To break or not to break
Evidence from price discovery process of Thai stocks during the pre-opening of each trading session

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Trading Hours of Equity Markets

- NYSE/NASDAQ
  9:30 a.m. - 4:00 p.m.
- London
  8:00 a.m. - 4:30 p.m.
- Frankfurt/Amsterdam/Paris
  9:00 a.m. - 5:30 p.m.
- Australian
  10:00 a.m. - 4:00 p.m.
- Korean
  9:00 a.m. - 3:30 p.m.
- Taiwan
  9:00 a.m. - 1:30 p.m.
- Bombay
  9:15 a.m. – 3:30 p.m.

- Shanghai/Shenzhen (90 min)
  9:30 - 11:30 a.m. & 1:00 - 3:00 p.m.
- Tokyo (60 min)
  9:00 - 11:30 a.m. & 12:30 - 3:00 p.m.
- Hong Kong (60 min)
  9:30 - 12:00 p.m. & 1:00 - 4:00 p.m.
- Stock Exchange of Thailand (120 min)
  10:00 - 12:30 p.m. & 2:30 - 4:30 p.m.
- Ho Chi Minh (90 min)
  9:15 - 11:30 a.m. & 1:00 - 2:30 p.m.
- Singapore* (60 min)
  9:00 - 12:00 p.m. & 1:00 - 5:00 p.m.

SET Trading Hours
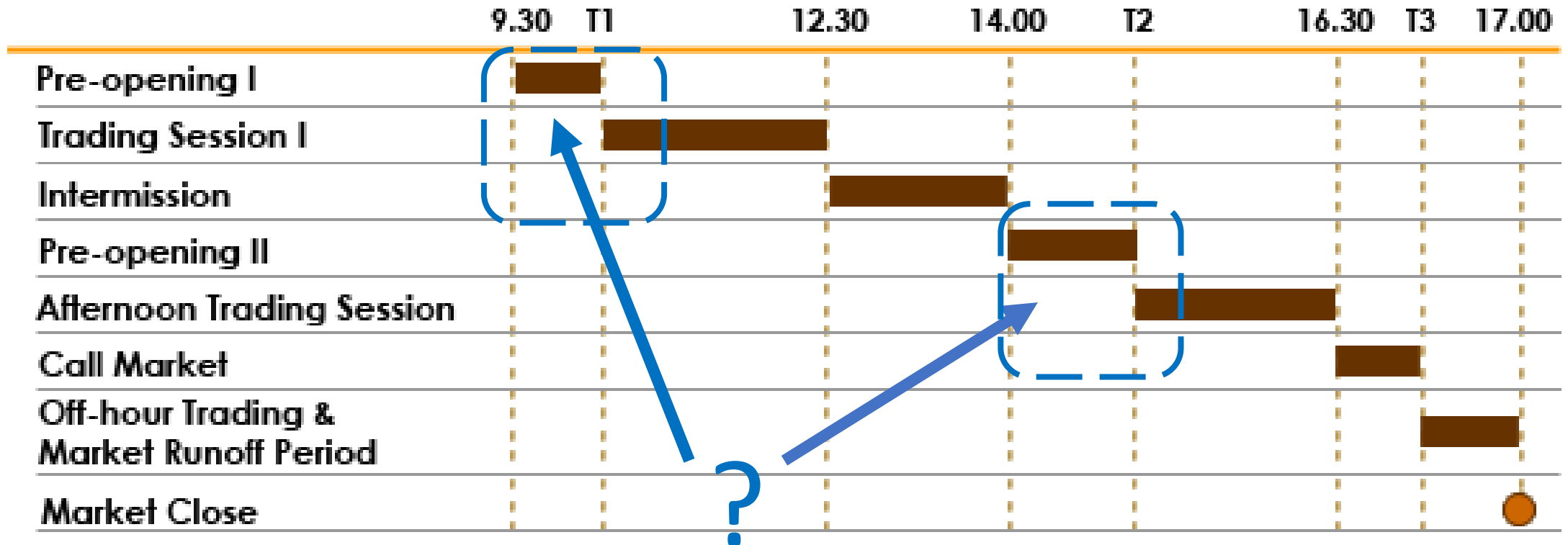
Literatures

- Opening time provides valuable information to the market, including signals to the market and efficient indicative opening price (Biais et al., 1999; Cao et al., 2000; Davies, 2003).

