

The Effectiveness of Trading Halts and Investor Trading Performance: An Intraday Analysis on the Stock Exchange of Thailand

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Abstract

This paper examines the effectiveness of trading halts and the trading performance of different types of investors or traders during halts in an Asian emerging equity market. We use trade-by-trade data flagged by types of traders from the Stock Exchange of Thailand between January 1999 and December 2007. The results suggest that trading halts improve the efficiency of the market by reducing the information asymmetry and stabilizing the market. Trading halts serve as devices to facilitate a price discovery process by giving investors opportunity to adjust their trading interests and reaction to the material information. Our findings show that return and volatility tend to revert to their normal trading periods in a short period of time. High trading volume appears before and after halts but gradually decays within three days after resumption of trades. The results also reveal that long duration of halts may cause higher volatility than short duration ones. Moreover, the evidence shows that domestic investors trade at better prices than foreign investors around trading halt periods. Retail domestic investors trade at a more favourable price than institutional domestic and foreign investors. Retail investors seem to follow a contrarian trading strategy by buying low and selling high.

Keywords: Trading Halts; Price Discovery; Volatility; Retails; Institutions; Foreign; Market Microstructure; Stock Exchange of Thailand

1. Introduction

A trading halt represents a temporary interruption in trading of an individual stock on a stock exchange. It has been implemented extensively by many international stock exchanges. The main purpose of a trading halt is to protect investors and public interests by maintaining price stability for an orderly market. Exchanges generally post trading halts to allow investors extra time to react to newly released information and to determine a new equilibrium price. It is also used to enforce companies to disclose additional information, or when there is excessive volatility, or when there is some other indication of disorderly trading. In all these cases, trading halts are primarily designed to reduce volatility and promote orderly price discovery.

However, there exists critical debate among securities market regulators, market participants and academicians as to the usefulness of trading halts. Proponents of trading halts propose that trading halts maintain price stability, facilitate an orderly market and keep transaction costs low. This proposition is consistent with empirical results found in the United States (Madura *et al.*, 2006), Canada (Kryzanowski, 1979), United Kingdom (Engelen and Kabir, 2006), Sweden (DeRidder, 1990) and Turkey (Bildik, 2004). On the other hand, opponents argue that a trading halt is not advantage because it delays stock price adjustments and impedes price discovery (Christie *et al.*, 2002), and imposes additional trading opportunity costs on investors and increases post-halt trading volatility (Lee *et al.*, 1994; Corwin and Lipson, 2000). Furthermore, it can be argued that institutional investors can evaluate new information quicker than uninformed investors during the halt period, and can profit from that information after the halt by using superior trade execution (Bildik, 2004).

The controversial issues are the motivations of this paper to search for the benefits and costs of trading halts. How effective are trading halts? Do trading halts reduce possible speculation? Do trading halts cause higher price volatility? Do trading halts enhance efficiency of the market? Do halt mechanisms and durations impact the effectiveness of halts? Do trading halts affect the trading behaviour of retail, institutional and foreign investors?

This paper investigates these issues by analyzing the impact of trading halts on the trading behaviour of stocks listed on the Stock Exchange of Thailand (SET). Particularly, this study examines abnormal changes in returns, volatility and liquidity of stocks around trading halts. This study adds to existing literature in four ways. First, the SET offers a good opportunity to evaluate the efficacy of trading halts on a pure order-driven market. Unlike the New York Stock Exchange (NYSE), the SET does not have market makers or specialists who may have an influence on the effectiveness of the trading halts. Second, while previous studies examine only the intra-day halts (i.e., halts imposed during trading session) and exclude those with delayed opening (i.e., halts issued right before trading session), this study analyzes both types of halts. Third, the study tests whether the impacts of halts on return, volatility, and trading volume are related to halt duration and firm size. The findings enable SET officials to improve the screening process used to call a trading halt. Last but not least the investigation on the trading behaviour of three types of traders, i.e., retail, domestic institutional and foreign investors, around trading halts reveals trading strategies implicitly pursued by the traders.

The remainder of this paper is organized as follows. Section 2 describes hypotheses development. Section 3 describes the trading halts in the Stock Exchange of Thailand. Section 4 explains data selection process and methodology used in the study. Section 5 presents the results. Section 6 compares the trade performance among various investor types. Section 7 provides the conclusion.

2. Hypotheses Development

Several studies on trading halts provide inconclusive evidence which cause controversial issues among academicians and regulators. This paper examines the impact of trading halts surrounding three market activities: price discovery process, volatility and liquidity.

2.1. Delayed Price Discovery Hypothesis

In a semi-strong form efficient market, a new equilibrium market price is assumed to reflect the new information within a short period of time. If halts are tools that enable dissemination of material information, we expect that halts should be installed unpredictably and withdrawn when full information disclosed. Thus the return in the first interval following resumption of trades should be relatively large to show how quickly new information is absorbed by the market. The rapid market adjustment in prices should leave the abnormal return small and insignificant in the post-halt period. This leads to the first hypothesis:

H1: Abnormal returns in the post-halt periods are not significantly different from zero.

On the other hand, if there is a delay in price discovery, we expect that the market would experience long time positive (negative) abnormal returns for stocks that are halted due to positive (negative) news in the post-halt period. We investigate the immediate and subsequent price movements following the halt using return series around the halt intervals.

2.2. Volatility Spillover Hypothesis

The main purpose of imposing trading halts is to prevent the excessive volatility caused by unexpected information released during trading. Since the halts allow dissemination of information, the ability of the market to reflect this new material information before, during and after the halt is examined. If the halt is an effective tool, volatility in the post-halt period should return to its normal level in a short period of time. In contrast, trading halt may interrupt information flow and cause volatility to spread over a longer period by preventing trading. This leads to the second hypothesis:

H2: Volatility in the post-halt periods is not significant different from that in nonhalt period.

One interesting question also relates to how quickly new information reflects into prices. In other words, if a spillover exists, then how long it last.

2.3. Trading Interference Hypothesis

Admati and Pfleiderer (1988) conjecture that concentrated trading patterns arise endogenously because of the strategic behaviour of liquidity traders and informed traders. The results show how trading volume will be high after a non-trading period, suggesting that trading volume will be abnormally soaring following a trading halt. In addition, Lee *et al.* (1994), Aitken *et al.* (1995), and Corwin and Lipson (2000) demonstrate that trading volume is expected to increase due to the need of investors to trade for liquidity and portfolio rebalancing purposes after receiving new information. The further increases in volume after a halt interval reveal trading interference by halts. Therefore, if the halt is the effective tool to control the volatility and trading activity, volume and number of trades should not increase excessively in the post-halt period. This view leads to the third hypothesis:

H3: Trading activities in the post-halt periods are not significantly different from those in nonhalt period.

