 100% collateral (note that these collateral amount can be vary depend on the short seller credit and the service of the brokerage firm)

Note: This table is modified from Sawad (2010). It presents the comparison of some important of market characteristics that relate to short selling. %Short ratio is the percentage of trading volume that is sold short (short volume/trading volume). SBL fee/year is the fee of borrowing and lending stocks. There are two types of fee which are represented here; Fee_{EW} is the equal-weight mean and Fee_{VW} is the size-weight average. %Avg. supply is the average of value of shares supplied relative to total value of shares outstanding. Both of SBL Fee/year and %Avg. Supply are quoted from Saffi and Sigurdsson (2011)

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[5] Initial collateral is the amount required to be collateralized in order to open a position.

[6] Maintenance collateral is the minimum amount which is required to be collateralized in order to keep an open position.

[7] Minimum collateral is the force buy threshold. When the collateral lower than this level, investor need to put more money in their collateral account otherwise brokerage firm possible force to buy the securities back.

Miller (1977) is one of the very first people who study the effect of short sale to security price. He shows that when the investors have heterogeneous opinions in the securities' value, shortable stocks with high short sale constrained tend to be overpriced and exhibit the negative abnormal return. Most of the subsequent papers focus on studying the information role of shorts selling activity and the relation between short selling and stock valuation. For example, by using US market data, the study of Diether et al. (2002) provide support evidence for Miller's (1977) research. They use various in analyst's forecast as a proxy for difference in opinions. Their paper finds the evidence that securities with higher distribution in analysts' earnings forecasts gain lower future returns than any other similar stocks. Not only within US, Chang et al. (2007) also confirmed the result of Miller (1977) in their study in Hong Kong stock market. The following paper of Berkman et al. (2009) is also robust the result of previous investigations. They use event study methodology around earning announcements to reduce the different in estimation in the securities' price. They conclude that the stocks subject to high varied in value judgment and more strict short-sales limitations become overprice prior announcement time.

Recent short sale literatures extend to study second aspect of short sale effect, the speed of price adjustment of shortable stock due to the new information. The model of Diamond and Verrecchia (1987) predicts that short-sale restrictions cause asymmetric of information and also reduce the speed of adjustment to new information, especially bad news. Chen and Rhee (2010) present the empirical evidence from Hong Kong stock market that short selling causes market to be efficiency by increasing speed of price transfer process to both private/public firm-specific information and market-wide information. Moreover, they remark that the empirical evidence in this area is rarely found because of lack in transaction data and the difficulty of measuring the speed of price adjustment to new information. This possible be the reasons that why other papers in this area cannot directly test the speed of price adjustment of stocks. For example, Fung and Draper (1999) indicate that mispricing futures can be reduced by loosen up the

restriction in short selling which also improve the speeds of adjustment. Their papers do not directly measure speed of adjustment in stocks markets.

Until now, we can summarize that the previous researches mainly focus on two main aspects of short selling in asymmetric price transmission; asymmetric size of price adjustment (i.e. Miller,1977) and asymmetric speed of price changes (i.e. first prediction of Diamond and Verrecchia,1987 and Chen and Rhee, 2010). The second aspect still not clearly examine because the essential data is not widely available. Since most of all stocks that listed in US and many other developed countries can be sold short, it is difficult to compare the speed of price adjustment between the same series of shares with and without short selling constraints. Chen and Rhee (2010) prevent this complexity by using unique characteristics from HKEx that limit shortable stocks to be the stocks that are listed in special list called D-list. They decide to compare the speed of price adjustment to new information between three-month period before and after stocks join D-list. Note that they define stocks with three-month period before (after) joining the D-list as non-shortable (shortable) stocks. Their results show that ability to short improves the speed of price adjustment to new information. By the way, this issue is not widely studied in developing markets. This academic gap leads to my primary study question that whether the result from developed markets is similar to emerging markets that have different market features including higher fees and limit of SBL. We apply Chen and Rhee (2010) technique to investigate the same topic in developing markets. In other word, we utilize the SET's unique institutional setting, which is the same as HKEx, in our study.

We separate our study in to two main parts: the explanatory characteristics of short sale and effect of short sale to the speed of price adjustment. We start first part by investigating the market micro-structure of short selling in intraday frequency data. They include intraday pattern of volume, value and number of short selling. The previous studies in intraday pattern tend to explore overall transaction-not specific to be short selling. There are very few papers that mainly focus on the intraday pattern of short sale. Angel (1997) and Aitken et al. (1998) are the only two papers that study the pattern of

short selling by using the data from the developed market which are US and Australia. However, the market micro-structure of short selling in newly developing market has not been broadly studied yet. This study exhibits whether short sale characteristics of SET are consistent with other developed markets. The contributions of studying in SET can be broadly applied to other emerging markets. In addition, we also extend to study patterns from different account types. We identify whether the short sale patterns from the individual and non-individual account are the same.

In the second part of this paper, we examine the speed of price movement by hypothesize that, in the SET, shortable stocks do not adjust faster to new information than non-shortable stocks. In this part we compare speed of price movement to two types of information – that is, firm-specific and market-wide information. By using high frequency microstructure data, we follow the Chen and Rhee (2010) technique which is previously adopted from the model of Hasbrouck (1991a). The dynamic vector autoregressive (dynamic VAR) is used to analyze the information role in speed of price adjustment to firm-specific information in each transaction. In addition, we also compare trading continuity and quote reversal between shortable and non-shortable stocks. Then, we evaluate speed of price adjustment to market-wide information by applying Dimson beta regression and DELAY measure introduce by Dimson (1979) and developed by Chordia and Swaminathan (2000). Lastly, we investigate the speed of price adjustment in different market conditions – that are, up and down markets.

CHAPTER II

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Intraday patterns in stock markets have attracted much market microstructure research attention. These include the study of Jain and Joh (1988) that study patterns from NYSE, Chan et al. (1995) that study patterns from NASDAQ. These two papers show that, in US, the intraday pattern of volume result in U-shape pattern. This means that the trading volume tend to be relatively higher during the opening trading period. Then, it significantly reduces to lowest level during the mid-day and after that it continuously increases until the end of trading day. After that, the availability of high frequency data from non-US equity markets increases the exploration in such research area. Abhyankar et al. (1997) exhibit that 8,235 stocks listed in the London Stock Exchange (LSE) have two U-shape (or W-shape) patterns for their trading volume. However, when they separate the stocks into two group - that are high trading volume and low trading volume, they find that the heavy-trade stocks show in U-shape pattern. Hamao and Hasbrouck (1995) is the other paper that investigates the patterns outside the US. Their research show that trading volume in the Tokyo Stock Exchange (TSE) shows in the W-shape pattern. There are some papers that use that investigate the intraday pattern in developing market such as Al-Suhaibani and Kryzanowski (2000). They found that, in the Saudi Stock Market (SSM), the intraday trading volume is shown as W-shape pattern. The detail of these previous studies in overall orders pattern is shown in table 2.

The latter intraday pattern studies extend the previous studies by focusing on a specific order like short selling. However, there is very few papers in this area due to the lack of tick-by-tick data that can specified the order type (i.e. buy, sell or short sell orders). This data has been available in developed market since the past 20 years[8]. However, for some emerging markets, the data have just been easily accessed within around past 10 years[9]. The study of Angel (1997) is one of the very first papers that investigate the short sale characteristics using intraday data. He used SuperDot orders

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[8] According to the book "Using SAS in Financial Research" by Ekkehart Boehmer, John Paul Broussard and Juha-Pekka Kallunki (2002), intraday data is broadly available in 1988.

[9] For example, tick by tick data from SET is obtainable since 1999.

from the NYSE TORQ database. His database contains 144 NYSE firms during the studying period from the beginning of November 1990 to the end of January 1991. In addition, he claims that his data can identify the investor types who submit the orders. His study reveals that size of short sell orders tend to be larger than regular sell orders. The volume of short orders is about 13 percent of total sell order volume placed through the NYSE SuperDot system. Index arbitrage and program trading are the investor types who sent the highest volume of short sale orders, which are over 30 percent of the overall short volume. For larger stocks, institutions submit more short orders than the individual traders do. In contrast, the individual portion of short selling increases statistically in the four smallest size deciles. Furthermore, institutions tend to send larger size of short order than individuals. He also exposed that short orders have intraday pattern as U-shape.

Aitken et al. (1998) study the intraday trading behavior in Australian Securities Exchange (ASX), in particular, which is associated with short sale orders and their information role. Their results conclude that, in a market condition that short sale information is transparent, short sale is nearly instantly bad news, just after execution. They also present that investors submit limit short order more than market short orders about two times. Furthermore, they separate intraday short orders in to two groups, limit orders and market orders, which were found U-shape patterns in both groups. The details of these intraday short sale patterns are shown in table 2.

Even though, each markets shows their patterns in two different shapes-that are U-shape and W-shape pattern, all of them are consistent with the study of Brock and Kleidon (1992) and Miller (1989). Brock and Kleidon(1992) explain that open and close of trading periods can be classified as special trading time because they are the linkage between two periods; continuous trading time and time which trading is impossible. Trading demand at the open and close is greater than at other times of the trading day due to the inability to trade when market is closed. This abnormal high demand is reflected in the increasing trading volume. For example, investor cannot trade on the information that occurs during the night, when market is closed. So, they tend to eagerly trade when market is open in the morning resulting in the relatively high trading volume. They also

point out that short-term day traders tend to transfer the risk of holding positions overnight to other traders. The other study that explains the U and W-shape patterns is the study of Miller (1989). He claims that short sellers desire to close out their short positions at day end in order to avoid the typical overnight rise in price as settlement is delayed by one day. Furthermore, day traders avoid the overnight exposure by closing their position out at the end of trading day, then re-establishing new positions the following day. Both of these two studies can explain the finding of U and W-shape patterns.

Table 2 Previous studies in intraday pattern of trading volume

Previous Researches	Study	Sample	Findings
Jain and Joh(1988)	Overall orders	NYSE	· U-shape pattern
Chan et al.(1995)	Overall orders	NASDAQ	· U-shape pattern
Abhyankar et al. (1997)	Overall orders	London Stock Exchange (LSE)	· two U-shape patterns (W-shape) · When separate the stocks into actively and thinly traded portfolios, they shows U-shaped pattern for the heavily traded stocks.
Hamao and Hasbrouck (1995)	Overall orders	Tokyo Stock Exchange (TSE)	· two U-shape patterns (W-shape)
Al-Suhaibani and Kryzanowski (2000)	Overall orders	Saudi Stock Market (SSM)	· W-shape pattern
Angel (1997)	Short sale order	NYSE	· U-shape pattern
Aitken et al. (1998)	Short sale order	Australian Securities Exchange (ASX)	· U-shape pattern

Note: There are two main groups of previous literature in intraday pattern. First group focuses on the studying time-of-the day pattern of overall orders, including regular buy, regular sell and short sell orders. The second group directs their analysis to short selling transaction. However, none of them uses sample from emerging equity market.

So, we can summarize that, there are two main groups of researches that study in intraday pattern. First group focuses on the studying time-of-the day pattern of overall orders including regular buy, regular sell and short sell orders. The second group directs their analysis to short selling transaction. The studies in first group have been covered various stock exchanges including US markets, other developed markets in Europe and Asia, and emerging markets. In contrary, the studies in this second group, short sale pattern, have been done in only developed market. None of them extend their scope to investigate into emerging markets. This academic gap leads to our objective that to

investigate whether the results in developing markets are consistent with developed markets. We would like to mention that we cannot precisely apply the result or U-shape that is found in these two developed market (i.e. Angel (1997) and Aitken et al. (1998)) to emerging market such as Thailand because of the difference in some market structure such as the trading hours (have or not have intermission) and trading system (quote-driven market or order-driven market). The first part of this study exhibits whether emerging market also have same pattern of short selling to developed market.

In addition, we investigate the patterns of short sale from the different investor types. As previous mention, the previous study of Angel (1997) show that non-individual investor send the short orders a lots more frequent than individual investors. He report that, in NYSE, individual account have a proportion in total short frequency less than 12 % and about 8% in total short volume. However he does not explore whether the result of U-shape he found come from the influence of any specific investor type that have significant higher short volume comparing to other investor types (i.e. institutional investor). There are some previous papers that analyze intraday variation patterns by trader types. Chiu et al. (2012) explore patterns in the Taiwan Futures Exchange (TAIFEX) from four types of traders; individual day trader, individual non day trader, foreign institutional trader, and future proprietary firm trader. They found that time-of-the day patterns are the same, resulting in U-shape, regardless of the investor types. However, there was no previous paper that compares the pattern of short selling characteristics from different investor types in stock market. This paper is the very first paper that explore in such an area.

The advantages and disadvantages of allowing short sale are widely argued. During the global financial crisis in 2007 until now 2012, many investors and politicians accuse on short selling as the mechanism that destabilize the market. They blame that some speculators may use short sale with momentum strategy to gain profit from the down-trend market condition and causes the overall stock price declines more than it should be. In other word, they charge that short selling activities cause the market to be

over reaction during the bearish market. However, some investors and academic researchers argue that short selling have the benefit in the price transfer process. Selling short makes price move to equilibrium quickly and causes the market to be more efficient. Our study investigates whether the short selling increase the prices transfer process. The results of this paper can be used as the evidence to support or oppose the benefit of permit short sale in the other emerging equity market.

Most of the prior papers that focus on studying short sale extend from two main papers: the study of Miller (1977) and Diamond and Verrecchia (1987). In the condition that investors have divergence of opinions, Miller (1977) shows that short-sale restrictions lead to overpricing in stocks. In markets with short-sale constrains, the stock prices are already included the optimistic estimation of traders because traders who have pessimistic view cannot short stocks. In other word, short-sales constraints emphasize that it is pessimists who are willing to submit short sale orders. This lead to his conclusions that when the investors have heterogeneous opinions in the security price, the high short-sale constrained shares tends to be overpriced and give the negative abnormal return.

In contrast with Miller (1977), Diamond and Verrecchia (1987) argue that if short sellers have rational expectation, short-sale restrictions do not lead to the biased prices. These constraints reduce some informative trades, but do not make upward biased prices. They also provide four conclusions which are widely studied in later time as following. First, forbidding traders from shorting decreases the adjustment speed of prices to private information, especially to bad news. Second, on public information announcement days, reducing short sales constraints causes the distribution of abnormal returns less skewed to the left and reduces the excess returns in absolute value. Third, the announcement of unexpected increasing in short-interest can be considered as a bad news. Last, the periods with absence trade are bad news because they increase probability of informed traders with bad information who are restricted from selling short. This refers to that a current period of inactive trade can be classified as a downward bias to measured excess return because the previous trading price is an upward biased measure of security price.

Later researches focus on testing Miller's study and the second to the fourth conclusions of Diamond and Verrecchia (1987) such as Aitken et al. (1998), Hong and Stein (2003), Gao et al. (2006), Chang et al. (2007), Diether et al. (2009a) and Takahashi (2010). However, there are very few studies that investigate the first conclusion of Diamond and Verrecchia (1987). Fung and Draper (1999) use multiple regression analysis to analyze the relation in futures market between the size of mispricing and several economic factors. They provide the evidence that short-sale restrictions increase mispricing in futures. This mispricing can be reduced by loosen up the restriction in short selling which also improve the speeds of adjustment. Diether et al. (2009b) investigate the impact of short-sale regulation on market quality in US stock markets, NYSE and NASDAQ. They find that the relaxing short sale constraints enhance the symmetric price transfer process without much increase in short-term volatility. Incidentally, both papers of Fung and Draper (1999) and Diether et al. (2009b) do not "directly" evaluate the speed of price adjustment of shortable and non-shortable stocks.

The only one paper that precisely studies the speed of price adjustment in equity is the research of Chen and Rhee (2010). By using shortable stock from Hong Kong Stock Exchange (HKEx) which is called D-listed stocks, they study the speed of price adjustment to new information for the stocks three months before and after they join the D-list. They conclude their paper as following. First, short selling increases speed of price transfer process to private/public firm-specific information. Second, shortable stocks adjust quicker to market-wide information than non-shortable stocks. Third, the speed of price adjustment for shortable stocks is higher than non-shortable stocks in both up and down market situations. Last, when control for firm size, trading volume, liquidity, price and option trading, ability to short sale stand out as the significant elements that speed up price adjustment.

Again, we cannot directly apply such result from developed markets to emerging markets because there are some unique features of emerging market such as high fee for SBL and stricter short-sale restrictions. The study of short selling across countries by Bris et al. (2007) found that prices incorporate negative information faster in countries

where short sales are allowed and practiced. They also indicate that short selling in Thailand is not clearly practical because SBL is very narrow, especially on the supply side. Saffi and Sigurdsson (2011) study the effect of short-sale constraints on price efficiency and return distributions by using data from 26 countries. There are two main findings in this paper. First, they define the high short sale constrain as the stocks with low lending supply and find that these group of stocks have lower price efficiency. Second, relaxing short sales constraints do not relate to an increase in price instability. They also indicate that although short selling is allowed in a particular country, stocks are still subjected to other frictions such as the availability of shares for lending. They conclude that limited lending supply and high fees affect the price efficiency. Last but not least, Reed (2007) show that stocks that have high cost of short selling tend to have larger price reactions to earnings announcements, especially to bad news. They also conclude that when short selling is costly, the strong reaction to information announcements provides evidence of informational inefficiency for constrained stocks. These unique feature of emerging market (e.g. the higher fee and less supply as showing in table 1) and the findings of Chen and Rhee (2010) lead to my research questions; does short sale ability in emerging market, which is represented by SET, increase price adjustment speed to firm-specific and market-wide information?

CHAPTER III
OBJECTIVES AND CONTRIBUTIONS

There are two main objectives of this paper. First, this paper examines the intraday short sale patterns including short volume, short value and frequency of short selling. We extend the previous studies from developed markets (i.e. Angel, 1997 and Aitken et al., 1998) by explore into the SET which is developing market. Moreover, we look into the detail of intraday short selling pattern of different kind of investors. We investigate whether the result of overall pattern come from an influence of any specific investor type. We also provide some descriptive information of short selling in SET such as the characteristic of volume, trade size and number of transactions of shortable stock since 2002 to 2009.

Second, this paper compares the speed of price adjustment of two groups of stocks which are shortable and non-shortable stocks. In developed market, the study of Chen and Rhee (2010) shows that short sale increase the speed of price discovery process. This paper investigates whether short sale also increases price transfer process in emerging market. As previously mention in the chapter II, there are many frictions in the SET (e.g. high SBL fee and lack of supply) that are possible slowdown the speed of price adjustment to information. The ability to short alone possible do not have much effect enough to improve the speed of price adjustment. So, I hypothesize our study questions as following;

Hypothesis1: The speed of price adjustment to new firm-specific information for shortable stock is insignificantly different from non-shortable stocks.

Hypothesis2: The speed of price adjustment to market-wide information is faster for shortable stock is insignificantly different from non-shortable stocks.

The results of this paper enhance many new contributions to the study of short sales in emerging market. First, this paper presents the trading short patterns in emerging market. This empirical evidence will fulfill the academic gap in short selling pattern

issue. We also extend our study area to compare the short sale pattern between two main types of investors in the SET which are individual and non-individual investors.   This short selling pattern comparison is the new topics that have never studied before. Second, this paper looks at the effect of short sales in term of speed of price adjustment for firm-specific and market- broad information. We compare price discovery process of shortable and non-shortable shares in emerging market. Additionally, we examines whether the shortable and non-shortable stocks differ in trade continuity and quote reversals. The conclusion from this distribution can lead to one component of the benefit of short selling which is also use to develop the regulation of short sell in emerging market. Third, since prior researches have not widely studied the effect of short selling in up market condition, this paper extends to evaluate the speed of price adjustment in both up and down market circumstances.

CHAPTER IV
INSTITUTIONAL FEATURES
4.1. SET's General Market Mechanism

The Stock Exchange of Thailand (SET) has been established since 1975 with market mechanism as a pure order-driven market without dealer. Computerized trading system which is called the Automated System for the Stock Exchange of Thailand (ASSET) had been initiated since April 1991 and then it was latterly upgraded to the new trading system called Advance Resilience Matching System (ARMS) since August 2008. The SET apply execution precedence as automatically matched and executed based upon price and time priority. Three trading methods are utilized in the SET which are, first, Call Market Matching. This method is used in calculating the opening and closing prices of a security at the opening and closing of the trading sessions. This method allows the orders to be queued for matching at a specified time at a single price that makes the highest trading volumes for each particular stock. The second trading method, "Continuous Order Matching", operates during the regular trading sessions. The system continuously matches the first buy and sale orders in the queue, and at the same time, confirms execution of each trading through the broker's terminal. The last trading method allows brokers to deal directly with each other, either on behalf of their clients or for their own account. Then, after finishing execution, broker must send the details of their deal to the SET. This last method is called "Put through (PT)".

The SET is operated on all bank business day, generally from Monday through Friday. There are two trading sessions each trading day which are morning and afternoon session. For more detail please see the following table 3 and figure 1.

Table 3 Description of the SET trading hours

Trading Session		Trading Method	Remark
Pre-opening 1	9:30 AM to T1	CM	T1 is the random opening time between 9:55 AM to 10:00 AM for calculating the opening price for the morning trading session.
Morning Session	T1 to 12:30 PM	COM, PT	-
Intermission	12:30 PM to 2:00PM	Trading Halt	-
Pre-opening 2	2:00 PM to T2	CM	T2 is the random opening time between 2:25 PM to 2:30 PM for calculating the opening price for the afternoon trading session.
Afternoon Session	T2 to 4:30 PM	COM, PT	The trading system stops matching all orders at 4:30 PM.; however orders may still be sent for queuing until the market closes (T3).
Call Market	4:30 PM to T3	CM, PT	T3 is the random closing time between 4:35 PM to 4:40 PM for calculating the closing price of each day.
Off-hour Trading and Market Runoff Period	T2 to 5:00 PM	PT	The trading system allows only PT transactions to be recorded.

Figure 1 the SET's trading hours

Session	Trading time						
	9:30 AM to T1	T1 to 12:30 PM	:30 PM to 2:00P	2:00 PM to T2	T2 to 4:30 PM	4:30 PM to T3	T2 to 5:00 PM
Pre-opening 1							
Morning Session							
Intermission							
Pre-opening 2							
Afternoon Session							
Call Market							
Off-hour Trading and Market Runoff Period							

Note: CM is Call Market Matching, COM is Continuous Order Matching and PT is Put Through Matching. (The Stock Exchange of Thailand, 2012: online)

4.2. Development of Short Sale in SET

In most of developed countries, such as United State and United Kingdom, short sale activities have been allowed for a long time, before 1990. For Thailand's capital market, short selling was firstly allowed in 1997. However, next few months later, on July 1997, the Securities Exchange Commission implement short selling banned due to crisis in currency which is latterly known as Asian financial crisis. After that, on January 1, 1998, SET permits short-sale transactions again through specialists with the license.

In 1999, the securities borrowing and lending (SBL) business is initially introduced to SET in order to facilitate short sellers. In practice, the short sale activities have increased slowly. From the paper of Bris et al. (2007), there were only three firms in Thailand during 1999 that provide SBL service. In addition, short selling in Thailand was not practical as other developed markets. There was only one short sale transaction in

SET from 1997 to 1999. In fact, such only one short sale trading occurs "accidentally" from mistaken transaction done by brokers. This low short selling volume is consistent with the low number of SBL which can be view as the supplier of securities to be short. Furthermore, during that time, SBL business is very limited, especially on the supply side, because of lacking in a futures market. From this time onward, short selling in SET is continuously developed. Recently data shows that SET short sale volume increasing dramatically to 1.29% of total trading volume.

From table 1, I can summarize that short sale in SET nowadays have been much developed from the beginning. However, there is still a gap between short sale in SET and in other developed exchanges. Together with the specific characteristics in SET such as regulations, short sales in Thailand are interesting to be investigated as an example of other developing markets.

4.3. The Securities Borrowing and Lending (SBL) System in SET

The Securities Borrowing and Lending (SBL) is an agreement between two parties; borrower and lender. SBL is a common market practice that the financial instruments, which mostly are the stocks, are transferred from the lender to the borrower, who generally is also a short seller, for a while-not permanently. The borrower has an obligation to return the borrowed instruments or equivalent securities at the due date of the agreement. In order to secure the lender from the credit risk and default risk of the counterparty, generally, the borrowers collateralize their deal with cash or other securities with not less in value than the borrowed securities.

In Thailand[10], SBL is organized by the clearing house named Thailand Securities Depository Co., Ltd. (TSD). TSD organize the SBL system to manage the settlement risk[11] and to promote security trading in the market, in other word, to reduce the liquidity problem. There are two main types of SBL in Thailand; Put-Through Transactions and

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[10] The information in this paragraph comes from the official website of the Thailand Securities Depository Co., Ltd. (TSD). For more information, please visit http://www.tsd.co.th/en/service/sbl.html (search since 10 January 2012)

[11] Settlement risk (or Herstatt risk, named after the famous failure of the German bank in 1974) is one type of default risk that occurs when the counter party fails to deliver the terms of contract with another party. (Source: http://www.investopedia.com/terms/s/settlementrisk.asp#axzz1j3WlcV2Z, search since 9 January 2012.)

Settlement Coverage Transactions. Put-Through Transactions will be sent to SBL system after the two parties, borrower and lender, agree on each other trading condition. In this case TSD provide the system service for the trade management. For Settlement Coverage Transactions, TSD is responsible for being as a lender of last resource for its members. When the borrower gets default, TSD, which is a clearing house, is responsible for the settlement of the securities. TSD gain profit from charging fee from the members, both borrower and lender, as shown in table 4.

Table 4 Fees for SBL service in the SET

Type of SBL Service	Put-Through Transaction	Settlement Coverage Transactions
Fee	Not more than 5%	Not more than 10%
Minimum Payment	100 THB per transaction	No Minimum Payment

The process of SBL in the SET can be described as the following steps. First of all, both borrower and lender need be the member of TSD. They must open the SBL account and the collateral for SBL account. Second, the borrowers start borrowing by submitting their intention to borrow to the broker. The lenders, who normally are the institutional investors, also instruct their intention to lend their securities to their brokerage firm. The borrowers' and lenders' brokers will contact each other through the SBL system. Then, both parties negotiate their agreement such as the quantity that they are willing to trade (borrow or lend), the settlement and due date. After that, at the settlement date, the lender delivers the securities to the borrower while the borrower gives the lender the collateralized instrument. The SET allows four types of the eligible collateral; cash in THB, Thailand government bond, securities of the companies listed in the SET, or letter of guarantee. In this step, the SBL may apply different discount rate called Haircut rates to calculate the value of each type of the collateral. This collateral possible are revalued or be mark-to-market overtime during the lending period to make the two parties ensure in the true value of the collateral. As the result of mark-to-market procedure, the borrowers may be requested to deposit the margin in case that their collateral value is lower than the value given by the regulation as shown in table 1. In addition, SBL will monitor the benefit of both parties until the due date of the agreement.

Last, on the due date, lenders will receive the securities that they have lent from the borrowers. They also receive the lending fee at the agreed rate on the contract from the borrowers as well. Meanwhile the lender must give cash collateral added by some interest back to the borrower. Moreover, the SET allows early returning securities prior to the expiration of the agreement or changing the agreement by the approval of both parties. These SBL process are summarized as shown in figure 2.

So, SBL play an important role in borrowing and lending stocks. According to the announcement of the TSD in August 26, 2010, there are two member types of the SBL; Network member and Non-Network member. Nowadays, there are 16 members of the first type and only one Non-Network member, as shown in the table 5.
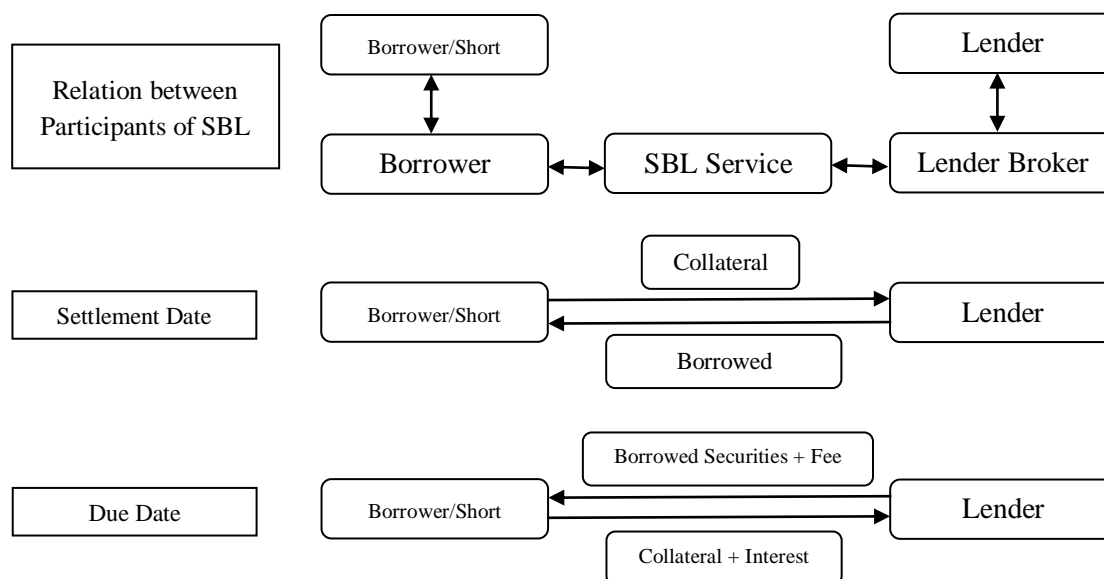
Figure 2 SBL process

<div align="center">

Table 5: Member of SBL service in the SET

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Member of SBL Service as of August 26, 2010	
Network Member	**Non-Network Member**
Country Group Security Public Co., Ltd	Bank Instrument Public Co., Ltd (Thailand)
Phatra Securities Public Co., Ltd	
Asia Plus Securities Public Co., Ltd	
KGI Securities (Thailand) Public Co., Ltd	
Capital Nomura Securities Public Co., Ltd	
Thanachart Securities Public Co., Ltd	
Finansa Securities Public Co., Ltd	
United Securities Public Co., Ltd	
Kim Eng Securities (Thailand) Public Co., Ltd	
Bualunag Securities Public Co., Ltd	
Globlex Securities Public Co., Ltd	
Citibank N.A. Bangkok Branch	
TSFC Securities Ltd-Custodian	
CIMB Thai Bank PLC. Co., Ltd For Treasury Operation Dept.	
Government Pension Fund	
Finansia Syruss Securities Ltd-Custodian	

4.4. Short Sale Report Procedures

According to the regulation Bor.Sor./Ngor.01-00, short sellers can short by submit their orders through matching system in concern with the following principle. First the disclosure about short order is indicated by two letter; "S" and "K". Short selling by the brokers in concern for their own accounts or for their customers will be revealed by the letter "S". In other case, a short sale by the market maker and/or dealer of the ETF unit for the brokerage firm's account[12] will be remarked by the letter "K". After that, the short sellers should prepare or update a record in strict conformity with the formation that is specified by SET. The short sale records that have not yet been covered are requested to report to the Members Supervision and Examination Department through the Broker Reporting System Exchange (BRS) within 8.00pm of each business day.

4.5. Short Sale Regulations in the SET

The SEC in Thailand provides quite a strict rule for short selling. The main restriction is that the traders can conduct a short sale only with the instrument specified

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[12] The dealers or market makers of the ETF investment unit possibly short sell in order to realize their profit from spread or in order to make the liquidity be stable.

by the SEC. Previously the shortable stocks are only stock listed in SET50. However, since 1 January 2011, this regulation has been changed and extent the list of stock that can be short to cover SET100. In addition, the stock in foreign board and in NVDR cannot be short. This restriction makes the SET unique, whereas almost all stocks can be sold short in the developed markets such as NYSE and the NASDAQ. The regulations also allow the market maker[13] to provide short sale of the securities listed as that market maker's responsibility[14].

To make a clear view, we would like to give the fundamental information about SET50 and SET100 as follow. SET50 and SET100 are the composite indices which are widely used as benchmarks of investment in the Stock Exchange of Thailand. Both indices are market capitalization-weighted price index. SET50 has been firstly introduced since 16 August, 1995 while SET100 has been latterly established in 30 April 2005. The based valued of them is 1,000 points. Normally, investors view these indices as index for the top 50 and 100 largest market capitalization corporations that are listed on the SET. By the end of 2011, there are 473 firms which are listed in SET which total market capitalization size of 8,160 billion THB. The market capital size of SET50 and SET100 are 6,398 billion THB and 6,911 billion THB, respectively. The stocks that are listed in these two indices are review and revised at the end of each June and December annually.

For offering price in short sale, regulations prohibit short sale with the price lower than the last trading price. The SET believe that this rule which is known as up-tick rule can protect the market from being high volatile. The securities borrowing and lending restrictions require that a borrower must maintain collateral no less than 100% to 150% of the market value of the borrowed shares, depend on the investor types and brokerage firms. The fee for borrowing stock is approximately 2.5% per annum. Last but not least, the naked or uncovered short sale is prohibited from trading in SET.

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[13] SEC in Thailand defines market maker as a person registered as the market maker to stabilize liquidity in the trading of securities.

[14]REGULATIONS OF THE STOCK EXCHANGE OF THAILAND, Re: Short Selling in the Exchange, 2001, Bor.Sor./Khor. 01-00

CHAPTER V

DATA DESCRIPTION

The study interval starts from January, 2002 to December, 2009. Short selling during this period increases dramatically, especially the last few years as showing in the table 6 and figure 3.

Table 6 Trading characteristics in the SET

Year	Overall orders			Short sale		
	Frequency (in thousands)	Volume (in millions shares)	Value (in millions baht)	Frequency (in thousands)	Volume (in millions shares)	Value (in millions baht)
2002	16,301.92	247,661.46	1,651,098.31	0.45	4.15	209.69
2003	30,132.22	522,117.49	4,140,704.68	2.22	38.55	562.82
2004	31,206.84	538,714.91	4,626,925.56	4.12	56.83	1,325.57
2005	27,563.00	625,151.33	3,643,969.22	8.14	144.55	2,380.09
2006	28,139.72	725,056.34	3,397,659.68	13.73	206.26	4,430.65
2007	27,303.10	579,668.93	3,696,915.43	27.39	356.77	9,669.56
2008	30,766.45	818,611.50	3,517,262.06	127.93	1,327.16	26,613.31
2009	34,612.82	877,600.09	4,110,159.97	207.52	3,459.32	50,757.40

Note: The panel "overall order" indicates the whole orders that are executed in the SET (i.e. regular buy, regular sell and short sale). The panel "short sale" show the data descriptive mainly focus on short sale.
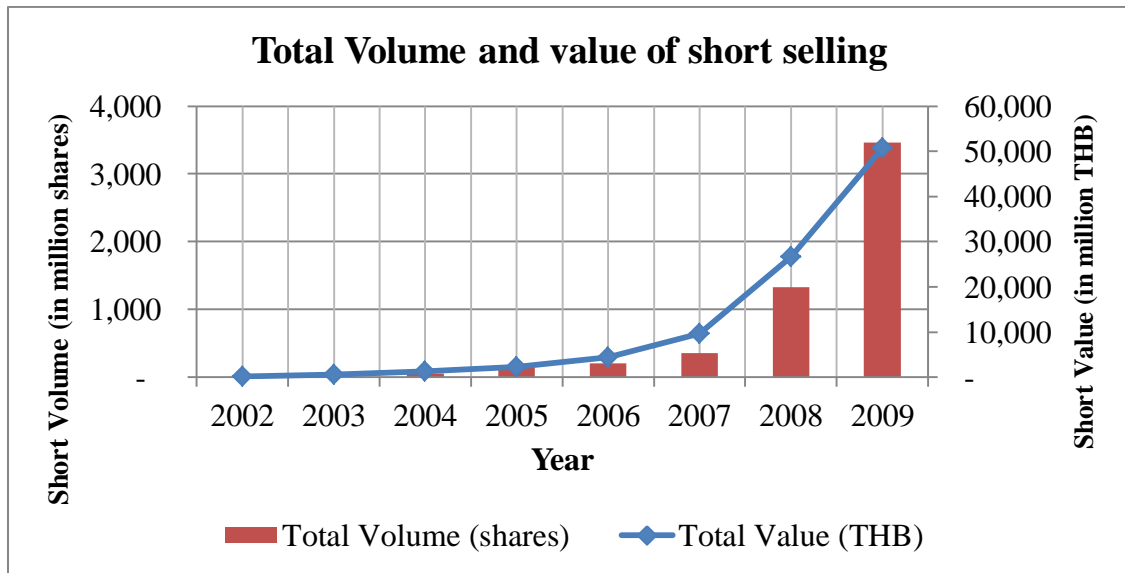
Figure 3 Short selling characteristics in the SET

SET50, which is also shortable stocks, has been revised 16 times during this period accounting for 71 addition stocks and also 71 deletion stocks. The changes in SET50 list are summarized in table 7, showing the records of ticker of additions and removals from shortable list. Note that the column "year" represents date that such stocks are added or removed from SET50. For example, "2002-1" means such stocks are add or removed to SET50 on the beginning of the first-half of year 2002 or 1 January 2002, and "2002-2" means such stocks are added or removed to SET50 on the beginning of the second-half of year 2002 or 1 July 2002.