- Call auctions at the pre-opening represent the market's collective view and contribute to the price discovery process (Amihud & Mendelson, 1987; Budish et al., 2014, 2015)

- Provide more accurate price discovery (Barclay & Hendershott, 2008; Li et al., 2021) and reduce volatility and improve liquidity (Eom et al., 2021;Huang & Tasi, 2008)

Call Auction Market Mechanism

	T=0			T=1	
Bid Quantity	Price	Ask Quantity	Bid Quantity	Price	Ask Quantity
3,000	ATO	40,500	3,000	ATO	40,500
8,800	179.50	91,400	8,800	179.5	91,400
	177.00	54,000		177.0	54,000
60,100	176.50	36,500	60,100	176.5	36,500
95,500	**176.00**	42,300	95,500	176.0	42,300
23,000	175.50	22,300	23,000	**175.5**	22,300
67,600	175.00	Projected Price	67,600	175.0	**80,000**
204,600	174.50	54,000	204,600	174.5	54,000
167,400		**159,100**	**190,400**		**196,800**

Projected Quantity = 159,100

Imbalance = +8,300

Projected Quantity = 190,400

Imbalance = -6,400

Variables

During the Call Markets

- Order submission

- Order matching status

- Order cancellation

- Projected price & quantity

- Imbalance (Buys – Sells)

- Reversals

Continuous Market Starts

- Spreads

- Market depths

- Realized volatility

- Weighted price contribution

- Unbiasness coefficient

Data Sample

- SET50 index constituents remain throughout the period = 40 stocks

- 3 January 2018 to 30 December 2021

- Data by Refinitiv Tick History, SETSMART and Market Microstructure

- Market Capitalization = 61.0%

- Trading Value = 57.9%

Call Auction Distribution

	Morning Call	
Time	Frequency	%
9:55 – 9:56	8104	20.9%
9:56 – 9:56	8251	21.3%
9:57 – 9:56	7319	18.9%
9:58 – 9:56	7234	18.7%
9:59 – 10:00	7380	19.0%
10:00 – 10:01	471	1.2%

	Afternoon Call	
Time	Frequency	%
14:25 - 14:26	8304	21.4%
14:26 - 14:27	7131	18.4%
14:27 - 14:28	8180	21.1%
14:28 - 14:29	6999	18.1%
14:29 - 14:30	7579	19.6%
14:30 - 14:31	570	1.5%

Descriptive Statistics

Trading Activities (Million shares)	Morning Call	Afternoon Call
Order submission	1,504.9	231.2
Trading volume	229.2	43.7
Cancelled volume	348.8	177.7
Projected Quantity (before start)	0.8580	0.4413
Imbalance (before start)	0.2227	0.1892
Number of Reversals (times)	31.48	32.75