3. Trading Halts in the Stock Exchange of Thailand

The Stock Exchange of Thailand (SET) employs various supervisory signs to regulate trading and inform investors of special situations and conditions that may affect the securities of any listed company in order to ensure fair and efficient trading. One of the significant sign that SET posts is the trading halt sign, the "H" sign posted on the security during the trading session to notify investors that

trading in the security is not allowed. Trading in the security is halted for a maximum period of one trading session. This may be because of four main reasons. First, when there exists critical changes or major events concerning a listed company which have occurred during trading hours, the firm involved must then clarify the situation with the SET immediately. Second, when the market experiences trading conditions (e.g., price fluctuations) which indicate that some investors may have received important news or information about a listed company before it was formally disseminated to the public. Third, trading may be halted at the request of the issuer in order to allow for clarification of a major development or for a news announcement to be made during trading hours. Fourth, there exist major events which may critically influence the trading system. The halt sign may be removed at any time during the trading session, if deemed appropriate by the SET, and/or following clarification or resolution of the situation.

4. Data and Methodology

4.1. Data Selection

We obtain data for trading halts on the SET from two sources. First, SETSMART database provides information of trading halts such as posted time and date and lifted time and date. Second, we use unique intraday transaction data provided by the SET from January 1999 to December 2007. The transaction data provides time, price, and volume of each trade execution and time, order identification, and trader type of each buy-side or sell-side order. If the SETSMART data do not provide posted or lifted time, the approximate times of halts are drawn from transaction data. We consider only transaction executed during normal trading hours (10.00 - 12.30 hours. and 14.30 – 16.30 hours). We group types of investors into (1) R--Individual domestic investors which include broker portfolio, broker customer, sub-broker portfolio and sub-broker customer, (2) I--Institutional domestic investors which include broker mutual fund and sub-broker mutual fund, and (3) F--Foreign investors which include broker foreign and sub-broker foreign. The sample is selected only from common stocks.

According to SETSMART database, trading halts are posted 882 times during the period of 1999 to 2007. In order to analyze the effects of trading halts alone, we exclude (1) halts surrounded by other signs such as NP, NR and SP¹ 20 days prior to and after halts, (2) multiple halts incurring within 20 days, (3) halted stocks having no trades within 1 days prior to and after halts, (4) halts that are posted and lifted before the open of the day, (5) halted stocks with price below 1 baht and (6) halts having trade execution for at least 54 intervals before and after events. The final sample comprises 228 trading halts.

Table 1: Descriptive statistics of trading halts

Panel A. Halts classified by year, month and day of the week								
Year	Frequency	(%)	Month	Frequency	(%)	Weekday	Frequency	(%)
1999	61	27	Jan	16	7	Mon	56	25
2000	24	11	Feb	38	17	Tue	49	21
2001	3	1	Mar	31	14	Wed	35	15
2002	10	4	Apr	9	4	Thu	52	23
2003	16	7	May	20	9	Fri	36	16
2004	40	18	Jun	13	6			
2005	40	18	Jul	16	7			
2006	27	12	Aug	17	7			
2007	7	3	Sep	13	6			

¹ “NP” (Notice Pending) sign is posted when the issuer failed to submit a quarterly or annual financial statement to the SET by the specified time. The SET is awaiting the disclosure of additional information from the issuer or the information which has been received is incomplete or unclear. “NR” (Notice Received) sign is posted to replace NP sign when sufficient disclosure of the additional information, as requested by the SET, has been made by the issuer. “SP” sign is posted to show that the posted stock is prohibited for trading for more than one trading session

Table 1: Descriptive statistics of trading halts - continued

Total	228		Oct	18	8			
			Nov	24	11			
			Dec	13	6			
Panel B. Halts classified by number of companies								
Number of Halts	Number of Companies	(%)						
1	98	65						
2	34	23						
3	12	8						
4	4	3						
5	2	1						
	150							
Panel C. Halts classified by news types								
	Number of Halts							
Good News	109							
Bad News	77							
No News	42							
Panel D. Halts classified by time of the day and duration of halt (minutes)								
	Number of Halts							
Intraday	36							
Delayed	192							
Openings								
Duration of Halt		Mean	Median	Min	Max			
≤60 minutes	80	45	49	12	60			
61-120 minutes	76	102	105	63	120			
> 120 minutes	72	151	150	131	240			
Panel E. Halts portfolios classified by market capitalization (in million baht)								
	Number of Halts	Mean	Median	Min	Max			
All	228	13,322	2,566	80	255,708			
Small	76	817	875	80	1,450			
Medium	76	2,867	2,566	1,454	6,064			
Large	76	36,282	14,596	6,124	255,708			

Table 1 reports summary statistics of final sample used in this study. Panel A shows year, day-of-week and month-of-year of 228 trading halts occurred from 1999 to 2007. Trading halts in the sample were issued heavily in 1999 with 61 halts (27%) and lightly in 2001 with only 3 halts (1%). Halts are usually posted during the first half of the year, especially in February and March. Halts are typically enforced on Monday and Thursday, there were fewer halts posted on mid of the week. Panel B indicates that these halt events belong to 150 firms. Out of 150 firms, 98 firms declared one halt, 34 declared twice, 12 firms for 3 times, 4 firms for 4 times and only 2 firms for 5 times. This result shows that our halt sample does not bias to only the same group of firms; thus, this sample is appropriate to analyze the trading halts in relation to other associated characteristics.

4.2. Halt Characteristics based on Price Change, Halt Time, Duration and Firm Size

Price Change. To assess the favourableness of information content released during the halts, we compare the first trade price following resumption of trade with the last trade price before the halt started similar using the tick test method suggested by Lee and Ready (1991). If the first price is greater (less) than last trade price, this informative trading halt is defined as good (bad) news. Conversely, less informative halts (no news) indicate zero price change. Panel C of Table 1 shows that 109 halts relate to good news, 77 halts link with bad news and 42 halts are from neutral news.

Time of Halts. Previous works mainly study the halts imposed during the trading day, and ignore halts that occur during off-hour trading. This paper analyzes both types of halts that occur before the opening of the trading session (delayed opening halts) and during the trading session (intraday halts). In Panel D of Table 1, halts are grouped into 192 delayed opening and 36 intraday halts. The results indicate that SET primarily imposes halts during the pre-opening period.