Table 7 Revised SET50 stocks

Year	Additions	Deletions	Year	Additions	Deletions	Year	Additions	Deletions
2002-1	TPI	COCO	2004-2	CK	SPL	2006-1	BGH	TT&T
	CCET	ITD	(cont')	STECON	GOLD	(cont')	BH	TPI
2002-2	PTT	CCET		PSL	SIRI	2006-2	CCET	UCOM
	AEONTS	EFS		TTA	GRAMMY		MINT	ITV
	GOLD	B-LAND		UCOM	MAJOR		AMATA	SHIN
	QH	PPPC		TRUE[2]	TA[2]		TCAP[6]	NFS[6]
2003-1	BT	NPC	2005-1	SCIB	CPF	2007-1	KSL	KEST
	CCET	BIGC		ASP	BOA		IRPC	SATTEL
	MAJOR	MAKRO		NPC	AMATA	2007-2	RRC	TISCO
	TISCO	AEONTS		AOT	QH		EGCO[7]	EGCOMP[7]
	ITD	SUC		NSM	DELTA		CPALL[8]	CP7-11[8]
2003-2	SSI	IFCT		STEC[3]	STECON[3]	2008-1	PS	SSI
	ATC	TT&T	2005-2	CPF	KGI		PTTAR[9]	ATC[9]
	ITV	UCOM		TUF	VNT		MAJOR[10]	RRC[9]
	MS	JASMIN		TOP	MS	2008-2	DTAC	KK
	AP	TPI		CP7-11	VNG	2009-1	TSTH	TPIPL
	LALIN	CCET		MCOT	AP		QH	AMATA
	SIRI	ASL		DELTA	STEC		ESSO	MAJOR
	AMATA	CNS		TISCO[5]	NPC[4]		TTW	BECL
	KBANK[1]	TFB[1]		TT&T[5]	TOC[4]		BIGC	RCL
2004-1	VNG	ASL	2006-1	PTTCH	ASP	2009-2	MBK	QH
	TT&T	LALIN		CPN	CK		BECL	TRUE
2004-2	KEST	TUF		GLOW	NSM	**Number of additions and deletions**		71
	TOC	BT		MAKRO	UBC			
	TPC	DTDB						

Note: This table reports the stock symbols that add or remove from shortable list from January 2002 to December 2009. Note that the shortable list in SET is also known as stock in SET50 and it revises every 6 month, in the beginning of January and July. The over scripts indicate that such stocks are renamed or have some special explanation. The detail are shown as follows; [1] TFB is renamed to be KBANK on 11 April 2003, [2] TA is renamed to be TRUE on 9 April 2004, [3] STECON is renamed to be STEC on 1 SEP 2004, [4] NPC and TOC is delisted on 8 DEC 2005, [5] TISCO and TT&T is replaced NPC and TOC on 8 DEC 2005, [6] NFS is renamed to be TCAP on 10 April 2006, [7] EGCOMP is renamed to be EGCO on 11 November 2007, [8] CP7-11 is renamed to be CPALL on 26 October 2007, [9] ATC merge with RRC to be PTTAR, effective 28 December 2007 and [10] MAJOR is upgraded from replacement list, effective 2 January 2008.

From table 7, some of the stocks with superscript are not suitable for our study. They show as add or remove from shortable list because their name or symbol is changed, not because they have just listed on SET50 and become shortable. For example "STECON" is added to SET50 since July 1, 2004 and it is shortable. Then, on September 1, 2004, its symbol is changed from "STECON" to be "STEC". So, in the row "2005-1", its new symbol is shown as additional stocks to SET50 and its old symbol "STECON" is shown as removal stocks from SET 50. In fact, both "STECON" and "STEC" are the same and they are shortable since July 1, 2004. So we decide to remove "STECON" from our studied sample. The stocks that we decide to study are shown in table 8.

Table 8 List of studied stocks

Year	Additions	Year	Additions	Year	Additions
2002-1	TPI	**2004-2**	KEST	**2006-1**	CPN
	CCET		TOC	**(cont')**	GLOW
2002-2	PTT		TPC		MAKRO
	AEONTS		CK		BGH
	GOLD		STECON		BH
	QH		PSL	**2006-2**	CCET
2003-1	BT		TTA		MINT
	CCET		UCOM		AMATA
	MAJOR	**2005-1**	SCIB	**2007-1**	KSL
	TISCO		ASP		IRPC
	ITD		NPC	**2007-2**	RRC
2003-2	SSI		AOT	**2008-1**	PS
	ATC		NSM		MAJOR
	ITV	**2005-2**	CPF	**2008-2**	DTAC
	MS		TUF	**2009-1**	TSTH
	AP		TOP		QH
	LALIN		CP7-11		ESSO
	SIRI		MCOT		TTW
	AMATA		DELTA		BIGC
2004-1	VNG		TISCO	**2009-2**	MBK
	TT&T	**2006-1**	PTTCH		BECL
				Total Number	**63**

In this paper, we investigate the speed of price adjustment to new information by focusing on the three-month period before and after such stocks in table 8 join shortable list. Our sample selection has at least three main advantages. First, according to the SET selection rule, stocks that can be sold short (i.e. stocks in SET50) must have met regulation from SEC for about 3-12 months of trading period before they can be sold short. This sample design make us sure that any difference in the speed of price adjustment between three months before and after the stock becomes shortable should be mainly come from the change in short sales restrictions rather than the changes in firm fundamental (e.g. size, P/E). The detail of this SEC regulation shows in appendix A. This settings and selection regulation prevent the confounding effect caused by the changes in firm-specific characteristics. Second, the inclusion decision in the shortable list is made by the SET not by the firm, which allows us to limit the self-selection bias. Third, the use of the SET data decrease the clustering effect of an event analysis because the effective days of sample stocks becoming shortable are distributed across the entire 8-year studied period. Event day from each stock are not the same day. Hence, this selection criteia adopted by SET allows us to solely examine the effect of changes in short sales limitation on the speed of price adjustment. The summary statistics of these stocks shows in the table 9. For more detail, please see the appendix B.

CHPATER VI
EMPIRICAL RESULTS

5.1. Short Sales and Short Seller Types

In this part, we examine the statistical description of short sale transaction. We look into three characteristics which are frequency of short sale, short selling volume (in shares) and short selling value (in THB). The information of these short selling is shown in table 10, 11 and 12. We separate the information by account types and year. In addition, we provide the scatter plot with line and bar chart to represent this info as shown in figure 4, 5and 6.

Table 9 Key statistics comparsion between non-shortable and shortable periods

	Non-shortable	Shortable	p-value of equality-test
Price	20.09	21.35	0.7493
Volume (in million shares)	916.08	1,001.58	0.8002
Value (in million THB)	6,291.37	7,617.67	0.4366
Market Cap (in million THB)	26,346.13	28,357.78	0.6997
P/E	14.76	14.07	0.7353
P/BV	2.65	2.78	0.7082
Book Value per Share (THB)	14.22	14.77	0.8606
Dividend Yield (%)	4.26	4.53	0.6703
Turnover Ratio (%)	34.70	36.55	0.7958
Listed Share (in million shares)	2,119.65	2,156.68	0.9462

Note: The table presents summary statistics of stock in two periods, three-month before join SET50 (in column named non-shortable) and three month after join SET50 (in column named shortable). This summary statistics include all stocks from table 8. Each variable is calculated from the arithmetic for each stock in the sample period, then compute the mean across stocks. Statistics for each stock is calculated as follows: price is total trading value (in THB) divide by total volume. Volume is total shares amount of every transaction during the studied period. Value is total value of transaction in THB during studied period. Market capitalization is calculated from the product of closing price and total number of registered shares during the studied period. P/E is price-earnings ratio calculated from product of closing price and outstanding number of common stocks divided by last 12-month profit of that firm. P/BV is price per book value ratio computed from product of closing price and outstanding number of common stocks divided by shareholders equity of the firm. Book value per share is common stocks part divided by total number of common stocks. Dividend yield is total last 12-month dividend payment divided by the product of closing price and total number of registered shares. Turnover ratio is total trading volume multiplies by 100 and divides by the average of number of listed stocks during studied period. Listed share is total number of stock that registers with SET. The null hypothesis of equality test is average value of shortable stock is equal to average value of non-shortable stocks.

The average of frequency of short transactions, since 2002 to 2009, is mostly sent by the account type "C" or individual investor account, about 70.46% of total short

selling. Most of the less comes from proprietary account. This amount accounts for around 29.15%. Only less than 1.00% comes from foreign account and institution account. In addition, since 2002 to 2009, individual investors generally sell short more than any other investor types; the exception is only year 2002 that there is no short sale from individual account.

For short selling volume (in shares), we find quite the same result as number of short transactions. Sorting from the highest volume to lowest volume, the short volume (in shares) is highest at about 67.49% for individual investor account, secondly high for the proprietary account at 31.36%, significantly lower for foreign account around 1.13% and lowest for institution. This proportion is quite the same as the proportion for number of short orders. However, if we look tin to time series of the results, we found that not every year that individual account sent short sale significantly higher than proprietary account. For example, in 2007 and 2008, individual and proprietary investor sold short in quite the same proportion.

Last, for the short value (in THB), the rank is also consistent with the rank of previous two information; sorting from the highest THB amount to the lowest THB amount as follows: individual investor account, proprietary account, foreign account and institution account. However, the proportion of short value is not exactly the same as previous two characters-short volumes and frequency of short. We found that the THB amount that is sold short by individual investor is about 53.51% of all account types while most of the less or about 46.03% of all account types come from proprietary account. Less than 1.00% comes from the other two account types, foreign account and institution account. The detail of these proportions from different investor types is shown in table 12 and figure 7.

Note that, generally, the main investor in the Stock Exchange of Thailand is also individual investor. Individual investor are account for more than 64 % of overall trading value (including regular buy, regular sell and short sale), around 83 % of trading frequency and 87% for trading volume. We find that when compare with the overall orders, short sale still mainly come from the individual investor. However, the proportion

of short sale that comes from proprietary investor is significantly high; especially if we take into account the size of overall order that comes from proprietary investor (e.g. approximately 6.35% of overall trading value is come from proprietary investor but around 46.03% of short sale value is come from this investor type)

When we look into each short transaction, we found that, on average, different type of short sellers tend to send short orders in different value measuring in THB. We notice that proprietary, foreign and institution account which are generally classified as agency or non-individual investors tend to send lager size in THB amount of orders than individual account. This result is consistent with the empirical finding in NYSE by Angel (1997). He found that agency account including proprietary and institution account tend to send larger value of short orders comparing to the individual traders. In addition, when looking into the data across time, we found that the frequency of shorting, short order volume (in shares) and short order value (in THB) drastically increase. Since year 2006 to 2009, short selling approximately doubles its size every year. For example, the market size for short selling in year 2009 is approximately THB 50.8 billion. This amount hugely expands from the previous year at size THB 26.6, or about 90.72% improve.

Table 10 Statistical description of short sale volume from 2002 to 2009 by account type

Year	Account Type	No. Obsetvation	Total Volume (shares)	Mean Size of Order	Standard Dev of Mean Order Size	Minimum	25th Percentile	50th Percentile (Median)	75th Percentile	90th Percentile	99th Percentile	Maximum
2002	C	-	-	-	-	-	-	-	-	-	-	-
2002	P	296	2,275,700	7,688.18	11,202.28	50	1,000	4,000	10,000	20,000	50,000	100,000
2002	F	158	1,875,200	11,868.35	15,385.05	100	1,000	5,000	20,000	30,000	59,200	100,000
2002	M	-	-	-	-	-	-	-	-	-	-	-
2002	ALL	454	4,150,900	9,142.95	12,951.07	50	1,000	4,250	10,000	23,600	50,000	100,000
2003	C	1,886	27,928,800	14,808.48	28,094.57	100	2,000	5,000	12,700	40,000	153,200	331,000
2003	P	336	10,623,400	31,617.26	49,613.36	100	2,000	10,000	44,050	100,000	200,000	300,000
2003	F	-	-	-	-	-	-	-	-	-	-	-
2003	M	-	-	-	-	-	-	-	-	-	-	-
2003	ALL	2,222	38,552,200	17,350.23	32,824.52	100	2,000	5,000	17,300	50,000	200,000	331,000
2004	C	3,490	48,102,300	13,782.89	31,023.75	100	1,500	5,000	10,500	34,650	111,000	600,000
2004	P	631	8,726,100	13,829.00	29,912.38	100	500	2,100	10,000	47,100	176,600	300,000
2004	F	-	-	-	-	-	-	-	-	-	-	-
2004	M	-	-	-	-	-	-	-	-	-	-	-
2004	ALL	4,121	56,828,400	13,789.95	30,852.62	100	1,000	5,000	10,200	35,900	111,000	600,000
2005	C	6,730	110,054,000	16,352.75	37,046.60	100	1,500	5,000	15,000	48,750	168,900	900,000
2005	P	1,280	27,284,100	21,315.70	42,587.49	100	1,000	5,000	20,000	68,200	200,000	500,000
2005	F	134	7,209,500	53,802.24	71,556.54	100	6,800	25,700	65,100	200,000	300,000	387,000
2005	M	-	-	-	-	-	-	-	-	-	-	-
2005	ALL	8,144	144,547,600	17,748.97	39,084.95	100	1,400	5,000	16,000	50,000	200,000	900,000
2006	C	10,031	132,453,700	13,204.44	34,821.97	100	1,000	4,300	10,000	30,000	118,500	850,000
2006	P	3,628	69,361,500	19,118.38	40,985.68	100	1,000	5,000	19,450	50,000	200,000	563,100
2006	F	67	4,441,900	66,297.01	97,313.53	500	5,000	16,000	100,000	211,400	500,000	500,000
2006	M	-	-	-	-	-	-	-	-	-	-	-
2006	ALL	13,726	206,257,100	15,026.74	37,353.22	100	1,000	4,500	10,000	40,000	163,000	850,000
2007	C	14,214	172,579,800	12,141.54	38,736.60	100	1,000	2,500	10,000	25,800	154,000	1,012,500
2007	P	13,121	183,495,900	13,984.90	52,560.90	100	500	2,300	10,000	33,000	191,000	2,000,000
2007	F	49	425,300	8,679.59	22,479.51	100	1,000	1,000	5,000	20,000	124,000	124,000
2007	M	1	267,600	267,600.00	-	267,600	267,600	267,600	267,600	267,600	267,600	267,600
2007	ALL	27,385	356,768,600	13,027.88	45,897.29	100	800	2,500	10,000	30,000	176,000	2,000,000
2008	C	71,422	683,053,200	9,563.62	29,898.99	100	600	2,000	9,100	20,000	100,000	3,000,000
2008	P	56,415	642,571,300	11,390.08	44,268.15	100	500	1,900	7,800	20,400	183,400	2,000,000
2008	F	88	1,533,400	17,425.00	21,506.24	100	4,750	10,000	20,600	50,000	100,000	100,000
2008	M	-	-	-	-	-	-	-	-	-	-	-
2008	ALL	127,925	1,327,157,900	10,374.50	36,938.82	100	500	2,000	8,500	20,000	125,000	3,000,000
2009	C	124,870	2,599,739,800	20,819.57	108,228.74	100	700	2,500	10,000	42,000	300,000	9,369,100
2009	P	81,872	839,606,500	10,255.11	30,246.46	100	500	2,000	8,800	21,900	137,000	1,200,000
2009	F	642	18,038,400	28,097.20	58,954.36	100	2,000	7,700	30,000	76,300	300,000	500,000
2009	M	131	1,937,100	14,787.02	33,451.40	100	1,000	2,000	9,200	42,000	167,000	170,300
2009	ALL	207,515	3,459,321,800	16,670.23	86,300.69	100	500	2,000	10,000	30,000	200,000	9,369,100

Note: This table presents statistical description of short orders by account type which are C (Individual Account), P (Proprietary Account), F (Foreign Account) and M (Institution Account). In addition, we also provide the aggregate value for all account type in the row named ALL. All, except number of observations, measures in "shares".

Table 11 Statistical description of short sale value from 2002 to 2009 by account type

Year	Account Type	No. Obsetvation	Total Value (THB)	Mean Value of Order	Standard Dev of Mean Order Value	Minimum	25th Percentile	50th Percentile (Median)	75th Percentile	90th Percentile	99th Percentile	Maximum
2002	C	-	-	-	-	-	-	-	-	-	-	-
2002	P	296	127,671,950	431,324.16	593,479.29	4,025	46,500	231,250	527,500	993,750	2,775,000	4,125,000
2002	F	158	82,017,475	519,097.94	751,628.72	3,525	66,025	156,375	715,000	1,412,500	3,660,000	4,125,000
2002	M	-	-	-	-	-	-	-	-	-	-	-
2002	ALL	454	209,689,425	461,870.98	653,390.43	3,525	47,750	214,325	560,000	1,140,000	3,000,000	4,125,000
2003	C	1,886	391,800,373	207,741.45	348,956.03	456	37,750	89,228	220,000	484,000	1,990,000	3,625,000
2003	P	336	171,021,350	508,992.11	721,360.62	1,550	53,825	250,978	723,090	1,390,000	3,680,000	6,331,800
2003	F	-	-	-	-	-	-	-	-	-	-	-
2003	M	-	-	-	-	-	-	-	-	-	-	-
2003	ALL	2,222	562,821,723	253,295.10	439,874.18	456	39,800	95,500	274,500	648,750	2,148,300	6,331,800
2004	C	3,490	776,798,296	222,578.31	530,053.63	199	34,100	89,550	230,000	516,000	1,932,000	18,100,000
2004	P	631	548,768,850	869,681.22	1,449,389.78	2,260	51,200	236,000	1,071,600	2,500,000	7,140,000	12,000,000
2004	F	-	-	-	-	-	-	-	-	-	-	-
2004	M	-	-	-	-	-	-	-	-	-	-	-
2004	ALL	4,121	1,325,567,146	321,661.53	783,241.84	199	35,600	96,000	270,000	731,250	3,640,000	18,100,000
2005	C	6,730	1,349,964,480	200,589.08	360,375.70	115	39,400	96,500	220,150	460,000	1,630,000	8,325,000
2005	P	1,280	999,022,020	780,485.95	1,554,906.59	665	52,063	199,250	758,200	2,080,000	8,240,000	15,038,400
2005	F	134	31,104,158	232,120.58	270,670.68	3,340	38,500	129,342	334,000	646,290	1,262,700	1,267,500
2005	M	-	-	-	-	-	-	-	-	-	-	-
2005	ALL	8,144	2,380,090,658	292,250.82	729,888.00	115	41,020	102,000	254,000	611,050	3,460,000	15,038,400
2006	C	10,031	2,005,203,272	199,900.64	380,507.19	126	26,000	79,000	208,000	498,000	1,904,000	7,679,200
2006	P	3,628	2,371,647,976	653,706.72	1,336,412.27	122	46,400	170,000	640,000	1,840,000	6,120,000	18,825,800
2006	F	67	53,795,874	802,923.49	1,481,292.11	2,230	89,200	188,000	845,000	2,449,640	8,550,000	8,550,000
2006	M	-	-	-	-	-	-	-	-	-	-	-
2006	ALL	13,726	4,430,647,122	322,792.30	793,372.02	122	29,040	94,530	270,000	735,000	3,741,200	18,825,800
2007	C	14,214	3,858,951,975	271,489.52	736,695.28	108	32,430	84,550	248,600	632,800	2,878,200	37,600,000
2007	P	13,121	5,795,312,994	441,682.26	1,215,441.40	93	25,600	77,760	297,600	1,090,000	5,900,000	21,500,000
2007	F	49	12,007,075	245,042.35	621,366.85	2,500	24,900	24,900	138,750	555,000	3,441,000	3,441,000
2007	M	1	3,291,480	3,291,480.00	-	3,291,480	3,291,480	3,291,480	3,291,480	3,291,480	3,291,480	3,291,480
2007	ALL	27,385	9,669,563,524	353,097.08	998,852.53	93	29,295	82,000	268,000	786,900	4,525,000	37,600,000
2008	C	71,422	12,215,183,389	171,028.30	484,729.86	59	16,100	45,200	137,200	391,230	1,990,000	19,458,000
2008	P	56,415	14,364,573,090	254,623.29	735,262.98	55	19,000	54,000	174,000	568,000	3,339,000	19,040,000
2008	F	88	33,557,820	381,338.86	418,668.38	7,200	56,520	183,600	532,500	1,060,000	1,750,000	1,750,000
2008	M	-	-	-	-	-	-	-	-	-	-	-
2008	ALL	127,925	26,613,314,299	208,038.42	609,467.90	55	17,400	49,000	152,000	465,000	2,580,000	19,458,000
2009	C	124,870	29,715,662,772	237,972.79	711,621.52	47	20,000	56,000	187,000	508,500	2,978,250	36,800,000
2009	P	81,872	20,814,520,747	254,232.47	586,205.12	56	20,450	64,000	215,198	660,000	2,844,525	21,750,000
2009	F	642	172,196,027	268,218.11	511,984.87	605	24,000	80,063	257,868	707,200	2,460,360	5,700,000
2009	M	131	55,015,515	419,965.76	676,240.04	564	20,900	82,750	597,000	1,353,550	3,356,700	3,542,240
2009	ALL	207,515	50,757,395,061	244,596.27	664,438.99	47	20,124	59,250	197,500	575,000	2,910,000	36,800,000

Note: This table presents statistical description of short orders by account type which are C (Individual Account), P (Proprietary Account), F (Foreign Account) and M (Institution Account). In addition, we also provide the aggregate value for all account type in the row named ALL. All, except number of observations, measures in "THB".
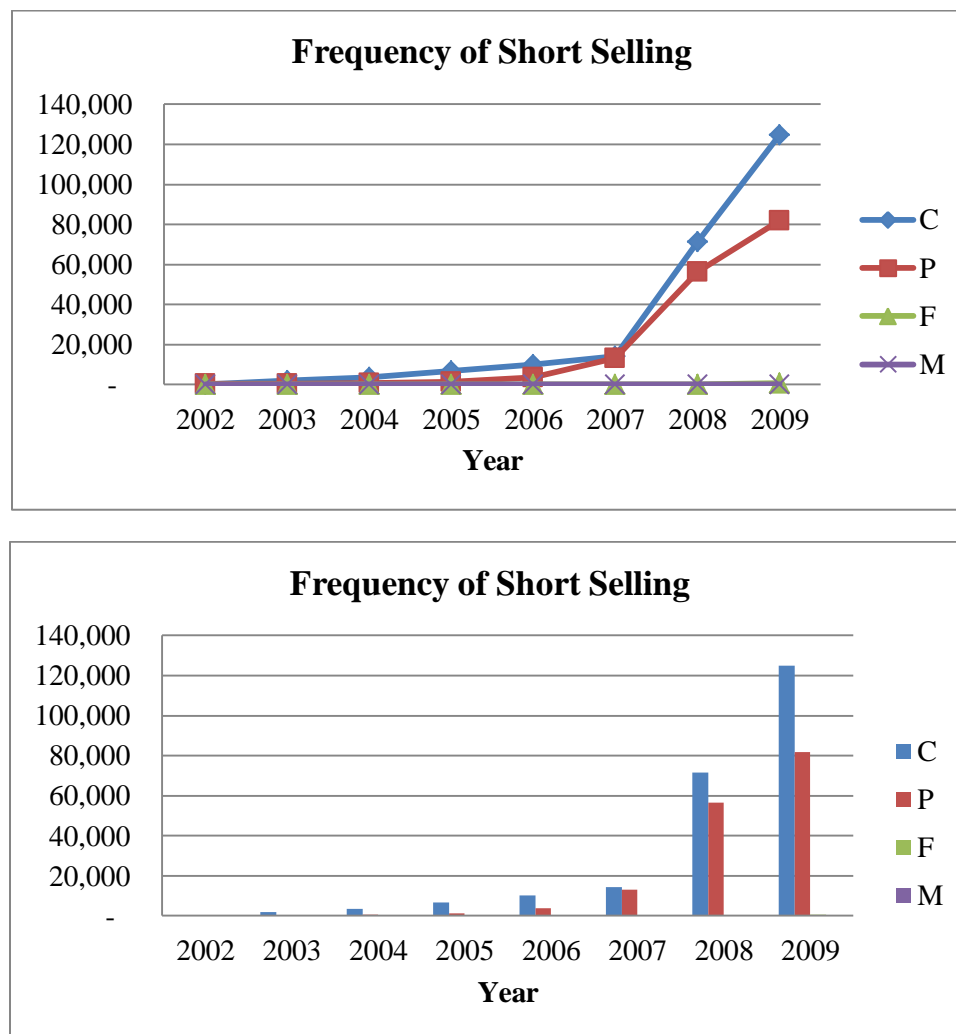
Figure 4 Frequency of short selling

Note: We present line (upper figure) and bar chart (lower figure) for number of short orders separate by account types. Note that C is individual account, P is proprietary account, F is foreign account and M is institution account.

Volume of Short Orders

Volume of Short Orders
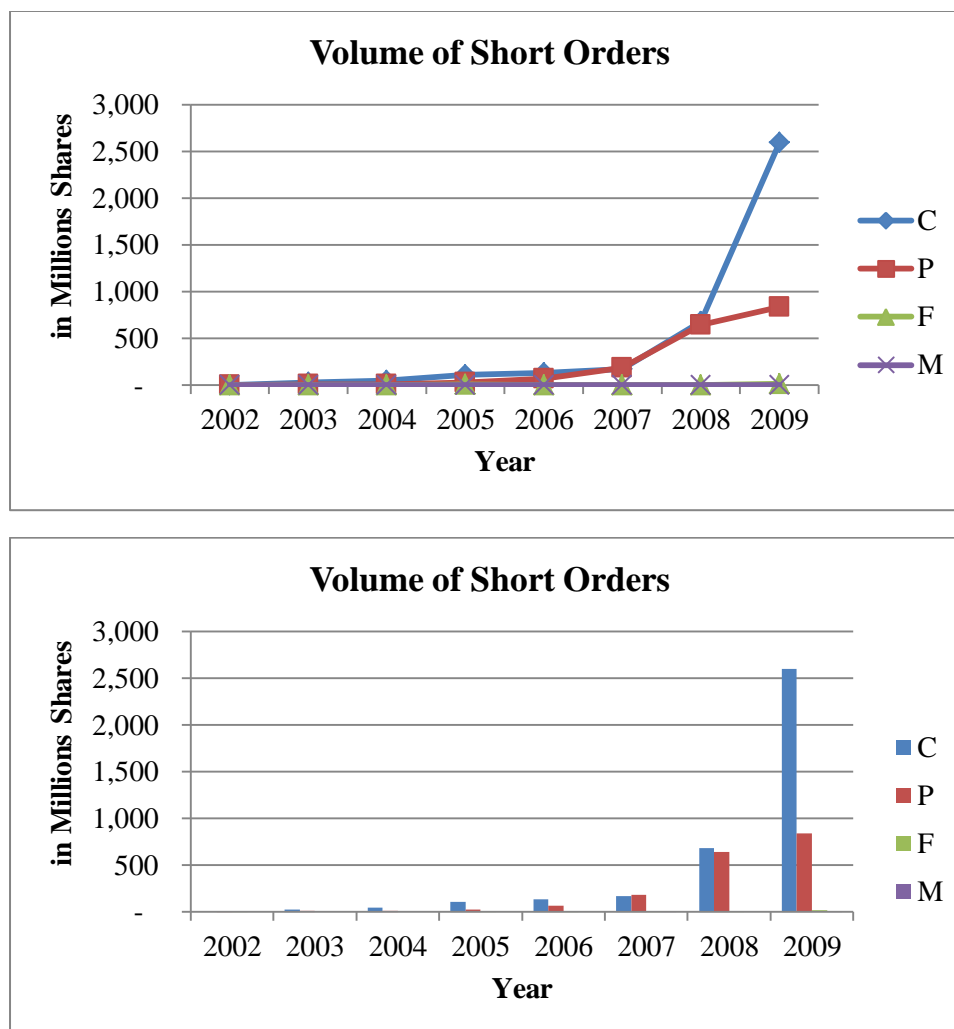
Figure 5 Short sale volumes

Note: We present line (upper figure) and bar chart (lower figure) for short order volume (in thousands shares) separate by account types. Note that C is individual account, P is proprietary account, F is foreign account and M is institution account.
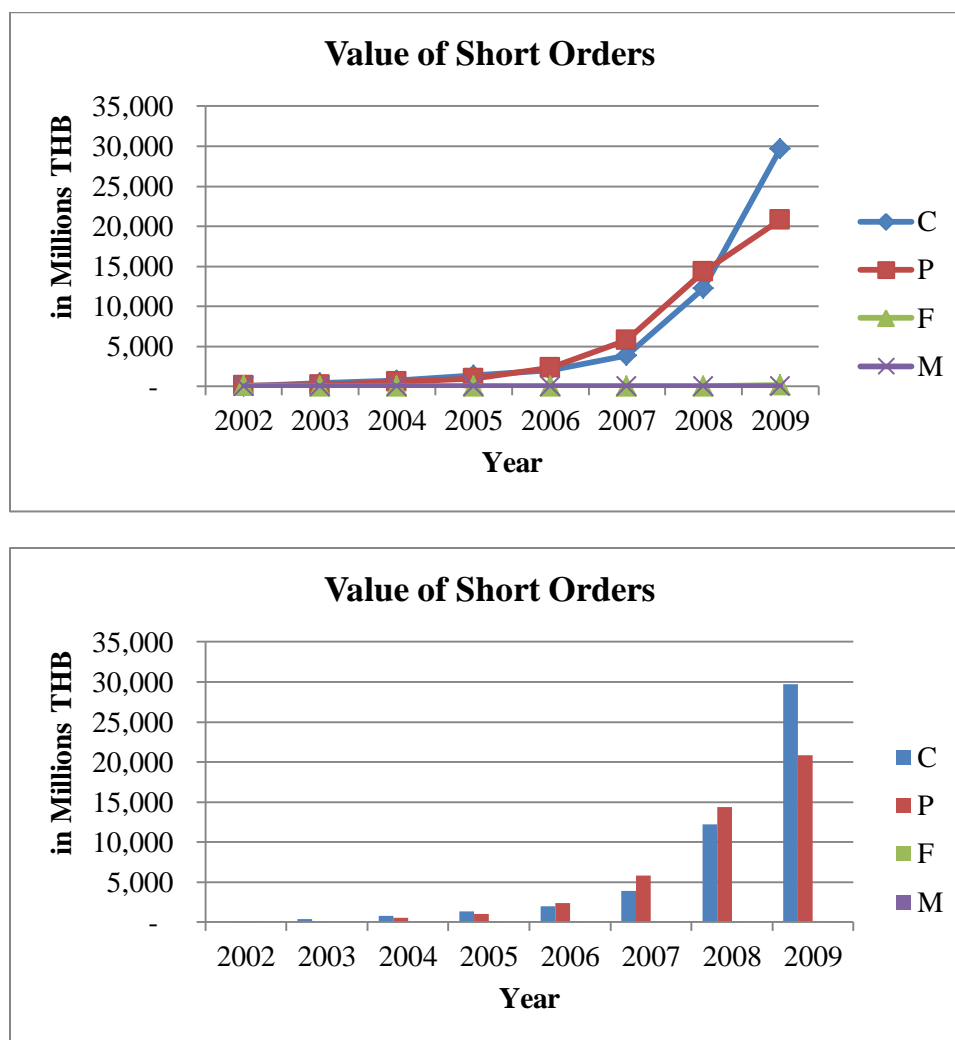
Figure 6 Shot sale value

Note: We present line (upper figure) and bar chart (lower figure) for short order value (in millions THB) separate by account types. Note that C is individual account, P is proprietary account, F is foreign account and M is institution account.

Table 12 Trading characteristics by account type

Year	Type	Overall order			Short sale		
		Frequency (in thousands)	Volume (in millions shares)	Value (in millions baht)	Frequency (in thousands)	Volume (in millions shares)	Value (in millions baht)
2002	Individual	14,082.83	221,641.92	1,299,090.91	-	-	-
	Proprietary	117.51	1,782.45	18,693.59	0.30	2.28	127.67
	Foreign	1,636.69	20,783.57	266,056.74	0.16	1.88	82.02
	Institution	464.89	3,453.53	67,257.06	-	-	-
	Total	16,301.92	247,661.46	1,651,098.31	0.45	4.15	209.69
2003	Individual	26,305.53	466,539.99	3,345,385.50	1.89	27.93	391.80
	Proprietary	278.23	5,216.94	66,177.65	0.34	10.62	171.02
	Foreign	2,615.76	40,675.37	543,950.76	-	-	-
	Institution	932.70	9,685.19	185,190.77	-	-	-
	Total	30,132.22	522,117.49	4,140,704.68	2.22	38.55	562.82
2004	Individual	26,537.27	467,747.81	3,444,798.90	3.49	48.10	776.80
	Proprietary	316.86	5,122.64	86,851.36	0.63	8.73	548.77
	Foreign	3,180.94	52,178.41	800,844.93	-	-	-
	Institution	1,171.77	13,666.06	294,430.38	-	-	-
	Total	31,206.84	538,714.91	4,626,925.56	4.12	56.83	1,325.57
2005	Individual	23,162.66	542,514.93	2,370,408.20	6.73	110.05	1,349.96
	Proprietary	347.51	5,751.11	126,875.41	1.28	27.28	999.02
	Foreign	3,089.41	62,109.07	880,880.52	0.13	7.21	31.10
	Institution	963.42	14,776.22	265,805.09	-	-	-
	Total	27,563.00	625,151.33	3,643,969.22	8.14	144.55	2,380.09
2006	Individual	23,647.83	620,564.05	1,960,607.76	10.03	132.45	2,005.20
	Proprietary	362.70	7,282.03	152,875.92	3.63	69.36	2,371.65
	Foreign	3,256.39	80,333.45	1,021,871.29	0.07	4.44	53.80
	Institution	872.80	16,876.81	262,304.70	-	-	-
	Total	28,139.72	725,056.34	3,397,659.68	13.73	206.26	4,430.65
2007	Individual	22,367.09	490,759.31	2,065,072.80	14.21	172.58	3,858.95
	Proprietary	568.64	7,721.25	278,219.78	13.12	183.50	5,795.31
	Foreign	3,473.24	67,805.73	1,076,901.46	0.05	0.43	12.01
	Institution	894.13	13,382.64	276,721.39	0.00	0.27	3.29
	Total	27,303.10	579,668.93	3,696,915.43	27.39	356.77	9,669.56
2008	Individual	24,796.66	722,593.44	1,968,760.60	71.42	683.05	12,215.18
	Proprietary	1,057.96	12,650.19	378,954.19	56.42	642.57	14,364.57
	Foreign	3,898.66	67,825.32	911,872.44	0.09	1.53	33.56
	Institution	1,013.18	15,542.54	257,674.82	-	-	-
	Total	30,766.45	818,611.50	3,517,262.06	127.93	1,327.16	26,613.31
2009	Individual	28,004.44	762,403.10	2,530,489.40	124.87	2,599.74	29,715.66
	Proprietary	1,882.13	35,530.58	603,600.90	81.87	839.61	20,814.52
	Foreign	3,427.69	59,126.85	690,822.01	0.64	18.04	172.20
	Institution	1,298.56	20,539.56	285,247.66	0.13	1.94	55.02
	Total	34,612.82	877,600.09	4,110,159.97	207.52	3,459.32	50,757.40

Note: this table presents the frequency, volume and value of overall order (i.e. regular buy, regular sell and short sale) and the same characteristics but mainly focus on short sale. The row which is labeled as "Average" is the arithmetic mean for each account type since year 2003 to year 2009. We decide to cut year 2002 from our consideration because the individual investors abnormally do not short sell at this year.