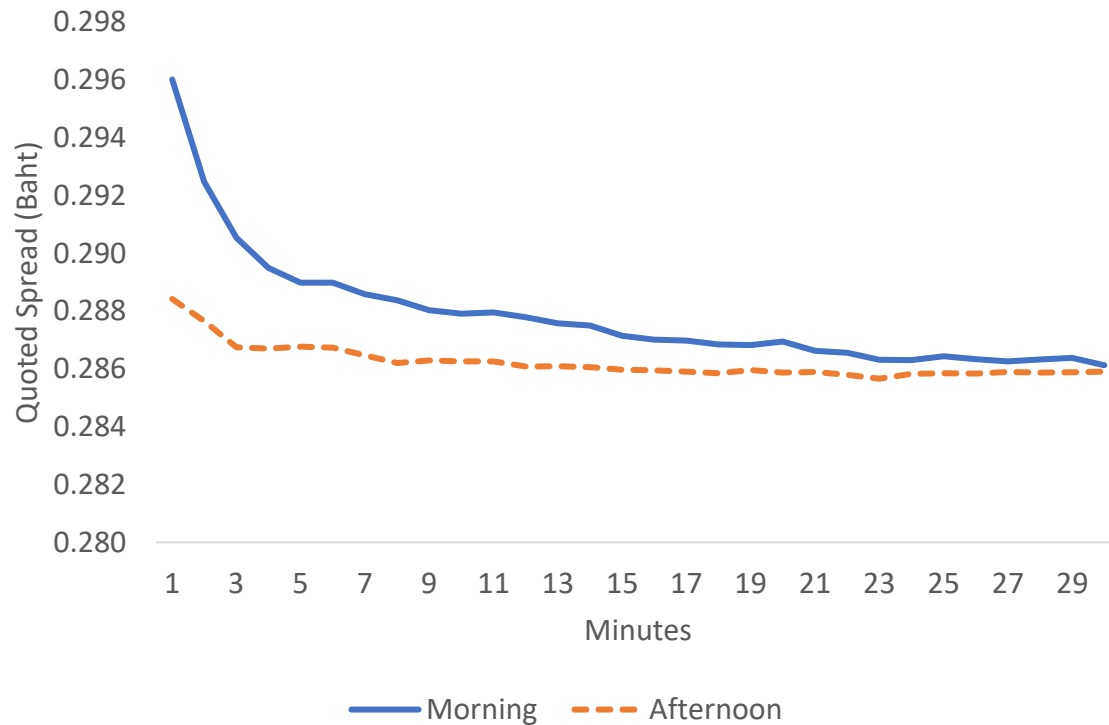# Activities throughout the trading day.