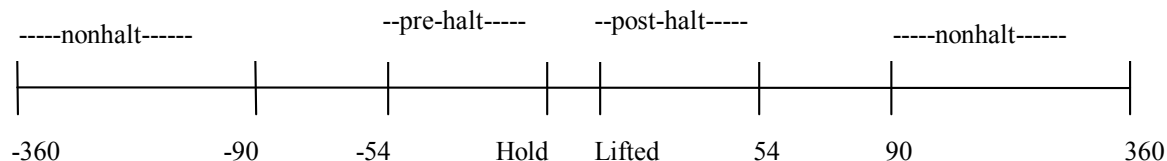
Duration of Halts. Bhattacharya and Spiegel (1998) point out that the NYSE has improved its ability to absorb more extreme news by using shorter halt durations. On the contrary, Christie *et al.* (2002) find that post-halt price volatility and transaction cost impacts are significantly larger following NASDAQ halts that are re-opened with a 5-minute quotation period than for NASDAQ halts re-opened with a 90-minute quotation period. This is consistent with Greenwald and Stein (1991) who suggest that longer trading halts will allow time for greater information dissemination and allow time for liquidity suppliers to enter the market. Therefore, this paper investigates whether duration of halts effect the uncertainty of market. We divide halts into two groups: (i) up to 60 minutes and (ii) from 60 to 120 minutes. In Table 1, Panel D shows that the minimum duration of halt is 12 minutes with maximum of 240 minutes. The halt sample is distributed equally across three duration groups, but mainly posted less than an hour.

Firm Size. Spiegel and Subrahmanyam (2000) argue that variance uncertainty and asymmetric information are lower for larger stocks as they have greater analyst coverage and are widely held. Consequently, they suggest that the suspension of trade due to impending public disclosures should occur less often for larger stocks.

To investigate whether our halt sample concentrates only one firm size, especially, small firms, we conversely discover that the sample primarily belongs to high and medium capitalization firms ranked from total listed stocks on SET. We further group the halted stocks into three size portfolios based on market capitalization as small, medium and large. Each group contains 76 halts. The small, medium and large size portfolios have mean market capitalization of 817, 2,867 and 36,282 million baht respectively.

4.3. Event Study

We use an event study method to analyze the trading behaviour around trading halts. We follow Lee *et al.* (1994) and Corwin and Lipson (2000) in calculating abnormal measures of three days activities centred from halts. Each trading day is divided into 18 fifteen-minute intervals (i.e. 10.00-10.15, 10.15-10.30...). We compare activities in event-period with those of the halted stocks during a non-event period (nonhalt). In other words, we compare trading activities on the halt day with those on normal trading days. In each event, hold interval and lifted interval are identified. Event periods consist of 108 intervals from (-54,...,-1) and (+1,...,+54). We define the nonhalt period from (-360,...,-90) and (90,...,360).



4.4. Variables Measurements

Return measurement. Abnormal return is measured as

$$AR_{it} = R_{it} - R_{itnon} \quad (1)$$

R_{it} = percentage change of the last trade price of stock i on interval t relative to the last trade price on interval $t-1$ during halt period

R_{imon} = percentage change of the last trade price of stock i on interval t relative to the last trade price on interval $t-1$ during nonhalt period
where

$$R_{it} = \frac{(P_{it-1} - P_{it})}{P_{it}} \quad (2)$$

Average abnormal return is defined as

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \quad (3)$$

Cumulative Average Abnormal Return is defined as

$$CAAR_T = \sum_{t=1}^T AAR_t \quad (4)$$

Volatility. Following Lee *et al.* (1994) and Corwin and Lipson (2000), we calculate two volatility measurements: high-low transaction price ranges and absolute value of transaction price return Hi-low $_t$ = the difference between the highest and the lowest trade price on interval t during halt period

Absolute return $_t$ = Absolute value of the differences between last trade price on interval t and the last trade price on interval $t-1$ during halt period

Trading Activities. We compute both total share volume and total number of trades in each trading interval.

The abnormal statistics of both volatility and trading activities utilize the following method proposed by Lee *et al.* (1994). For each variable and each time period, the abnormal measure is defined as

$$\text{Abnormal measure (\%)} = \left(\frac{\text{Halt Period Value} - \text{Mean Value Across Nonhalt Periods}}{\text{Mean Value Across Nonhalt Periods}} \right) * 100 \quad (5)$$

This measure can be interpreted as the percentage difference between the halt-day value and the mean value across the nonhalt period.

4.5. Volatility Regression Analysis

To investigate the relationship between abnormal volatility measures and abnormal volume, we employ an ordinary least squares (OLS) regression and control for time of halt, duration of halt and firm size. The regressions are estimated for interval 1 (15 minutes after a trading halt interval) to provide an indication of the relationship immediately after a trading halt. The regressions take the following general form:

$$\begin{aligned} \text{Abnormal Volatility}_i = & \alpha_0 + \alpha_1 * \text{Abnormal Volume}_i + \alpha_2 * \text{HaltTimeDum}_i \\ & + \alpha_3 * \text{Duration}_i + \alpha_4 * \text{MarketCap}_i + \varepsilon_i \end{aligned} \quad (6)$$

We use abnormal absolute return as abnormal volatility measures. Abnormal volume is measured from share volume. *HaltTimeDum* is dummy variable defined as 1 for Delayed Opening Halts and 0 for Intraday Halts.

5. Empirical Findings

5.1. Delayed Price Discovery

To examine the price discovery process around trading halts, we measure price return for our analysis. Table 2 reports average abnormal return (AAR) around trading halts events in relation to news types, halt time, durations, and firm size.

Panel A of Table 2 indicates that AAR for full sample significantly increases to 1.26% for the first 15 minutes after halts and decreases to normal level after 30 minutes following halt period. The significant changes appear for both good and bad news. Fig. 1 shows cumulative average abnormal return (CAAR) classified by news types. The ‘good news’ CAAR exhibits an upward trend in the pre-halt and significant drift in the first post-halt period. While the ‘bad news’ halts provide some unanticipated results. The ‘bad news’ halts are unanticipated for two reasons. First, there is a positive price run up in the pre-halt period for ‘bad news’ trading halts. If there was correct anticipatory trading behaviour in the market, ‘bad news’ trading halts should show a negative run up. This could possibly be explained by investors that anticipate trading halts and trade in the incorrect side prior to the information released during the trading halt. Secondly, ‘price discovery’ generally occurs faster on ‘bad news’ rather than ‘good news’ (Easley *et al.*,1995; Easley *et al.*,1996). The CAAR for ‘no news’ trading halts exhibits a positive abnormal returns just before the halts, but not during or after a trading halt. This is as expected, suggesting that ‘no news’ trading halts are initiated for the release of less informative announcements that have no significant impact on the returns generated.