Overall Order

Short Sale

Frequency

3.40%
10.99%
2.21%
83.41%

Frequency

Foreign and Institution < 1%
29.15%
70.46%

Volume

9.32% 2.23%
1.54%
86.91%

Volume

Foregin 1.13 %
Institution 0.01%
31.36%
67.49%

Value

6.80%
22.37%
6.35%
64.49%

Value

Foreign and Institution < 1%
46.03%
53.51%

■ Individual ■ Proprietary
■ Foreign ■ Institution
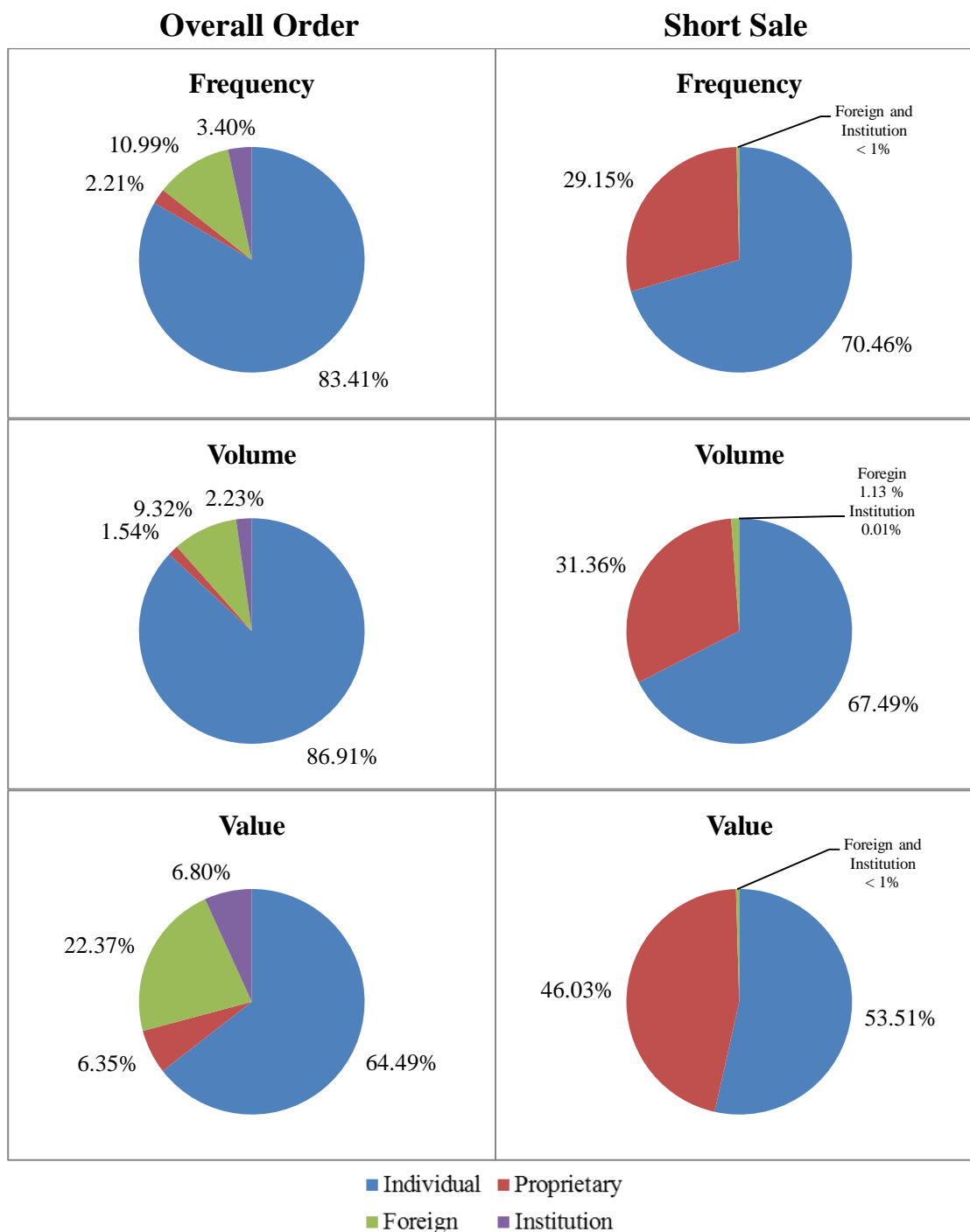
Figure 7 Average percentage of overall order and short selling characteristic

Note: These figures exhibit the average of percentage of frequency, volume and value of overall orders (left figures) and short sale (right figures).

5.2. Short Sale Intraday Pattern

In this section, we examine the short selling patterns in intraday time period. We start by investigate the time-of-the day pattern of short selling from every account type and then, we divide our sample into two groups-which are individual and non-individual investors. We compare the intraday pattern of these two investor groups. Note that since the short selling activities from foreign and institution investors are relatively lower than any other investor type, we include these two investor types with proprietary trader and define them as non-individual investors.

The results of time-of-the day pattern for every account type are shown in table 13 and figure 8. We compute the statistics measurement of short volume, frequency of short and short selling value for every 15 minute-trading periods, starting on 10.00 AM to 12.30 PM and 2.30 PM to 4.30 PM. Then, we scale down such variables into percentage of total amount of each variable in a trading day. The pattern of short selling volume reveals that they are comparatively high at the start of both morning and afternoon trading sessions and then noticeably decreases after first 15-minute trading period. Then, it slightly decreases during the middle of each trading session, and then, a little improves before the end of trading day-which is similar to two U-shape or W-shape pattern. The short selling volume at open in the morning trading session is about four times higher than the mid-day trading volume (before morning trading session is closed). The first two trading hours during each opening period-one hour in the morning session and one hour in the afternoon session-accounts for most of all trading volume, about 56.79% of the total volume trading in each day. The result of intraday pattern for number of short sale transaction and value of short selling are quite the same as short selling volume pattern. They show the same W-shape patterns. In addition, when we separate our sample in to individual and non-individual investor, we found that both groups of investor show the same results, W-shape pattern. The result of patterns for individual investors and non-individual are presented in table 14, 15 and figure 9, 10.

This short sale empirical evidence is different from a U-shape pattern that is found in the study of Angel (1997) and Aitken et al. (1998) which use the data fron NYSE and

Australian Securities Exchange, respectively. However, our W-shape patterns are quite the same as the pattern found in the study of overall orders pattern, not specified only short selling-i.e. the study of Hamao and Hasbrouck (1995) in Tokyo Stocks Exchanges. Note that each exchange has different trading hours that possible affect these patterns. Both NYSE and Australian Securities Exchange (ASX) have no lunch break in the middle day, while Tokyo Stock Exchange (TSE) have a hour lunch break during 11:30 AM - 12:30 AM and Stock Exchange of Thailand (SET) also have lunch break for the period of 12.30 AM - 2.30 PM. Interestingly, both U-shape and W-shape are consistent with the explanation of Brock and Kleidon (1992) and Miller (1989). Brock and Kleidon (1992) show that, during opening and closing of each trading session, trading demand tend to be greater than at other times of the trading day due to the inability to trade when market is closed. This unusual high demand is reflected in the high trading volume, trading value and frequency of trading. Moreover, Miller (1989) claims that short sellers and short-term day traders wish to close out their positions at the end of each trading day in order to prevent the possible risk that occurs overnight. This causes the trading volume to be relatively high during the opening and closing trading time. So, these results of U-shape appear in any exchanges that have no lunch break and W- shape pattern shows in any exchanges that have midday trading halt. The trading pattern is mainly influenced by (1) the behavior of investors as explain in the study of Brock and Kleidon (1992) and Miller (1989) and (2) regulations about trading time.

Table 13 Percentage of average of intraday patterns for short selling

Year	Percentage of average 2002 to 2009		
Time	Volume	No. of Transaction	Value
10:00-10:14 AM	13.96	11.01	11.02
10:15-10:29 AM	8.25	7.76	7.65
10:30-10:44 AM	6.23	6.30	6.61
10:45-10:59 AM	6.26	5.86	6.09
11:00-11:14 AM	5.01	5.45	5.49
11:15-11:29 AM	4.31	4.91	4.71
11:30-11:44 AM	4.24	4.36	4.01
11:45-11:59 AM	3.52	3.88	3.80
12:00-12:14 PM	3.78	3.77	3.67
12:15-12:29 PM	3.52	3.67	3.77
Trading Halt			
02:30-02:44 PM	8.15	8.56	8.28
02:45-02:59 PM	4.88	5.09	5.30
03:00-03:14 PM	4.73	4.76	4.99
03:15-03:29 PM	4.32	4.56	4.54
03:30-03:44 PM	4.38	4.40	4.43
03:45-03:59 PM	4.32	4.58	4.85
04:00-04:14 PM	4.78	4.92	4.75
04:15-04:29 PM	5.35	6.13	6.02
Total (%)	100.00	100.00	100.00

Note: This table presents the percentage of shortable stocks' characteristics which include the following information; total volume of short trading (in thousands shares), total number of transactions, and total value of short selling (in thousands THB), which each 15-minute trading interval.
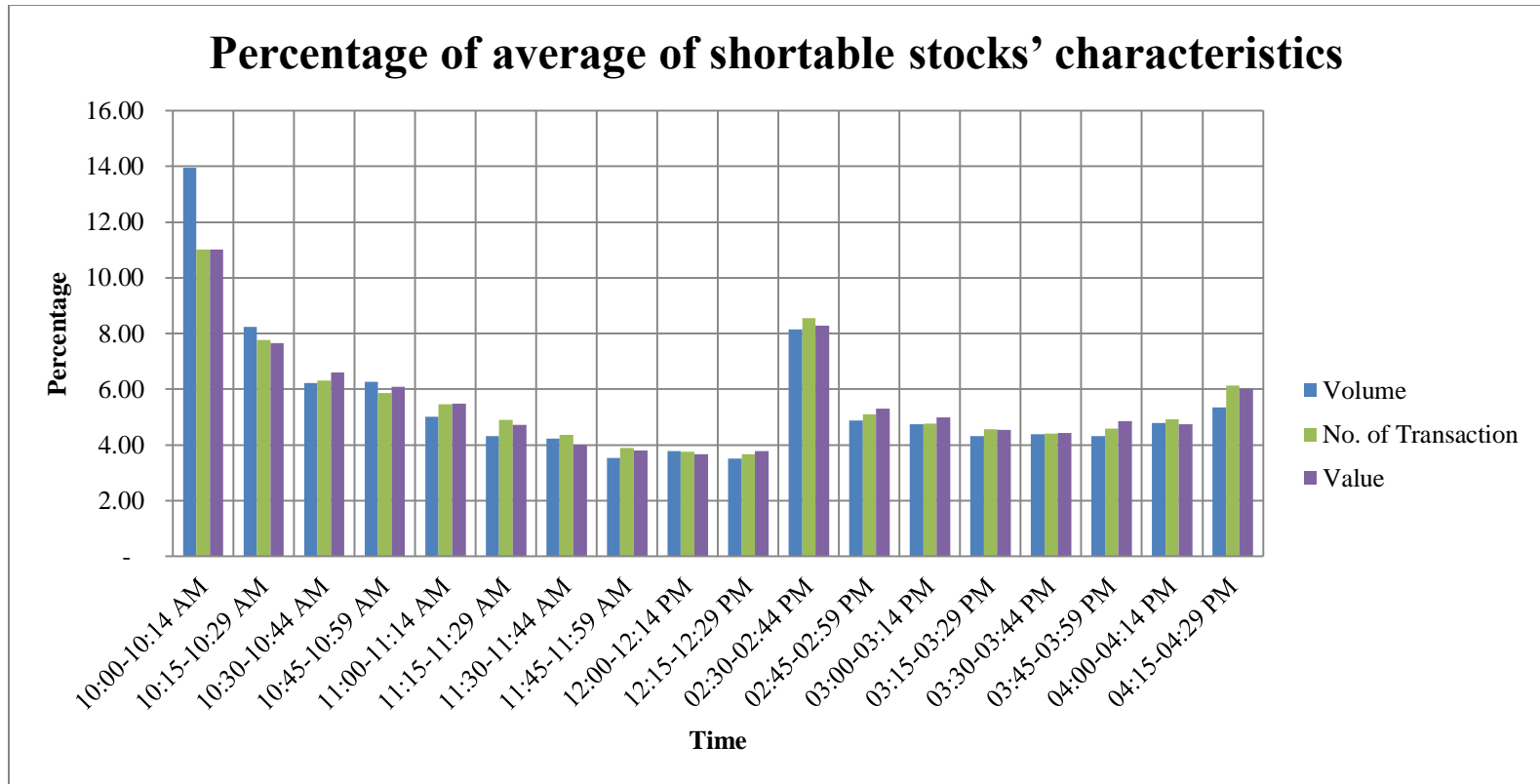
Figure 8 Percentage of average intraday patterns for short selling

Note: This figure shows the intraday patterns of short selling in SET. These patterns include W-shape of short volume, frequency of shorting and short value. The results are presented in the percentage form of the average of eight-year short selling transactions.

Table 14 Percentage of average of intraday patterns for short selling: Individual investor

Year	Percentage of average 2002 to 2009		
Time	Volume	No. of Transaction	Value
10:00-10:14 AM	16.63	12.78	13.33
10:15-10:29 AM	9.00	8.42	8.59
10:30-10:44 AM	6.16	6.25	6.36
10:45-10:59 AM	6.35	5.61	6.09
11:00-11:14 AM	4.74	5.10	5.16
11:15-11:29 AM	4.11	5.08	4.80
11:30-11:44 AM	4.46	4.51	4.09
11:45-11:59 AM	3.30	3.87	3.79
12:00-12:14 PM	3.90	3.56	3.53
12:15-12:29 PM	3.18	3.18	3.29
Trading Halt			
02:30-02:44 PM	8.25	8.72	8.45
02:45-02:59 PM	4.55	4.75	4.82
03:00-03:14 PM	4.27	4.51	4.44
03:15-03:29 PM	3.89	4.26	4.03
03:30-03:44 PM	4.00	4.14	3.95
03:45-03:59 PM	4.00	4.68	5.16
04:00-04:14 PM	4.45	5.00	4.71
04:15-04:29 PM	4.76	5.57	5.42
Total (%)	100.00	100.00	100.00

Note: This table presents the percentage of shortable stocks' characteristics which include the following information; total volume of short trading (in thousands shares), total number of transactions, and total value of short selling (in thousands THB), which each 15-minute trading interval. The results are presented for eight-year of data for all short selling transactions. Note that all variable come from individual account type only.
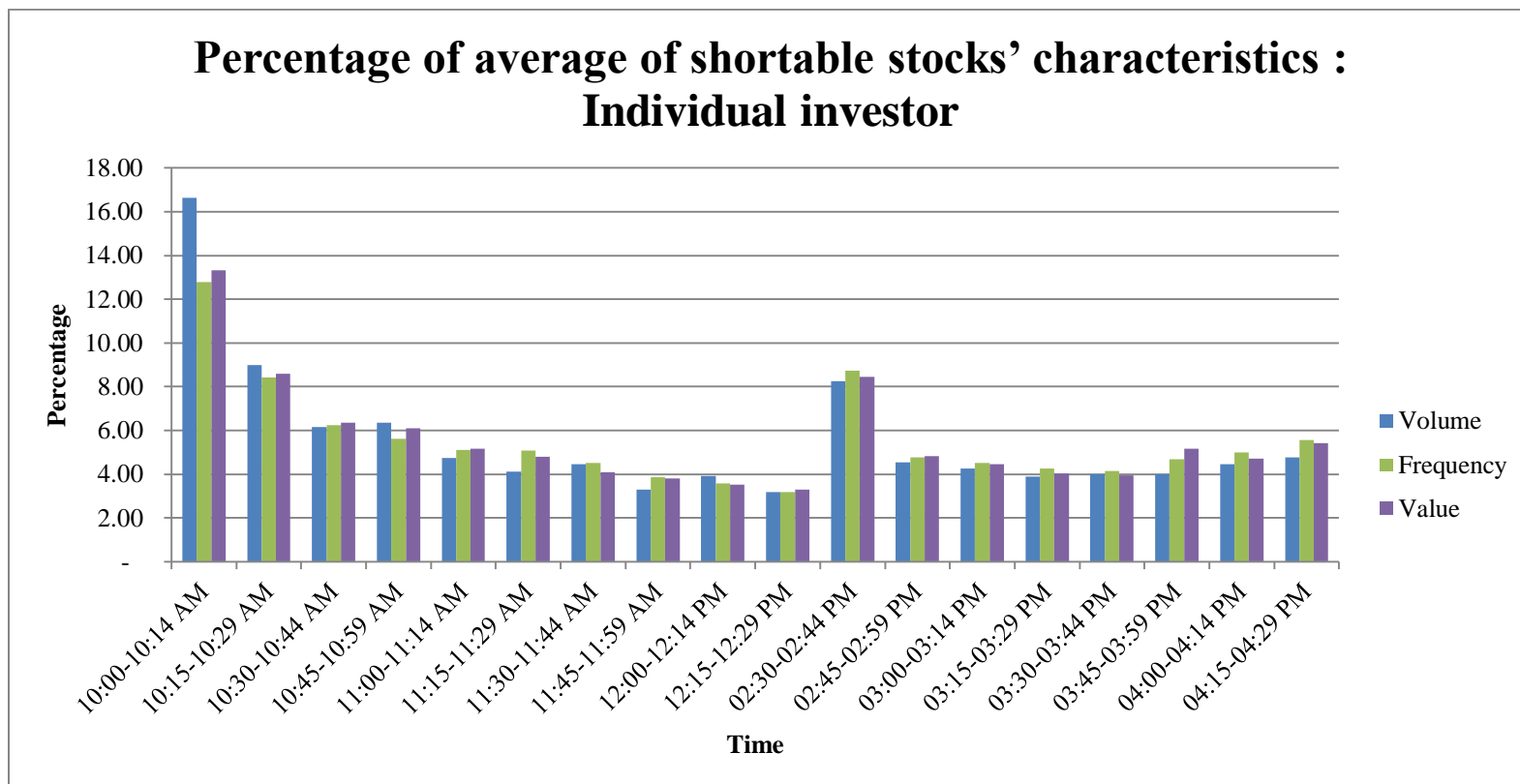
Figure 9 Percentage of average intraday patterns for short selling: Individual investor

Note: This figure shows the intraday patterns of short selling in SET for individual account type in percentage form. These patterns include W-shape of short volume, frequency of shorting and short value. The results are presented in the percentage form of the average of eight-year short selling transactions.

Table 15 Percentage of average intraday patterns for short selling: Non-individual investor

Year	Percentage of average 2002 to 2009		
Time	Volume	No. of Transaction	Value
10:00-10:14 AM	8.42	8.42	8.47
10:15-10:29 AM	6.69	6.80	6.62
10:30-10:44 AM	6.36	6.38	6.90
10:45-10:59 AM	6.09	6.22	6.10
11:00-11:14 AM	5.56	5.97	5.86
11:15-11:29 AM	4.73	4.66	4.61
11:30-11:44 AM	3.78	4.16	3.92
11:45-11:59 AM	3.99	3.90	3.81
12:00-12:14 PM	3.53	4.07	3.82
12:15-12:29 PM	4.24	4.39	4.30
Trading Halt			
02:30-02:44 PM	7.92	8.32	8.08
02:45-02:59 PM	5.59	5.59	5.83
03:00-03:14 PM	5.70	5.14	5.59
03:15-03:29 PM	5.23	5.01	5.11
03:30-03:44 PM	5.15	4.78	4.97
03:45-03:59 PM	4.98	4.43	4.50
04:00-04:14 PM	5.49	4.80	4.81
04:15-04:29 PM	6.57	6.96	6.70
Total (%)	100.00	100.00	100.00

Note: This table presents the percentage of shortable stocks' characteristics which include the following information; total volume of short trading (in thousands shares), total number of transactions, and total value of short selling (in thousands THB), which each 15-minute trading interval. The results are presented for eight-year of data for all short selling transactions. Note that all variable come from non-individual account type which includes proprietary account, foreign account and institution account.
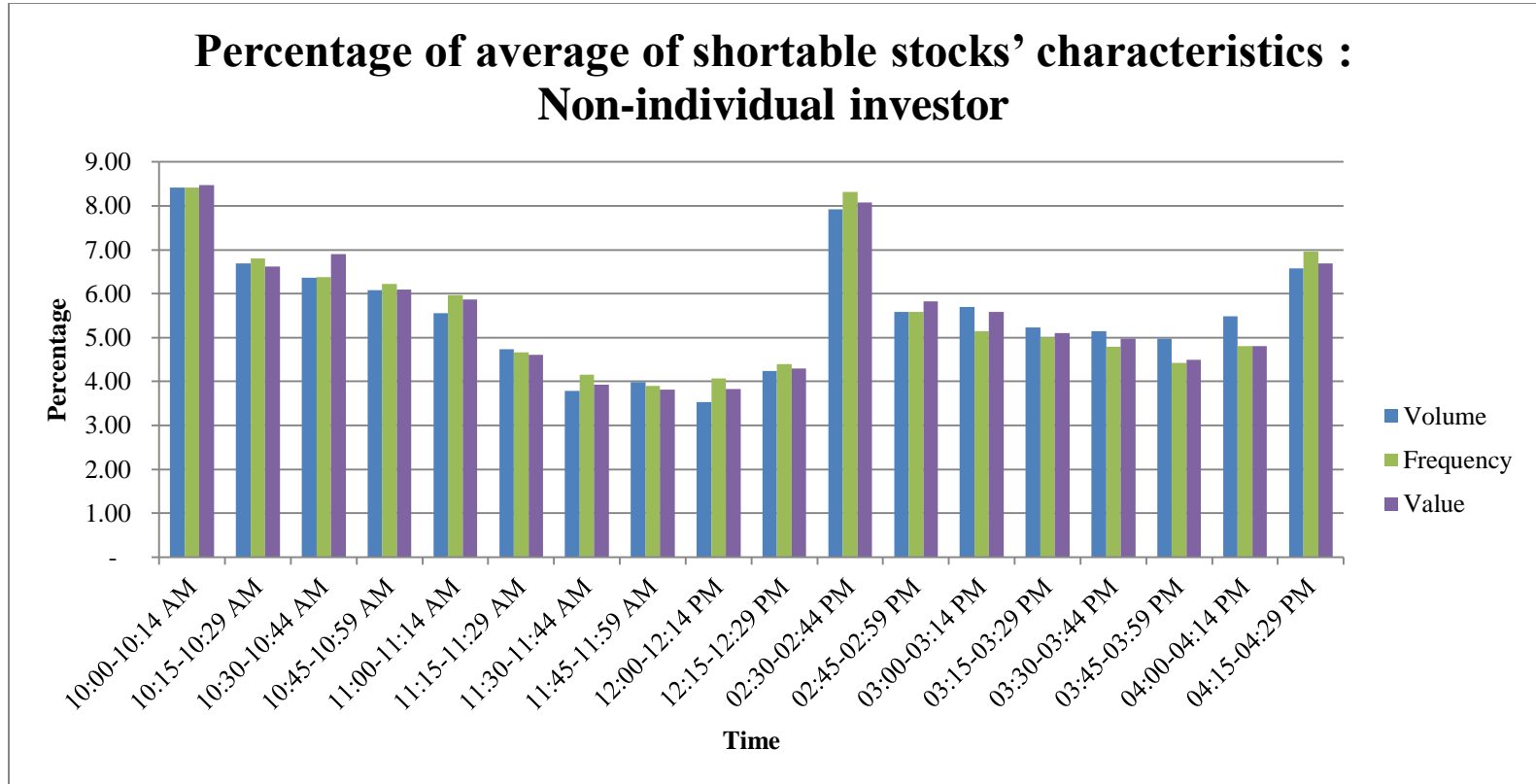
Figure 10 Percentage of average intraday patterns for short selling: Non-individual investor

Note: This figure shows the intraday patterns of short selling in SET for non-individual account type in percentage term. Note that we define non-individual account as the combination of proprietary account, foreign account and institution account. These patterns include W-shape of short volume, frequency of shorting and short value. The results are presented in the percentage form of the average of eight-year short selling transactions.

5.3. Comparing Speed of Price Adjustment to Information

In this part, we investigate the speed of price discovery process due to the firm-specific information and market-wide information. Then, we compare the speed of price adjustment before and after the stock become shortable. We state two hypotheses as follows:

Hypothesis1: The speed of price adjustment to new firm-specific information for shortable stock is insignificantly different from non-shortable stocks.

Hypothesis2: The speed of price adjustment to market-wide information is faster for shortable stock is insignificantly different from non-shortable stocks.

Testing Hypothesis 1:

We apply dynamic vector autoregressive model (dynamic VAR model) from the research of Hasbrouck (1991a) to test our Hypothesis 1. Hasbrouck (1991a) suggests that the interactions of security trades and quotes changes can be modeled as vector autoregressive model system. Trades pass on the information and make a continuing impact on the stock price. By using VAR model, information effect in trade can meaningfully be determined as the ultimate price impact of the trade innovations. Note that since price impacts can be either permanent or transitory, the immediate price effect is measured by b_0 in the following equation 1. Additionally, Hasbrouck (1991b) suggest the impulse response function to measure permanent price effects.

To sum up, we estimate the following Dynamic VAR model:

Equation 1 Dynamic vector autoregressive model

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t}$$

$$Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where

m_t is the log midpoint of the quote when transaction occurs at time t

$r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t

Q_t is the buy-sell indicator equal to 1 if trade is buyer initiator. If the trade is initiated by the seller, then the variable Q_t is equal to -1.

This dynamic VAR model is estimated using ordinary least square estimates of the multiple-equation system. The coefficients a_i indicates the autocorrelation in the quote revision. The coefficients b_0 captures contemporaneous correlation between order flows and quote midpoint return. The coefficients b_i indicates the quote adjustment subsequent to each trade. The coefficients c_i indicates the Granger causality running from quote revision to trades. The coefficients d_i implies the autocorrelation in trade.

The model is estimated using five lags following the technique of Chen and Rhee (2010). The lag terms beyond five lags tend to be statistically insignificant or less in their magnitudes. This model is estimated twice; first, for three-month-period before stocks become shortable and second, three-month-period after the stocks become shortable. We delete the data in the call auction period and use only data during the continuous trading periods – that is, during 10.00 AM to 12.30 PM and during 2.00 PM to 4.30 PM, due to the following three reasons; first, to avoid the effect of overnight returns, second to minimize the abnormal trading activity during the opening in both morning and afternoon trading session, third to control the studying period to be the same market mechanism - continuous trading system. Table 16 presents the result from dynamic VAR model.

The estimation of b_0 is 8.8 and 8.1 basis points before and after the stocks join SET50, which indicates that generally the quote-midpoint increases by 0.088% (0.081%) immediately after a purchase order when a stock is shortable (non-shortable). The coefficients at longer lags b_i are decreasing. The positive autocorrelation in the trades reflected by the coefficients $\sum_{i=1}^{5} d_i$ suggests trading continuity, which implies that a buy transaction tends to follow by another buy transaction and sales are more likely to follow by sales. The negative autocorrelation in the quote adjustment reflected by the

coefficients $\sum_{i=1}^{5} a_i$ indicates quote reversals. Hasbrouck (1991a) and Chen and Rhee (2010) suggest that positive autocorrelations in trades and negative autocorrelations in quote revisions are consistent with lagged adjustment to new information.

Comparing the shortable and non-shortable stocks, the magnitude of $\sum_{i=1}^{5} d_i$ for shortable stocks is quite the same as non-shortable counterparts, which implies that shortable stocks have quite the same trade continuity as non-shortable stocks. The estimated $\sum_{i=1}^{5} a_i$ are also not much different for both types of stocks, which imply that quote reversal is quite the same for shortable and non-shortable. The summations $\sum_{i=0}^{5} b_i$ are the same for before and after stocks become shortable. This implies the quote adjustment subsequent to each trade is the same for both shortable and non-shortable stocks. The amounts of $\sum_{i=1}^{5} c_i$ which indicates the Granger causality running from quote revision to trades are negative for both shortable and non-shortable stocks. This means that knowledge of past quote revision and past trade leads to better predictions of trade than would result from knowledge of past trade alone for both shortable and non-shortable stocks.

Stronger trade continuity (high positive value of $\sum_{i=1}^{5} d_i$) and weaker quote reversals (less negative value of $\sum_{i=1}^{5} a_i$) imply slower speed of price adjustment to new information. According to the studies of Hasbrouck (1991a) and Chen and Rhee (2010), strong trade continuity is consistent with lagged adjustment to new information. In other words, weaker trade continuity leads to faster adjustment to new information. Madhavan et al. (1997) found that stronger trade continuity leads to weaker quote reversal. The fundamental intuition is that, the greater the autocorrelation in order flow, the less the revision in beliefs, and the slower the price adjust to new information. If trade is positively correlated, successive transactions at the bid or the ask are more likely to continue than reverse and this will delay the price adjustment. Therefore, stronger trade continuity and weaker quote reversals lead to a slower speed of price adjustment to new information. In contrast, weaker trade continuity and stronger quote reversals lead to a faster speed of price adjustment. Table 16 indicates that short sales do not reduce the

trade continuity and do not increase the quote reversals; thus the short ability of a stock does not enhance the speed of stock price adjustment process.

We also measure the long-run impact of the trade on price from the cumulative quote-midpoint response to a unit innovation in trade. The results are shown in table 17 and figure 11. We find that the eventual price impacts following a unit shock to Q_t are 0.00092 (0.00105) for shortable stocks (non-shortable stocks). The immediate quote adjustment is 39.13% of the total adjustment for shortable stocks, while it is 38.10% for non-shortable stocks. The second quote adjustment reaches half of total adjustment for shortable stocks and 47.62% for non-shortable stocks. It takes about 21 trades to accomplish the total price adjustment for shortable stocks and around 22 trades to accomplish the same percentage level of price adjustment for non-shortable stocks. The shortable stocks have slightly reverse adjustment. All in all, our results suggest that both shortable and non-shortable stocks provide roughly the same speed of price adjustment, and thus we fail to reject our first hypothesis.

Table 16 Estimation of dynamic VAR model

Variable	Non-shortable stocks		Shortable stocks	
	Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20624	***	-0.21872	***
a2	-0.05733		-0.06202	*
a3	-0.01402		-0.01676	
a4	0.00280		-0.00231	
a5	0.00731		0.00247	
Sum a	-0.26747		-0.29735	
p-value of equality-test	0.16750			
b0	0.00088	***	0.00081	***
b1	0.00008		0.00010	
b2	0.00000		-0.00001	
b3	-0.00004		-0.00004	
b4	-0.00006		-0.00005	
b5	-0.00008		-0.00007	
Sum b	0.00077		0.00075	
p-value of equality-test	0.76850			
c1	-200.84496	***	-203.87635	***
c2	-72.32266	***	-74.10666	**
c3	-28.17791	*	-30.36226	*
c4	-11.77618		-14.00268	
c5	-5.18232		-5.64199	
Sum c	-318.30401		-327.98994	
p-value of equality-test	0.66410			
d1	0.47109	***	0.46406	***
d2	0.19783	***	0.19395	***
d3	0.08623	**	0.08794	**
d4	0.04721	*	0.05491	*
d5	0.04046	*	0.04069	
Sum d	0.84282		0.84156	
p-value of equality-test	0.92350			

Note: This table presents the result from estimation of dynamic VAR model:

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t} \text{ and } Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 17 Cumulative impulse response of quote price to a unit shock in Q_t

	Non-shortable Stocks					Shortable Stocks			
No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.	No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.
0	0.00040	0.00068	0.00040	38.10%	0	0.00036	0.00067	0.00036	39.13%
1	0.00010	<0.00001	0.00050	47.62%	1	0.00010	<0.00001	0.00046	50.00%
2	0.00009	<0.00001	0.00059	56.19%	2	0.00009	<0.00001	0.00055	59.78%
3	0.00007	<0.00001	0.00066	62.86%	3	0.00007	<0.00001	0.00062	67.39%
4	0.00004	<0.00001	0.00070	66.67%	4	0.00006	<0.00001	0.00068	73.91%
5	0.00002	<0.00001	0.00072	68.57%	5	0.00004	<0.00001	0.00072	78.26%
6	0.00005	<0.00001	0.00077	73.33%	6	0.00004	<0.00001	0.00076	82.61%
7	0.00004	<0.00001	0.00081	77.14%	7	0.00003	<0.00001	0.00079	85.87%
8	0.00003	<0.00001	0.00084	80.00%	8	0.00002	<0.00001	0.00081	88.04%
9	0.00003	<0.00001	0.00087	82.86%	9	0.00002	<0.00001	0.00083	90.22%
10	0.00002	<0.00001	0.00089	84.76%	10	0.00002	<0.00001	0.00085	92.39%
11	0.00002	<0.00001	0.00091	86.67%	11	0.00001	<0.00001	0.00086	93.48%
12	0.00002	<0.00001	0.00093	88.57%	12	0.00002	<0.00001	0.00088	95.65%
13	0.00002	<0.00001	0.00095	90.48%	13	0.00001	<0.00001	0.00089	96.74%
14	0.00002	<0.00001	0.00097	92.38%	14	0.00001	<0.00001	0.00090	97.83%
15	0.00001	<0.00001	0.00098	93.33%	15	0.00001	<0.00001	0.00091	98.91%
16	0.00001	<0.00001	0.00099	94.29%	16	0.00000	<0.00001	0.00091	98.91%
17	0.00001	<0.00001	0.00100	95.24%	17	0.00001	<0.00001	0.00092	100.00%
18	0.00001	<0.00001	0.00101	96.19%	18	0.00000	<0.00001	0.00092	100.00%
19	0.00001	<0.00001	0.00102	97.14%	19	0.00000	<0.00001	0.00092	100.00%
20	0.00001	<0.00001	0.00103	98.10%	20	-0.00001	<0.00001	0.00091	98.91%
21	0.00001	<0.00001	0.00104	99.05%	21	0.00001	<0.00001	0.00092	100.00%
22	0.00001	<0.00001	0.00105	100.00%	22	0.00000	<0.00001	0.00092	100.00%
23	0.00000	<0.00001	0.00105	100.00%	23	0.00000	<0.00001	0.00092	100.00%
24	0.00000	<0.00001	0.00105	100.00%	24	0.00000	<0.00001	0.00092	100.00%
25	0.00000	<0.00001	0.00105	100.00%	25	0.00000	<0.00001	0.00092	100.00%
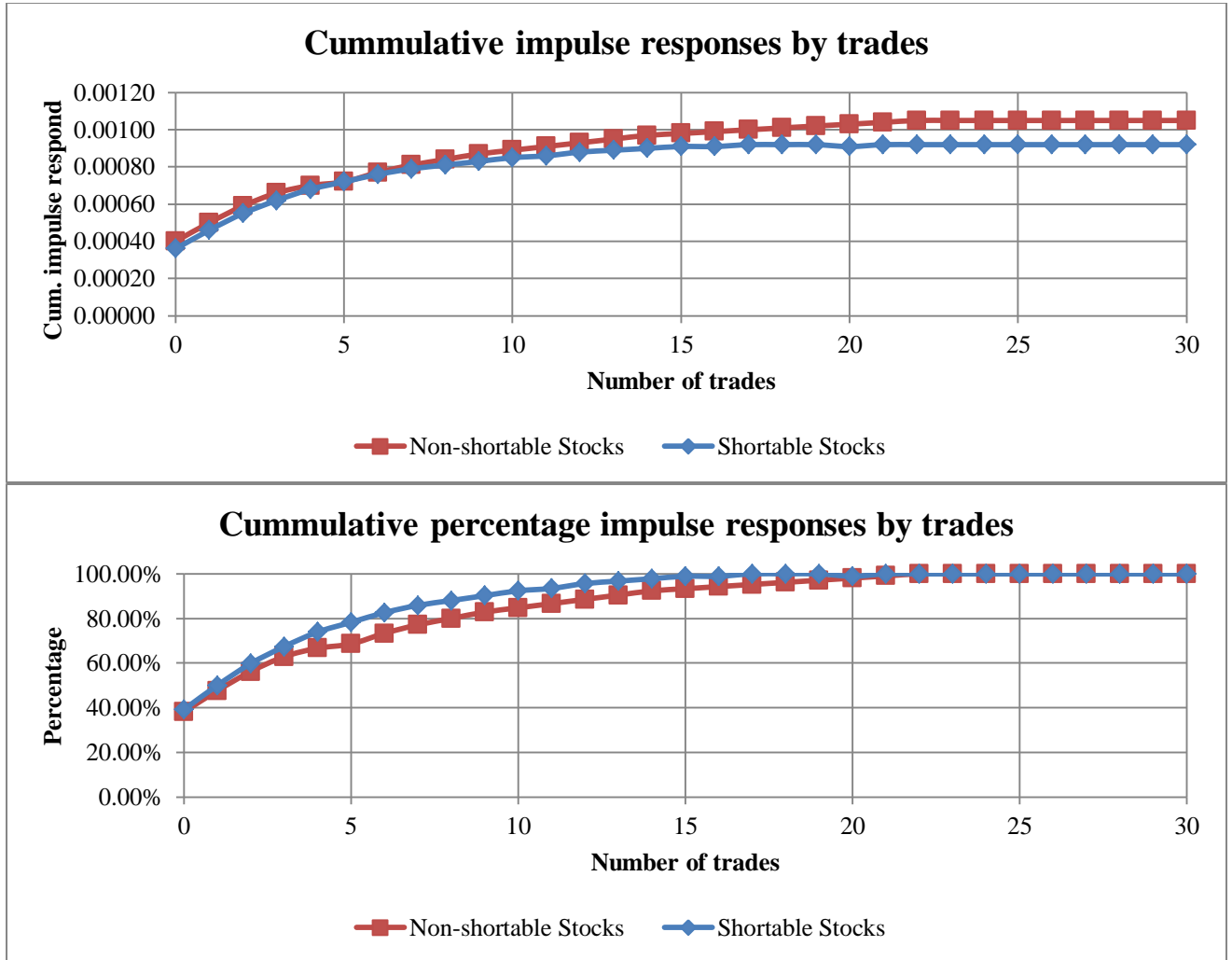
Figure 11 Cumulative impulse responses and cumulative percentage impulse response by trades

Testing Hypothesis 2:

To measure the speed of price movement that reflects the new market-wide information, we use the stock price adjustment DELAY measure, which is estimated by Dimson beta regression. This model is introduced by Dimson (1979) and developed by Chordia and Swaminathan (2000). In this model, the market return is employed as a proxy for new information to which individual stock prices respond. Specifically, we estimate Equation 2 as shown below.