5 minute volume from 9:30 & 14:00

5 minute volume from 9:30 & 14:00
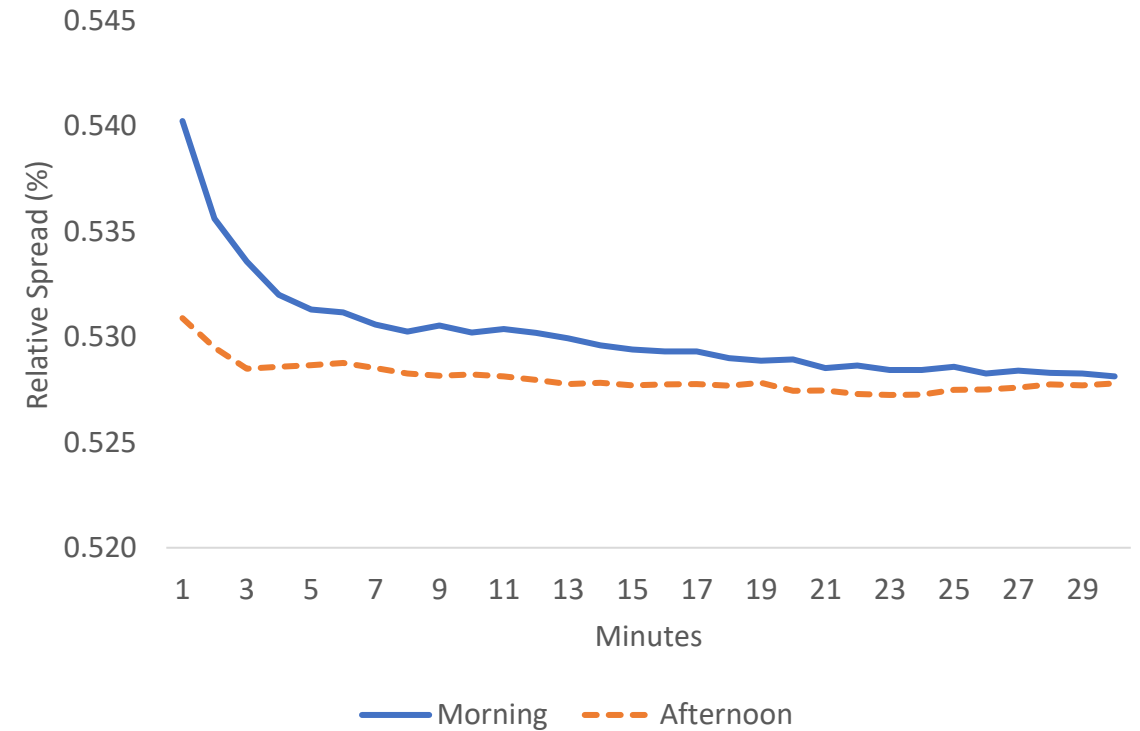