Table 2: Average abnormal return (AAR) around trading halts (%)

Panel A. Classified by news types								Panel B. Classified by halt time					
	All		Good news		Bad news		No news		All		Intraday		Delayed openings
Interval	AAR		AAR		AAR		AAR		AAR		AAR		AAR
(-54,-1)	0.01		0.05		-0.07		0.02		0.01		-0.17		0.04
(-36,-1)	0.04		0.06	*	0.01		0.02		0.04		-0.06		0.05
(-18,-1)	0.06	*	0.11	**	0.00		0.03		0.06	*	-0.06		0.08
-4	0.29		0.38		0.3		0.03		0.29		0.02		0.35
-3	0.09		0.26		-0.07		-0.08		0.09		0.33		0.05
-2	0.15		0.24		0.28		-0.38		0.15		-0.42	*	0.26
-1	0.16		0.06		0.05		0.73	***	0.16		0.30		0.14
1	1.26	***	4.82	***	-3.04	***	0.46		1.26	***	0.54		1.43
2	-0.27	*	0.01		-0.64	**	-0.28		-0.27	*	-0.43		-0.24
3	-0.07		0.48	*	-0.51	*	-0.81	**	-0.07		-0.54		0.03
4	0.26		0.60		-0.1		-0.05		0.26		0.31		0.25
(1,18)	0.06		0.40	***	-0.36	***	-0.04		0.06		0.02		0.07
(1,36)	0.04		0.24	***	-0.2	***	-0.04	*	0.04		-0.01		0.05
(1,54)	0.01		0.13	**	-0.13	**	-0.05	**	0.01		0.01		0.01
Panel C. Classified by halt duration						Panel D. Classified by market capitalization							
	All		≤60 mins.		61-120 mins.		All		Small		Medium		Large
Interval	AAR		AAR		AAR		AAR		AAR		AAR		AAR
(-54,-1)	0.01		0.00		0.01		0.01		-0.01		0.03		0.00
(-36,-1)	0.04		0.03		0.04		0.04		0.06		0.05		0.00
(-18,-1)	0.06	*	0.12	*	0.00		0.06	*	0.19	**	0.03		-0.04
-4	0.29		-0.07		0.75		0.29		1.38		-0.04		-0.20
-3	0.09		0.19		0.07		0.09		0.49	*	-0.31		0.15
-2	0.15		0.36		-0.04		0.15		0.25		0.52		-0.23
-1	0.16		0.14		0.12		0.16		0.13		0.21		0.16
1	1.26	***	1.22		1.62	**	1.26	***	1.44		1.13		1.24
2	-0.27	*	0.34		-0.76	***	-0.27	*	-0.23		-0.23		-0.35
3	-0.07		0.34		-0.11		-0.07		-0.21		-0.07		0.06
4	0.26		0.80		-0.04		0.26		-0.02		0.45		0.28
(1,18)	0.06		0.08		0.07		0.06		0.07		0.11		0.01
(1,36)	0.04		0.06		0.03		0.04		0.04		0.04		0.03
(1,54)	0.01		0.04		0.01		0.01		0.01		-0.01		0.02

Table 3: Average abnormal volatility around trading halts (%)

Panel A. All halts classified by news types																
Interval	All				Good news				Bad news				No news			
	High-low		Absolute return		High-low		Absolute return		High-low		Absolute return		High-low		Absolute return	
(-54,-1)	18.39	***	8.22	**	26.13	**	14.55	**	15.9		8.07		2.88		-7.93	
(-36,-1)	20.27	**	6.38		29.63	**	13.91	**	16.7		5.71		2.54		-11.95	
(-18,-1)	24.53	**	8.68		30.86	**	16.88	*	28.66		10.14		0.55		-15.27	*
-4	-8.71		2.66		-11.2		24.37		14.29		7.68		-48.08	***	-72.7	***
-3	31.19		20.81		81.21	**	49.01	*	5.42		7.49		-62.65	***	-34.28	**
-2	71.28	**	28.07	*	21.19		31.61		104.2	*	20.1		165.55		33.06	
-1	106.49	***	23.27		97.96	**	27.39		107.53	**	18.35		130.91	**	21.19	
1	720.24	***	479.87	***	843.16	***	619.13	***	680.19	***	460.37	***	471.13	***	144.98	***
2	192.5	***	100.06	***	207	***	116.88	***	220.55	***	118.22	***	94.35	**	15.91	
3	160.84	***	83.74	***	187.49	***	90.23	***	133.5	***	86.07	***	134.62	***	61.5	
4	107.39	***	53.97	***	121.96	***	65.97	**	102.45	***	40.21	***	75.45		44.29	
(1,18)	100.2	***	50.7	***	128.21	***	58.66	***	88.17	***	63.82	***	49.61	*	5.99	
(1,36)	77.03	***	36.7	***	99.69	***	45.81	***	76.31	***	44.26	***	19.56		-0.8	
(1,54)	55.97	***	24.9	***	72.53	***	27.72	***	58.04	***	32.58	***	9.22		3.49	
Panel B. All halts classified by halt time																
Interval	All				Intraday				Delayed openings							
	High-low		Absolute return		High-low		Absolute return		High-low		Absolute return					
(-54,-1)	18.39	***	8.22	**	8.92		-6.78		20.17	***	11.03	**				
(-36,-1)	20.27	**	6.38		12.66		-7.26		21.7	**	8.93	*				
(-18,-1)	24.53	**	8.68		26.23		-2.35		24.22	**	10.75	*				
-4	-8.71		2.66		17.84		-12.76		-14.21		5.85					
-3	31.19		20.81		62.96		62.65		25.1		12.79					
-2	71.28	**	28.07	*	8.9		28.78		82.55	**	27.94					
-1	106.49	***	23.27		248.91	**	51.67		80.76	***	18.14					
1	720.24	***	479.87	***	367.21	***	372.69	***	801.31	***	504.48	***				
2	192.5	***	100.06	***	194.52	***	53.44	**	192.08	***	109.7	***				
3	160.84	***	83.74	***	127.02	**	91.49	*	167.48	***	82.22	***				
4	107.39	***	53.97	***	45.22		-4.04		118.45	***	64.29	***				
(1,18)	100.2	***	50.7	***	55.03	**	21.7	**	108.67	***	56.14	***				
(1,36)	77.03	***	36.7	***	33.78	*	11.75	*	85.14	***	41.38	***				
(1,54)	55.97	***	24.9	***	20.35		5.71		62.65	***	28.5	***				
Panel C. All halts classified by halt duration																
Interval	All				≤60 mins				61-120 mins				>120 mins			
	High-low		Absolute return		High-low		Absolute return		High-low		Absolute return		High-low		Absolute return	
(-54,-1)	18.39	***	8.22	**	12.94		1.2		18.72	*	12.22		24.11	*	11.8	
(-36,-1)	20.27	**	6.38		7.27		-1.39		18.98		7.24		36.08	**	14.09	