First, we use the regression model of return of stock i on the return of the market index and their lag market index returns up to five lags. The number of lags is applied from method of Chen and Rhee (2010). All is estimated using daily data.

Equation 2 Dimson beta regression

$$r_{i,t} = \alpha_0 + \sum_{k=0}^{5} \beta_{i,k} r_{m,t-k} + \mu_{i,t}{}^k$$

Where

$p_{i,t}$ is the natural logarithm of total return index for stock i on day t

$p_{m,t}$ is the natural logarithm of total return index for market on day t. Note that we use SET total return index as a proxy for the market. For more detail of total index return provide, please see the appendix.

$r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t

$r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t

The Dimson beta regression is estimated daily for each individual stock. We use GMM to control and correct heteroskedasticity. Coefficient $\beta_{i,0}$ is the contemporaneous adjustment of market return. The summation of the lagged coefficient $\sum_{k=1}^{5} \beta_{i,k}$ is the lagged adjustment to market return in time 0. If shortable stocks adjust faster to market-wide information, its contemporaneous beta $\beta_{i,0}$ should be greater than non-shortable

stocks. In addition, if the market-wide news is reflected slower for non-shortable stocks, their lagged coefficient size $\sum_{k=1}^{5}\beta_{i,k}$ should be larger than those of shortable stocks. This implies that non-shortable stocks adjust lag to market information more than shortable stocks. Then, following Chordia and Swaminathan (2000), we compute the DELAY measure as follows;

Equation 3: DELAY measures

$$X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$$

$$DELAY_i = 1/(1 + e^{-x})$$

The possible value of DALAY is ranged between zero and one. The value of DELAY close to zero means a less delay in adjustment or the price can instantly reflect the new market-wide information. The higher the value of DELAY, especially closer to one, indicates the slow speed of price adjustment.

Table 18 shows the result of Dimson beta regression and DELAY measure. The contemporaneous beta is 1.00982 for shortable stocks and 0.99182 for non-shortable stocks. They are quite the same, indicating that their price adjustment to the market-wide news is quite the same. The lagged coefficients tend to be statistically insignificant. Then, when we transform to DELAY measure, they show that the DELAY for shortable stocks is 0.51885 and 0.51822 for non-shortable stocks. In addition, the p-value for equality-test between the DELAY values of shortable and non-shortable stocks indicates that such difference is not statistically significant. Therefore, our empirical show that short-ability of stocks cannot improve the speed of price adjustment to market-wide information.

Table 18 Dimson beta regression and DELAY measure

Coefficient	Non-shortable stocks	Pr > |t|	Shortable stocks	Pr > |t|
α_0	0.00002	0.5243	0.00056	0.4605
β_0	0.99182	0.0559	1.00982	0.0378
β_1	-0.10311	0.4810	0.00936	0.4605
β_2	0.02021	0.4775	0.01516	0.4863
β_3	0.03847	0.4544	0.05090	0.4597
β_4	0.03485	0.5055	-0.02306	0.4976
β_5	0.01345	0.4600	0.03280	0.4589
DELAY	**0.51822**		**0.51885**	
P-value of equality test	0.98320			

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure:

$$X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0} \text{ and } DELAY_i = 1/(1 + e^{-x})$$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. We estimate this Dimson beta regression and DELAY measure 3-month period before and after a stock joins the shotable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The coefficients and DELAY show in this table is the arithmetic mean of coefficient estimate from individual stocks. The p-value in the last row indicates equality-test of DELAY between shortable and non-shortable stocks. H₀: DELAY_Non-shortable stocks = DELAY_Shortable stocks (For more detail of this equality-test, please see Chiang et al., 2008)

Our empirical results for both hypotheses 1 and 2 seem contrast with the findings from the Hong Kong stock market by Chen and Rhee (2010). The possible reason is that cost of short selling is higher for the SET than the Hong Kong Stock Exchange (HKEx). In addition, the supply of stocks to be lent for the SET is relatively lower than for the HKEx. The details of cost of short sale and the supply of stocks are shown in table 1.

The study of short selling across countries by Bris et al. (2007) found that prices incorporate negative information faster in countries where short sales are allowed and practiced. They also indicate that short selling in Thailand is not clearly practical because security borrowing and lending stock (SBL) is very narrow, especially on the supply side. Saffi and Sigurdsson (2011) study the price efficiency and short selling in 26 countries. They point out that high equity lending supply and low fees are related with an improvement in speed of price adjustment. They also indicate that although short selling

is allowed in a particular country, stocks are still subjected to other frictions such as the availability of shares for lending. They conclude that limited lending supply and high fees could make the price respond to market-wide information slower. Last but not least, Reed (2007) studied the price adjustment during quarterly announcement. His results show that stocks realize 32% less of the total post earnings announcement drift on the announcement day when short sale is limited. He suggests that when short sale is costly, stocks price incorporate private information slowly even after the information become public knowledge. So, our result can be explained by these three studies (Bris et al, 2007, Saffi and Sigurdsson, 2011 and Reed, 2007). In conclusion, our empirical evidence reveals that the speed of price adjustment to firm-specific and market-wide information between shortable stocks and non-shortable stocks for developing market is not the same as the finding in developed markets. The ability to short alone is insufficient to improve the speed of price adjustment. The other constraints such as high fees and the insufficiency of stock supply to lend in the SET could possibly slow down the speed of price movement to the new information.

CHAPTER VII
ROBUSTNESS TESTS

We also further investigate whether the speed of price adjustment to both firm-specific and market-wide information for shortable stocks versus non-shortable stocks is different in up and down market conditions. Specifically, we separate our sample period into two market conditions: up days and down days.

Following Chen and Rhee (2010), we define up (down) day as the day a stock has positive (negative) open-to-close return. Then, we use dynamic VAR model to test whether the speed of price adjustment to firm-specific information is different for shortable and non-shortable stocks in each market condition; up and down days. For testing speed of price movement to market-wide information, we classify up (down) market day as the day the SET index has positive (negative) open-to-close return. We then apply the Dimson beta regression and DELAY measure to estimate whether the different market conditions affect the speed of price movement of shortable and non-shortable stocks.

The result of dynamic VAR and impulse response are shown in table 19 to 22 and figure 12 and 13. The summary of the result is that speed of price adjustment between shortable stocks and non-shortable stocks are the same regardless of the market conditions (up or down days). Comparing the shortable and non-shortable stocks, the magnitude of $\sum_{i=1}^{5} d_i$ for shortable stocks is quite the same as non-shortable counterparts in both up and down days. This implies that shortable stocks have quite the same trade continuity as non-shortable stocks regardless of condition in the market. The estimated $\sum_{i=1}^{5} a_i$ are also not much different for shortable and non-shortable stocks in these two market conditions, which imply that quote reversal is quite the same for shortable and non-shortable. The summations $\sum_{i=0}^{5} b_i$ are the same for before and after stocks become shortable in both market conditions. This implies the quote adjustment subsequent to each trade is the same for both shortable and non-shortable stocks in both market situations. The amounts of $\sum_{i=1}^{5} c_i$ which indicates the Granger causality running from quote revision to trades are negative for both shortable and non-shortable stocks. These

means that, in both bull and bear circumstances, knowledge of past quote revision and past trade leads to better predictions of trade than would result from knowledge of past trade alone for both shortable and non-shortable stocks. None of the summations of coefficients between shortable and non-shortable stocks are statistically significant different in both up and down market conditions.

For impulse response, we found that, in up days (down days), the eventual price impacts following a unit shock to Q_t are 0.00095 (0.00104) for shortable stocks and 0.00105 (0.00110) for non-shortable stocks. In up days (down days), the immediate quote adjustment is 40.00% (32.69%) of the total adjustment for shortable stocks, while it is 37.14% (36.36%) for non-shortable stocks. For up days (down days), the second quote adjustment reaches 51.58% (42.31%) of total adjustment for shortable stocks and 47.62% (45.45%) for non-shortable stocks. For up market conditions (down market condition), it takes about 21(27) trades to accomplish the total price adjustment for shortable stocks and around 22 (23) trades to accomplish the same percentage level of price adjustment for non-shortable stocks. Overall, our empirical evidence suggests that both shortable and non-shortable stocks provide quite the same speed of price adjustment regardless of the market conditions. Our results in emerging market do not consistent with the study of Chen and Rhee (2010) in developed market that ability to short improves the speed with which both private and firm-specific information are reflected in prices in both up and down days.

Table 19 Estimation of dynamic VAR model: Up days

Up days	Non-shortable stocks		Shortable stocks	
Variable	Coeff.	Stat. Sig.	Coeff.	Stat. Sig.
a1	-0.19830	**	-0.21146	***
a2	-0.05181		-0.05351	
a3	-0.00631		-0.01320	
a4	0.00206		-0.00383	
a5	0.00720		0.00360	
Sum a	-0.24716		-0.27839	
p-value of equality-test	0.15440			
b0	0.00086	***	0.00082	***
b1	0.00006		0.00009	
b2	0.00002		-0.00001	
b3	-0.00006		-0.00005	
b4	-0.00005		-0.00005	
b5	-0.00009		-0.00008	
Sum b	0.00074		0.00072	
p-value of equality-test	0.72870			
c1	-203.28028	***	-204.36211	***
c2	-71.92882	**	-73.98826	**
c3	-28.10190	*	-30.45994	*
c4	-10.41346		-14.86196	
c5	-4.20119		-6.24360	
Sum c	-317.92566		-329.91586	
p-value of equality-test	0.60630			
d1	0.47405	***	0.46447	***
d2	0.19738	***	0.19331	***
d3	0.08724	*	0.08809	**
d4	0.04395		0.05450	
d5	0.04032		0.04085	
Sum d	0.84294		0.84122	
p-value of equality-test	0.89920			

Note: This table presents the result from estimation of dynamic VAR model:

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t} \text{ and } Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market days as a day with positive (negative) open-to-close return of particular stocks. This table shows the results of up days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 20 Estimation of dynamic VAR model: Down days

Down days	Non-shortable stocks		Shortable stocks	
Variable	Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20954	***	-0.22196	***
a2	-0.06172		-0.06794	
a3	-0.01683		-0.01809	
a4	0.00569		0.00044	
a5	0.00605		-0.00025	
Sum a	-0.27634		-0.30780	
p-value of equality-test	0.33050			
b0	0.00091	***	0.00082	***
b1	0.00010		0.00013	
b2	0.00000		0.00000	
b3	-0.00002		-0.00003	
b4	-0.00008		-0.00004	
b5	-0.00006		-0.00007	
Sum b	0.00085		0.00081	
p-value of equality-test	0.67180			
c1	-196.60115	***	-204.56740	***
c2	-70.66436	**	-73.46866	**
c3	-27.38441		-31.54147	
c4	-12.65039		-13.29305	
c5	-5.53214		-4.66515	
Sum c	-312.83246		-327.53574	
p-value of equality-test	0.52950			
d1	0.46756	***	0.46539	***
d2	0.19247	***	0.18854	**
d3	0.08791	*	0.08530	
d4	0.05197		0.05667	
d5	0.03796		0.04031	
Sum d	0.83787		0.83621	
p-value of equality-test	0.91070			

Note: This table presents the result from estimation of dynamic VAR model:

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t} \text{ and } Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market days as a day with positive (negative) open-to-close return of particular stocks. This table shows the results of down days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 21 Cumulative impulse response of quote price to a unit shock in Q_t: Up days

	Non-shortable Stocks: up days					Shortable Stocks: up days			
No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.	No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.
0	0.00039	0.00092	0.00039	37.14%	0	0.00038	0.00088	0.00038	40.00%
1	0.00011	<0.0001	0.00050	47.62%	1	0.00011	<0.00001	0.00049	51.58%
2	0.00010	<0.00001	0.00060	57.14%	2	0.00009	<0.00001	0.00058	61.05%
3	0.00007	<0.00001	0.00067	63.81%	3	0.00007	<0.00001	0.00065	68.42%
4	0.00004	<0.00001	0.00071	67.62%	4	0.00005	<0.00001	0.00070	73.68%
5	0.00002	<0.00001	0.00073	69.52%	5	0.00005	<0.00001	0.00075	78.95%
6	0.00005	<0.00001	0.00078	74.29%	6	0.00004	<0.00001	0.00079	83.16%
7	0.00004	<0.00001	0.00082	78.10%	7	0.00002	<0.00001	0.00081	85.26%
8	0.00003	<0.00001	0.00085	80.95%	8	0.00002	<0.00001	0.00083	87.37%
9	0.00003	<0.00001	0.00088	83.81%	9	0.00002	<0.00001	0.00085	89.47%
10	0.00002	<0.00001	0.00090	85.71%	10	0.00002	<0.00001	0.00087	91.58%
11	0.00002	<0.00001	0.00092	87.62%	11	0.00001	<0.00001	0.00088	92.63%
12	0.00002	<0.00001	0.00094	89.52%	12	0.00002	<0.00001	0.00090	94.74%
13	0.00002	<0.00001	0.00096	91.43%	13	0.00001	<0.00001	0.00091	95.79%
14	0.00001	<0.00001	0.00097	92.38%	14	0.00001	<0.00001	0.00092	96.84%
15	0.00001	<0.00001	0.00098	93.33%	15	0.00001	<0.00001	0.00093	97.89%
16	0.00001	<0.00001	0.00099	94.29%	16	0.00001	<0.00001	0.00094	98.95%
17	0.00001	<0.00001	0.00100	95.24%	17	0.00001	<0.00001	0.00095	100.00%
18	0.00001	<0.00001	0.00101	96.19%	18	0.00000	<0.00001	0.00095	100.00%
19	0.00001	<0.00001	0.00102	97.14%	19	0.00000	<0.00001	0.00095	100.00%
20	0.00001	<0.00001	0.00103	98.10%	20	-0.00001	<0.00001	0.00094	98.95%
21	0.00001	<0.00001	0.00104	99.05%	21	0.00001	<0.00001	0.00095	100.00%
22	0.00001	<0.00001	0.00105	100.00%	22	0.00000	<0.00001	0.00095	100.00%
23	0.00000	<0.00001	0.00105	100.00%	23	0.00000	<0.00001	0.00095	100.00%
24	0.00000	<0.00001	0.00105	100.00%	24	0.00000	<0.00001	0.00095	100.00%
25	0.00000	<0.00001	0.00105	100.00%	25	0.00000	<0.00001	0.00095	100.00%
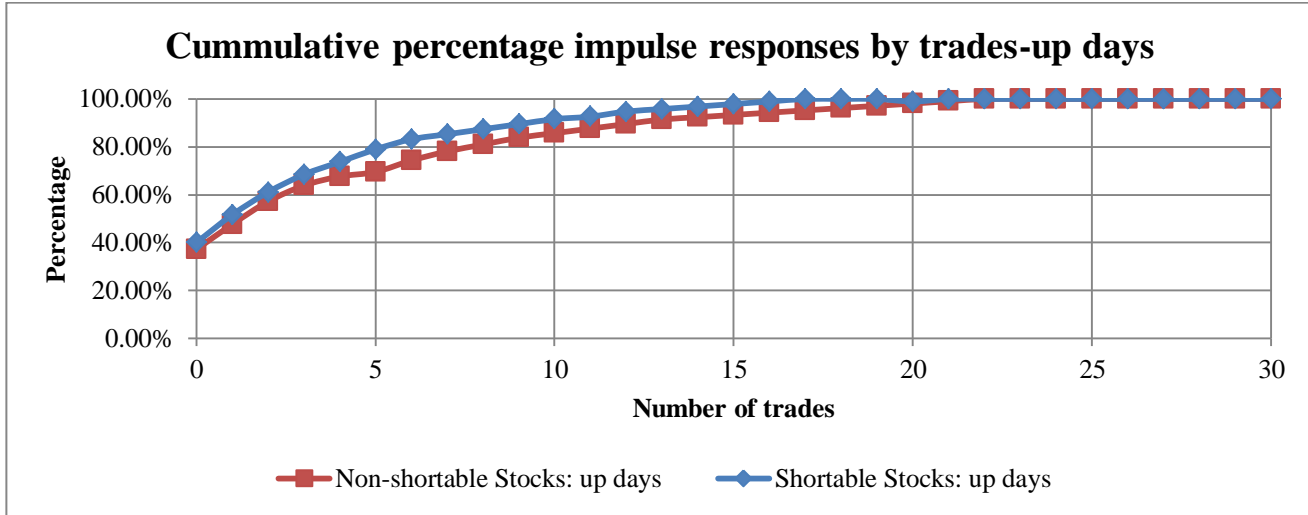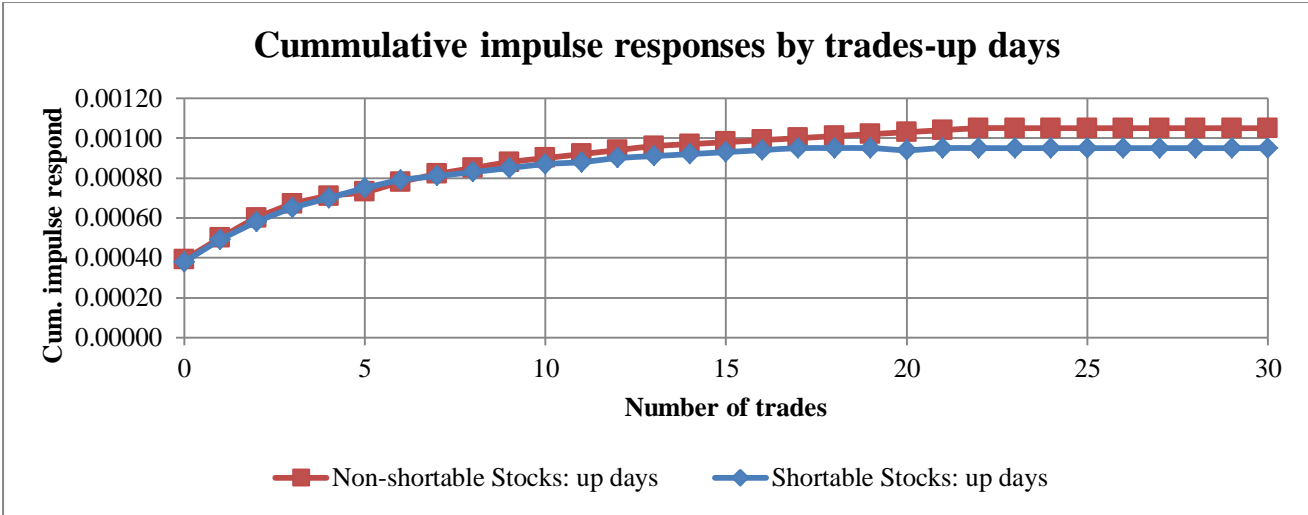
Figure 12 Cumulative impulse responses and cumulative percentage impulse response by trades: Up days

Table 22 Cumulative impulse response of quote price to a unit shock in Q_t: Down days

Non-shortable Stocks: down days					Shortable Stocks: down days				
No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.	No. of trades	Quote responses	Std. dev.	Cum. Quote resp.	% cum. Quote resp.
0	0.00040	0.00108	0.00040	36.36%	0	0.00034	0.00115	0.00034	32.69%
1	0.00010	<0.00001	0.00050	45.45%	1	0.00010	<0.00001	0.00044	42.31%
2	0.00009	<0.00001	0.00059	53.64%	2	0.00009	<0.00001	0.00053	50.96%
3	0.00008	<0.00001	0.00067	60.91%	3	0.00007	<0.00001	0.00060	57.69%
4	0.00005	<0.00001	0.00072	65.45%	4	0.00006	<0.00001	0.00066	63.46%
5	0.00003	<0.00001	0.00075	68.18%	5	0.00004	<0.00001	0.00070	67.31%
6	0.00005	<0.00001	0.00080	72.73%	6	0.00005	<0.00001	0.00075	72.12%
7	0.00004	<0.00001	0.00084	76.36%	7	0.00003	<0.00001	0.00078	75.00%
8	0.00003	<0.00001	0.00087	79.09%	8	0.00003	<0.00001	0.00081	77.88%
9	0.00003	<0.00001	0.00090	81.82%	9	0.00003	<0.00001	0.00084	80.77%
10	0.00003	<0.00001	0.00093	84.55%	10	0.00003	<0.00001	0.00087	83.65%
11	0.00002	<0.00001	0.00095	86.36%	11	0.00002	<0.00001	0.00089	85.58%
12	0.00002	<0.00001	0.00097	88.18%	12	0.00001	<0.00001	0.00090	86.54%
13	0.00002	<0.00001	0.00099	90.00%	13	0.00002	<0.00001	0.00092	88.46%
14	0.00002	<0.00001	0.00101	91.82%	14	0.00002	<0.00001	0.00094	90.38%
15	0.00001	<0.00001	0.00102	92.73%	15	0.00001	<0.00001	0.00095	91.35%
16	0.00001	<0.00001	0.00103	93.64%	16	0.00001	<0.00001	0.00096	92.31%
17	0.00001	<0.00001	0.00104	94.55%	17	0.00002	<0.00001	0.00098	94.23%
18	0.00001	<0.00001	0.00105	95.45%	18	0.00000	<0.00001	0.00098	94.23%
19	0.00001	<0.00001	0.00106	96.36%	19	0.00000	<0.00001	0.00098	94.23%
20	0.00001	<0.00001	0.00107	97.27%	20	-0.00001	<0.00001	0.00097	93.27%
21	0.00001	<0.00001	0.00108	98.18%	21	0.00001	<0.00001	0.00098	94.23%
22	0.00001	<0.00001	0.00109	99.09%	22	0.00001	<0.00001	0.00099	95.19%
23	0.00001	<0.00001	0.00110	100.00%	23	0.00001	<0.00001	0.00100	96.15%
24	0.00000	<0.00001	0.00110	100.00%	24	0.00001	<0.00001	0.00101	97.12%
25	0.00000	<0.00001	0.00110	100.00%	25	0.00001	<0.00001	0.00102	98.08%
26	0.00000	<0.00001	0.00110	100.00%	26	0.00001	<0.00001	0.00103	99.04%
27	0.00000	<0.00001	0.00110	100.00%	27	0.00001	<0.00001	0.00104	100.00%
28	0.00000	<0.00001	0.00110	100.00%	28	0.00000	<0.00001	0.00104	100.00%
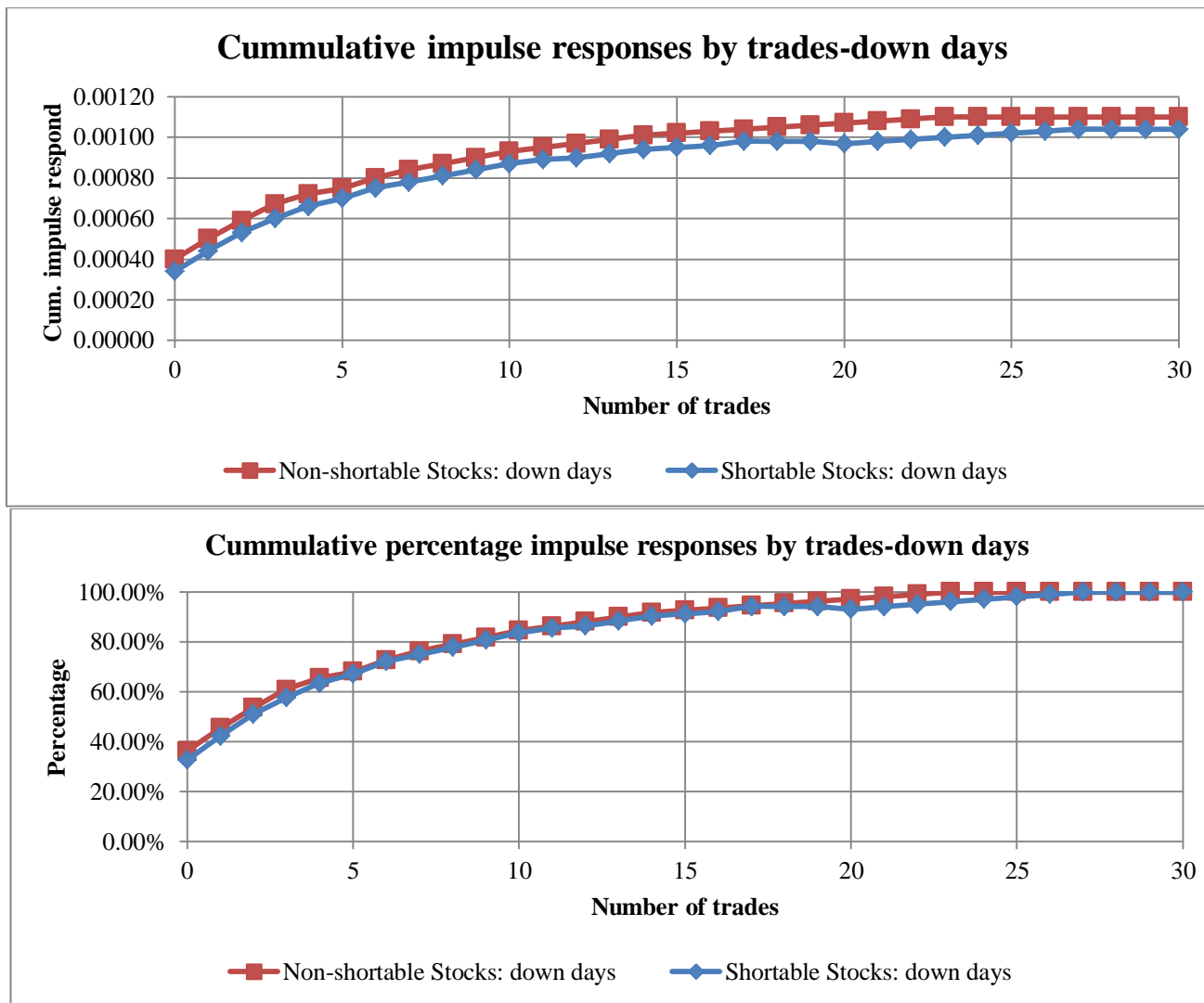
Figure 13 Cumulative impulse responses and cumulative percentage impulse response by trades: Down days

To measure the speed of price adjustment between shortable and non-shortable stock to market-wide news in up and down market condition, we use the Dimson beta regression and DELAY measure. The results present in table 23. We found that, in up days (down days), the contemporaneous beta is approximately 0.98400 (1.06882) for shortable stocks and 0.97712 (0.98776) for non-shortable stocks. They are quite the same for up days. However, they are higher for shortable stocks than non-shortable stocks in the down market condition. This indicates that, during down days, shortable stocks seem to adjust to contemporaneous market-wide information faster than those of non-shortable stocks. However, when take into account the adjustment to lag market-wide information- that is $\sum_{k=1}^{5} \beta_{i,k}$ and transfer to DELAY measure, we found no different in the speed of price adjustment between shortable and non-shortable stocks in down days. The summations of lagged coefficients are not statistically significant. The DELAY measures show that, in up days (down days), the DELAY for shortable stocks is 0.49760 (0.53761) and 0.53430 (0.52860) for non-shortable stocks. Moreover, the p-value of equality-test suggests that they are not statistically different in both up and down market conditions. In conclusion, regardless of market conditions, short-sale ability does not improve the speed of price adjustment to new market-wide information.

Table 23 Dimson beta regression and DELAY measure: Up and Down days

Coefficient	Up days				Down days			
	Non-shortable	Pr > |t|	Shortable stocks	Pr > |t|	Non-shortable	Pr > |t|	Shortable stocks	Pr > |t|
α_0	0.00060	0.5000	0.00113	0.4435	-0.00151	0.4592	-0.00024	0.4199
β_0	0.97712	0.1239	0.98400	0.0866	0.98776	0.1131	1.06882	0.0919
β_1	-0.02380	0.4538	-0.03433	0.4484	-0.22141	0.4138	-0.01291	0.4673
β_2	0.05791	0.5123	0.00525	0.4503	-0.03840	0.4304	0.10712	0.4952
β_3	0.07700	0.5341	0.02124	0.5228	0.07567	0.4977	0.04080	0.4373
β_4	-0.02990	0.5190	-0.03020	0.4343	0.11790	0.4467	-0.00596	0.5089
β_5	0.10030	0.4528	0.00979	0.5320	0.03188	0.3955	0.06430	0.5189
DELAY	**0.53430**		**0.49760**		**0.52860**		**0.53761**	
P-value of equality test	0.38450				0.81990			

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure:

$$X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0} \text{ and } DELAY_i = 1/(1 + e^{-x})$$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. We estimate this Dimson beta regression and DELAY measure 3-month period before and after a stock joins the shotable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The coefficients and DELAY show in this table is the arithmetic mean of coefficient estimate from individual stocks. The p-value in the last row indicates equality-test of DELAY between shortable and non-shortable stocks. H_0: DELAY$_{\text{Non-shortable stocks}}$ = DELAY$_{\text{Shortable stocks}}$. We define up (down) market days as a day with positive (negative) market return.

CHAPTER VIII

CONCLUSION

This thesis explores the short selling transactions from the Stock Exchange of Thailand (SET), one of leading emerging markets. There are two parts in this study. The first part is about investigating the characteristics of short selling transactions and their intraday patterns. Previous studies (Angel 1997; Aitken et al. 1998) found that the intraday patterns of short sale volume in developed markets are to U-shaped. Such pattern indicates that short orders are highly concentrated during the first trading hour, and then decrease during mid-day, with a little upward improvement before the market closes. In contrast with these previous findings, short sale data from SET reveals the W-shape pattern. We find that the patterns of volume (in shares), value (in THB), and number of transactions show relatively high during the beginning of the day. Then, they significantly reduce. After that, their patterns have upturn during the beginning of the afternoon trading session and again, they reduce during the mid of afternoon trading session. Last, before market is closed, they also show their up turns. These patterns can be classified as W-shape pattern (or two U-shaped patterns). The difference in W-shape pattern and U-shape patterns come from the difference in trading hours between the markets. The U-shape patterns appear in the markets that have no trading break during the midday such as U-shape pattern in NYSE from the study of Angel (1997) and U-shape pattern in the Australian Securities Exchange from paper of Aitken et al. (1998). In contrary, W-shape is exhibited in the exchanges that have intermission during the midday including W-shape in the Tokyo Stock Exchange from study of Hamao and Hasbrouck (1995) and W-shape from SET in our study. However, both U-shaped and W-shaped patterns are consistent with the explanation of Brock and Kleidon (1992) and Miller (1989). Their research concludes that much of trading at the open and close is due to the inability to trade when market is closed. In addition, our study reveals that most of all of short sale in SET, approximately 70 percent, is performed by individual investor. The second most significant player is proprietary trader. Foreign investors and domestic institutional investors rarely short sell stocks. Furthermore, the analysis of short selling

shows that agency account, which includes proprietary trader, institutional investor and foreign investor, has a tendency to send relatively larger value (in THB) of short orders comparing to individual account.

For the second part, we compare the speed of price adjustment between shortable and non-shortable stocks to new information. We classify the information into two types; firm-specific information and market-wide information. We hypothesize that shortable stocks have the speed of price adjustment to both firm-specific and market-wide information same as non-shortable stocks. We apply the dynamic VAR model of Hasbrouck (1991a) to test the speed of price adjustment to firm-specific information. However, our first hypothesis that shortable stocks have the speed of price adjustment to firm-specific information same as non-shortable stocks seems empirically supported. We then employ the Dimson beta regression and DELAY measure from Chordia and Swaminathan (2000) to measure the speed of price adjustment to market-wide information. Again, our findings suggest that there is no improvement in such speed when stocks become shortable. Therefore, we fail to reject our second hypothesis that shortable stock and non-shortable stocks have same speed of price adjustment to market-wide information. Our findings are robust in both up and down market conditions. Ability to short does not enhance speed of price adjustment to firm-specific and market-wide information in both up and down market conditions. These results are different from the empirical evidence from the developed market (Hong Kong stock exchange) by Chen and Rhee (2010). The possible explanations of our results lie in the short-sale constraints in the SET. That is, the high fees and the scarcity of supply in SBL in the SET could possibly slow down the speed of price adjustment to the new information (Bris et al 2007; Saffi and Sigurdsson 2011; Reed 2007).

REFERENCES

Abhyankar A., Ghosh, D., Levin, E. and Limmack, R.J. 1997. Bid-ask spreads, trading volume and volatility: intraday evidence from the London Stock Exchange. Journal of Business Finance and Accounting 24 (3), (4) : 343-362.

Aitken, M., Frino, A., McCorry, M. and Swan, P. 1998. Short sales are almost instantaneously bad news: evidence from the Australian stock exchange. Journal of Finance 53: 2205–2223.

Al-Suhaibani, M. and Kryzanowski, L. 2000. An exploratory analysis of the order book, and order flow and execution on the Saudi stock market. Journal of Banking and Finance 24: 1323-1357.

Angel, J. J. 1997. Short Selling on the NYSE, Working Paper, Georgetown University.

Beber, A. and Pagano, M. 2011. Short-selling bans around the world: evidence from the 2007-09 Crisis. Working paper accepted to publication in Journal of Finance.

Berkman, H., Dimitrov, V., Jain, P.C. and Tice, S. 2009. Sell on the news: differences of opinion, short-sales constraints, and returns around earnings announcements. Journal of Finance Economics 92 : 376-399.

Bris, A., Goetzmann, W. N. and Zhu, N. 2007. Efficiency and the bear: short sales and markets around the world. Journal of Finance 62:1029–79.