Matched_Volume   Order_Total_Volume
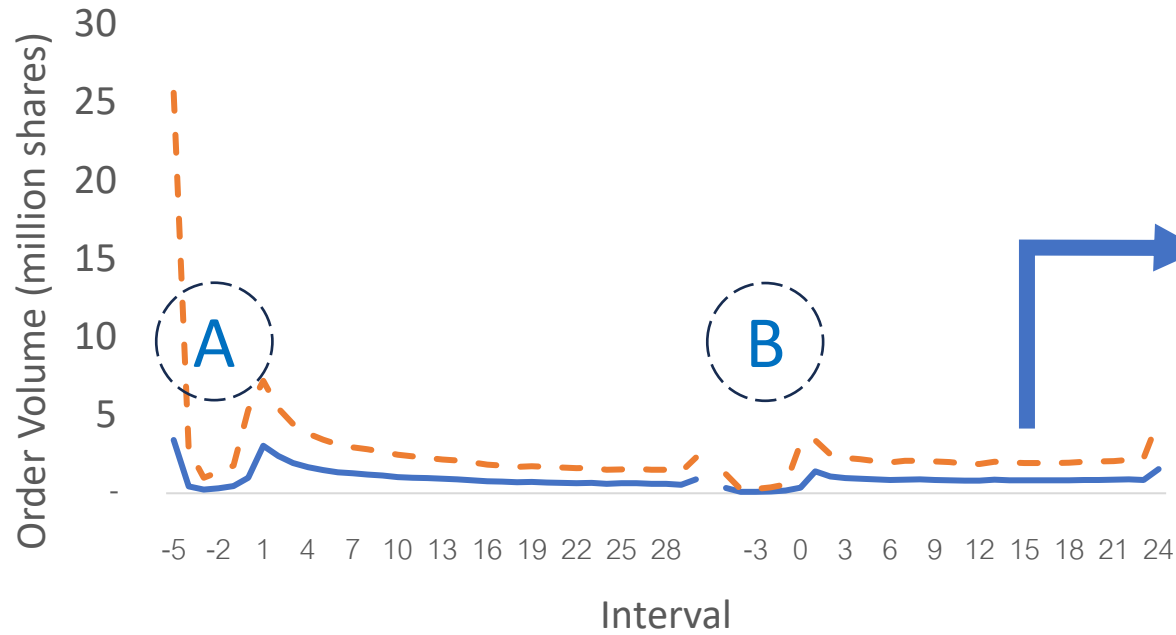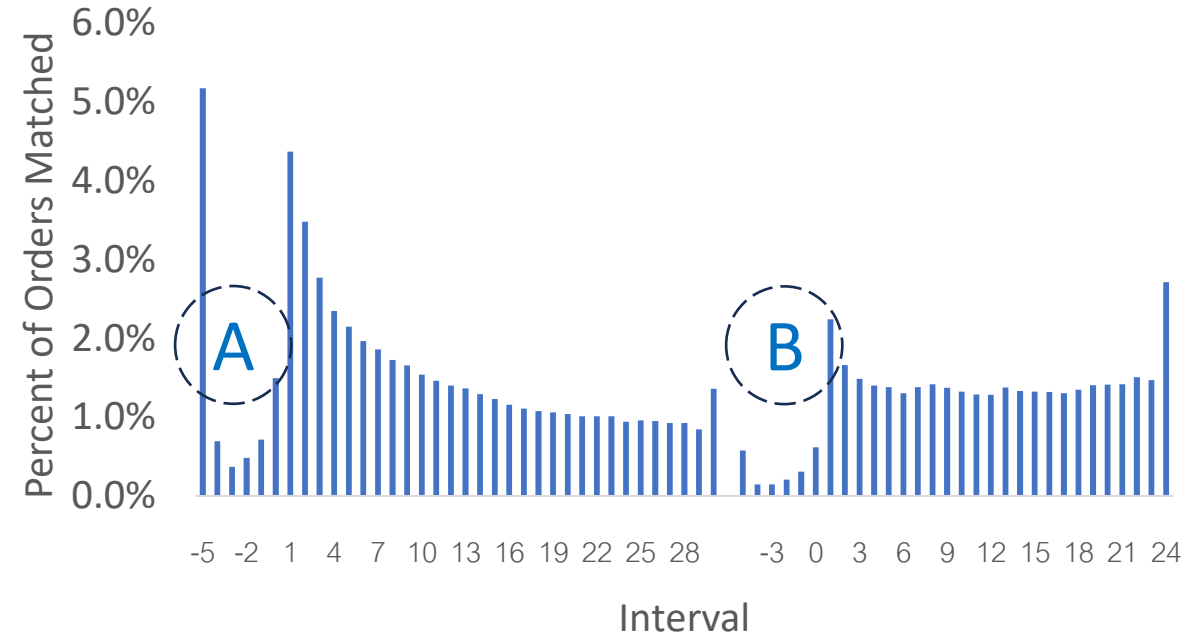
Spread Measures