Table 3: Average abnormal volatility around trading halts (%) - continued

(-18,-1)	24.53	**	8.68		12.41		4.4		14.82		11.65		48.27	**	10.32	
-4	-8.71		2.66		-17.02		-15.56		-5.21		39.55		-3.65		-19.94	
-3	31.19		20.81		19.9		40.64		12.68		-14.16		66.01		37.52	
-2	71.28	**	28.07	*	32.09		28.14		15.22		21.9		168.49	*	34.16	
-1	106.49	***	23.27		154.44	**	24.4		44.01		10.53		124.94	***	35.69	
1	720.24	***	479.87	***	727.8	***	382.2	***	822.58	***	456.34	***	589.53	***	586.68	***
2	192.5	***	100.06	***	167.42	***	60.66	***	154.26	***	90.91	***	258.42	***	144.24	***
3	160.84	***	83.74	***	124.3	***	47.37	***	132.1	***	81.76	***	232.1	***	123.07	***
4	107.39	***	53.97	***	113.94	**	92.38	**	58.41	**	2.91		157.34	***	70.13	*
(1,18)	100.2	***	50.7	***	87.23	***	42.53	***	100.16	***	40.97	***	114.67	***	70.05	***
(1,36)	77.03	***	36.7	***	58.06	***	31.72	***	73.85	***	27.05	***	101.48	***	52.44	***
(1,54)	55.97	***	24.9	***	50.62	***	28.63	***	52.51	***	14.98	***	65.56	***	31.23	***
Panel D. Halts portfolio classified by market capitalization																
	All				Small				Medium				Large			
Interval	High-low		Absolute return		High-low		Absolute return		High-low		Absolute return		High-low		Absolute return	
(-54,-1)	18.39	***	8.22	**	25.16	*	16.71	*	31.86	***	17.35	**	-1.84		-9.4	**
(-36,-1)	20.27	**	6.38		30.21	*	16.31	*	28.26	**	14.48	*	2.33		-11.67	**
(-18,-1)	24.53	**	8.68		32.76		14.46		30.19	*	19.7	**	10.65		-8.11	
-4	-8.71		2.66		-23.37		37.45		8.98		-7.6		-12.63		-13.24	
-3	31.19		20.81		63.49		27.4		15.71		34.73		20.89		4.39	
-2	71.28	**	28.07	*	68.47		25.6		76.98	*	72.31	*	68.64		-7.8	
-1	106.49	***	23.27		167.51	**	52.7	*	107.68	*	38.31		54.5	**	-14.08	
1	720.24	***	479.87	***	832.43	***	440.49	***	919.63	***	533.54	***	400.28	***	459.54	***
2	192.5	***	100.06	***	184.13	***	62.86	**	224.87	***	106.22	***	165.2	***	125.31	***
3	160.84	***	83.74	***	201.64	***	99.6	***	180.18	***	91.84	***	108.33	***	62.74	**
4	107.39	***	53.97	***	160.76	***	69.91		113.03	***	47.38		64.17	**	48.99	*
(1,18)	100.2	***	50.7	***	121.24	***	51.96	***	124.24	***	52.84	***	55.14	***	47.3	***
(1,36)	77.03	***	36.7	***	106.77	***	43.26	***	91.53	***	36.54	***	32.79	***	30.3	***
(1,54)	55.97	***	24.9	***	78.22	***	31.64	***	66.17	***	21.79	***	23.52	***	21.27	**

In general, market immediately reacts to halts. Price discovery process occurs during the first 15 minutes after halt interval for 'good news' as price reaches its new equilibrium level and does not seem to reverse to the pre-halts period. The increase in prices in pre-halt period signifies the existence of information leakage or insider trading prior to halts imposed. It is possible that posting halt stimulates the investors to adjust their interests faster. However, the price discovery process takes about 75 minutes for 'bad news.' Overall, halts are effective in controlling post-halt information asymmetry which is consistent with the first hypothesis that the market does not experience the delay in price discovery.

Panel B of Table 2 shows significant positive AAR in the first post-halt interval for delayed opening halts which is consistent with existing literature of high return at the opening session (Harris, 1986; French and Roll, 1986; Amihud and Mendelson, 1987, 1991; Jain and Joh, 1988; Stoll and Whaley, 1990; Gerety and Mulherin, 1992; Andersen and Bollerslev, 1997). The intraday halts show insignificant negative abnormal return post-halt period. Fig. 2 provides the graph of CAAR.

Panel C of Table 2 shows that halt durations from 1 to 2 hours show significant AAR of 1.62% for the first post-halt and significantly negative after that. Fig. 3 indicates that halts with shorter time duration are followed by positive adjustment or favourable event, while longer halt duration is associated with negative adjustment or unfavourable information. Panel D of Table 2 indicates that the significant positive AAR post-halt period is attributed to large size halted stocks.

5.2. Volatility Spillover

Table 3 reports that both average abnormal volatility measures for full sample, high-low and absolute return, increase significantly to 720% and 480% respectively after trades resume and decline significantly within one hour. This implies that halts are successful in controlling volatility. Halts do not cause volatility to spread over long period, in contrast, halts help prevent overreaction to announcements by facilitating the distribution of valuable information during the halt periods. High volatility is mainly influenced by trading for information at the reopening. The slightly higher volatility in the post-halt period is possibly explained by the change in the fundamental value of the stock and unmeasured information effects after the announcement (Corwin and Lipson, 2000).

Panel A shows that good news cause the highest volatility and last longer than other types of news. Delayed openings halts show higher volatility and last longer than intraday halts as reported in Panel B. Panel C illustrates interesting evidence that halts with long duration more than 2 hours result in highest volatility in terms of absolute return, and tend to last longer than the shorter duration halts. This result is consistent with Spiegel and Bhattacharya (1998) that the market has improved its ability to absorb more extreme news by using shorter halt durations. Panel D shows that medium size stocks have highest volatility after halts but it declines significantly within one hour.

5.3. Trading Interference

Table 4 presents abnormal trading volume and abnormal number of trades. Both trading volume and number of trades greatly increase one day before halts and then significantly increase after resume of trades for the first fifteen minutes. Trading activities decline immediately after first fifteen minutes hour and stay higher than nonhalt period but gradually decrease and almost fully reverse at the beginning of the third days. Investors tend to slowly adjust their liquidity and portfolio rebalancing. Trading activity is more pronounced for good news. Moreover, high abnormal trading occurs with delayed opening, large firms and long duration halts.

Table 4: Average abnormal trading volume and number of trades around trading halts (%)