Brock, W. A. and Kleidon, A. W. 1992. Periodic market closure and trading volume. Journal of Economic Dynamics and Control 16: 451-489.

Chan, K. C., Christie, W. G. and Schultz, P. H. 1995. Market structure and the intraday pattern of bid-ask spreads for NASDAQ securities. Journal of Business 68: 35–60.

Chang, E., Cheng, J. and Yu, Y. 2007. Short-sales constraints and price discovery: evidence from the Hong Kong market. Journal of Finance 62: 2097-2121.

Chen, C. X. and Rhee, S.G. 2010. Short sales and speed of price adjustment: evidence from the Hong Kong stock market. Journal of Banking & Finance 34: 471-483.

Chiang, T. C., Nelling, E. and Tan, L. 2008. The speed of adjustment to information: Evidence from the Chinese stock market. Review of Economics and Finance 17: 216–229

Chiu, J., Chung, H. and Wang, G. H. K. 2012. Intraday liquidity provision by trader types in a limit order market: evidence from Taiwan Index Futures. Working paper, George Mason University

Chordia, T. and Swaminathan, B. 2000. Trading volume and cross-autocorrelations in stock returns. Journal of Finance 55: 913–935.

Diamond, D.W. and Verrecchia, R.E. 1987. Constraints on short-selling and asset price adjustment to private information, Journal of Financial Economics 18: 277–311.

Diether, K., Lee, K. and Werner, I. 2009a, Short-sale strategies and return predictability. Review of Financial Studies, 22: 575−607.

Diether, K., Lee, K. and Werner, I. 2009b. It's SHO time! Short-sale price test and market quality. Journal of Finance 64: 37–73.

Diether, K., Malloy, C.J. and Scherbina, A. 2002. Differences of opinion and the cross section of stock returns. Journal of Finance 57: 2113-2141.

Dimson, E. 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics 7: 197–226.

Fung, J. and Draper, P. 1999. Mispricing of index futures contracts and short sales constraints. Journal of Futures Market 19: 695–715.

Gao, P., Hao, J. and Ma, T. 2006. Does removing the short-sale constraint improve liquidity? Evidence from Hong Kong. Working Paper, Northwestern University.

Gregoriou, G. N. 2012. U.S. Short Sale Background. In G. Gregoriou, <u>Regulating short sales in the 21st century</u>, 85-95. New York : Academic Press,2011.

Hamao, Y. and Hasbrouck, J. 1995. Securities trading in the absence of dealers: trades and quotes on the Tokyo Stock Exchange. <u>The Review of Financial Studies</u> 8: 849-878.

Hasbrouck, J. 1991a. Measuring the information content of stock trades. Journal of <u>Finance</u> 46: 179–207.

Hasbrouck, J. 1991b. The summary informativeness of stock trades: An econometric analysis. Review of Financial Studies 4: 571–595.

Hong, H. and Stein, J. 2003. Differences of opinion, short-sales constraints and market crashes. <u>Review of Financial Studies</u> 16: 487–525.

Jain, A., Jain, P., McInish, T.H. and McKenzie, M. 2011. Worldwide short selling: regulations, activity, and implications (revise and resubmit at the Journal of Financial Economics).

Jain, P. and Joh, G. 1988. The dependence between hourly prices and trading volume. <u>Journal of Financial and Quantitative Analysis</u> 23 : 269-83.

Madhavan, A., Richardson, M. and Roomans, M. 1997. Why do security prices change? A transaction-level analysis of NYSE stocks. <u>Review of Financial Studies</u> 10: 1035–1064.

Miller, E. M. 1977. Risk, uncertainty, and divergence of opinion. Journal of Finance 32: 1151-1168.

Miller, E.M. 1989. Explaining intraday and overnight price behavior. <u>Journal of Portfolio</u> Management 19: 10-16.

Reed, A. 2007. <u>Costly short-selling and stock price adjustment to earnings announcements.</u> University of North Carolina, unpublished manuscript.

Saffi, P. and Sigurdsson, K. 2011. Price efficiency and short selling. <u>Review of Financial Studies</u>, 24(3): 821-852.

Sawad, N. 2010. <u>Short sales as informative content to investors: Evidence from the Stock Exchange of Thailand</u>, Master's Thesis, Department of Banking and Finance, Faculty of Commerce and Accountancy, ChulalongkornUniveristy.

Takahashi, H. 2010. Short-sale inflow and stock returns: Evidence from Japan. <u>Journal of Banking and Finance</u> 34: 2403–2412.

APPENDICES

Appendix A: SET50 Selection Criteria

The followings are the detail about the criteria that SET use to decide qualified stocks to be adding to SET50 which is also become be able to short sell. All the followings are quoted from the recent version announcement of SET in March 2012 quoted from http://www.set.or.th/en/products/index/files/201203_SET50100_Selection_Criteria_EN.pdf

Selection criteria for companies to be included in the SET50

The methodology for choosing eligible stocks is comprised of (1) the Selection Criteria for periodic review (semi-annual) and (2) the Rule of the Changing to Constituent Companies which is the ongoing index maintenance between the periodic reviews.

Periodic Review

1. Eligible stocks must be listed and traded on the SET for a minimum of 6 (six) months. The criteria shall not be applied for stocks from the Changing of Constituent Companies
2. The eligible stocks must be in the top 200 stocks on the SET's main board in terms of average daily market capitalization for the past 3 (three) months. For the stock(s) included from the Changing to Constituent Companies and listed for less than 3 (three) months, average daily market capitalization shall be based on its (their) available trading days.
3. Eligible stocks must maintain their share distributions or free-float qualifications (Aggregation of ordinary shareholders) of at least 20 percent of the paid-up capital of the listed company in question.
4. Eligible stocks must meet the following liquidity criteria (Active trading):

4.1. For securities on the SET's main board, the monthly turnover value of the eligible stocks must be more than 50.00% of the total average monthly turnover value per stock in the same month and;

4.2. The criteria 4.1 should be met for at least 9 (nine) out of the 12 (twelve) months during the evaluation period (or 3/4 (three fourths) of the trading period but not less than 6 (six) months). Stock(s) recently entered from the Changing of Constituent Companies shall meet a minimum 3 of 4 of the available trading period.

5. If the number of eligible stocks is less than 105, SET index committee shall gradually alter until a minimum of 105 stocks is fulfilled, as follows:

5.1. Step 1 The percentage used in Step 4.1, above, will be reduced in steps of 5.00% each, for example, instead of the monthly turnover value of the stock in question having to be more than 50.00% of the total average monthly turnover value per stock for that month, it need be only more than 45.00%. If that level does not yield 105 stocks, then the limit will be reduced to 40.00%, etc. However, the limit must not be less than 20.00% in any one month.

5.2. Step 2 The number of months that are required as stipulated in criteria 4.2 will be reduced by 1 month at a time, i.e., to 8 or 7 months but not less than 6 months. This step is not applied to the stocks recently entered from the Changing of Constituent Companies.

5.3. Step 3 If the number of eligible stocks still does not reach the target of 105 securities, the percentage of the average monthly turnover per stock used for screening actively traded stocks will be reduced until a minimum of 105 stocks is reached.

6. Eligible stocks must not:

6.1. Be in the process of being delisted by the SET or having been declared by the SET as being in danger of being delisted.

6.2. Being voluntarily delisted

6.3. Be still suspended from trading for a period of time.

6.4. Its trading might be suspended for an extended period of time in the near future.

7. The top 50 stocks ranked by average daily market capitalization will be chosen for calculating the SET50 Index (the 51st – 55th stocks will be treated as replacements for the SET50 Index). The top 100 stocks, which include all those in the SET50 index together with the next 50 stocks will be used in calculating the SET100 Index (the 101st – 105th stocks will be treated as replacements for the SET100 Index)

8. Periodic Review and Adjustments

The revisions are conducted every December and June. Periodic adjustments and the new list of stocks will be announced as soon as the lists become available. The new stock lists will be used for the SET50 and the SET100 Indices calculations starting with the first trading day of January and July of each year.

Changing to Constituent Companies

Ongoing event-related changes to the indices that are the result of newly-listed securities and other corporate events are reflected in changes to the components of the SET50 or SET100 Indices at the time of the event. These events can affect many aspects of an index and its constituents, as shown below.

1. New Issue

1.1. If there a large company is listed on the SET (i.e., its market capitalization calculated using its IPO price is greater than 1.00% of SET's market capitalization or is expected to be as large as one of the top 20 of the SET50 or SET100 constituents). The SET will include the new company as a SET50 and SET100 constituent in order to maintain the efficiency of SET50 and SET100 Indices as market indicators.

1.2. For the purpose of Rule 1, a new company which is restructured, renamed or has resulted from a merger or complex restructuring with/from an existing constituent as shown in Rule 2 is not considered as a new issue.

1.3. The new company will be included in SET50 Index at the end of its first trading day (Day T). The smallest stock ranked by market capitalization on the close of the announced date (Day T-3) will be removed and placed in the replacement list at the end of Day T.

2. Mergers & acquisitions, takeovers and complex restructurings

   2.1. If the above corporate events involve only index constituents.

      2.1.1. The company resulting from the events in 2.1 will remain a constituent in the original index.

      2.1.2. If a constituent is absorbed by another constituent, the resulting vacancy will be filled subject to Rule 5.

   2.2. If the above corporate events involve both an index constituent(s) and non-constituents

      2.2.1. If the constituent(s) survives, the above corporate actions and its (their) equity can still be listed, it (they) will remain in the original index.

      2.2.2. If an index constituent is absorbed by a non-constituent, the original constituent will be removed and replaced by the resulting company, if it is in listed company status.

   2.3. If an index constituent splits or spins off a portion of its business to form one or more new companies, the constituent involved in the spinoff is still included in its original index on condition that the company has survived and its securities is listed.

   2.4. The Index Committee shall be responsible for considering corporate events not identified above, as well as the interpretation or possible exceptions to the rules above.

3. Timing of deletion as an index constituent

If a stock is to be deleted as a SET50 or SET100 constituent (e.g. inclusion of early entry company), the constituent with the smallest market capitalization on Day T-3 before first

trading day (T) of inclusion stock will be removed and placed in replacement list at the end of Day T.

4. Timing of replacing as an index constituent

When a vacancy is created, the company on the replacement list with the largest market capitalization on closing of 3 Days before any sock is deleted from the constituents (Day T-3) will be replaced in the constituents at the end of Day T.

5. Trading suspension for long periods

When a constituent of the SET50 or SET100 Index is suspended from trading for longer than 20 trading days, the SET will exclude that company from the SET50 or SET100 Indices, as the case may be.

Appendix B: Raw Data and Data Analysis

This section is consists of two topics. The first topic provides the detail about the data that we use in our study. The second topic demonstrates the analysis of raw data that we use.

B.1 Raw data

There are two main types of data that is used in this paper separating by the frequency of the data; intraday data and daily data. Intraday data is a high frequency data that contain two types of data which are called "Deal file" and "Limit Order Book (LOB) file". We mainly use this high frequency data to analyze the short sale order and short sale pattern as shown in our empirical result (e.g. part 6.1 and 6.2). In addition, we also use intraday data with dynamic VAR model in testing our first hypothesis. For the daily data, we use them in Dimson beta regression and DELAY measure to test our second hypothesis. All intraday data are obtained from SET and daily data is got form DataStream providing by Thomson Reuters.

B.1.1 Intraday data

As previous mention, there are two kinds of intraday data which are "Deal file" and "LOB file" Each type of data contains different information which is essential in our study. The following part shows about descriptive information about these two data files that are especially related to our study scope. Then, we analyze and provide statistical comparison between two periods; 3-month before and after stock join SET50.

Deal file

Deal file contain all executed transaction on SET. It contains following important information:

- Deal date or date that order is executed
- Deal time or time that order is executed

- BPCFlag or letter that indicates type of buyer account (use following abbreviation; "C" is individual investor account, "P" is proprietary account, "F" is foreign account, "M" is institution account, "I" is sub-broker individual investor account, "S" is sub-broker proprietary account, "O" is sub-broker foreign account, and "U" is sub-broker institution account).

- SPCFlag or letter that indicates type of seller account (use following abbreviation; "C" is individual investor account, "P" is proprietary account, "F" is foreign account, "M" is institution account, "I" is sub-broker individual investor account, "S" is sub-broker proprietary account, "O" is sub-broker foreign account, and "U" is sub-broker institution account).

- Board Type which represents type of board that orders are submitted to (use following abbreviation; "B" is big lot board, "F" is foreign board, "I" is index options board, "M" is main board, and "O" is odd lot board account).

- Security symbol

- Deal volume

- Deal price

- Short sale flag (use following abbreviation; "S" is short sale from general broker account, "K" is short sale from sub-broker account,)

Limit Order Book file

LOB file is the data provided by SET containing all orders that are sent to SET, not limit to executed orders as Deal file. This file also contains the operation in SET when order that is sent to system is matched. LOB file consist of many data but the followings are the information that we use in our study.

- Date that orders are placed
- Time that orders are placed

- Type of orders (use following abbreviation; "A" for submit orders which indicate all the orders that SET receives, "D" for deleted orders, and "M" for orders that are matched)
- Security symbol
- Price and volume of each book (e.g. best bid price, best offer price, volume at best bid price , volume at best offer price)

B.1.2 Daily data

Daily data that we use is Return Index (RI) of SET index and stocks in our sample as shown their symbol in table 8. TRI is an index which reflects the value of particular stock. It computes by taking into account the re-investing concept. It assumes to re-invest dividend by purchasing the additional unit of share at the closing price applicable on the ex-dividend date. Note that RI is computed using the annualized dividend yield by assuming to be 260 days in a year, market holidays are ignored. The following formula shows the method to compute RI;

$$RI_t = RI_{t-1} \times \frac{PI_t}{PI_{t-1}} \times \left(1 + \frac{DY_t}{100} \times \frac{1}{N}\right)$$

Where RI_t is the return index on day t

PI_t is the price index on day t.

DY_t is the dividend yield in percentage term on day t

N is the number of working days in a year (assume to be 260)

Note that both return index (RI), price index (PI) are set to be 100 at the equity's bas date. This base date is the first date that stock is traded in SET or the first date that data are available. Dividend yield (DY) is calculated from the total dividend amount and display as a percentage of the market value for the constituents. It provides an average of the individual yields for that particular stock weighted by overall market value

B.2 Data analysis

B.2.1 Intraday data analysis

We provide some statistical analysis of our raw data in this part. We start by investigate the LOB file by separate LOB file into two group 3 month period before and after stocks are join shortable list. The following table shows some description of LOB file.

Table 24 Order type in LOB files

Table 24.1 Non-shortable stock			Table 24.2 Shortable stock		
Panel A: All orders			**Panel A: All orders**		
Order type	Frequency	Percent	Order type	Frequency	Percent
A	5,273,322	57.74	A	5,444,429	57.65
D	2,899,231	31.74	D	3,036,156	32.15
M	960,975	10.52	M	963,148	10.20
Panel B: **Orders during continuous trading period**			**Panel B:** **Orders during continuous trading period**		
Order type	Frequency	Percent	Order type	Frequency	Percent
A	3,725,514	65.54	A	3,789,623	66.16
D	1,028,260	18.09	D	1,005,383	17.55
M	930,481	16.37	M	933,360	16.29

Note: These two tables present the frequency of each order type that is record in Limit Order Book file (LOB file) from SET. The data showing in these tables include non-shortable stocks (for table 24.1) and shortable stock (for table 24.2) from year 2002 to 2009. Note that non-shortable stocks mean 3-month period before such stock join SET50 while shortable stocks mean 3-month after such stock join SET50.Panel A indicates all orders in LOB file, including both call auction and continuous trading periods. Panel B are consist of all orders that are approximately submitted during continuous trading periods (from 10.00 AM to 12.30 PM and 2.30 PM to 4.30 PM). Note that order type "A" is order that is placed to the system. Order type "D" is the order that is canceled from the system and "M" stands for order that is executed.

Comparing data from table 24.1 and table 24.2, the proportion of each order type is quite the same for both shortable and non-shortable stocks. In addition, comparing between panel A and B, there are two interesting point. First, the frequency of order type

"M" or matching orders is not exactly the same because, in fact, the continuous trading period is randomly start between 9.55AM to 10.00 AM for the morning trading session and also randomly start between 2.25PM to 2.30 PM for the afternoon trading session. The different between frequencies of order type "M" from these two tables is the orders that are matched during such random period. Note that we provide the detail about trading period on SET in section 4.1 SET's General Market Mechanism.

Second, panel B shows that the deleted order, type "D", is significant reduced compare to panel A. This result comes from the uncommon delete order in the call auction period for some stocks. For non-shortable stocks, we found that there is only one stock that its frequency accounts for more than three standard deviations above arithmetic mean frequency. Such stock is "TOP". For shortable stocks, we found that there are two stocks that their frequencies account for more than three standard deviations above arithmetic mean frequency. These two stocks are "RRC" and "TOP". The detail of frequency of order type "D" is shown in table 25. The three socks that have irregular high order type "D" is shown in blue high-light. We need to further investigate whether we can use these three shares in our study.

Since the data that we use in our study is data during continuous trading period, we explore into these abnormal-type "D"-frequency stocks during continuous trading period. Showing in table 26, we found that their proportion of each order type still be the same as other stocks aka same proportion of order type as the average stocks as shown in panel B table 24.2. So, we still include their data in our study.

Table 25 Frequency of order type "D" in LOB file

Non-shortable stocks			Non-shortable stocks			Shortable stocks			Shortable stocks		
Symbol	Frequency	Percent	Symbol	Frequency	Percent	Symbol	Frequency	Percent	Symbol	Frequency	Percent
AEONTS	6,674	0.36	MINT	9,405	0.50	AEONTS	2,931	0.14	MINT	12,567	0.62
AMATA	38,782	2.07	MS	38,662	2.07	AMATA	54,156	2.67	MS	37,896	1.87
AOT	47,377	2.53	NPC	38,389	2.05	AOT	51,457	2.53	NPC	46,962	2.31
AP	20,213	1.08	NSM	34,228	1.83	AP	31,457	1.55	NSM	37,638	1.85
ASP	46,211	2.47	PS	6,937	0.37	ASP	54,498	2.68	PS	6,933	0.34
ATC	37,289	1.99	PSL	46,105	2.47	ATC	28,772	1.42	PSL	37,169	1.83
BECL	33,127	1.77	PTT	44,259	2.37	BECL	29,418	1.45	PTT	45,694	2.25
BH	9,911	0.53	QH	113,455	6.07	BH	8,865	0.44	QH	100,515	4.95
BIGC	4,714	0.25	RRC	121,164	6.48	BIGC	3,688	0.18	RRC	187,582	9.24
BT	34,212	1.83	SCIB	70,350	3.76	BT	22,160	1.09	SCIB	96,555	4.76
CCET	18,461	0.99	SIRI	17,289	0.92	CCET	20,191	0.99	SIRI	18,102	0.89
CK	31,076	1.66	SSI	17,035	0.91	CK	32,190	1.59	SSI	31,143	1.53
CP7-11	8,806	0.47	STECON	23,889	1.28	CP7-11	12,794	0.63	STECON	12,910	0.64
CPF	28,092	1.50	TISCO	48,984	2.62	CPF	55,637	2.74	TISCO	51,767	2.55
DELTA	7,274	0.39	TOC	51,704	2.77	DELTA	8,638	0.43	TOC	71,353	3.51
DTAC	17,059	0.91	TOP	234,993	12.57	DTAC	17,106	0.84	TOP	218,224	10.75
ESSO	23,338	1.25	TPC	14,969	0.80	ESSO	34,893	1.72	TPC	21,349	1.05
GOLD	15,131	0.81	TPI	16,980	0.91	GOLD	17,500	0.86	TPI	12,944	0.64
IRPC	90,686	4.85	TSTH	18,284	0.98	IRPC	93,402	4.60	TSTH	24,739	1.22
ITD	28,731	1.54	TTA	80,529	4.31	ITD	24,663	1.21	TTA	98,865	4.87
ITV	42,180	2.26	TTW	19,912	1.07	ITV	47,113	2.32	TTW	20,866	1.03
KEST	63,007	3.37	TUF	5,624	0.30	KEST	48,783	2.40	TUF	7,994	0.39
KSL	15,559	0.83	UCOM	47,448	2.54	KSL	7,718	0.38	UCOM	63,969	3.15
LALIN	6,166	0.33	VNG	37,626	2.01	LALIN	4,521	0.22	VNG	20,979	1.03
MAJOR	19,363	1.04	Average	36,655.22	1.96	MAJOR	14,119	0.70	Average	39,815.33	1.96
MBK	2,606	0.14	Std. Error	38,553.00	2.06	MBK	3,447	0.17	Std. Error	42,020.68	2.07
MCOT	15,151	0.81				MCOT	15,750	0.78			

Note: By using LOB file during call auction period, this table present the frequency of order type "D" of each particular stock during two periods; three month period before and after they join SET50. The last two row of the table provide the arithmetic mean and standard error for the frequency and percentage of frequency. We define the stock with abnormal order type "D" as the stock that stay out of ± 3 std. error from mean. We found three stocks that have unusual high order type "D" which are "RRC" for shortable stocks and "TOP" for both periods. These three stocks show in blue high-light. There is no stock with uncommon low order type "D" frequency.

Table 26 Frequency of order type during continuous trading period for irregular stocks

Order type	Shortable stocks				Non-shortable stocks	
	RRC		TOP		RRC	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
A	366,764	67.86	262,603	69.37	278,252	69.62
D	95,641	17.69	70,761	18.69	73,617	18.42
M	78,097	14.45	45,166	11.93	47,832	11.97

Note: This table exhibits the frequency of three stocks during continuous trading period. These three stocks have too high frequency of order type "D" during the call auction as shown in table 25.

B.2.3 Daily data analysis

This part compares the statistical description and some important financial ratio between two group of our sample; shortable and non-shortable stocks. Recall that we define non-shortable stock as stocks from table 8 during 3-month period before these stocks join SET50, which is also shortable list, and we define shortable stocks as these same stocks during 3-month period after they join SET50. We provide the detail of statistics of these stocks as following table 27 and 28.

Table 27 Non-shortable stocks statistics

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2002-1	TPI	1.12	1.34	0.92	1.28	1.16	743,160,584	862,462,005.00	20,721,125,597.04	N/A	2.94	0.90	-	4.66	7,848,911,211
	CCET	2.10	3.00	1.95	2.80	2.64	198,993,000	526,244,745.00	8,456,000,000.00	7.2	1.48	18.89	4.64	6.59	302,000,000
2002-2	PTT	36.00	38.00	28.75	36.00	34.16	297,745,400	10,169,673,080.00	100,700,846,100.00	34.1	1.59	22.61	6.94	10.96	2,797,245,725
	AEONTS	40.00	50.40	32.60	47.60	39.37	31,817,500	1,252,698,900.00	11,900,000,000.00	N/A	10.19	23.36	0.42	13.60	50,000,000
	GOLD	11.89	17.16	11.50	13.74	14.64	260,343,659	3,811,644,070.00	8,186,945,096.40	20.85	1.79	7.88	-	44.38	580,634,404
	QH	1.74	2.04	1.64	1.86	1.88	2,535,116,500	4,762,686,611.00	7,570,076,570.40	24.91	3.34	2.79	-	62.65	813,986,728
2003-1	BT	3.49	3.56	3.10	3.24	3.40	1,069,138,036	3,631,042,060.00	13,889,085,000.00	7.28	1.27	7.26	-	25.30	1,493,450,000
	CCET	3.10	3.38	2.90	3.30	3.18	138,831,000	441,065,775.00	9,966,000,000.00	4.80	1.66	19.87	9.09	4.80	302,000,000
	MAJOR	13.80	16.30	13.30	16.20	14.47	42,460,500	614,314,750.00	9,509,400,000.00	45.04	6.09	13.31	-	10.75	117,400,000
	TISCO	20.60	25.00	19.10	22.40	22.76	314,752,000	7,164,914,920.00	10,991,631,168.00	9.21	1.53	16.41	-	64.85	490,697,820
	ITD	2.62	3.12	2.16	2.27	2.70	1,725,565,000	4,666,135,970.00	8,486,799,468.60	1.44	0.93	24.36	-	46.15	373,867,818
2003-2	SSI	0.77	1.00	0.75	0.96	0.89	2,934,937,918	2,599,550,920.00	8,316,750,000.00	2.07	0.85	11.43	-	33.86	853,000,000
	ATC	13.10	19.30	10.30	18.00	13.73	706,647,700	9,700,034,040.00	17,244,000,000.00	12.32	2.99	6.03	-	74.01	958,000,000
	ITV	4.72	9.80	4.70	9.10	7.13	1,961,592,800	13,981,069,631.00	10,465,000,000.00	N/A	6.48	1.40	-	170.62	1,150,000,000
	MS	1.30	1.89	1.29	1.70	1.64	5,414,037,974	8,866,618,763.00	6,529,752,782.84	N/A	0.84	2.05	-	142.03	3,796,367,897
	AP	3.21	4.00	2.92	3.78	3.38	1,052,293,050	3,558,972,620.00	9,483,458,268.40	12.92	4.94	0.92	2.13	52.50	2,088,867,460
	LALIN	6.75	7.40	5.90	7.10	6.50	185,559,500	1,206,464,076.00	5,857,500,000.00	12.93	3.10	11.46	1.97	23.25	165,000,000
	SIRI	1.12	1.38	1.11	1.34	1.23	2,264,908,388	2,792,126,060.00	7,197,840,327.40	71.72	2.20	3.78	-	44.20	867,209,678
	AMATA	3.68	5.00	3.58	4.82	4.18	688,013,300	2,874,229,742.00	5,142,940,000.00	5.51	1.86	2.60	4.15	65.27	1,067,000,000
2004-1	VNG	12.80	13.50	10.80	12.70	12.17	632,970,200	7,704,959,970.00	16,309,667,380.60	15.26	4.54	2.80	3.25	49.36	1,284,225,778
	TT&T	5.00	5.50	4.02	4.98	4.85	2,760,476,800	13,398,827,221.00	14,190,496,534.08	11.49	1.11	4.49	-	96.88	2,849,497,296
2004-2	KEST	45.50	56.50	38.75	40.50	46.72	386,497,600	18,059,032,775.00	22,072,500,000.00	17.21	5.94	6.82	1.98	71.00	545,000,000
	TOC	55.00	65.50	43.25	58.00	54.67	279,482,500	15,278,738,028.00	47,626,178,000.00	32.42	2.30	25.18	-	34.57	821,141,000
	TPC	19.60	21.60	14.70	18.50	18.39	121,205,000	2,229,377,800.00	16,187,500,000.00	9.71	1.89	97.80	5.41	16.49	87,500,000
	CK	17.00	19.10	11.20	13.20	14.02	493,728,900	6,920,056,700.00	13,860,000,000.00	43.11	3.66	3.60	-	47.11	1,050,000,000
	STECON	16.20	19.10	9.70	11.10	13.57	522,008,700	7,081,930,995.00	11,232,443,535.00	20.72	3.54	3.14	2.7	53.57	1,011,931,850
	PSL	18.50	21.38	13.00	17.38	16.29	741,974,800	12,089,745,875.00	18,070,000,000.00	9.00	7.05	4.86	3.65	72.22	520,000,000
	TTA	33.41	38.18	22.95	29.55	27.84	782,893,300	21,795,148,870.00	20,778,999,150.00	9.11	4.51	7.21	3.83	112.17	639,353,820
	UCOM	41.25	51.50	38.00	49.25	45.25	302,964,300	13,710,601,600.00	21,407,409,194.75	13.63	2.20	22.38	-	69.70	434,668,207

Table 27 Non-shortable stocks statistics (continue)

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2005-1	SCIB	22.90	26.25	20.80	25.25	23.64	1,524,020,300	36,034,344,426.00	53,348,469,569.00	7.98	1.65	15.34	2.97	79.54	2,112,810,676
	ASP	7.65	8.20	6.80	7.15	7.38	1,381,778,000	10,196,903,550.00	14,091,902,253.00	N/A	4.23	16.96	5.52	70.30	197,089,542
	NPC	102.00	119.00	97.50	107.00	106.91	41,894,700	4,478,993,350.00	33,170,000,000.00	9.87	1.58	67.64	4.67	13.55	310,000,000
	AOT	49.75	52.50	44.75	51.50	49.41	114,037,400	5,634,564,450.00	73,571,355,000.00	15.42	1.26	40.88	-	8.13	1,428,570,000
	NSM	1.91	2.08	1.53	1.93	1.83	2,050,273,200	3,750,876,609.00	17,343,749,377.13	0.82	1.01	1.92	-	22.82	8,986,398,641
2005-2	CPF	4.04	4.60	4.02	4.24	4.31	1,203,703,900	5,185,500,486.00	24,299,341,996.64	7.82	0.74	6.05	2.59	21.46	5,730,976,886
	TUF	26.17	27.34	25.00	25.70	26.01	23,435,824	609,481,729.00	23,768,358,625.00	11.37	2.11	13.01	5.67	6.35	864,303,950
	TOP	62.00	69.00	55.00	63.50	62.40	696,918,600	43,487,562,665.00	129,541,769,935.50	8.77	2.46	25.83	2.83	35.10	2,040,027,873
	CP7-11	5.45	6.05	5.20	5.65	5.71	204,049,800	1,165,077,909.00	24,924,641,424.00	15.22	2.97	1.90	3.98	4.47	4,411,440,960
	MCOT	22.60	23.10	18.10	21.80	20.77	61,309,400	1,273,572,470.00	14,978,762,778.00	N/A	2.52	8.66	2.71	8.92	687,099,210
	DELTA	20.00	21.10	14.60	16.90	17.43	42,329,900	737,912,670.00	20,079,172,906.00	22.38	1.59	10.62	4.73	4.04	1,188,116,740
	TISCO	25.00	27.25	22.40	25.00	25.23	71,011,700	1,791,893,705.00	13,374,405,500.00	8.42	1.55	16.14	5.2	18.26	534,976,220
2006-1	PTTCH	89.00	90.00	77.50	81.00	82.74	35,415,200	2,930,427,900.00	91,622,421,000.00	7.76	1.76	46.05	-	3.15	1,131,141,000
	CPN	10.70	14.50	10.60	14.40	12.03	68,646,200	825,622,230.00	31,374,950,400.00	9.71	2.90	4.97	1.59	3.26	2,178,816,000
	GLOW	22.40	23.40	21.20	23.30	22.44	42,717,600	958,789,270.00	34,084,755,315.50	7.14	1.45	16.02	3	4.24	1,462,865,035
	MAKRO	56.50	70.50	55.00	69.50	62.13	8,024,200	498,508,085.00	16,680,000,000.00	15.05	1.72	40.31	3.96	3.64	240,000,000
	BGH	17.10	24.60	17.00	23.70	21.12	83,793,700	1,770,105,370.00	27,572,819,559.60	38.53	3.60	6.59	2.11	7.22	1,163,410,108
	BH	25.75	30.00	24.90	29.50	26.92	46,045,500	1,239,706,462.00	21,466,895,474.00	20.07	9.24	3.19	2.29	6.78	727,691,372
2006-2	CCET	3.60	3.94	3.54	3.94	3.74	150,809,200	564,084,074.00	14,301,132,437.30	7.94	1.43	2.75	7.61	4.15	3,629,729,045
	MINT	6.69	9.83	6.69	7.81	8.47	224,603,087	1,902,029,940.00	27,263,317,491.90	23.59	3.97	2.40	1.31	6.93	2,885,007,142
	AMATA	17.70	21.80	16.00	17.00	18.64	203,747,600	3,797,111,907.00	18,139,000,000.00	15.92	4.63	3.67	3.82	22.03	1,067,000,000
2007-1	KSL	8.35	10.20	8.25	10.00	9.56	96,303,100	920,471,790.00	15,500,000,000.00	24.73	2.43	4.12	1.6	7.54	1,550,000,000
	IRPC	6.90	7.45	4.88	6.10	6.91	2,433,874,500	16,827,482,983.00	118,950,000,000.00	1.86	1.08	5.64	-	12.51	19,500,000,000
2007-2	RRC	17.70	20.00	17.60	19.40	18.83	858,600,700	16,164,249,750.00	55,607,822,478.80	7.52	1.20	16.19	5.15	30.12	2,866,382,602
2008-1	PS	8.25	8.85	7.30	8.40	8.25	78,815,800	650,459,541.00	18,313,496,880.00	16.16	2.37	3.54	2.37	4.78	2,180,178,200
	MAJOR	17.90	19.00	15.50	19.00	17.27	104,954,300	1,812,447,445.00	16,718,719,761.00	13.70	3.04	6.27	3.86	17.41	879,932,619

Table 27 Non-shortable stocks statistics (continue)

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2008-2	DTAC	46.00	60.00	44.75	50.50	51.09	174,001,700	8,890,269,766.00	119,574,455,500.00	18.04	2.21	22.89	1.45	8.92	2,367,811,000
2009-1	TSTH	1.49	1.54	0.60	1.35	0.93	1,058,655,700	989,810,987.00	11,027,836,291.05	2.56	0.62	2.18	5.63	12.96	8,168,767,623
	QH	1.75	1.78	0.66	0.94	0.91	14,181,670,300	12,973,043,491.00	7,968,699,332.10	5.18	0.72	1.31	6.49	168.12	8,477,339,715
	ESSO	6.90	7.00	3.96	5.35	5.10	233,795,400	1,192,550,387.00	18,515,590,300.00	2.68	0.60	8.88	18.27	6.83	3,460,858,000
	TTW	4.34	4.62	3.62	4.18	4.04	418,246,800	1,688,531,758.00	16,678,200,000.00	13.84	1.96	2.14	3.59	11.03	3,990,000,000
	BIGC	42.75	42.75	28.00	38.25	32.28	14,250,800	459,982,040.00	30,653,036,455.50	11.20	1.87	20.50	4.08	1.81	801,386,574
2009-2	MBK	50.50	55.50	50.00	53.50	52.05	3,553,800	184,972,775.00	10,091,656,850.00	7.35	1.00	53.66	7.48	1.88	188,629,100
	BECL	16.00	17.20	15.10	16.70	16.09	187,629,800	3,018,874,682.00	12,859,000,000.00	8.63	0.76	21.98	6.59	24.40	770,000,000
Average		20.05	23.11	17.51	20.83	20.09	916,079,899	6,291,374,368.63	26,346,128,239.12	14.76	2.65	14.22	4.26	34.70	2,119,646,231

Note: The table presents statistics of each stock three-month before join SET50. This statistics include all stocks from table 8. Statistics for each stock is calculated as follows: Open (Close) is the first (last) trading price during the studied period. High (Low) is the highest (lowest) trading price during three-month period before such stock join SET50. Avg. Price is total trading value (in THB) divide by total volume. Volume is total shares amount of every transaction during the studied period. Value is total value of transaction in THB during studied period. Market capitalization is calculated from the product of closing price and total number of registered shares during the studied period. P/E is price-earnings ratio calculated from product of closing price and outstanding number of common stocks divided by last 12-month profit of that firm. P/BV is price per book value ratio computed from product of closing price and outstanding number of common stocks divided by shareholders equity of the firm. 'N/A' in column P/E indicates that such firm has negative earning per shares. Book value per share (BVPS) is common stocks part divided by total number of common stocks. Dividend yield (DIY) is total last 12-month dividend payment divided by the product of closing price and total number of registered shares. '-' in column DIY indicate that such firm pay no dividend. Turnover ratio is total trading volume multiplies by 100 and divides by the average of number of listed stocks during studied period. Listed share is total number of stock that registers with SET. Last row show the average value of each variables. For the average of DIY, we define as the average of the firm that pay dividend. Note that the column year mean the year that such stocks join SET50. The second number (1 or 2) following the year number is indicate the half year that stock includes in SET50 (1 if stock join SET50 since 1 January of that particular year, 2 if stock join SET50 since 1 July of that year)