Panel A. All halts classified by news types														
Interval	All				Good news				Bad news				No news	
	Share volume		Number of share		Share volume		Number of share		Share volume		Number of share		Share volume	Number of share
(-54,-1)	38.88	***	28.49	***	50.8	***	40.63	***	44.18	*	28.65	**	-1.78	-3.32
(-36,-1)	45.58	***	34.45	***	55.3	***	48.21	***	60.13	**	36.57	**	-6.31	-5.14
(-18,-1)	70.78	***	53.9	***	76.72	***	66.01	***	103.9	**	65.23	***	-5.39	1.71
-4	106.2	***	63.72	***	84.71	*	61.56	**	204.4	**	107.7	***	-29.2	-19.3
-3	112.3	***	75.31	***	147.3	**	103	**	130.2	**	81.66	**	-18.4	-13.9
-2	167.4	***	119.8	***	187.3	**	136.5	**	208.6	**	135.7	**	17.38	32.9
-1	136.4	***	118.9	***	191.6	***	167.6	***	100.1	*	66.28	**	43.39	82.03
1	1196	***	1038	***	1669	***	1467	***	970	***	762.4	***	386.6	447.3
2	519.9	***	425.5	***	700.4	***	592.8	***	461.2	***	334.2	***	140	149.7
3	375.1	***	288.2	***	598	***	447	***	153.6	**	130.4	***	143	122.9
4	226.4	***	161.9	***	344.9	***	219.7	***	159	**	139.4	***	13.7	40.19
(1,18)	192.7	***	146.9	***	288.7	***	222.4	***	144.9	***	100.6	***	31.23	35.94
(1,36)	137.2	***	105.5	***	206.6	***	159.2	***	103.3	***	75.36	***	19.08	21.44
(1,54)	88.06	***	68.49	***	135	***	105.5	***	58.21	***	43.35	***	20.95	18.5
Panel B. All halts classified by halt time														
Interval	All				Intraday				Delayed openings					
	Share volume		Number of share		Share volume		Number of share		Share volume		Number of share			
(-54,-1)	38.88	***	28.49	***	-2.61		16.94		46.66	***	30.65	***		
(-36,-1)	45.58	***	34.45	***	-1.69		19.39		54.44	***	37.27	***		
(-18,-1)	70.78	***	53.9	***	6.6		34.34		82.82	***	57.57	***		
-4	106.2	***	63.72	***	40.01		41		119.9	**	68.42	***		
-3	112.3	***	75.31	***	70.28	**	91.73	**	120.3	***	72.16	**		
-2	167.4	***	119.8	***	66.17	*	60.56	**	185.6	***	130.5	***		
-1	136.4	***	118.9	***	41.89		174.2		153.5	***	108.9	***		
1	1196	***	1038	***	373.4	***	492	***	1385	***	1164	***		
2	519.9	***	425.5	***	146.9	**	150.2	**	596.9	***	482.3	***		
3	375.1	***	288.2	***	95.24	*	126.6	**	430	***	319.9	***		
4	226.4	***	161.9	***	105.3		116.2	**	248	***	170	***		
(1,18)	192.7	***	146.9	***	27.77		48.25	**	223.7	***	165.4	***		
(1,36)	137.2	***	105.5	***	7.88		24.18		161.4	***	120.8	***		
(1,54)	88.06	***	68.49	***	-3.08		10.5		105.2	***	79.37	***		
Panel C. All halts classified by halt duration														
Interval	All				≤60 mins				61-120 mins				>120 mins	
	Share volume		Number of share		Share volume		Number of share		Share volume		Number of share		Share volume	Number of share
(-54,-1)	38.88	***	28.49	***	10.77		12.77		49.63	**	34.46	**	58.75	39.65
(-36,-1)	45.58	***	34.45	***	8.53		11.71		48.96	**	39.47	**	83.19	54.41
(-18,-1)	70.78	***	53.9	***	21.94		25.7		61.07	**	49.17	**	135.3	90.24
-4	106.2	***	63.72	***	32.47		30.04		75.04	**	41.3	**	223	126.5
-3	112.3	***	75.31	***	69.47	*	34.6	*	51.63	**	41.25	**	233.2	163.1
-2	167.4	***	119.8	***	37.25	*	25.01	*	162.6	*	113.7	*	308.7	225.4
-1	136.4	***	118.9	***	100.1	***	141.8	**	144.8	**	96.19	**	163.9	120.1
1	1196	***	1038	***	578.5	***	698.3	***	1414	***	1125	***	1426	1204
2	519.9	***	425.5	***	403.7	***	353.5	***	381.4	***	333	***	780.1	594.5
3	375.1	***	288.2	***	188.1	***	214.9	***	487.9	*	318.8	***	431.3	326.4
4	226.4	***	161.9	***	144.6	***	136.8	***	163.9	**	121.1	***	392.9	238.3
(1,18)	192.7	***	146.9	***	76.95	***	80.54	***	243.1	***	179.9	***	268.3	186
(1,36)	137.2	***	105.5	***	45.9	***	50.8	***	168.3	***	128.4	***	205.7	142.2
(1,54)	88.06	***	68.49	***	31.39	***	34.36	***	113.9	***	88.39	***	123.8	85.43
Panel D. Halts portfolio classified by market capitalization														
Interval	All				Small				Medium				Large	
	Share volume		Number of share		Share volume		Number of share		Share volume		Number of share		Share volume	Number of share
(-54,-1)	38.88	***	28.49	***	26.35		24		68.84	**	45.24	***	21.44	16.23
(-36,-1)	45.58	***	34.45	***	44.63	*	35.68	*	61.63	**	45.92	**	30.48	21.74
(-18,-1)	70.78	***	53.9	***	80.29	**	60.61	**	81.21	**	63.3	**	50.85	37.8
-4	106.2	***	63.72	***	36.06		31.3		172	*	89.32	**	102.5	65.79
-3	112.3	***	75.31	***	106.5		98.25		62.35	**	45.98	**	158.2	83.35
-2	167.4	***	119.8	***	152.4	*	153	*	239.8	**	153.7	**	117.4	64.35
-1	136.4	***	118.9	***	156.7	**	133.8	***	115.5	*	129.3	*	137.3	97.61
1	1196	***	1038	***	1115	***	961.3	***	1154	***	980	***	1318	1174
2	519.9	***	425.5	***	547	***	415.2	***	496.2	***	423.8	***	521.9	436.1
3	375.1	***	288.2	***	726.9	**	449.8	***	213.8	**	189.1	***	255.2	258.5
4	226.4	***	161.9	***	349.3	***	215.3	***	138.7	***	128.2	***	223.5	156.4

Table 4: Average abnormal trading volume and number of trades around trading halts (%) - continued

(1,18)	192.7	***	146.9	***	220.9	***	151.9	***	190.3	***	143.7	***	167	***	145.2	***
(1,36)	137.2	***	105.5	***	165.5	***	118.6	***	131.1	***	100.3	***	114.9	***	97.72	***
(1,54)	88.06	***	68.49	***	110	***	80.45	***	85.33	***	64.12	***	68.85	***	60.92	***

5.4. Volatility Regression Analysis

The regression result of abnormal volatility is reported in Table 5. Abnormal share trading volume is significantly positively related to abnormal volatility. Long duration of halt significantly results in high abnormal volatility. However, firm size and halt time show weak relationship with volatility. This result provides implication to policymaker that long duration of halts tends to cause high price movement.

Table 5: Abnormal volatility regressions for first fifteen minutes after halts

$$\begin{aligned} \text{Abnormal Volatility}_i = & \alpha_0 + \alpha_1 * \text{Abnormal Volume}_i + \alpha_2 * \text{HaltTimeDum}_i \\ & + \alpha_3 * \text{Duration}_i + \alpha_4 * \text{MarketCap}_i + \varepsilon_i \end{aligned} \quad (6)$$

Abnormal volatility measures	Mean abnormal volatility	Intercept	Abnormal trading volume	Halts time dummy	Duration of halts	Market capitalization	Adj. R ²
			(α_0)	(α_1)	(α_2)	(α_3)	(α_4)
Abnormal absolute return	479.871	214.240	0.039	-9.089	2.311	0.000	0.0726
t-stat			1.810	2.664	-0.085	2.484	-0.581
p-value			0.072	0.009	0.932	0.014	0.562

6. Investors Trading Performance Around Trading Halts

It is interesting to further discover who gains or losses from the trading halts. The impacts of trading halts are significant for investors who want to understand the behaviour of stock prices from a portfolio management viewpoint.