Table 28 Shortable stocks statistics

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2002-1	TPI	1.27	1.79	1.24	1.50	1.52	1,026,348,174	1,564,993,712.00	24,331,624,754.10	2.72	4.98	0.62	-	6.34	7,848,911,211
	CCET	2.82	4.38	2.80	4.20	3.45	538,060,000	1,856,544,890.00	12,684,000,000.00	7.86	2.08	20.23	7.14	19.36	302,000,000
2002-2	PTT	35.75	41.00	34.00	41.00	37.53	306,388,100	11,499,753,970.00	114,687,074,725.00	5.44	1.65	24.80	6.10	11.82	2,797,245,725
	AEONTS	46.40	46.40	32.60	34.20	39.37	7,759,500	305,457,521.00	8,550,000,000.00	N/A	6.74	25.37	1.46	3.61	50,000,000
	GOLD	13.55	14.91	8.33	8.43	11.96	178,121,665	2,130,699,915.00	5,022,487,594.60	12.44	1.09	7.92	-	29.97	580,634,404
	QH	1.84	1.94	1.43	1.44	1.72	870,732,000	1,496,946,300.00	5,947,050,369.60	13.08	2.39	3.05	-	22.31	825,979,218
2003-1	BT	3.24	3.35	2.88	2.93	3.16	442,497,574	1,399,335,910.00	12,544,980,000.00	6.38	1.13	7.24	0.86	10.33	1,493,450,000
	CCET	3.25	3.53	2.70	2.70	3.11	99,860,000	310,192,525.00	8,154,000,000.00	3.93	1.29	20.87	11.11	3.61	302,000,000
	MAJOR	16.10	16.40	13.20	13.30	14.87	62,530,000	929,599,400.00	7,807,100,000.00	23.92	4.71	14.13	3.01	11.82	117,400,000
	TISCO	22.40	23.30	15.70	18.20	19.85	331,269,900	6,575,526,897.00	9,480,806,244.00	8.22	1.28	15.04	-	64.15	520,923,420
	ITD	2.26	2.49	1.45	1.72	1.87	2,167,649,000	4,049,477,270.00	6,430,526,469.60	1.01	0.69	25.05	-	57.98	373,867,818
2003-2	SSI	0.96	2.95	0.89	2.78	1.71	11,048,701,403	18,909,786,135.00	24,097,250,000.00	5.92	2.31	12.22	-	127.53	853,000,000
	ATC	18.40	25.50	16.90	24.70	20.37	570,024,600	11,612,976,040.00	23,662,600,000.00	14.16	3.98	6.21	-	59.73	958,000,000
	ITV	9.20	12.70	7.90	11.90	10.09	2,108,346,600	21,276,408,480.00	14,280,000,000.00	N/A	9.95	1.25	-	180.75	1,200,000,000
	MS	1.71	3.64	1.71	3.01	2.45	5,931,970,305	14,534,015,479.00	11,678,813,362.88	N/A	1.53	2.00	-	153.76	3,841,714,922
	AP	3.82	5.71	3.75	5.21	4.76	1,505,806,551	7,168,014,796.00	13,110,549,625.00	17.56	6.81	0.92	1.54	61.03	2,097,687,940
	LALIN	7.10	11.30	7.10	9.80	8.82	122,917,000	1,084,441,075.00	8,085,000,000.00	15.00	3.97	12.34	1.43	15.44	165,000,000
	SIRI	1.36	2.99	1.36	2.60	2.14	4,127,248,746	8,827,211,795.00	14,133,977,657.10	49.99	4.09	3.98	-	78.15	877,886,811
	AMATA	4.88	10.90	4.82	10.50	7.00	924,252,900	6,465,952,769.00	11,203,500,000.00	14.39	3.99	2.63	1.9	86.86	1,067,000,000
2004-1	VNG	12.70	15.50	11.10	11.30	13.92	447,858,200	6,233,539,880.00	14,670,279,319.10	14.36	3.85	2.94	4.27	34.76	1,298,254,807
	TT&T	5.00	6.95	4.80	5.05	5.99	3,959,595,800	23,706,275,781.00	14,518,608,574.75	14.75	1.14	4.46	-	138.95	2,874,971,995
2004-2	KEST	40.00	42.00	26.50	35.75	36.88	261,049,900	9,628,698,100.00	19,483,750,000.00	13.71	4.94	7.23	2.24	47.90	545,000,000
	TOC	57.00	65.50	51.00	63.00	58.46	260,122,000	15,206,148,450.00	51,731,883,000.00	24.49	2.42	26.08	-	31.92	821,141,000
	TPC	18.40	21.00	17.70	19.60	18.98	173,645,000	3,295,873,200.00	17,150,000,000.00	7.70	1.99	98.57	5.10	19.85	87,500,000
	CK	13.10	14.70	7.20	13.90	12.24	722,730,000	8,846,198,315.00	14,659,243,020.00	39.22	3.52	3.96	-	68.59	1,054,621,800
	STECON	11.00	12.10	7.30	8.85	9.80	401,150,400	3,930,458,278.00	8,988,475,507.50	20.62	2.95	3.01	3.38	39.64	1,015,646,950
	PSL	17.00	20.88	15.50	20.25	18.36	438,735,000	8,053,327,150.00	21,060,000,000.00	7.94	7.37	5.43	3.17	42.45	520,000,000
	TTA	28.86	38.41	26.36	36.36	31.61	786,683,861	24,864,788,310.00	25,582,708,800.00	7.55	4.73	8.46	1.22	113.18	639,567,720
	UCOM	48.75	60.50	46.25	58.00	53.14	329,724,300	17,520,897,075.00	25,210,756,006.00	13.62	2.49	23.34	-	76.00	434,668,207

Table 28 Shortable stocks statistics (continue)

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2005-1	SCIB	25.25	28.75	24.50	25.00	26.53	835,967,000	22,174,688,192.00	52,820,266,900.00	8.30	1.59	15.74	5.60	42.77	2,112,810,676
	ASP	7.20	8.70	6.75	6.85	7.99	2,035,560,000	16,256,782,000.00	13,500,633,627.00	N/A	3.37	20.31	5.55	104.63	197,089,542
	NPC	107.00	123.00	105.00	108.00	114.13	51,218,800	5,845,825,100.00	33,480,000,000.00	7.68	1.48	72.75	8.33	16.71	310,000,000
	AOT	51.50	52.00	46.00	46.75	49.09	96,691,600	4,746,826,449.00	66,785,647,500.00	12.62	1.12	41.87	2.57	7.05	1,428,570,000
	NSM	1.94	2.10	1.72	1.74	1.97	1,841,218,800	3,632,146,479.00	15,636,333,635.34	26.80	0.86	2.01	-	20.55	8,986,398,641
2005-2	CPF	4.26	6.50	4.08	6.25	5.12	2,659,015,400	13,624,814,478.00	46,999,611,412.50	9.52	1.25	6.95	1.34	43.55	7,519,937,826
	TUF	25.70	27.81	24.54	26.87	26.41	33,329,526	880,086,757.00	24,991,827,312.50	12.13	2.25	12.83	5.40	6.95	869,280,950
	TOP	63.00	76.50	57.00	75.00	66.82	699,959,600	46,768,132,175.00	153,002,090,475.00	9.77	2.92	25.69	2.40	35.12	2,040,027,873
	CP7-11	5.65	6.20	5.40	6.20	5.80	279,490,900	1,620,827,771.00	27,425,939,382.00	16.50	3.42	1.82	3.62	12.67	4,423,538,610
	MCOT	21.80	29.25	20.50	27.75	25.07	76,846,500	1,926,338,633.00	19,067,003,077.50	20.34	3.09	8.98	2.13	12.02	687,099,210
	DELTA	16.50	16.80	15.10	15.30	15.75	30,623,900	482,446,960.00	18,178,186,122.00	23.37	1.36	11.23	5.23	2.69	1,188,116,740
	TISCO	25.00	29.50	23.40	27.50	26.67	104,393,200	2,784,576,765.00	14,877,778,300.00	9.22	1.66	16.54	4.67	28.50	541,010,120
2006-1	PTTCH	81.50	90.00	81.00	87.00	84.98	75,940,800	6,453,549,132.00	98,409,267,000.00	7.61	1.71	50.82	5.75	6.93	1,131,141,000
	CPN	14.20	20.50	13.80	18.90	17.17	71,791,200	1,232,419,202.00	41,179,622,400.00	12.50	3.67	5.15	2.12	3.29	2,178,816,000
	GLOW	23.30	29.75	23.30	29.50	25.89	155,609,900	4,028,434,783.00	43,154,518,532.50	11.16	1.75	16.88	7.63	13.54	1,462,865,035
	MAKRO	69.00	83.50	50.00	81.50	72.53	11,209,300	812,965,708.00	19,560,000,000.00	17.21	2.21	36.83	11.04	5.29	240,000,000
	BGH	23.90	25.75	23.10	25.25	24.42	56,253,000	1,373,529,475.00	29,821,204,450.00	35.84	3.78	6.78	1.98	5.13	1,181,037,800
	BH	29.75	35.00	29.00	31.25	32.34	42,541,500	1,375,692,350.00	22,740,355,375.00	21.67	8.72	3.58	2.40	18.97	727,691,372
2006-2	CCET	3.88	4.08	3.68	3.88	3.93	105,451,900	413,975,410.00	15,187,964,506.96	8.04	1.44	2.91	7.17	2.71	3,914,423,842
	MINT	7.81	8.68	6.98	7.89	7.77	187,310,665	1,454,497,611.00	27,622,054,024.90	22.32	4.02	2.38	1.29	5.41	2,892,361,678
	AMATA	17.00	18.00	11.40	12.70	14.34	325,214,300	4,663,930,960.00	13,550,900,000.00	15.29	3.67	3.46	5.12	32.91	1,067,000,000
2007-1	KSL	9.50	9.95	8.90	9.35	9.55	28,533,300	272,464,355.00	14,492,500,000.00	23.05	2.21	4.23	2.35	1.84	1,550,000,000
	IRPC	5.70	6.35	4.88	6.00	5.80	2,061,605,200	11,965,492,647.00	117,000,000,000.00	17.15	1.41	4.26	2.00	10.61	19,500,000,000
2007-2	RRC	19.40	26.50	19.40	25.50	23.10	2,659,779,700	61,447,431,074.00	73,092,756,351.00	10.21	1.56	16.30	3.92	93.14	2,866,382,602
2008-1	PS	8.20	11.40	6.85	10.00	8.85	177,189,100	1,567,528,635.00	21,859,527,000.00	17.21	2.67	3.75	2.20	8.37	2,185,952,700
	MAJOR	18.60	18.90	16.60	18.20	17.77	76,718,200	1,363,035,010.00	16,022,217,465.80	13.06	2.85	6.39	5.76	13.28	880,341,619

Table 28 Shortable stocks statistics (continue)

Year	Ticker	Open	High	Low	Close	Avg. Price	Volume (shares)	Value (THB)	Market Cap (THB)	P/E	P/BV	BVPS (THB)	DIY (%)	Turnover Ratio (%)	Listed Share (shares)
2008-2	DTAC	50.50	51.50	37.00	39.50	44.14	106,990,700	4,722,438,270.00	93,528,534,500.00	10.16	1.66	23.81	1.85	4.90	2,367,811,000
2009-1	TSTH	1.36	1.43	0.71	0.83	1.02	1,460,831,700	1,487,495,244.00	6,780,077,127.09	4.50	0.43	1.91	9.16	17.88	8,168,767,623
	QH	0.97	1.03	0.70	0.81	0.89	5,721,668,000	5,116,141,240.00	6,866,645,169.15	4.41	0.60	1.36	9.88	67.54	8,477,339,715
	ESSO	5.45	6.15	3.50	3.60	4.52	381,830,200	1,726,670,322.00	12,459,088,800.00	N/A	0.61	5.90	13.89	11.08	3,460,858,000
	TTW	4.24	4.96	4.08	4.54	4.57	360,828,700	1,649,195,376.00	18,114,600,000.00	13.34	2.18	2.08	4.41	9.57	3,990,000,000
	BIGC	38.25	43.25	35.25	41.50	38.83	8,296,700	322,192,500.00	33,257,542,821.00	11.66	1.92	21.65	3.93	1.04	801,386,574
2009-2	MBK	53.50	66.75	52.00	63.00	58.22	3,656,800	212,907,350.00	11,883,633,300.00	9.08	1.01	62.23	6.75	2.02	188,629,100
	BECL	16.70	19.30	16.20	18.50	17.91	124,158,600	2,224,121,990.00	14,245,000,000.00	8.42	0.84	21.94	5.95	16.29	770,000,000
Average		20.72	24.17	18.36	21.98	21.35	1,001,579,415	7,617,668,886.05	28,357,783,676.13	14.07	2.78	14.77	4.53	36.55	2,156,678,727

Note: The table presents statistics of each stock three-month after join SET50. This statistics include all stocks from table 8. Statistics for each stock is calculated as follows: Open (Close) is the first (last) trading price during the studied period. High (Low) is the highest (lowest) trading price during three-month period before such stock join SET50. Avg. Price is total trading value (in THB) divide by total volume. Volume is total shares amount of every transaction during the studied period. Value is total value of transaction in THB during studied period. Market capitalization is calculated from the product of closing price and total number of registered shares during the studied period. P/E is price-earnings ratio calculated from product of closing price and outstanding number of common stocks divided by last 12-month profit of that firm. P/BV is price per book value ratio computed from product of closing price and outstanding number of common stocks divided by shareholders equity of the firm. 'N/A' in column P/E indicates that such firm has negative earning per shares. Book value per share (BVPS) is common stocks part divided by total number of common stocks. Dividend yield (DIY) is total last 12-month dividend payment divided by the product of closing price and total number of registered shares. '-' in column DIY indicate that such firm pay no dividend. Turnover ratio is total trading volume multiplies by 100 and divides by the average of number of listed stocks during studied period. Listed share is total number of stock that registers with SET. Last row show the average value of each variables. Note that the column year mean the year that such stocks join SET50. The second number (1 or 2) following the year number is indicate the half year that stock includes in SET50 (1 if stock join SET50 since 1 January of that particular year, 2 if stock join SET50 since 1 July of that year)

Appendix C: Other Empirical Evidence

In this part, we provide other empirical evidence to robust our finding. These include adding the longer lag term in the dynamic VAR model to be 10 lags. The results are shown in table 29, 30 and 31. These three tables include the result of up days only, down days only and the combination of both two days. The results of 10-lags show quite the same result as using 5-lags. They are not much different in speed of price adjustment to firm-specific information. We still fail to reject our first hypothesis and conclude that the speed of price adjustment to firm-specific information between shortable stocks and non-shortable stocks are the same. Then, we provide the result of Dimson beta regression and DELAY measure. We start by showing the result of Dimson regression and DELAY measure of each particular stocks before and after they become shortable. Then, we present the results when we sepate our sample to be up and down days by using the market-index return. All these are shown in table 32 to 37.

Last, we show the results from hypothesis 1 and 2 by changing the definition of up and down conditions. This time, we extend the period from looking into daily return to the three-month period return. For non-shortable stocks (shortable stocks), We define up markets condition as positive three-month retun before(after) the stocks join SET50 and we define down market condition as negative three-month retun before(after) the stocks join SET50. The results are shown in table 38 to 40. We find that result still be the same, ability to short does not improve speed of price adjustment to both firm-specific and market-wide information.

Table 29 Estimation of 10- lag dynamic VAR model

Variable	Non-shortable Stocks		Shortable Stocks		Variable	Non-shortable Stocks		Shortable Stocks	
	Coeff.	Stat. Sig	Coeff.	Stat. Sig		Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20733	***	-0.22047	***	c1	-200.38575	***	-203.44105	***
a2	-0.05847		-0.06356	*	c2	-72.44210	***	-74.21709	**
a3	-0.01487		-0.01814		c3	-28.78791	*	-30.98506	*
a4	0.00282		-0.00258		c4	-13.15232		-15.40740	
a5	0.00943		0.00480		c5	-7.85821		-8.61179	
a6	0.00827		0.01094		c6	-5.01632		-5.30928	
a7	0.01242		0.01436		c7	-3.05070		-3.76988	
a8	0.00969		0.01187		c8	-1.76020		-1.91269	
a9	0.00839		0.01027		c9	-1.50084		-1.77052	
a10	0.00811		0.00717		c10	-1.46519		-0.10640	
Sum a	-0.22154		-0.24535		Sum c	-335.41954		-345.53116	
p-value of equality-test	0.43140				p-value of equality-test	0.70680			
b0	0.00088	***	0.00081	***					
b1	0.00008		0.00011		d1	0.46715	***	0.46005	***
b2	0.00001		0.00000		d2	0.19384	***	0.19009	***
b3	-0.00003		-0.00002		d3	0.08102	**	0.08254	**
b4	-0.00004		-0.00002		d4	0.03862		0.04568	*
b5	-0.00004		-0.00002		d5	0.02454		0.02396	
b6	-0.00002		-0.00003		d6	0.01586		0.01935	
b7	-0.00003		-0.00004		d7	0.01348		0.00984	
b8	-0.00003		-0.00004		d8	0.00997		0.00730	
b9	-0.00003		-0.00004		d9	0.00807		0.01109	
b10	-0.00007		-0.00006		d10	0.01055		0.01187	
Sum b	0.00069		0.00065		Sum d	0.86310		0.86177	
p-value of equality-test	0.59210				p-value of equality-test	0.91260			

Note: This table presents the result from estimation of dynamic VAR model: $r_t = \sum_{i=1}^{10} a_i r_{t-i} + \sum_{i=0}^{10} b_i Q_{t-i} + v_{1,t}$ and $Q_t = \sum_{i=1}^{10} c_i r_{t-i} + \sum_{i=1}^{10} d_i Q_{t-i} + v_{2,t}$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 30 Estimation of 10- lag dynamic VAR model : Up days

Variable	Non-shortable Stocks		Shortable Stocks		Variable	Non-shortable Stocks		Shortable Stocks	
	Coeff.	Stat. Sig	Coeff.	Stat. Sig		Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20733	***	-0.22047	***	c1	-200.38575	***	-203.44105	***
a2	-0.05847		-0.06356	*	c2	-72.44210	***	-74.21709	**
a3	-0.01487		-0.01814		c3	-28.78791	*	-30.98506	*
a4	0.00282		-0.00258		c4	-13.15232		-15.40740	
a5	0.00943		0.00480		c5	-7.85821		-8.61179	
a6	0.00827		0.01094		c6	-5.01632		-5.30928	
a7	0.01242		0.01436		c7	-3.05070		-3.76988	
a8	0.00969		0.01187		c8	-1.76020		-1.91269	
a9	0.00839		0.01027		c9	-1.50084		-1.77052	
a10	0.00811		0.00717		c10	-1.46519		-0.10640	
Sum a	-0.22154		-0.24535		Sum c	-335.41954		-345.53116	
p-value of equality-test	0.43140				p-value of equality-test	0.70680			
b0	0.00088	***	0.00081	***					
b1	0.00008		0.00011		d1	0.46715	***	0.46005	***
b2	0.00001		0.00000		d2	0.19384	***	0.19009	***
b3	-0.00003		-0.00002		d3	0.08102	**	0.08254	**
b4	-0.00004		-0.00002		d4	0.03862		0.04568	*
b5	-0.00004		-0.00002		d5	0.02454		0.02396	
b6	-0.00002		-0.00003		d6	0.01586		0.01935	
b7	-0.00003		-0.00004		d7	0.01348		0.00984	
b8	-0.00003		-0.00004		d8	0.00997		0.00730	
b9	-0.00003		-0.00004		d9	0.00807		0.01109	
b10	-0.00007		-0.00006		d10	0.01055		0.01187	
Sum b	0.00069		0.00065		Sum d	0.86310		0.86177	
p-value of equality-test	0.59210				p-value of equality-test	0.91260			

Note: This table presents the result from estimation of dynamic VAR model: $r_t = \sum_{i=1}^{10} a_i r_{t-i} + \sum_{i=0}^{10} b_i Q_{t-i} + v_{1,t}$ and $Q_t = \sum_{i=1}^{10} c_i r_{t-i} + \sum_{i=1}^{10} d_i Q_{t-i} + v_{2,t}$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market days as a day with positive (negative) open-to-close return of particular stocks. This table shows the results of up days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 31 Estimation of 10- lag dynamic VAR model : Down days

Variable	Non-shortable Stocks		Shortable Stocks		Variable	Non-shortable Stocks		Shortable Stocks	
	Coeff.	Stat. Sig	Coeff.	Stat. Sig		Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.19993	**	-0.21358	***	c1	-203.02864	***	-203.92147	***
a2	-0.05336		-0.05523		c2	-72.09854	**	-74.01869	**
a3	-0.00764		-0.01440		c3	-28.99423	*	-31.18723	*
a4	0.00162		-0.00420		c4	-11.88257		-16.22002	
a5	0.00943		0.00576		c5	-6.93185		-8.92229	
a6	0.00815		0.00885		c6	-4.36521		-5.10311	
a7	0.00955		0.01741		c7	-2.82298		-2.84107	
a8	0.00728		0.01130		c8	-0.83236		-1.44931	
a9	0.00478		0.00884		c9	-1.88384		-1.42441	
a10	0.00838		0.00350		c10	-2.10469		-0.17371	
Sum a	-0.21174		-0.23177		Sum c	-334.94490		-345.26132	
p-value of equality-test	0.52250				p-value of equality-test	0.72170			
b0	0.00086	***	0.00082	***					
b1	0.00007		0.00010		d1	0.47058	***	0.46048	***
b2	0.00003		0.00000		d2	0.19320	***	0.18880	***
b3	-0.00005		-0.00004		d3	0.08288	*	0.08295	**
b4	-0.00003		-0.00003		d4	0.03586		0.04589	
b5	-0.00005		-0.00003		d5	0.02655		0.02450	
b6	-0.00002		-0.00002		d6	0.01330		0.01841	
b7	-0.00003		-0.00005		d7	0.01306		0.01177	
b8	-0.00003		-0.00004		d8	0.00610		0.00686	
b9	-0.00003		-0.00004		d9	0.00610		0.00922	
b10	-0.00005		-0.00004		d10	0.01235		0.01215	
Sum b	0.00067		0.00063		Sum d	0.85999		0.86104	
p-value of equality-test	0.60880				p-value of equality-test	0.93540			

Note: This table presents the result from estimation of dynamic VAR model: $r_t = \sum_{i=1}^{10} a_i r_{t-i} + \sum_{i=0}^{10} b_i Q_{t-i} + v_{1,t}$ and $Q_t = \sum_{i=1}^{10} c_i r_{t-i} + \sum_{i=1}^{10} d_i Q_{t-i} + v_{2,t}$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market days as a day with positive (negative) open-to-close return of particular stocks. This table shows the results of down days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 32 Dimson beta regression and DELAY measure for individual non-shortable stocks: All days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	-0.00087	0.7553	1.93019	0.0000	0.10318	0.6610	-0.18403	0.4852	0.34085	0.1593	0.25164	0.1664	-0.48383	0.0656	0.50360
	CCET	0.00480	0.1671	0.47697	0.0232	-0.04307	0.8708	0.31612	0.2357	-0.23328	0.2970	-0.28198	0.3210	-0.33199	0.1301	0.23079
2002-2	AEONTS	0.00131	0.7920	1.59375	0.0047	-0.09824	0.8480	-0.18947	0.5460	-0.04570	0.9017	-0.10028	0.7749	0.59202	0.2700	0.52481
	GOLD	0.00031	0.9267	2.01489	0.0000	-0.22447	0.3160	-0.19433	0.4208	0.51332	0.0727	0.02282	0.9410	0.02088	0.9371	0.51714
	PTT	0.00080	0.7026	0.71663	0.0000	0.14905	0.3382	-0.17007	0.2895	-0.17673	0.3333	-0.14125	0.4805	0.26373	0.1962	0.47376
	QH	-0.00004	0.9868	1.11353	0.0000	-0.07671	0.7270	-0.12114	0.3663	0.60186	0.0085	-0.27994	0.2052	-0.23884	0.3484	0.47426
2003-1	BT	-0.00404	0.0684	0.79900	0.0017	-0.08316	0.5763	-0.11784	0.4002	-0.17259	0.4231	0.52419	0.2507	-0.18637	0.4193	0.48881
	CCET	0.00165	0.5516	0.10233	0.7665	-5.00000	0.9997	-0.10006	0.7104	0.20244	0.4259	-0.37120	0.1799	0.43753	0.1592	0.00000
	MAJOR	0.00170	0.2018	0.60344	0.0000	-0.03679	0.7824	-0.02408	0.8550	0.08095	0.4746	-0.08569	0.4587	0.13410	0.2520	0.52834
	TISCO	-0.00051	0.7440	1.80220	0.0000	-0.11836	0.4453	0.08442	0.6210	-0.09274	0.5066	-0.19859	0.1485	-0.43598	0.0165	0.39594
	ITD	-0.00467	0.1247	1.47730	0.0007	-0.17768	0.4687	0.33608	0.1193	-0.27841	0.3184	0.05557	0.8312	-0.21165	0.4596	0.45341
2003-2	SSI	-0.00415	0.2208	0.90182	0.0163	-0.06969	0.7822	0.52066	0.0892	-0.07015	0.7687	0.10641	0.7971	0.41149	0.0758	0.73038
	ATC	-0.00096	0.8507	1.13883	0.0331	-0.78166	0.1299	-0.15705	0.7939	0.80761	0.0800	-0.05895	0.8973	0.56008	0.3197	0.58052
	ITV	0.00493	0.3985	0.81534	0.0512	0.29065	0.5833	0.17686	0.6542	0.01321	0.9780	0.74480	0.1513	-0.50085	0.2823	0.70864
	MS	-0.00452	0.2693	1.20814	0.0052	-0.29235	0.3607	0.34648	0.4085	0.21433	0.5473	0.75682	0.0794	-0.08396	0.7929	0.68550
	AP	-0.00045	0.8960	0.75247	0.0162	0.27421	0.2017	-0.23262	0.4182	0.51607	0.1401	-0.08165	0.6799	-0.36433	0.2696	0.53703
	LALIN	-0.00211	0.4107	0.66476	0.0044	0.11611	0.5517	0.19110	0.3860	0.24433	0.2805	-0.43384	0.1100	0.01539	0.9365	0.54988
	SIRI	-0.00181	0.5086	1.18178	0.0000	0.20433	0.3951	-0.10389	0.6455	-0.36638	0.2683	0.18314	0.3163	0.08843	0.7584	0.50119
	AMATA	-0.00228	0.4019	1.04781	0.0000	-0.05326	0.7744	0.43161	0.1006	0.07094	0.7292	0.13987	0.6154	0.22186	0.3240	0.68439
2004-1	VNG	-0.00441	0.1089	1.08742	0.0000	-0.04919	0.8160	-0.21107	0.2690	-0.08865	0.6683	0.08423	0.6903	0.20094	0.2464	0.48535
	TT&T	-0.00778	0.0278	1.73681	0.0000	-0.34801	0.3871	0.34560	0.4534	-0.20282	0.5525	-0.17643	0.5833	0.32277	0.2847	0.49152
2004-2	KEST	-0.00227	0.3666	1.74460	0.0000	-0.24367	0.0483	-0.09905	0.4543	-0.04809	0.6981	-0.07010	0.5294	0.03220	0.8265	0.43887
	TOC	0.00068	0.8119	1.77088	0.0000	-0.01171	0.9450	-0.21280	0.2187	0.09468	0.5516	0.12977	0.4118	-0.00984	0.9574	0.49860
	TPC	-0.00086	0.7520	0.99546	0.0000	0.18460	0.2814	0.05587	0.7382	0.01945	0.8574	-0.25335	0.0775	0.20698	0.1875	0.55342
	CK	-0.00452	0.1830	1.67262	0.0000	-0.03249	0.8963	-0.09993	0.5512	0.06323	0.7759	0.07628	0.7123	-0.01809	0.9034	0.49836
	STECON	-0.00681	0.2152	2.12474	0.0000	0.28144	0.2533	-0.04476	0.8724	-0.13315	0.5988	0.30513	0.2591	-0.12040	0.6908	0.53387
	PSL	-0.00131	0.6973	1.87106	0.0000	-0.36153	0.1458	0.12072	0.4511	0.13786	0.3475	-0.04204	0.7962	-0.02433	0.9017	0.47739
	TTA	-0.00201	0.5784	1.81764	0.0000	-0.23331	0.3219	0.27268	0.0515	-0.02265	0.8876	0.12112	0.4321	-0.09750	0.6353	0.50555
	UCOM	0.00270	0.2707	1.30083	0.0000	-0.34782	0.0187	-0.07838	0.4957	-0.08994	0.3174	-0.18506	0.0934	-0.06363	0.5826	0.35710
2005-1	SCIB	0.00112	0.6550	0.95643	0.0000	-0.03402	0.8565	0.05280	0.8035	0.02239	0.8785	0.00961	0.9554	-0.02662	0.8911	0.50632
	ASP	-0.00155	0.3051	1.29006	0.0000	0.07913	0.7060	-0.20498	0.0970	-0.13450	0.3266	0.14246	0.2222	-0.30377	0.0033	0.41901
	NPC	-0.00003	0.9852	1.33863	0.0000	-0.19868	0.0856	0.14960	0.3573	-0.13016	0.3593	0.00955	0.9472	0.49488	0.0041	0.56044
	AOT	0.00025	0.8442	0.63925	0.0000	0.10829	0.3465	-0.03535	0.7434	-0.04834	0.7042	-0.15429	0.1387	-0.11897	0.1991	0.40396
	NSM	-0.00053	0.8627	1.54361	0.0000	0.08734	0.6292	-0.23464	0.3091	0.03298	0.9001	0.15139	0.5095	-0.13640	0.6000	0.48392

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	0.00129	0.4802	0.34674	0.0511	0.08174	0.5943	-0.23406	0.1834	-0.17088	0.4762	0.04679	0.7957	-0.21713	0.3601	0.19413
	TUF	0.00032	0.8693	0.07131	0.7372	-0.21834	0.4734	-0.21011	0.3214	-0.13331	0.6312	0.05369	0.8083	-0.00886	0.9704	0.00071
	TOP	0.00025	0.9061	0.92493	0.0005	0.15308	0.4159	0.24532	0.1555	-0.00427	0.9789	0.12876	0.4775	0.16515	0.3982	0.67784
	CP7-11	0.00039	0.8276	0.37552	0.0210	-0.07470	0.6846	0.12383	0.3289	0.24797	0.0741	-0.02646	0.8493	0.06428	0.7023	0.70929
	MCOT	-0.00076	0.8322	0.82789	0.0028	0.18451	0.4281	-0.05348	0.8932	0.27823	0.4920	0.12198	0.6389	-0.08673	0.7291	0.63109
	DELTA	-0.00290	0.3721	0.86677	0.0128	-0.10517	0.7508	-0.05081	0.8813	0.09835	0.8193	-0.12038	0.6951	0.50818	0.1383	0.59409
	TISCO	-0.00062	0.7582	0.84058	0.0004	0.22152	0.3509	0.03526	0.8479	0.37606	0.0447	0.26073	0.2525	0.12713	0.3910	0.77106
2006-1	PTTCH	-0.00065	0.9290	0.79134	0.5437	0.24123	0.8512	-0.22926	0.8275	0.21375	0.8581	0.03396	0.9616	-1.06730	0.0737	0.51842
	CPN	0.00481	0.0470	0.33559	0.1387	-0.80172	0.0016	0.09605	0.6917	-0.38120	0.0471	0.47029	0.0213	-0.14917	0.4503	0.09264
	GLOW	0.00093	0.2710	0.09530	0.5010	0.17139	0.2199	0.08565	0.4535	0.17740	0.2773	0.01367	0.9270	0.10367	0.3122	0.99695
	MAKRO	0.00308	0.2843	0.35975	0.3221	0.34949	0.3013	0.36388	0.2307	-0.36605	0.1829	0.09230	0.7366	-0.06885	0.8320	0.73704
	BGH	0.00525	0.1443	0.41072	0.2214	0.04277	0.9085	-0.29976	0.3816	0.10673	0.8112	-0.26455	0.5316	0.14543	0.6417	0.34167
	BH	0.00226	0.2865	1.17887	0.0000	-0.31574	0.1692	0.08544	0.7380	-0.21074	0.3723	-0.00508	0.9824	0.22943	0.3679	0.45417
2006-2	MINT	0.00542	0.2646	1.57004	0.0000	-0.15622	0.6570	0.58474	0.0814	-0.04909	0.8820	0.21720	0.5302	-0.09509	0.7874	0.57919
	AMATA	0.00108	0.7575	1.00091	0.0004	-0.17070	0.5861	-0.17349	0.3623	-0.17012	0.5944	0.00840	0.9718	0.60291	0.0273	0.52421
	CCET	0.00152	0.3963	0.33833	0.0099	-0.06038	0.5619	-0.01072	0.9331	-0.10951	0.2728	-0.07070	0.5247	0.06085	0.5767	0.36287
2007-1	KSL	0.00307	0.2363	0.50830	0.0000	0.03691	0.6606	0.06706	0.2293	0.15426	0.0171	0.10151	0.1821	0.02079	0.6974	0.67889
	IRPC	-0.00173	0.2979	1.11107	0.0000	0.05370	0.3446	0.04465	0.3616	0.11659	0.0064	0.04101	0.3351	0.02160	0.5659	0.56213
2007-2	RRC	-0.00018	0.8701	1.00364	0.0000	-0.10651	0.2600	0.00614	0.9532	-0.09738	0.3499	-0.02005	0.8512	-0.15511	0.1046	0.40817
2008-1	PS	-0.00005	0.9761	0.60188	0.0000	0.21678	0.0868	-0.20247	0.2105	0.52614	0.0008	-0.15021	0.4039	0.01803	0.8848	0.66336
	MAJOR	0.00095	0.6850	0.41867	0.0012	0.26781	0.0838	-0.05954	0.6377	0.13919	0.4843	-0.07974	0.6469	0.12875	0.5974	0.72050
2008-2	DTAC	0.00288	0.3222	0.75882	0.0000	-0.05124	0.7556	0.22577	0.3151	0.27741	0.2307	0.02387	0.9281	-0.05920	0.7858	0.63391
2009-1	TSTH	0.00837	0.2123	1.44671	0.0000	0.46674	0.0286	-0.16797	0.3422	-0.26862	0.1187	0.28137	0.0515	0.37845	0.0499	0.61702
	QH	-0.00225	0.5970	1.97642	0.0000	-0.18975	0.2860	0.04740	0.7097	0.08016	0.4658	-0.28392	0.0157	0.13642	0.2533	0.47350
	ESSO	0.00139	0.6369	0.82650	0.0000	0.25543	0.0173	-0.03978	0.6313	-0.03891	0.5795	0.10534	0.2965	0.05842	0.4695	0.60156
	TTW	0.00240	0.3477	0.33531	0.0000	0.05582	0.4409	0.07661	0.3986	-0.06456	0.3585	0.12208	0.0536	-0.05369	0.2574	0.60021
	BIGC	0.00245	0.4566	0.47874	0.0006	0.02632	0.7989	0.28227	0.1038	0.18471	0.1232	0.06164	0.5324	-0.19626	0.0834	0.67901
2009-2	MBK	0.00085	0.5580	0.25698	0.0231	-0.07738	0.4766	-0.00277	0.9745	-0.07258	0.5523	0.06407	0.6959	-0.03492	0.8079	0.38204
	BECL	-0.00048	0.7662	0.19572	0.0087	0.04412	0.5564	0.05229	0.4929	-0.05852	0.3880	0.06760	0.3849	0.02425	0.7340	0.65991
Average		0.00002	0.5243	0.99182	0.0559	-0.10311	0.4810	0.02021	0.4775	0.03847	0.4544	0.03485	0.5055	0.01345	0.4600	0.51419

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$ Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period before a stock joins the shortable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column.

Table 33 Dimson beta regression and DELAY measure for individual shortable stocks: All days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	-0.00333	0.2156	1.38985	0.0000	0.03523	0.8059	0.28055	0.1262	-0.07005	0.6808	-0.01535	0.9262	0.06035	0.8038	0.55211
	CCET	0.00213	0.5435	0.56020	0.0038	0.34211	0.0451	0.10387	0.4953	0.29387	0.0380	-0.12390	0.4369	0.05343	0.7383	0.76762
2002-2	AEONTS	-0.00276	0.2808	0.82787	0.0005	0.02840	0.9040	-0.09946	0.6518	0.37409	0.0788	-0.19514	0.1902	0.01330	0.9471	0.53653
	GOLD	-0.00540	0.0228	1.93581	0.0000	-0.85633	0.0203	0.27670	0.2547	-0.51755	0.1631	0.02670	0.9150	-0.01838	0.9344	0.36297
	PTT	0.00192	0.3229	0.24295	0.1155	-0.08583	0.4404	-0.02999	0.7956	0.05740	0.6232	-0.26554	0.0290	-0.03548	0.7893	0.18551
	QH	-0.00057	0.7289	1.42459	0.0000	0.06405	0.6248	0.00581	0.9644	-0.07369	0.5728	-0.03009	0.8284	0.04815	0.7387	0.50250
2003-1	BT	-0.00179	0.1029	0.78442	0.0000	0.11030	0.3565	-0.10912	0.2391	-0.25880	0.0287	0.04504	0.6181	-0.13169	0.1993	0.39201
	CCET	-0.00346	0.1062	0.79763	0.0000	0.17037	0.4194	0.06658	0.7767	0.21814	0.1486	-0.45290	0.0663	0.13143	0.4151	0.54178
	MAJOR	-0.00267	0.0582	0.40561	0.0058	-0.36750	0.0161	-0.18639	0.1505	0.04422	0.7354	0.12163	0.3202	0.06326	0.5601	0.30987
	TISCO	-0.00464	0.1047	1.53621	0.0000	0.27217	0.2034	0.14449	0.5274	0.03405	0.8730	-0.14500	0.5610	0.13413	0.5914	0.57109
	ITD	-0.00625	0.0900	1.90022	0.0000	0.43170	0.2332	0.27321	0.2377	0.25852	0.4047	0.21043	0.6087	-0.55671	0.0712	0.58049
2003-2	SSI	0.01543	0.0475	1.38029	0.0024	-1.17119	0.0187	0.23720	0.5642	-0.19883	0.6010	0.27244	0.4243	-0.09093	0.8388	0.33421
	ATC	0.00155	0.6537	0.88244	0.0000	-0.24093	0.3221	0.49657	0.0329	-0.10039	0.6435	-0.38537	0.0402	0.34243	0.0777	0.53177
	ITV	0.00419	0.4448	0.92728	0.0048	0.03446	0.9129	-0.42476	0.1759	-0.20424	0.5751	0.03412	0.9176	-0.34971	0.2945	0.27259
	MS	0.00361	0.5758	1.40407	0.0010	-0.51060	0.1708	0.36001	0.2547	-0.19541	0.5632	0.29382	0.3775	0.12856	0.6891	0.51360
	AP	0.00212	0.4133	1.22882	0.0000	-0.00174	0.9913	-0.23840	0.1868	0.00281	0.9892	-0.21826	0.1722	0.05650	0.7181	0.41951
	LALIN	-0.00020	0.9552	0.78632	0.0006	0.21427	0.3694	0.00999	0.9588	0.16499	0.3241	0.05804	0.8107	0.18668	0.3968	0.69131
	SIRI	0.00277	0.6245	1.43664	0.0000	-0.27456	0.4561	-0.29916	0.2898	0.34526	0.3112	0.44533	0.1437	0.43764	0.1691	0.61197
	AMATA	0.01060	0.0042	0.89107	0.0007	-0.11767	0.5367	-0.53537	0.0332	0.06006	0.8229	0.26507	0.3192	0.12382	0.5990	0.44299
2004-1	VNG	0.00148	0.6173	0.87382	0.0000	0.15877	0.3965	-0.08147	0.6823	0.08369	0.6208	0.49865	0.0093	-0.01990	0.9033	0.67527
	TT&T	0.00609	0.1706	2.04665	0.0000	-0.23669	0.3391	0.07459	0.7279	0.67026	0.0075	0.05603	0.8464	-0.19212	0.4124	0.54532
2004-2	KEST	-0.00169	0.5409	2.24739	0.0000	-0.04053	0.8490	0.33040	0.2293	-0.10816	0.6630	-0.07267	0.7266	-0.19657	0.2710	0.49026
	TOC	0.00129	0.4766	1.10976	0.0000	-0.04836	0.8044	-0.09664	0.6384	0.19088	0.1753	-0.12787	0.4689	-0.10433	0.5247	0.45812
	TPC	0.00111	0.4934	0.70578	0.0000	-0.03050	0.8614	0.07358	0.6178	-0.01362	0.9219	-0.01950	0.8697	-0.02837	0.7664	0.49348
	CK	0.00073	0.8849	2.88096	0.0000	0.26427	0.6220	-0.22412	0.5456	0.80418	0.0994	-0.00192	0.9958	-0.48028	0.2463	0.53138
	STECON	-0.00349	0.3143	1.59161	0.0000	0.76972	0.0373	-0.07770	0.8016	-0.09888	0.7375	-0.11622	0.6702	-0.04818	0.8815	0.56694
	PSL	0.00262	0.3294	1.09272	0.0000	0.29487	0.3313	-0.24583	0.2696	0.17639	0.5331	-0.23150	0.2751	0.36197	0.2257	0.58071
	TTA	0.00295	0.3412	1.56408	0.0000	0.15278	0.6461	-0.14063	0.6303	0.08821	0.7807	-0.13242	0.6328	0.38869	0.1777	0.55676
	UCOM	0.00268	0.1906	1.74356	0.0000	-0.22346	0.3121	0.05527	0.7864	-0.50196	0.0110	0.13239	0.5168	-0.35592	0.0657	0.37459
2005-1	SCIB	-0.00052	0.7151	1.51934	0.0000	0.03943	0.8443	-0.16075	0.3850	0.14191	0.2559	0.05925	0.7629	-0.22739	0.1816	0.47574
	ASP	-0.00073	0.6634	1.19073	0.0000	0.06688	0.6881	0.16203	0.4354	0.10735	0.5367	0.02240	0.9160	-0.14048	0.4396	0.54568
	NPC	0.00105	0.4224	0.72986	0.0005	-0.03731	0.7796	-0.25854	0.0914	0.12104	0.5030	0.06211	0.7369	0.01764	0.9243	0.46748
	AOT	-0.00124	0.1979	0.32726	0.0064	-0.12975	0.3233	-0.01746	0.8791	-0.03358	0.7787	0.19162	0.1966	-0.26920	0.0703	0.31228
	NSM	-0.00194	0.2211	0.40926	0.0178	-0.08628	0.5617	0.07461	0.6449	0.10271	0.4543	-0.16663	0.5043	0.09904	0.6108	0.51432

Table 33 Dimson beta regression and DELAY measure for individual shortable stocks: all days [continue]

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	0.00568	0.0396	-0.01141	0.9670	-0.06156	0.8047	0.43844	0.1186	-0.17403	0.5157	0.30506	0.1805	0.29461	0.2782	0.00000
	TUF	0.00044	0.8194	0.31037	0.1453	-0.12222	0.6078	-0.08312	0.7379	0.22505	0.2679	-0.07389	0.7057	0.15119	0.4529	0.57751
	TOP	0.00092	0.5994	1.47573	0.0000	-0.16660	0.3597	0.30636	0.1549	-0.18228	0.4062	-0.24787	0.2994	0.16528	0.3233	0.47882
	CP7-11	0.00065	0.7442	0.61518	0.0116	-0.10555	0.6041	-0.00127	0.9945	0.15244	0.5186	-0.40109	0.1255	0.39438	0.0921	0.51581
	MCOT	0.00309	0.2701	0.89114	0.0033	-0.02120	0.9384	0.04666	0.8991	-0.09753	0.7606	0.03867	0.8807	0.12421	0.6966	0.52545
	DELTA	-0.00203	0.2695	0.78286	0.0007	-0.65712	0.0039	0.15969	0.3097	0.10379	0.6521	-0.42325	0.0732	0.48370	0.0172	0.39518
	TISCO	0.00008	0.9648	1.12068	0.0000	-0.18373	0.3913	-0.08944	0.7773	0.40907	0.0836	-0.08822	0.6958	-0.04945	0.8156	0.49961
2006-1	PTTCH	0.00085	0.5020	0.87302	0.0000	-0.15015	0.3385	-0.13577	0.4993	0.08656	0.5473	-0.17262	0.0711	-0.06896	0.6065	0.37635
	CPN	0.00334	0.1275	0.83425	0.0018	0.30366	0.3505	0.01463	0.9596	-0.07980	0.7374	0.13481	0.5248	0.07313	0.8134	0.63068
	GLOW	0.00383	0.0512	0.26669	0.1443	0.10072	0.5494	-0.27606	0.0756	0.15790	0.4505	-0.09481	0.6554	-0.22057	0.3543	0.22305
	MAKRO	0.00110	0.7546	0.79595	0.1377	-0.39076	0.3053	0.75537	0.0288	0.24677	0.5351	0.05818	0.8662	0.44211	0.2005	0.80165
	BGH	0.00076	0.6204	0.40974	0.0207	0.22071	0.2976	-0.36849	0.1158	0.19467	0.1931	0.38170	0.0328	-0.15918	0.5530	0.65870
	BH	0.00020	0.9422	0.59863	0.0084	0.12926	0.5692	0.26580	0.5162	0.32840	0.1100	0.18696	0.4604	-0.20048	0.3454	0.76602
2006-2	MINT	-0.00081	0.7309	0.84492	0.0011	0.20450	0.3616	0.37172	0.1765	-0.07638	0.8129	-0.11805	0.6487	0.46688	0.1547	0.73193
	AMATA	-0.00571	0.1602	1.61143	0.0000	0.88066	0.0573	-0.14882	0.6838	0.25058	0.4986	-0.16324	0.6361	-0.03610	0.9229	0.61915
	CCET	-0.00031	0.8376	0.29001	0.1066	0.17695	0.2494	0.18509	0.2538	-0.14074	0.3358	0.06484	0.5855	0.10947	0.4234	0.79643
2007-1	KSL	-0.00075	0.6014	0.24489	0.3254	0.36415	0.0264	-0.09466	0.6108	-0.13020	0.3150	-0.20228	0.2543	0.12062	0.3080	0.55856
	IRPC	-0.00031	0.8493	2.12723	0.0000	0.05511	0.7619	0.12288	0.5803	0.06136	0.7476	-0.30234	0.1915	0.05486	0.7871	0.49904
2007-2	RRC	0.00297	0.1513	1.12984	0.0000	0.07277	0.4863	-0.19409	0.1283	-0.16358	0.2127	-0.03156	0.7780	0.11553	0.3037	0.45566
2008-1	PS	0.00407	0.2858	0.92111	0.0003	0.67352	0.0055	0.04234	0.8431	0.08905	0.6551	-0.07527	0.7837	-0.20656	0.3148	0.63827
	MAJOR	-0.00038	0.8309	0.39794	0.0003	0.46218	0.0078	-0.13512	0.3735	-0.16628	0.1941	0.03748	0.7239	0.00243	0.9846	0.62348
2008-2	DTAC	0.00004	0.9856	0.73857	0.0000	0.00308	0.9832	-0.12746	0.3330	-0.01354	0.9127	0.16785	0.1832	0.31780	0.0017	0.61558
2009-1	TSTH	-0.00729	0.0972	1.58344	0.0000	-0.09684	0.7877	-0.01794	0.9457	0.07892	0.6822	-0.50405	0.1366	0.19980	0.3953	0.44651
	QH	-0.00179	0.3627	1.40227	0.0000	0.11309	0.3714	0.01967	0.8651	0.15239	0.2387	-0.08555	0.5003	0.21263	0.1923	0.57297
	ESSO	-0.00591	0.0074	1.26699	0.0000	0.16599	0.4236	0.14318	0.3781	0.12060	0.3568	0.15657	0.2366	0.11894	0.4109	0.63568
	TTW	0.00222	0.3141	0.55879	0.0000	-0.31968	0.0062	-0.16419	0.2939	-0.13364	0.3267	-0.06408	0.7284	-0.24830	0.0340	0.15921
	BIGC	0.00228	0.3845	0.65887	0.0006	-0.06663	0.7199	0.08054	0.7049	-0.14854	0.4043	-0.06085	0.7026	-0.06446	0.5830	0.40263
2009-2	MBK	0.00251	0.1261	0.04465	0.2884	-0.00239	0.9586	0.04232	0.3075	0.04807	0.1753	0.04082	0.2386	0.03439	0.2559	0.97480
	BECL	0.00166	0.1400	0.05967	0.0577	0.01740	0.4431	-0.00269	0.8917	0.04277	0.0579	-0.01165	0.6141	0.03701	0.0141	0.80028
	Average	0.00056	0.4198	1.00982	0.0378	0.00936	0.4605	0.01516	0.4863	0.05090	0.4597	-0.02306	0.4976	0.03280	0.4589	0.51885

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$ Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period after a stock joins the shortable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column.

Table 34 Dimson beta regression and DELAY measure for individual non-shortable stocks: Up days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	0.00900	0.2397	1.49414	0.0008	-0.41983	0.4876	0.16061	0.5580	0.10615	0.7862	0.90214	0.0073	-0.81416	0.0374	0.48911
	CCET	-0.00081	0.9163	0.23511	0.5174	0.21611	0.6473	0.33213	0.3303	0.24954	0.5560	-0.49344	0.4343	-0.45865	0.2892	0.34157
2002-2	AEONTS	-0.00958	0.6846	1.56417	0.1102	0.87065	0.6924	-0.11196	0.8834	-0.28590	0.7109	-0.42108	0.5862	1.47905	0.1943	0.72684
	GOLD	-0.00466	0.5615	1.75196	0.0000	-0.25919	0.6483	0.53339	0.1891	0.82364	0.0207	-0.06737	0.8650	0.57080	0.2697	0.71382
	PTT	0.00684	0.3643	0.23222	0.3730	-0.16578	0.7328	0.22695	0.5839	-0.17402	0.5089	-0.53425	0.1784	0.54283	0.2062	0.38960
	QH	0.01182	0.2365	1.01024	0.0021	-1.03526	0.1245	0.04046	0.9189	0.35527	0.2982	-0.00572	0.9921	0.13081	0.7918	0.37538
2003-1	BT	-0.00490	0.3788	0.78804	0.0540	-0.12590	0.7760	-0.09689	0.6016	-0.11382	0.7605	0.69900	0.3811	-0.32657	0.4429	0.51136
	CCET	-0.00412	0.3912	-0.39180	0.3928	0.83008	0.0658	-0.14735	0.6795	0.70744	0.1177	-0.18558	0.5887	0.67686	0.0578	0.00815
	MAJOR	0.00170	0.4962	0.64130	0.0011	-0.15597	0.4240	0.08505	0.6520	0.22548	0.1739	-0.12863	0.3460	0.00618	0.9609	0.51252
	TISCO	-0.00677	0.0246	2.09668	0.0000	0.39489	0.2197	0.12161	0.5425	-0.36945	0.0648	-0.10963	0.4081	-0.60598	0.0057	0.43262
	ITD	-0.01257	0.0419	1.84258	0.0009	0.24316	0.5977	0.72363	0.0138	0.13995	0.7543	0.01742	0.9578	-0.32495	0.2381	0.60677
2003-2	SSI	-0.00095	0.8223	0.44061	0.1086	0.13382	0.6908	0.64020	0.0347	-0.27912	0.2603	-0.81214	0.0017	0.53220	0.0326	0.61960
	ATC	0.00427	0.7395	1.08828	0.2858	-0.85657	0.4231	-0.53222	0.5242	1.12991	0.0575	0.30975	0.6848	0.39864	0.5368	0.60182
	ITV	-0.00141	0.9268	0.41453	0.6047	0.96496	0.4127	0.40121	0.3929	-0.11613	0.8260	0.41807	0.5708	-0.51363	0.3594	0.94186
	MS	-0.00816	0.2492	0.39103	0.3994	0.37967	0.3776	1.12034	0.0109	0.01778	0.9609	-0.41895	0.3896	0.12376	0.7305	0.95798
	AP	0.00001	0.9989	0.65071	0.2227	0.25226	0.5208	0.06663	0.8331	0.69065	0.1411	-0.23585	0.3933	-0.25783	0.5459	0.68843
	LALIN	-0.00423	0.4142	0.42864	0.1513	0.36849	0.3096	0.12444	0.6412	0.32251	0.1326	-0.66819	0.0473	0.05500	0.8005	0.61582
	SIRI	-0.00354	0.4878	0.96277	0.0333	0.50512	0.2645	0.06480	0.8103	-0.42864	0.3560	-0.09537	0.7931	0.18411	0.6555	0.55945
	AMATA	-0.00625	0.2590	1.05193	0.0123	0.40245	0.3542	0.51580	0.1236	-0.00962	0.9733	-0.33767	0.1283	0.40802	0.1374	0.71721
2004-1	VNG	0.00138	0.8111	0.84040	0.0027	-0.10947	0.8085	-0.30793	0.2320	-0.17691	0.4926	-0.63675	0.1471	0.28403	0.1662	0.24474
	TT&T	0.00487	0.6960	1.85305	0.0390	-1.03605	0.3928	0.29924	0.6493	-0.16163	0.7196	-0.26412	0.6835	0.44692	0.2190	0.40463
2004-2	KEST	-0.00628	0.3897	1.54259	0.0000	0.01689	0.9629	-0.31831	0.3190	0.20498	0.3349	-0.15606	0.7039	0.58352	0.0261	0.55344
	TOC	-0.00501	0.5270	1.65686	0.0000	0.25970	0.5664	-0.51755	0.0216	0.46558	0.0519	-0.28302	0.3672	0.23692	0.5392	0.52437
	TPC	-0.00122	0.7721	0.65679	0.0004	0.14288	0.5507	-0.09073	0.4954	-0.03713	0.7490	-0.00745	0.9526	0.12164	0.6259	0.54902
	CK	-0.01663	0.1210	1.91899	0.0226	0.82059	0.1823	-0.30521	0.3863	0.03273	0.9317	0.80491	0.1151	0.29976	0.5160	0.70293
	STECON	-0.00636	0.3981	1.01431	0.0030	0.27301	0.3765	-0.13932	0.7161	0.00119	0.9962	-0.07992	0.8141	0.57990	0.1184	0.65156
	PSL	-0.00084	0.8873	1.51094	0.0000	-0.06804	0.8472	0.25368	0.1427	0.06678	0.7314	0.48208	0.1977	0.02354	0.9419	0.62286
	TTA	-0.00783	0.3190	1.92427	0.0000	0.42068	0.2719	0.10579	0.6488	-0.09261	0.6814	0.68453	0.1353	-0.02596	0.9434	0.63823
	UCOM	0.01563	0.0245	1.34850	0.0000	-0.83148	0.0085	0.24769	0.3773	-0.18168	0.2427	-0.10903	0.7693	-0.00309	0.9920	0.34281
2005-1	SCIB	0.00461	0.5097	1.07836	0.0094	-0.14748	0.7980	-0.44965	0.3082	0.23025	0.6079	0.26150	0.4648	-0.36112	0.3034	0.39350
	ASP	0.00331	0.3811	1.28746	0.0000	-0.32461	0.3315	0.09090	0.5921	-0.18512	0.2513	0.11263	0.5096	-0.49116	0.0017	0.34993
	NPC	-0.00361	0.5339	1.42208	0.0000	0.03107	0.9461	0.22618	0.1332	-0.18256	0.3212	-0.03338	0.8420	0.43174	0.0392	0.58240
	AOT	0.00976	0.0107	0.84990	0.0008	-0.66169	0.0004	0.00668	0.9613	0.19309	0.6506	-0.19846	0.3665	-0.21610	0.1205	0.26284
	NSM	0.01391	0.3366	1.58786	0.0033	-1.11885	0.2564	0.22462	0.6532	0.00122	0.9989	-0.25105	0.4567	-0.01520	0.9799	0.32518

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	-0.00057	0.8342	0.43121	0.0093	0.36852	0.0582	-0.08407	0.7711	-0.08344	0.8013	-0.17927	0.5540	0.48454	0.1003	0.76388
	TUF	0.00843	0.1301	0.17905	0.5289	-1.10878	0.1188	-0.14605	0.6806	-0.28214	0.5158	0.29381	0.6397	0.14104	0.6596	0.00212
	TOP	-0.00199	0.6396	1.03131	0.0015	0.27057	0.4508	0.53495	0.1180	0.17784	0.4680	0.10679	0.7133	0.43031	0.0869	0.81371
	CP7-11	-0.00133	0.5923	0.39391	0.1255	0.09829	0.6862	0.44059	0.1138	0.23688	0.1568	-0.02864	0.9008	0.10495	0.5908	0.89689
	MCOT	0.00358	0.6815	0.90429	0.0612	-0.08730	0.8836	-0.34974	0.5764	0.49404	0.5608	0.02552	0.9710	-0.15103	0.8119	0.48107
	DELTA	-0.01007	0.2029	1.03576	0.0398	0.34094	0.6936	0.16904	0.7599	0.27829	0.7366	-0.11283	0.8510	0.05575	0.9259	0.66951
	TISCO	0.00255	0.4831	1.05092	0.0056	0.19181	0.6069	0.02205	0.9458	0.79569	0.0002	0.63172	0.1191	0.13109	0.5275	0.84376
2006-1	PTCH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CPN	0.00806	0.2265	0.48166	0.4223	-1.06987	0.1198	-0.10105	0.8245	-0.28299	0.5108	0.26368	0.5431	0.17544	0.7946	0.10843
	GLOW	0.00033	0.9130	0.01156	0.9693	0.39216	0.1868	-0.14249	0.4286	0.03729	0.8799	0.28761	0.3622	0.13269	0.6573	1.00000
	MAKRO	0.00703	0.3876	0.70059	0.3011	0.14842	0.8226	-0.25667	0.6423	0.04091	0.9386	-0.55325	0.2203	0.50503	0.6222	0.45886
	BGH	-0.00065	0.9391	0.81301	0.2218	0.69612	0.3661	-0.72018	0.0640	0.14010	0.8101	-0.58574	0.4980	0.25134	0.7210	0.43325
	BH	0.01139	0.1527	2.61676	0.0000	-1.26533	0.0606	-0.06497	0.8395	-0.31895	0.3753	-0.07012	0.8663	-0.70484	0.3651	0.28365
2006-2	MINT	0.00754	0.3462	2.08927	0.0295	-0.78103	0.2627	0.19568	0.4692	-0.72949	0.1164	-0.06385	0.8719	0.50629	0.3004	0.39710
	AMATA	0.00056	0.9340	0.82670	0.0739	0.13663	0.8323	0.20288	0.4978	0.26010	0.5606	-0.32086	0.3899	-0.07084	0.8595	0.56254
	CCET	0.00519	0.2404	0.64814	0.0250	-0.32919	0.3631	-0.05644	0.7167	-0.11427	0.6067	-0.19143	0.4070	-0.06466	0.6801	0.23751
2007-1	KSL	0.00089	0.8994	0.06216	0.9244	-0.19317	0.8022	-0.04192	0.9235	0.14069	0.6788	0.04712	0.8461	-0.01725	0.8686	0.26151
	IRPC	-0.00010	0.9820	1.44617	0.0178	-0.32685	0.4686	-0.22576	0.3570	0.20715	0.4584	0.12452	0.5071	0.03773	0.6343	0.46837
2007-2	RRC	-0.00118	0.6246	1.00881	0.0000	-0.00151	0.9943	0.02198	0.9034	-0.15959	0.2810	0.07539	0.5582	-0.25760	0.0910	0.42103
2008-1	PS	0.00046	0.9156	0.80364	0.0034	0.23657	0.3765	-0.09507	0.7603	0.68113	0.0050	-0.24048	0.4735	-0.06432	0.7132	0.65574
	MAJOR	-0.00086	0.8399	0.31752	0.1411	0.40038	0.1657	0.04763	0.8102	0.11832	0.7560	0.19509	0.4777	0.17011	0.6561	0.94949
2008-2	DTAC	-0.00993	0.2697	0.41187	0.4037	1.22363	0.1233	1.11154	0.1363	0.01581	0.9606	-0.09160	0.8099	0.31910	0.4500	0.99809
2009-1	TSTH	0.01784	0.1336	1.39578	0.0000	-0.26093	0.5588	-0.53339	0.0398	-0.22061	0.4224	0.46696	0.0928	0.31484	0.0453	0.45834
	QH	-0.00307	0.4435	2.15978	0.0000	-0.54214	0.0318	-0.19410	0.1685	-0.01292	0.9384	-0.22190	0.2331	0.17008	0.1101	0.40833
	ESSO	0.00128	0.7844	0.67939	0.0000	0.42244	0.0341	0.01406	0.9123	0.07781	0.4770	0.04830	0.7481	0.11625	0.1375	0.73091
	TTW	0.00486	0.0905	0.35739	0.0027	-0.07854	0.6232	0.09105	0.3732	-0.01331	0.9174	0.11687	0.1880	-0.08227	0.2094	0.52363
	BIGC	0.01302	0.0065	0.86834	0.0022	-0.46354	0.0578	0.23180	0.3976	0.20008	0.2803	-0.08106	0.5500	-0.07800	0.5068	0.44531
2009-2	MBK	0.00281	0.3643	0.40055	0.0077	-0.13234	0.4783	-0.07267	0.5969	-0.07410	0.7228	-0.01292	0.9434	-0.09334	0.6259	0.27646
	BECL	0.00004	0.9898	0.27038	0.0122	0.02792	0.8399	-0.00289	0.9722	-0.00609	0.9553	0.05785	0.5642	0.05411	0.4956	0.61872
	Average	0.00060	0.5000	0.97712	0.1239	-0.02380	0.4538	0.05791	0.5123	0.07700	0.5341	-0.02990	0.5190	0.10030	0.4528	0.53430

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period before a stock joins the shotable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column. We define up (down) market days as a day with positive (negative) market return. The last row presents the arithmetic mean of each variable in the column. Note that "PTCH" is shown as missing because it is a newly listed stock and there is not enough data to be estimated in this model.

Table 35 Dimson beta regression and DELAY measure for individual shortable stocks: Up days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	-0.00032	0.9767	1.49148	0.0002	-0.22559	0.6528	0.30691	0.3807	-0.00130	0.9971	0.00546	0.9815	0.23246	0.7657	0.55309
	CCET	0.00356	0.7826	0.78960	0.0374	0.15625	0.7663	0.10355	0.7401	0.41929	0.1512	-0.27504	0.2592	0.02767	0.9520	0.63338
2002-2	AEONTS	-0.00338	0.4590	0.80452	0.0164	0.08349	0.8322	-0.59470	0.0246	0.45533	0.0124	-0.44886	0.0441	-0.01941	0.8810	0.34265
	GOLD	-0.00774	0.2883	2.57100	0.0000	0.11085	0.8826	0.47739	0.2086	-0.77406	0.0258	0.55032	0.0991	-0.18869	0.4794	0.51709
	PTT	-0.00212	0.5381	0.31724	0.0775	0.40632	0.1414	-0.04636	0.7670	0.16570	0.3576	-0.17614	0.3386	-0.01263	0.9384	0.74306
	QH	0.00493	0.1898	1.42754	0.0000	-0.67222	0.1039	-0.21511	0.3851	-0.04744	0.7708	-0.26353	0.0849	-0.03139	0.8822	0.29705
2003-1	BT	0.00012	0.9660	0.87362	0.0000	-0.15107	0.5852	-0.55321	0.0032	-0.29482	0.0177	-0.11978	0.4823	-0.32797	0.0546	0.16028
	CCET	-0.00327	0.3167	0.55873	0.0030	0.06729	0.8350	0.02459	0.9277	0.00432	0.9810	-0.59666	0.0231	0.06695	0.7574	0.31521
	MAJOR	0.00251	0.6575	0.42994	0.0185	-0.80545	0.0679	-0.60674	0.0347	0.01523	0.9569	0.05189	0.8811	0.10266	0.6113	0.05266
	TISCO	0.00072	0.8690	1.44119	0.0004	-0.06503	0.8629	0.00186	0.9966	-0.06260	0.8787	-0.01768	0.9654	0.19840	0.6000	0.50953
	ITD	-0.00795	0.2272	1.93756	0.0000	0.80084	0.2342	0.46719	0.3391	-0.04265	0.9166	0.69156	0.3495	-0.34988	0.4377	0.69185
2003-2	SSI	0.01432	0.1777	0.68196	0.0653	-1.14585	0.1756	-0.04906	0.9396	0.43109	0.4518	0.46949	0.2571	-0.03291	0.9319	0.38229
	ATC	0.00951	0.3647	0.86119	0.0012	-0.69187	0.2514	0.71919	0.0864	-0.50978	0.0756	-0.22682	0.3333	0.35038	0.2439	0.39729
	ITV	0.01338	0.3354	0.53888	0.1895	-0.18934	0.8551	-0.31542	0.6592	-0.39327	0.5446	0.04371	0.9424	-0.72442	0.1325	0.05071
	MS	-0.00107	0.8896	0.85820	0.0014	-0.16890	0.7205	-0.09639	0.8363	0.35109	0.3112	0.27954	0.5538	0.10478	0.7392	0.63362
	AP	0.00831	0.1434	1.30192	0.0000	-0.37101	0.2527	-0.37594	0.1624	0.08516	0.7779	-0.32653	0.2555	-0.00243	0.9906	0.31843
	LALIN	0.00652	0.4629	1.06871	0.0000	-0.13151	0.8133	0.09269	0.7643	-0.06742	0.8204	-0.03236	0.9367	0.02357	0.9344	0.47312
	SIRI	0.00670	0.5081	1.54422	0.0003	-0.22706	0.7375	-0.44725	0.3252	0.51340	0.2469	0.66129	0.1671	0.06115	0.8632	0.58992
	AMATA	0.01910	0.0762	0.65740	0.0622	-0.76246	0.2006	-0.18098	0.6359	-0.03105	0.9360	0.40995	0.1817	-0.16598	0.5693	0.24764
2004-1	VNG	0.00253	0.7360	1.11657	0.0027	0.40922	0.3722	0.02659	0.8584	0.20008	0.4845	0.96224	0.0005	-0.52492	0.0632	0.72335
	TT&T	0.00159	0.8935	2.26992	0.0009	0.06557	0.8822	0.07902	0.7717	0.67509	0.2195	0.05324	0.9082	-0.31198	0.5867	0.56147
2004-2	KEST	0.00280	0.7883	2.51397	0.0002	-0.42400	0.6200	0.46110	0.2847	-0.51803	0.1422	-0.09123	0.8564	-0.06767	0.8113	0.43671
	TOC	-0.00111	0.7328	0.89862	0.0004	-0.03468	0.9278	0.18813	0.4792	0.33445	0.1836	-0.07034	0.7896	-0.35622	0.1528	0.51706
	TPC	-0.00091	0.8046	0.57747	0.0479	0.14963	0.7050	0.13358	0.5111	-0.01524	0.9480	0.13259	0.5823	0.01028	0.9461	0.67072
	CK	-0.01545	0.0044	2.01493	0.0017	2.20425	0.0072	-0.39548	0.4122	0.31828	0.5531	-0.25591	0.6261	-0.73490	0.1879	0.63736
	STECON	-0.01675	0.0010	1.66527	0.0005	1.90396	0.0309	0.52008	0.1979	0.11743	0.8238	-1.04799	0.0058	0.74416	0.0628	0.79310
	PSL	-0.00405	0.4532	0.63517	0.0656	0.84290	0.1661	-0.06629	0.8355	0.03336	0.9376	-0.09832	0.8239	0.22293	0.6941	0.81327
	TTA	-0.00935	0.0205	1.36487	0.0005	1.05298	0.0482	-0.18057	0.6226	0.05971	0.9051	-0.66119	0.1284	0.61264	0.1967	0.65642
	UCOM	0.00236	0.5638	1.24395	0.0001	-0.16755	0.6759	0.04446	0.8443	-1.02348	0.0004	-0.47696	0.1618	-0.21818	0.4621	0.18535
2005-1	SCIB	0.00815	0.0255	1.85951	0.0000	-1.21911	0.0005	0.36901	0.1468	0.36031	0.0274	-0.53336	0.0559	0.10875	0.6938	0.37948
	ASP	-0.00183	0.6245	1.32324	0.0000	0.22878	0.3549	0.19024	0.5691	0.31916	0.1435	-0.20676	0.4930	-0.29587	0.5463	0.54438
	NPC	-0.00115	0.7630	0.72399	0.0225	0.35286	0.3571	-0.57341	0.0522	0.20789	0.3802	0.30734	0.3145	-0.17716	0.7041	0.54049
	AOT	0.00047	0.8845	0.30484	0.1002	-0.32241	0.3594	0.30266	0.0953	0.10927	0.5017	0.05949	0.7952	-0.16525	0.5095	0.48668
	NSM	0.00130	0.7430	0.69521	0.0170	-0.36089	0.2725	0.38959	0.0678	0.22651	0.2309	-0.22288	0.3309	-0.00488	0.9891	0.50987

Table 35 Dimson beta regression and DELAY measure for individual shortable stocks: Up days [continue]

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	-0.00214	0.8471	0.24565	0.5859	0.68992	0.4772	0.42398	0.3509	-0.23974	0.6688	0.39827	0.1234	0.48756	0.2860	0.99923
	TUF	-0.01432	0.0028	0.65124	0.0200	1.61303	0.0022	-0.67210	0.0007	0.04729	0.8707	0.75714	0.0000	0.45211	0.0333	0.96689
	TOP	-0.00235	0.8032	2.16560	0.0110	-0.11703	0.8819	0.00933	0.9778	-0.10753	0.7928	0.05052	0.9186	0.33709	0.2160	0.51989
	CP7-11	0.00668	0.3168	-0.17857	0.5297	-0.56400	0.4383	0.35186	0.2464	0.08060	0.8294	-0.72687	0.0828	0.39530	0.1688	0.93044
	MCOT	0.01291	0.0905	1.33440	0.0084	-1.34995	0.1597	0.74439	0.0485	0.30274	0.3421	-0.50014	0.0953	-0.47700	0.2479	0.27704
	DELTA	0.00130	0.8488	0.80517	0.0770	-0.89670	0.2344	0.51162	0.0457	-0.46063	0.2882	-0.82859	0.0701	0.33730	0.4344	0.15969
	TISCO	-0.00488	0.5757	1.22192	0.0239	0.45810	0.5949	-0.22995	0.6615	0.32586	0.4567	0.10696	0.7824	0.05578	0.8864	0.64258
2006-1	PTTCH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CPN	0.00986	0.2364	0.36957	0.2075	-0.38284	0.7145	-0.24423	0.5532	-0.16543	0.5272	0.28512	0.4108	0.40970	0.0778	0.43430
	GLOW	0.00924	0.1720	0.18862	0.4543	-0.30888	0.4659	-0.14364	0.7302	0.04855	0.8527	-0.00571	0.9883	-0.00747	0.9833	0.09872
	MAKRO	0.00898	0.4380	0.77333	0.1733	-1.26742	0.1668	0.60486	0.4104	-0.37387	0.5796	0.65010	0.2383	0.01677	0.9695	0.38275
	BGH	0.00800	0.3079	0.38180	0.1689	-0.54032	0.5093	-0.10560	0.7965	0.04838	0.8448	0.62618	0.0185	0.14134	0.6778	0.60949
	BH	0.01413	0.1256	0.48237	0.1358	-1.10170	0.2768	0.69461	0.5080	0.26294	0.4574	0.75571	0.2305	-0.18900	0.7694	0.70599
2006-2	MINT	0.00270	0.4380	0.23189	0.3637	-0.26327	0.5014	0.35484	0.4715	-0.16755	0.6459	0.24721	0.3917	0.76053	0.0691	0.98233
	AMATA	0.00001	0.9978	1.44612	0.0049	0.25197	0.6690	-0.49847	0.2427	0.79067	0.3469	-0.11923	0.7879	-0.07090	0.8463	0.56090
	CCET	0.00572	0.0403	0.33810	0.2882	-0.36801	0.1000	-0.22880	0.2677	-0.04751	0.8433	0.21277	0.1838	-0.08782	0.5953	0.17710
2007-1	KSL	-0.00429	0.0992	-0.17055	0.6117	0.72973	0.0013	-0.02309	0.9085	-0.25038	0.1120	-0.53370	0.0303	0.12212	0.3435	0.43488
	IRPC	-0.00453	0.3246	2.46660	0.0000	0.06136	0.9018	0.14445	0.6242	0.00785	0.9664	-0.90854	0.0049	0.01173	0.9712	0.43120
2007-2	RRC	0.00522	0.4067	1.08449	0.0037	-0.11811	0.6973	-0.17243	0.4519	-0.27801	0.2627	0.05456	0.8274	0.21836	0.3993	0.43227
2008-1	PS	0.01267	0.1626	1.21953	0.0078	0.25494	0.6203	0.51030	0.4248	-0.36128	0.3801	-0.58307	0.2000	-0.33592	0.3718	0.39596
	MAJOR	-0.00454	0.3551	0.45504	0.0167	0.70671	0.0621	0.20220	0.5698	-0.06771	0.7560	0.01054	0.9541	-0.14861	0.5385	0.82422
2008-2	DTAC	-0.00262	0.3672	0.77349	0.0000	0.10995	0.5012	-0.08788	0.5371	0.13923	0.4196	0.18342	0.2168	0.30380	0.0185	0.69813
2009-1	TSTH	-0.01479	0.0419	1.30561	0.0050	0.09658	0.8736	-0.73826	0.1323	-0.22232	0.5962	-0.42109	0.2167	-0.06714	0.8166	0.26198
	QH	-0.00628	0.1187	1.35790	0.0000	0.25562	0.2466	-0.39578	0.0248	0.08932	0.7201	-0.08057	0.5386	0.14435	0.3184	0.50238
	ESSO	-0.00194	0.7154	1.33010	0.0002	-0.32658	0.1234	0.04899	0.8483	0.21973	0.3899	0.13279	0.3617	0.31500	0.2163	0.57277
	TTW	-0.00539	0.1373	0.66285	0.0000	0.08037	0.7228	-0.66437	0.0230	-0.01336	0.9392	-0.08501	0.5540	-0.38033	0.0337	0.16753
	BIGC	0.00151	0.8035	0.78661	0.0038	-0.06364	0.8377	-0.03394	0.9223	-0.18882	0.6016	-0.12721	0.4992	-0.07317	0.7177	0.35005
2009-2	MBK	-0.00154	0.5627	0.18531	0.0339	0.15168	0.1499	0.21229	0.0945	0.26547	0.0785	-0.00060	0.9862	0.00330	0.8948	0.96805
	BECL	0.00446	0.0820	0.00118	0.9833	-0.08134	0.2953	-0.13481	0.1642	-0.12674	0.2617	0.01433	0.6504	0.05693	0.0102	0.00000
Average		0.00113	0.4435	0.98400	0.0866	-0.03433	0.4484	0.00525	0.4503	0.02124	0.5228	-0.03020	0.4343	0.00979	0.5320	0.49760

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period after a stock joins the shotable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column. We define up (down) market days as a day with positive (negative) market return. The last row presents the arithmetic mean of each variable in the column. Note that, since non-shortable period have not enough data to estimate regression, we cut "PTTCH" during shortable period out to avoid bias when comparing between shortable and non-shortable stocks.