To investigate trade performance of different types of investor, we follow Choe *et al.* (2005) and Agarwal *et al.* (2007) methodology to calculate the volume-weighted average price. In particular, the volume-weighted average price measurement will be calculated using the volume-weighted average price at which the stock traded using all trades during interval (WP_i^{td}) and then compute the volume-weighted average price for all trades involving the investor group which we are interested in ($WP_{i,j}^{td}$). Finally, the ratio of the average price for all trades involving an investor class to all trades for a stock on a given interval is calculated. The volume-weighted average price is calculated separately for purchases and sales as well as for investor types.

$$WP_i^{td} = \frac{\sum_t P_i^{td} V_i^{td}}{\sum_t V_i^{td}}; \quad WP_{i,j}^{td} = \frac{\sum_t P_{i,j}^{td} V_{i,j}^{td}}{\sum_t V_{i,j}^{td}} \quad (7)$$

where, P_i^{td} is the price of stock i on interval t for trade d ,

V_i^{td} is the number of share traded for stock i on interval t for trade d ,

$P_{i,j}^{td}$ is the price of stock i on interval t for trade d by investor group j

$V_{i,j}^{td}$ is the number of share traded for stock i on interval t for trade d by investor group j

WP_i^{td} is the volume-weighted average price for stock i on interval t for trade d

$WP_{i,j}^{td}$ is the volume-weighted average buying or selling prices by investor group j
for stock i on interval t for trade d

Trading performance is measured by trade price ratio as below.

$$WP_{i,j}^{dt} / WP_i^{dt}$$

The ratio mainly indicates which investor type trades at better price than the others in each day. In other words, this ratio is simply a measure of how much more or less an investor pays than the average price on that day when he buys and how much more or less he receives when he sells. Furthermore, crucial question is whether trading performance in each group significantly differs from others groups. To answer this question, we compare trading performance across investor classes. In each day we summarize both investor class's purchases and sales, then take the difference on that day between the prices paid by two investor groups. If one of the two investor groups does not trade on that day, we will skip that day and report the t -statistics for the daily differences. The result will indicate the trading price of the investor groups which are more significantly higher or lower than other groups.

Table 6: Trading volume divided by types of investors

Panel A. Trading volume (shares)							Panel C. Trading volume (shares) grouped by halts portfolios									
Interval	R	I	F				Interval	R	I	F	R	I	F	R	I	F
(-54,-1)	2824800000	86%	119150000	4%	324010000	10%	(-54,-1)	96%	1%	3%	92%	2%	7%	79%	6%	15%
(-36,-1)	2003200000	88%	88545282	4%	197530000	9%	(-36,-1)	96%	1%	4%	93%	2%	5%	79%	7%	14%
(-18,-1)	1117600000	88%	49155032	4%	103170000	8%	(-18,-1)	96%	1%	3%	94%	2%	4%	80%	7%	14%
-4	64042012	86%	3595400	5%	6785400	9%	-4	98%	0%	2%	90%	4%	6%	78%	7%	15%
-3	57513216	81%	6755600	10%	6687800	9%	-3	96%	1%	2%	97%	0%	3%	70%	16%	14%
-2	134430000	93%	2860532	2%	6801000	5%	-2	97%	2%	1%	95%	1%	4%	90%	4%	7%
-1	94964691	89%	3660000	3%	7632700	7%	-1	90%	2%	9%	93%	1%	6%	87%	5%	8%
1	555860000	91%	19070433	3%	34211635	6%	1	98%	1%	2%	95%	1%	4%	86%	6%	8%
2	190930000	89%	10048800	5%	14195800	7%	2	97%	1%	2%	91%	5%	5%	84%	6%	10%
3	136720000	85%	3496100	2%	20463800	13%	3	94%	0%	6%	90%	1%	9%	79%	4%	18%
4	86599859	85%	3311400	3%	12501335	12%	4	89%	0%	11%	90%	3%	7%	79%	5%	17%
(1,18)	2160700000	87%	84229618	3%	244830000	10%	(1,18)	96%	1%	4%	92%	2%	6%	79%	5%	16%
(1,36)	2928400000	86%	116930000	3%	348790000	10%	(1,36)	96%	1%	4%	92%	2%	6%	78%	6%	17%
(1,54)	4140400000	86%	163010000	3%	507550000	11%	(1,54)	96%	1%	3%	93%	2%	5%	77%	5%	18%
Panel B. Trading value							Panel D. Trading value (baht) grouped by halts portfolios									
Interval	R	I	F				Interval	R	I	F	R	I	F	R	I	F
(-54,-1)	27914993030	77%	2160969853	6%	6165524395	17%	(-54,-1)	96%	1%	3%	91%	2%	7%	69%	8%	22%
(-36,-1)	20284877848	78%	1487619938	6%	4076367991	16%	(-36,-1)	96%	1%	3%	93%	2%	5%	70%	8%	22%
(-18,-1)	10522968501	79%	831969243	6%	1960629489	15%	(-18,-1)	96%	1%	3%	92%	3%	5%	71%	8%	20%
-4	496267768	77%	49194602	8%	99019894	15%	-4	98%	1%	1%	81%	9%	10%	72%	8%	20%
-3	571606643	69%	113908455	14%	146733785	18%	-3	96%	2%	2%	94%	2%	4%	60%	18%	22%
-2	849095777	82%	42881392	4%	140439727	14%	-2	96%	2%	2%	91%	2%	7%	75%	6%	19%
-1	815859982	74%	83314767	8%	197971012	18%	-1	93%	1%	6%	88%	1%	11%	71%	9%	20%
1	5115653131	87%	284055816	5%	457431812	8%	1	98%	1%	2%	94%	2%	5%	84%	6%	10%
2	2210639325	83%	157775842	6%	282477377	11%	2	96%	1%	3%	89%	6%	5%	80%	6%	14%
3	1461421962	82%	57267186	3%	267600406	15%	3	94%	0%	6%	88%	2%	11%	79%	4%	17%
4	1005312791	80%	63953348	5%	191263883	15%	4	87%	0%	12%	91%	4%	5%	76%	6%	18%
(1,18)	20542397189	80%	1375014036	5%	3688648708	14%	(1,18)	94%	1%	5%	89%	4%	7%	75%	6%	18%
(1,36)	28567224621	80%	2009535254	6%	5241177932	15%	(1,36)	93%	1%	5%	90%	4%	7%	75%	7%	18%
(1,54)	40430614175	78%	2892730395	6%	8382956551	16%	(1,54)	94%	1%	5%	90%	3%	7%	73%	7%	21%

Table 6 reports trading volume and value by each investor type. Panel A and B show that retails are major players for halted stocks for both volume and baht, account for more than 85% during the event period. Foreigners tend to trade at high price stocks. Retails increase their trade half hour before halts, whereas institutions intensely trade forty five minutes prior halts. This may imply that domestic investors know better than foreign investors. Panel C shows that retails mostly concentrate on small size stocks and medium stocks. Foreigners focus on large size stocks and less on small stocks. Institutions focus on larger size stocks but less volume than those of foreigner. In other words, retails prefer small stocks and institutions and foreigners prefer large stocks.

Table 7 compares trade price performance for different types of investors. Retails trade at better price than foreign investors by buying low and selling high three days prior halts. Retails do not buy better than institutions. Retails sell at higher price than institutions after halts during good news. Institutions start buying at lower price than foreign investors just two days prior to trading halts.

The better performance of retails and institutions than foreign investors implies that there is leakage of information before halts. In other words, domestic investors know more than foreign investors and take advantage of this information by purchasing earlier at a lower price. In other words, they buy on good news. Retails follow a contrarian trading strategy by buying low and selling high. Their performance is more manifest for good news.

7. Conclusions

This paper empirically investigates the efficiency of trading halts on the Stock Exchange of Thailand during the year 1999 to 2007. This paper is of interest for four reasons. First, we examine trading halts for the first time on the Stock Exchange of Thailand which offers an opportunity to evaluate the efficacy of trading halts on a computerized order-driven market. Second, different from the previous studies, we study all halts occurring during the trading day (intra-day) and before the trading session starts (delayed opening). Third, we test whether the impact of trading halts is related to halt time, halt duration and firm size. Finally, our unique data allows us to investigate the trading behaviour of various types of investors such as retail, domestic institutional and foreign investors.

We find that trading halts help disseminate information and maintaining stability in the market. Trading halts facilitate price discovery process by allowing investors to adjust their trading interests and react to the material information. The price and volatility tend to reverse to their normal trading period in the short period of time, especially for good news. However, high trading activities appear before and after halts but slowly decay within 3 days after resumption of trades. The result also provides implication to policymaker that long duration of halts may cause higher volatility than short duration. Furthermore, the evidence shows that domestic investors trade at better prices than foreign investors during trading halts. Retail domestic investors trade at the most favourable price than institutional domestic and foreign investors. Retails generally implement contrarian trading strategy by buying low and selling high.

Table 7: Comparison of trade value-weighted average buy and sell price ratios relative to daily average prices (%)

Panel A. Differences in trade price ratio among types of investors classified by buy and sell trades												
Interval	Buy					Sell						
	R-F		R-I		I-F	R-F		R-I		I-F		
(-54,-1)	-0.03	**	0.00		-0.04		0.05	**	-0.01		0.10	*
(-36,-1)	-0.04	***	0.00		-0.05	*	0.05	**	-0.01		0.11	*
(-18,-1)	-0.04	*	-0.02		-0.02		0.04		-0.01		0.12	
-4	0.02		0.07		-0.08		0.00		0.00		-0.03	
-3	0.016		0.07		-0.19	*	-0.08		0.10		-0.09	
-2	-0.13	**	0.00		0.045		0.02		-0.06		-0.03	
-1	-0.21	*	0.11		-0.27	**	0.09		0.18		-0.14	
1	0.034		0.11		-0.18		0.17		0.36	***	-0.13	
2	0.041		-0.08		0.373	**	0.09		-0.15	*	0.34	**

Table 7: Comparison of trade value-weighted average buy and sell price ratios relative to daily average prices (%) - continued

Panel A. Differences in trade price ratio among types of investors classified by buy and sell trades												
	Buy						Sell					
3	0.13		-0.16		0.518	*	0.20	*	-0.10		0.23	
4	-0.07		-0.25		0.177		0.11		-0.04		-0.29	*
(1,18)	-0.01		-0.02		0.036		0.08	***	0.01		0.02	
(1,36)	-0.02		-0.02		0.032		0.05	***	-0.01		0.04	
(1,54)	-0.02	*	-0.01		0.015		0.04	***	-0.01		0.05	**
Panel B. Differences in trade price ratio between types of investors around good news												
	Buy						Sell					
Interval	R-F		R-I		I-F		R-F		R-I		I-F	
(-54,-1)	-0.06	***	0.01		-0.03		0.06	**	0.01		0.10	
(-36,-1)	-0.08	***	0.00		-0.04		0.08	**	-0.01		0.19	*
(-18,-1)	-0.11	***	-0.02		-0.08	**	0.07		0.00		0.23	
-4	-0.03		0.05		-0.21		0.00		-0.04		-0.07	
-3	0.05		0.12		-0.16		-0.11		0.11		-0.13	
-2	-0.14	**	-0.03		0.08		0.05		-0.07		0.11	
-1	-0.33		0.10		-0.24		0.09		0.27		0.04	
1	0.05		0.41		-0.50		0.15		0.49	***	-0.43	**
2	-0.04		-0.28	**	0.57	***	0.11		-0.22		0.38	
3	-0.01		-0.29		0.64		0.12		-0.03		0.36	
4	-0.20		-0.04		-0.36		0.07		0.06		-0.38	*
(1,18)	-0.01		-0.01		-0.01		0.08	*	0.05		-0.03	
(1,36)	-0.04	*	-0.02		0.01		0.04		-0.01		0.02	
(1,54)	-0.03	*	0.00		0.02		0.04	*	0.01		0.02	
Panel C. Differences in trade price ratio between types of investors around bad news												
	Buy						Sell					
Interval	R-F		R-I		I-F		R-F		R-I		I-F	
(-54,-1)	0.015		-0.01		0.035		-0.01		-0.02		0.03	
(-36,-1)	0.02		0.017		-0.02		-0.01		-0.02		0.03	
(-18,-1)	0.03		0.021		0.047		0.02		-0.04		0.04	
-4	0.07		-0.09		0.082		-0.05		0.037		0.00	
-3	-0.02		0.183	*	-0.3		-0.06		0.13		-0.12	
-2	-0.19		0.144		-0.22		0.09		-0.26		0.22	
-1	-0.12		0.131		-0.31		0.05		0.05		-2.05	
1	0.01		-0.37	*	0.427	*	0.27		0.022		0.47	
2	0.20		0.144		0.218		0.02		-0.13		0.33	**
3	0.37		-0.27		0.683		0.40		-0.36	**	0.37	
4	0.00		-0.13		0.143		0.26		0.009		-0.40	
(1,18)	-0.01		-0.07		0.095		0.10	**	-0.08	*	0.14	**
(1,36)	0.00		-0.04		0.068		0.09	**	-0.02		0.09	**
(1,54)	-0.03		-0.02		0.022		0.05	*	-0.07		0.10	**

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