Table 36 Dimson beta regression and DELAY measure for individual non-shortable stocks: Down days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	0.00053	0.9264	2.34006	0.0000	0.14952	0.7684	-0.78773	0.2303	0.42677	0.3602	1.18000	0.2464	-0.03468	0.1694	0.43301
	CCET	0.00936	0.0654	0.72911	0.0082	0.38090	0.4791	0.00207	0.9969	-0.52522	0.3091	-1.70000	0.1007	-0.14621	0.2274	0.31223
2002-2	AEONTS	-0.00121	0.8374	1.39497	0.0015	-0.80838	0.0458	-0.32942	0.2862	0.57730	0.3965	1.46000	0.1578	0.46818	0.7047	0.45966
	GOLD	0.01204	0.0526	2.09472	0.0001	0.63203	0.1588	-0.27062	0.2839	0.22209	0.3566	0.62000	0.5391	-0.26337	0.4069	0.49944
	PTT	-0.00473	0.0801	1.16025	0.0000	-0.36565	0.0264	-0.46636	0.0007	0.01387	0.2019	0.07000	0.9458	0.36788	0.1236	0.46572
	QH	0.00369	0.3171	0.98261	0.0036	0.37674	0.2580	-0.07505	0.6412	0.58461	0.2290	2.55000	0.0172	-0.59452	0.1726	0.48986
2003-1	BT	-0.00068	0.7572	0.99877	0.0000	0.21303	0.3511	-0.20032	0.3634	-0.11652	0.2024	-0.58000	0.5708	0.18313	0.5635	0.49840
	CCET	-0.00113	0.7773	0.92257	0.0126	-0.77694	0.0554	0.39227	0.2631	-0.09193	0.3603	-0.26000	0.8010	-0.96285	0.3135	0.23536
	MAJOR	0.00319	0.2961	0.43036	0.0145	0.17332	0.5366	-0.13219	0.5145	-0.07932	0.2116	-0.37000	0.7114	0.03574	0.1264	0.68706
	TISCO	-0.00108	0.6722	1.51036	0.0000	-0.52477	0.0278	0.15678	0.3970	0.19008	0.1934	0.98000	0.3364	-0.11764	0.4228	0.47712
	ITD	-0.00211	0.7567	0.80955	0.0986	0.02633	0.9628	0.02679	0.9453	-0.66580	0.4349	-1.53000	0.1400	0.42980	0.6556	0.51058
2003-2	SSI	-0.01946	0.0356	0.89018	0.0920	-0.75092	0.4577	0.34819	0.5635	1.16948	0.5830	2.01000	0.0611	1.12775	0.2157	0.95217
	ATC	-0.02100	0.1214	1.40673	0.0024	-3.51475	0.0129	0.27978	0.4703	0.76340	0.5423	1.41000	0.1772	-0.59962	0.2926	0.15074
	ITV	0.00026	0.9867	1.25157	0.0556	-0.19781	0.8758	-0.30639	0.6548	0.59766	1.0522	0.57000	0.5775	0.81424	0.9650	0.66691
	MS	-0.01656	0.1015	1.92653	0.0004	-0.96961	0.3425	-1.04709	0.0387	1.25620	0.7561	1.66000	0.1150	1.69179	0.4596	0.67522
	AP	-0.00232	0.7580	1.06549	0.0096	-0.24639	0.7484	-0.74391	0.1640	0.10209	0.5049	0.20000	0.8422	-0.07415	0.1612	0.18964
	LALIN	0.00499	0.5574	0.80523	0.0299	0.67038	0.2993	0.37080	0.3577	-0.27482	0.6478	-0.42000	0.6767	-0.42322	0.5690	0.49998
	SIRI	-0.00919	0.0706	1.40121	0.0000	-0.64570	0.2088	-0.39689	0.2890	0.12209	0.4381	0.28000	0.7838	0.33967	0.7820	0.42184
	AMATA	-0.00867	0.0525	0.85529	0.0009	-0.72987	0.0580	0.50107	0.1703	0.71461	0.4312	1.66000	0.1158	0.59094	0.9070	0.78522
2004-1	VNG	-0.00880	0.1415	1.05660	0.0000	-0.12585	0.7702	-0.72262	0.0225	0.51902	0.3585	1.45000	0.1640	0.49633	0.5307	0.58706
	TT&T	-0.01845	0.0039	1.65755	0.0000	-0.97161	0.0514	0.45536	0.3212	-0.23443	0.5689	-0.41000	0.6849	-0.03150	0.8159	0.37057
2004-2	KEST	-0.00053	0.8993	1.78625	0.0000	-0.19020	0.4503	-0.02316	0.8772	-0.02185	0.1506	-0.15000	0.8858	-0.05135	0.3506	0.43873
	TOC	-0.00046	0.8836	1.86257	0.0000	-0.10019	0.6232	-0.00752	0.9714	-0.10572	0.1791	-0.59000	0.5604	0.27600	0.7487	0.51668
	TPC	0.00300	0.5314	1.20349	0.0000	0.46994	0.1524	0.22005	0.3406	0.00676	0.1948	0.03000	0.9726	-0.28222	0.1281	0.65193
	CK	-0.00466	0.1746	1.47250	0.0000	-0.28389	0.1785	-0.22989	0.2193	0.28353	0.2473	1.15000	0.2624	-0.07000	0.0829	0.39937
	STECON	-0.00363	0.6906	2.66157	0.0000	0.45979	0.2941	0.16991	0.6542	0.03505	0.4149	0.08000	0.9333	0.48897	0.4988	0.58036
	PSL	-0.00921	0.0969	2.03007	0.0000	-0.86702	0.0113	0.03403	0.8965	0.14290	0.2086	0.69000	0.4996	-0.04944	0.8298	0.40368
	TTA	-0.01113	0.0222	1.77679	0.0000	-0.91287	0.0008	0.25773	0.2192	0.07028	0.1879	0.37000	0.7115	0.12293	0.3414	0.40587
	UCOM	-0.00375	0.3135	1.20663	0.0000	-0.58617	0.1186	-0.25803	0.0125	-0.07741	0.1575	-0.49000	0.6274	-0.24198	0.1460	0.24418
2005-1	SCIB	-0.00150	0.6807	1.38300	0.0002	-0.19473	0.5583	0.57858	0.0460	0.02556	0.2020	0.13000	0.9003	-0.19831	0.0667	0.62009
	ASP	-0.00023	0.9513	1.13577	0.0004	0.13564	0.7675	-0.49655	0.0389	-0.20017	0.2320	-0.86000	0.3961	0.03079	0.2769	0.33792
	NPC	0.00486	0.2016	0.86153	0.0046	0.02529	0.9138	-0.13553	0.5709	-0.26907	0.1917	-1.40000	0.1723	-0.00317	0.1149	0.52679
	AOT	0.00189	0.4912	0.41491	0.0573	0.31154	0.1057	-0.11396	0.5087	-0.18323	0.1182	-1.55000	0.1331	-0.11754	0.2371	0.36323
	NSM	-0.00578	0.1880	1.52325	0.0000	-0.04118	0.8769	-0.41781	0.0164	0.10273	0.2066	0.50000	0.6233	0.54947	0.0941	0.43951

Table 36 Dimson beta regression and DELAY measure for individual non-shortable stocks: Down days [continue]

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	-0.00284	0.3196	0.29895	0.3155	-0.50663	0.0479	-0.25447	0.3227	-0.31357	0.2331	-1.35000	0.1907	0.17199	0.0174	0.00515
	TUF	0.00389	0.2235	0.08814	0.8508	0.56684	0.0849	-0.24513	0.3431	0.01849	0.2643	0.07000	0.9448	0.00631	0.7899	0.93847
	TOP	0.00152	0.6119	0.85942	0.1574	0.24748	0.4844	0.06622	0.7764	-0.23460	0.2586	-0.91000	0.3730	0.15461	0.9376	0.57464
	CP7-11	-0.00096	0.7889	0.33561	0.2574	-0.28740	0.4665	-0.08797	0.6033	0.17408	0.2379	0.73000	0.4711	-0.04819	0.7741	0.37479
	MCOT	-0.00412	0.3196	0.37839	0.4325	-0.07117	0.8650	0.00290	0.9954	0.01336	0.3161	0.04000	0.9666	0.25748	0.8174	0.66534
	DELTA	0.00059	0.9109	0.44656	0.4869	0.13931	0.7492	-0.23123	0.6437	-0.13214	0.3941	-0.34000	0.7402	-0.12956	0.0141	0.80411
	TISCO	-0.00576	0.0742	0.21604	0.4793	-0.34451	0.1894	-0.14218	0.4023	-0.10709	0.2229	-0.48000	0.6351	0.26324	0.2154	0.48535
2006-1	PTCH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CPN	0.00438	0.3114	0.21675	0.4580	-0.82442	0.2030	0.26522	0.5843	-0.42877	0.3438	-1.25000	0.2213	0.54447	0.2514	0.03049
	GLOW	-0.00135	0.3882	0.12829	0.3575	-0.21280	0.5674	0.26194	0.1336	0.20209	0.1687	1.20000	0.2397	-0.11388	0.2076	0.90120
	MAKRO	0.00094	0.8432	0.02929	0.9398	-0.08108	0.9051	0.83643	0.0286	-0.60963	0.3817	-1.60000	0.1201	0.39925	0.2805	0.99035
	BGH	0.00112	0.8491	-0.12981	0.7366	-1.06059	0.2185	-0.36892	0.5799	0.37203	0.8025	0.46000	0.6461	0.28308	0.5254	0.99958
	BH	-0.00516	0.1557	0.76548	0.0440	-1.45082	0.0211	0.12878	0.7140	0.07151	0.3602	0.20000	0.8439	0.13605	0.1827	0.24628
2006-2	MINT	0.01134	0.2613	1.56180	0.0033	0.36344	0.5711	0.64619	0.2130	0.03518	0.4191	0.08000	0.9338	0.21627	0.2724	0.62011
	AMATA	-0.00748	0.2087	0.96334	0.0098	-0.83600	0.1822	-0.35108	0.2791	-0.15114	0.3956	-0.38000	0.7056	0.18833	0.0036	0.46869
	CCET	-0.00188	0.5326	0.15955	0.3059	-0.21053	0.3017	-0.10135	0.6069	-0.08287	0.1385	-0.60000	0.5551	-0.08225	0.1624	0.14628
2007-1	KSL	0.00565	0.1791	0.53574	0.0000	0.10267	0.1110	-0.08402	0.8448	0.00758	0.2560	0.03000	0.9766	0.90610	0.8848	0.83369
	IRPC	-0.00147	0.5242	1.09298	0.0000	0.05678	0.3034	-0.16881	0.5611	-0.02100	0.1974	-0.11000	0.9160	0.22972	0.1192	0.64126
2007-2	RRC	-0.00123	0.6183	1.16986	0.0000	-0.27877	0.1090	0.17627	0.3876	-0.31640	0.3478	-0.91000	0.3750	0.00263	0.4153	0.46344
2008-1	PS	-0.00152	0.6390	0.41630	0.0024	-0.01981	0.9358	-0.27325	0.1495	0.55124	0.2042	2.70000	0.0120	-0.21814	0.1963	0.69214
	MAJOR	0.00000	0.9995	0.45532	0.0177	0.15876	0.6557	-0.17015	0.4014	0.13123	0.1820	0.72000	0.4772	-0.26191	0.6355	0.52181
2008-2	DTAC	0.00290	0.5128	0.77958	0.0088	-0.18975	0.5890	0.23945	0.4778	0.39408	0.4964	0.79000	0.4344	0.03511	0.5962	0.60381
2009-1	TSTH	0.01451	0.2634	1.57447	0.0000	0.67900	0.0222	0.05175	0.8394	-0.17627	0.3021	-0.58000	0.5650	0.07462	0.4410	0.65351
	QH	0.01385	0.0508	2.17527	0.0000	0.04738	0.8967	0.10287	0.7530	0.37728	0.2266	1.66000	0.1090	-0.14830	0.5846	0.51401
	ESSO	-0.00302	0.4370	0.97704	0.0000	-0.04497	0.7324	0.17839	0.1321	0.07784	0.1058	0.74000	0.4691	0.49093	0.0805	0.61502
	TTW	0.00056	0.9307	0.19738	0.0955	0.19048	0.3194	-0.05765	0.7514	-0.23340	0.1326	-1.76000	0.0911	-0.14129	0.2961	0.45096
	BIGC	-0.00419	0.4502	0.29504	0.0319	-0.02445	0.8483	0.35358	0.0052	0.13762	0.1412	0.97000	0.3396	0.12207	0.0698	0.71894
2009-2	MBK	-0.00072	0.7756	0.11658	0.2432	-0.06009	0.7474	0.11461	0.3891	-0.05750	0.1235	-0.47000	0.6481	0.12824	0.4552	0.90579
	BECL	-0.00070	0.7954	0.12961	0.3856	0.00399	0.9791	0.09824	0.4194	-0.08827	0.1058	-0.83000	0.4171	0.09109	0.7930	0.61213
Average		-0.00151	0.4592	0.98776	0.1131	-0.22141	0.4138	-0.03840	0.4304	0.07567	0.3159	0.12194	0.4977	0.11790	0.3955	0.52860

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period before a stock joins the shortable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column. We define up (down) market days as a day with positive (negative) market return. The last row presents the arithmetic mean of each variable in the column. Note that "PTCH" is shown as missing because it is a newly listed stock and there is not enough data to be estimated in this model.

Table 37 Dimson beta regression and DELAY measure for individual shortable stocks: Down days

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2002-1	TPI	-0.00222	0.6818	1.30125	0.0003	0.15840	0.7225	0.26769	0.2872	-0.10286	0.7542	-0.16526	0.4388	0.01537	0.9441	0.53325
	CCET	0.00563	0.1302	0.28017	0.3044	0.66825	0.0080	0.03473	0.7714	0.27353	0.2990	-0.09316	0.5621	0.13617	0.4313	0.97439
2002-2	AEONTS	-0.00787	0.1581	0.96950	0.0072	-0.52422	0.3341	0.23896	0.4826	0.37760	0.3411	0.01445	0.9567	-0.04048	0.9287	0.51709
	GOLD	-0.01499	0.0256	1.80868	0.0000	-1.59221	0.0074	0.34870	0.2189	-0.32358	0.4227	-0.23263	0.4211	0.21228	0.5642	0.29366
	PTT	0.00171	0.6585	0.20712	0.3894	-0.13594	0.6018	0.04807	0.7783	-0.03730	0.8425	-0.32539	0.0645	-0.05371	0.8423	0.08056
	QH	0.00104	0.7306	1.41524	0.0000	0.23052	0.3520	-0.03727	0.8131	-0.14036	0.4927	0.06473	0.7771	0.12264	0.5571	0.54234
2003-1	BT	0.00172	0.4778	0.69721	0.0000	0.52473	0.0087	0.03246	0.6707	-0.22610	0.1525	-0.00708	0.9498	-0.10589	0.3348	0.57758
	CCET	-0.00100	0.8817	1.19601	0.0023	0.63129	0.3297	0.09416	0.7850	0.42681	0.1347	-0.43180	0.2794	0.06361	0.8662	0.65826
	MAJOR	-0.00564	0.0215	0.49466	0.0096	-0.39213	0.1184	0.07221	0.6103	0.14093	0.3652	0.25085	0.0354	-0.12778	0.4159	0.47177
	TISCO	-0.01263	0.0249	1.78767	0.0010	-0.21653	0.6361	0.33923	0.3160	0.21337	0.4619	-0.03162	0.9316	0.08425	0.8362	0.55415
	ITD	-0.01415	0.0177	1.76992	0.0177	-0.37766	0.5519	0.26594	0.3889	0.50404	0.3689	0.06868	0.9088	-0.44983	0.3186	0.50158
2003-2	SSI	0.01643	0.3723	2.83168	0.0047	-0.62853	0.5843	0.55178	0.3740	-1.22365	0.0705	0.28851	0.6298	-0.16314	0.8784	0.39772
	ATC	-0.00271	0.6371	0.88389	0.0029	-0.51279	0.3246	0.57402	0.0969	0.36000	0.2230	-0.60628	0.0949	0.25210	0.4112	0.51895
	ITV	-0.01469	0.0318	1.72620	0.0000	-1.17288	0.0270	-0.28488	0.4023	-0.29703	0.3839	0.13377	0.6469	0.01652	0.9637	0.28303
	MS	0.00387	0.7127	2.50627	0.0131	-0.05438	0.9564	0.73731	0.1729	-0.92812	0.2076	0.39927	0.5068	0.22219	0.7149	0.53746
	AP	0.00096	0.8466	1.21258	0.0015	0.10794	0.7957	-0.07042	0.7907	-0.15129	0.6249	-0.16841	0.4919	0.14243	0.6481	0.47122
	LALIN	-0.00424	0.3377	0.28053	0.4377	-0.13269	0.6961	0.01859	0.9353	0.44698	0.0631	0.02209	0.9003	0.40465	0.1836	0.93749
	SIRI	-0.01574	0.1389	1.41136	0.0230	-1.89676	0.0151	0.12451	0.7607	0.11702	0.8199	-0.01919	0.9660	1.09544	0.0454	0.39886
	AMATA	0.01621	0.0470	1.21581	0.0065	0.63049	0.3022	-0.73423	0.0434	-0.19266	0.6080	0.26902	0.5443	0.45992	0.1967	0.58801
2004-1	VNG	-0.00269	0.6714	0.64974	0.0343	-0.17016	0.7316	-0.05070	0.8802	0.24079	0.4019	0.39122	0.1080	0.18508	0.4385	0.71456
	TT&T	0.00125	0.9069	1.79766	0.0000	-0.60263	0.2747	0.09144	0.8046	0.91319	0.0175	0.12587	0.7022	-0.06194	0.8515	0.56444
2004-2	KEST	-0.00396	0.3069	1.76755	0.0000	-0.16002	0.7422	0.06435	0.8313	0.48910	0.0876	-0.06775	0.7180	-0.43793	0.1060	0.48413
	TOC	0.00737	0.0722	1.35143	0.0000	0.62908	0.1485	-0.28419	0.3030	-0.11529	0.5178	-0.05124	0.8694	0.32874	0.2516	0.59272
	TPC	0.00285	0.3307	0.82318	0.0000	0.02342	0.9114	0.13579	0.5570	-0.00097	0.9958	-0.21214	0.2873	-0.16220	0.3355	0.43474
	CK	0.00352	0.7500	3.46706	0.0012	-0.05060	0.9634	0.41741	0.5013	0.72236	0.3985	-0.14369	0.7925	-0.23129	0.6870	0.55132
	STECON	-0.01032	0.0949	1.47091	0.0069	-0.00742	0.9866	-0.79508	0.0940	-0.27596	0.3277	0.26697	0.5256	-0.47358	0.3817	0.29449
	PSL	0.01082	0.0201	1.45827	0.0000	0.88334	0.1705	-0.08818	0.7883	0.14283	0.6881	-0.48384	0.0744	0.48890	0.1673	0.65626
	TTA	0.01415	0.0632	1.79407	0.0001	0.93113	0.2453	0.25586	0.6129	0.08708	0.8402	-0.25505	0.5356	0.43151	0.2797	0.69179
	UCOM	0.00625	0.1290	2.05257	0.0000	0.22023	0.5590	0.16954	0.5980	-0.32332	0.1764	0.42304	0.0468	-0.24407	0.4129	0.52986
2005-1	SCIB	0.00312	0.2384	1.13942	0.0000	0.62039	0.0145	-0.31773	0.0853	-0.27411	0.2856	0.32519	0.1701	-0.37268	0.0570	0.49584
	ASP	-0.00085	0.7615	1.02209	0.0092	-0.05972	0.8337	0.31229	0.1557	-0.46756	0.1214	0.42533	0.2146	-0.03404	0.8494	0.54302
	NPC	0.00017	0.9547	0.67016	0.0059	-0.24140	0.3135	0.02219	0.9175	-0.15581	0.6282	0.05438	0.8459	0.03611	0.8474	0.39543
	AOT	-0.00084	0.6306	0.34363	0.0323	-0.10185	0.5780	-0.21928	0.2435	-0.19381	0.2327	0.24586	0.1658	-0.26898	0.1258	0.17281
	NSM	-0.00510	0.1005	0.18944	0.4168	-0.40310	0.1971	-0.07703	0.6657	0.07672	0.8149	-0.12792	0.7509	0.09882	0.6802	0.09254

Year	Stock	α	Pr > |t|	β0	Pr > |t|	β1	Pr > |t|	β2	Pr > |t|	β3	Pr > |t|	β4	Pr > |t|	β5	Pr > |t|	DELAY
2005-2	CPF	0.00471	0.4105	-0.14052	0.7308	-0.26853	0.6597	0.41247	0.3567	-0.16456	0.6408	0.54443	0.1439	0.20290	0.6324	0.00564
	TUF	-0.00159	0.5562	0.35547	0.2703	-0.56883	0.1080	0.14627	0.6906	0.37332	0.1800	-0.40630	0.1582	0.28007	0.4755	0.37904
	TOP	0.00378	0.1607	1.19863	0.0000	0.28582	0.2059	0.48956	0.1043	-0.15854	0.5875	-0.39023	0.1539	-0.06728	0.7807	0.53318
	CP7-11	0.00199	0.6523	1.01169	0.0024	0.06567	0.8862	-0.32875	0.3439	0.17140	0.6639	-0.48369	0.2878	0.21840	0.6093	0.41269
	MCOT	0.00229	0.5242	0.64540	0.1735	-0.08886	0.8049	-0.23142	0.5462	-0.28982	0.4292	0.27370	0.5430	0.75152	0.0405	0.65547
	DELTA	-0.00410	0.1760	0.61006	0.0395	-0.98328	0.0096	0.08857	0.7595	0.35699	0.1598	-0.05398	0.8916	0.74156	0.0261	0.56110
	TISCO	-0.00247	0.4409	1.06123	0.0032	-0.57674	0.1644	0.01590	0.9663	0.42415	0.2134	0.01152	0.9768	0.00258	0.9936	0.47115
2006-1	PTTCH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CPN	0.00497	0.2190	1.24429	0.0012	0.73360	0.0547	0.51030	0.1796	0.09490	0.7554	-0.05714	0.8289	-0.37711	0.4015	0.67414
	GLOW	0.00082	0.8179	0.25188	0.3757	-0.17434	0.6927	-0.08170	0.7872	0.20600	0.5368	-0.20787	0.5277	-0.38021	0.3886	0.07355
	MAKRO	0.00635	0.2907	1.04529	0.1857	0.38905	0.6408	0.79965	0.1673	0.77111	0.0987	-0.08260	0.8619	0.56368	0.2206	0.91174
	BGH	0.00240	0.4612	0.46192	0.0793	0.49002	0.1150	-0.35244	0.2392	0.28990	0.1451	0.23307	0.3210	-0.40242	0.3092	0.63618
	BH	-0.00142	0.6802	0.66940	0.0351	0.00992	0.9706	0.25328	0.2243	0.30503	0.2352	-0.12278	0.5990	-0.19295	0.4763	0.59320
2006-2	MINT	-0.00224	0.7250	1.13433	0.0030	0.01097	0.9857	0.45335	0.3110	-0.02164	0.9595	-0.53708	0.2432	0.22009	0.6068	0.52767
	AMATA	-0.01030	0.0880	1.57128	0.0314	0.76835	0.3151	0.37081	0.5693	-0.05645	0.8976	0.26128	0.7208	-0.53246	0.5529	0.62632
	CCET	-0.00560	0.0552	0.03594	0.8446	-0.05509	0.8227	0.85193	0.0021	-0.00171	0.9909	0.09201	0.6500	-0.16350	0.3195	1.00000
2007-1	KSL	-0.00084	0.7572	0.48705	0.0752	0.17501	0.5139	-0.05780	0.8348	0.10380	0.7325	-0.06511	0.7378	0.04392	0.8788	0.60115
	IRPC	0.00480	0.0642	1.80128	0.0000	0.64271	0.0124	0.50908	0.1048	-0.50066	0.0432	0.15071	0.6028	0.28928	0.1629	0.64697
2007-2	RRC	0.00655	0.0564	1.03782	0.0036	0.37546	0.2359	-0.20544	0.3618	-0.09747	0.6230	-0.17199	0.4172	-0.02927	0.9079	0.46903
2008-1	PS	-0.00394	0.3457	1.07457	0.0009	-0.03259	0.8989	-0.11497	0.5599	0.51436	0.0509	0.33456	0.4818	0.01059	0.9543	0.65983
	MAJOR	-0.00127	0.6654	0.44727	0.0152	0.21964	0.2808	-0.21130	0.1985	-0.14436	0.5437	0.18921	0.3137	0.14006	0.3264	0.60636
2008-2	DTAC	0.00834	0.1632	0.78117	0.0023	0.40232	0.2480	-0.06614	0.7220	-0.19525	0.3853	0.18696	0.4628	0.44505	0.0955	0.72898
2009-1	TSTH	-0.00705	0.4133	1.90563	0.0008	-0.00875	0.9902	0.29922	0.1806	0.23110	0.3080	-0.90928	0.0818	0.33040	0.4344	0.49248
	QH	-0.00230	0.5113	1.44083	0.0000	0.12042	0.5847	0.20987	0.1932	0.18224	0.2829	-0.13367	0.5139	0.25808	0.3507	0.60875
	ESSO	-0.00185	0.6218	1.20093	0.0000	0.64912	0.0319	0.25222	0.3498	0.08708	0.5602	0.36919	0.1456	-0.02463	0.8336	0.75212
	TTW	-0.00071	0.8556	0.40323	0.0264	-0.54317	0.0136	0.04960	0.8262	-0.20064	0.2804	0.07590	0.7780	-0.10159	0.3452	0.14365
	BIGC	0.00263	0.6897	0.51130	0.1438	-0.02663	0.9452	0.13702	0.6753	-0.15808	0.4743	0.12033	0.6390	-0.04283	0.804	0.51457
2009-2	MBK	0.00171	0.6326	0.01168	0.7750	0.30211	0.4306	0.26234	0.3041	0.10965	0.5844	0.17127	0.4869	0.31651	0.3031	1.00000
	BECL	0.00058	0.8707	0.05773	0.2397	0.04753	0.7775	0.00972	0.9603	0.15847	0.2656	0.10839	0.5218	-0.00941	0.9648	0.99573
Average		-0.00024	0.4199	1.06882	0.0919	-0.01291	0.4673	0.10712	0.4952	0.04080	0.4373	-0.00596	0.5089	0.06430	0.5189	0.53761

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure: $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$ and $DELAY_i = 1/(1 + e^{-x})$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. This table present Dimson beta regression and DELAY measure 3-month period after a stock joins the shotable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The last row presents the arithmetic mean of each variable in the column. We define up (down) market days as a day with positive (negative) market return. The last row presents the arithmetic mean of each variable in the column. Note that, since non-shortable period have not enough data to estimate regression, we cut "PTTCH" during shortable period out to avoid bias when comparing between shortable and non-shortable stocks.

Table 38 Dynamic VAR with new definition of market condition: Up days

Up days	Non-shortable stocks		Shortable stocks	
Variable	Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20851	***	-0.21711	***
a2	-0.05754		-0.05536	
a3	-0.01331		-0.01593	
a4	0.00255		-0.00540	
a5	0.00883		0.00120	
Sum a	-0.26799		-0.29261	
p-value of equality-test	0.33120			
b0	0.00092	***	0.00080	***
b1	0.00006		0.00010	
b2	0.00000		-0.00001	
b3	-0.00004		-0.00006	
b4	-0.00007		-0.00004	
b5	-0.00009		-0.00007	
Sum b	0.00077		0.00072	
p-value of equality-test	0.60710			
c1	-207.00292	***	-205.27022	***
c2	-72.39084	***	-75.45292	
c3	-27.21142	*	-30.46066	
c4	-10.47269		-14.23168	
c5	-5.20936		-6.54595	
Sum c	-322.28724		-331.96143	
p-value of equality-test	0.73050			
d1	0.47096	***	0.46035	***
d2	0.19793	***	0.19322	***
d3	0.07978	*	0.09076	**
d4	0.04481		0.05457	
d5	0.04211	*	0.04684	*
Sum d	0.83559		0.84573	
p-value of equality-test	0.49330			

Note: This table presents the result from estimation of dynamic VAR model:

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t} \text{ and } Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market condition as a positive (negative) three-month period return. This table shows the results of up days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 39 Dynamic VAR with new definition of market condition: Down days

Down days	Non-shortable stocks		Shortable stocks	
Variable	Coeff.	Stat. Sig	Coeff.	Stat. Sig
a1	-0.20701	**	-0.22955	***
a2	-0.05892		-0.07458	*
a3	-0.01399		-0.02221	
a4	0.00904		-0.00509	
a5	0.00426		0.00563	
Sum a	-0.26662		-0.31561	
p-value of equality-test	0.21860			
b0	0.00092	***	0.00089	***
b1	0.00008		0.00010	
b2	0.00001		-0.00001	
b3	-0.00002		-0.00001	
b4	-0.00007		-0.00005	
b5	-0.00006		-0.00008	
Sum b	0.00087		0.00086	
p-value of equality-test	0.97280			
c1	-197.05342	***	-201.02075	***
c2	-65.96619	**	-68.42517	**
c3	-25.44606	*	-29.25634	*
c4	-11.30747		-11.94096	
c5	-3.81165		-4.16028	
Sum c	-303.58480		-314.80350	
p-value of equality-test	0.69330			
d1	0.48634	***	0.47596	***
d2	0.18744	***	0.18537	***
d3	0.08655	*	0.08417	**
d4	0.04905	*	0.04932	
d5	0.03069		0.03591	
Sum d	0.84008		0.83073	
p-value of equality-test	0.64720			

Note: This table presents the result from estimation of dynamic VAR model:

$$r_t = \sum_{i=1}^{5} a_i\, r_{t-i} + \sum_{i=0}^{5} b_i\, Q_{t-i} + v_{1,t} \text{ and } Q_t = \sum_{i=1}^{5} c_i\, r_{t-i} + \sum_{i=1}^{5} d_i\, Q_{t-i} + v_{2,t}$$

Where m_t is the log midpoint of the quote when transaction occurs at time t, $r_t = m_t - m_{t-1}$ is the log quote-mid-point change due to transaction t, Q_t is the buy-sell indicator equal to [1,-1] if the trade is [buy, sell]. The call auction period is eliminated from our study to avoid the effect of overnight return and abnormal trading activity during the morning opening and afternoon closing periods. The model is estimated for 3-month period before and after stocks become shortable. The p-value of equality-test is p-value from testing the null hypothesis that the summations of coefficients between shortable and non-shortable stocks are the same. All regressions are estimated with the White heteroskedasticity correction for standard error. We define up (down) market condition as a positive (negative) three-month period return. This table shows the results of down days. Note that the row Stat. Sig is indicated the statistical significant of the variables. * indicates a 10% significance level; ** indicates a 5% significance level; *** indicates a 1% significance level.

Table 40 Dimson beta regression and DELAY measure with new definition of market condition: Up and Down days

Coefficient	Up days				Down days			
	Non-shortable	Pr > |t|	Shortable stocks	Pr > |t|	Non-shortable	Pr > |t|	Shortable stocks	Pr > |t|
α_0	-0.00073	0.5684	0.00084	0.4292	0.00074	0.4815	-0.00039	0.3881
β_0	1.01323	0.0309	0.99464	0.0462	0.97107	0.0802	1.06008	0.0085
β_1	-0.02995	0.5194	0.01189	0.4690	-0.01774	0.4437	0.00222	0.4307
β_2	0.01498	0.4789	0.01976	0.4454	0.02528	0.4761	0.00118	0.6260
β_3	0.06638	0.4477	0.05375	0.4719	0.01143	0.4609	0.03996	0.4196
β_4	0.02258	0.4978	-0.02277	0.5007	0.04673	0.5129	-0.01887	0.4924
β_5	0.01037	0.3991	0.03956	0.5320	0.01643	0.5190	0.01287	0.5484
DELAY	**0.53521**		**0.52623**		**0.52004**		**0.49747**	
P-value of equality test	0.4468				0.6793			

Note: This table presents the result from estimation of Dimson beta regression and DELAY measure:

$$X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0} \text{ and } DELAY_i = 1/(1 + e^{-x})$$

Where $p_{i,t}$ is the natural logarithm of total return index for stock i on day t, $p_{m,t}$ is the natural logarithm of total return index for market on day t, $r_{i,t} = p_{i,t} - p_{i,t-1}$ is the return of stock i on day t, $r_{m,t} = p_{m,t} - p_{m,t-1}$ is the return of market on day t and $X = \sum_{k=1}^{5} \beta_{i,k}/\beta_{i,0}$. We estimate this Dimson beta regression and DELAY measure 3-month period before and after a stock joins the shortable list for individual stocks. All regressions are estimated using GMM to correct standard errors. The coefficients and DELAY show in this table is the arithmetic mean of coefficient estimate from individual stocks. The p-value in the last row indicates equality-test of DELAY between shortable and non-shortable stocks. H_0: DELAY$_{\text{Non-shortable stocks}}$ = DELAY$_{\text{Shortable stocks}}$. We define up (down) market condition as a positive (negative) three-month period return.

BIOGRAPHY

Kawin Weerawatsunthorn was born on October 15, 1988 in Bangkok. He graduated his Bachelor degree in Engineering, major in Industrial Engineering, from Chulalongkorn University in 2011. He has been studying in Master of Science in Finance, Faculty of Commerce and Accountancy, Chulalongkorn University since 2011.