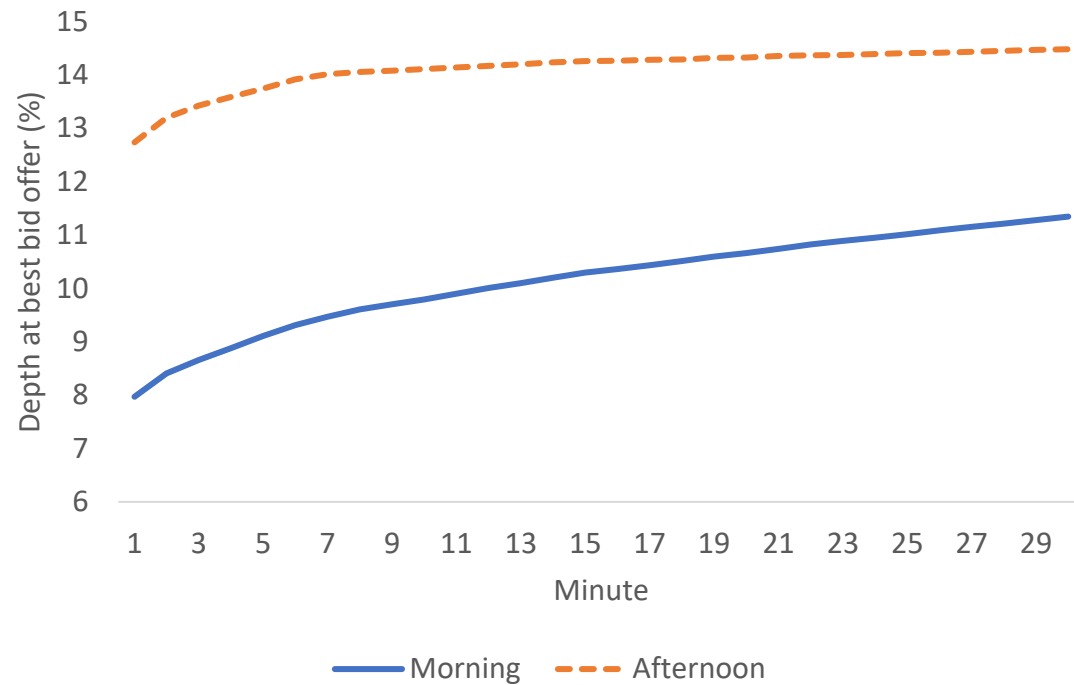30 minutes when continuous market starts

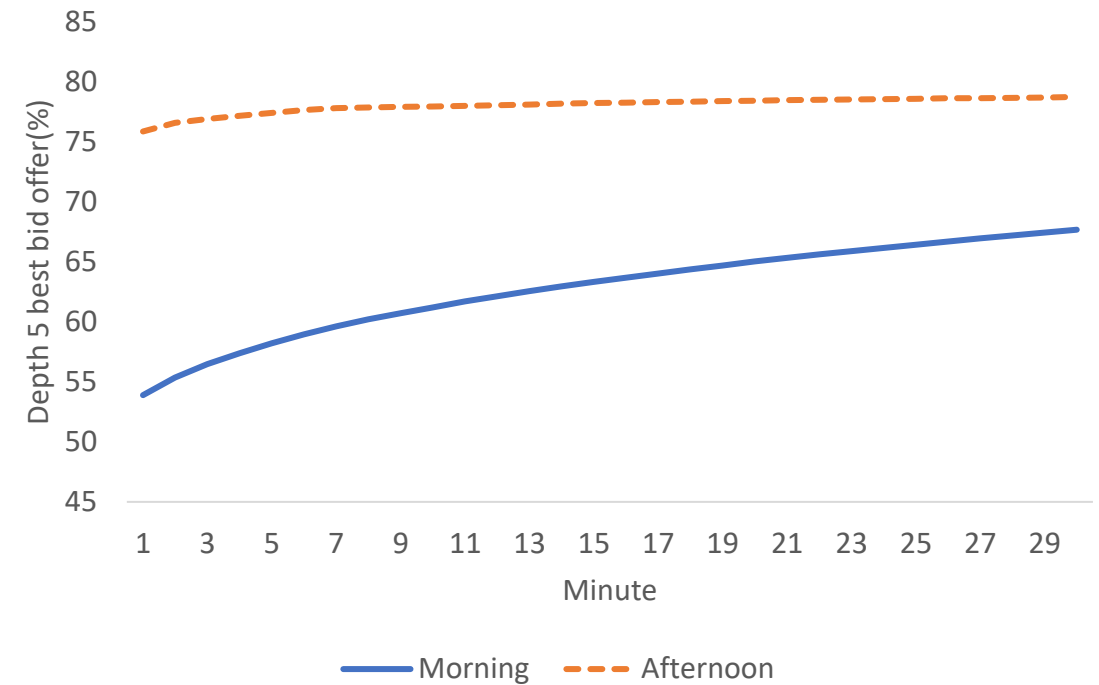30 minutes when continuous market starts

Depth Measures

30 minutes when continuous market starts

30 minutes when continuous market starts

Volatility Measures

Minute(i)	Morning	Afternoon	Diff	t-stat
RV_1	0.236	0.212	0.024***	5.436
RV_2	0.581	0.388	0.193***	7.287
RV_3	0.894	0.534	0.360***	10.453
RV_4	1.164	0.688	0.476***	12.352
RV_5	1.412	0.832	0.580***	14.663
RV_30	6.562	5.042	1.521***	23.178

Price Discovery Process

- We use weighted price contribution (WPC) following Barclay and Warner (1993), Cao et al. (2000), Jiang et al. (2012).

$$WPC_i = \sum_{t=1}^{T} \left(\frac{|\Delta P_t|}{\sum_{t=1}^{T} |\Delta P_t|} \right) \left(\frac{\Delta P_{i,t}}{\Delta P_t} \right)$$

Where WPC of each trading session i
(Call vs Continuous – Morning vs Afternoon)
$\Delta P_{i,t}$ is the price change for period *i* on day *t*.
ΔP_t is the daily price change

Price Discovery Process

| Trading Session	All Sample	2018	2019	2020	2021
MORNING					
WPC Call auction	14.80%	11.69%	10.25%	18.53%	15.77%
WPC Continuous	43.27%	42.82%	46.64%	36.91%	52.11%
AFTERNOON					
WPC Call auction	2.32%	1.80%	2.30%	3.13%	1.65%
WPC Continuous	23.01%	27.49%	24.72%	22.43%	17.53%

Price Efficiency of the Call Auctions

- We use the unbiasness regression following Biais et al. (1999), Barclay and Hendershott (2003), Moshirian et al. (2012)

$$Return_{close-close} = \alpha + \boldsymbol{\beta} \cdot Return_{call\_i-close} + \varepsilon_i$$

where $Return_{call\_i-close}$ is the log return of indicative price minute-i[th] to the closing price of the stock *i* day *t*

$Return_{close-close}$ is the log return from price of day *t-1* to day *t*.

Price Efficiency of the Call Auctions
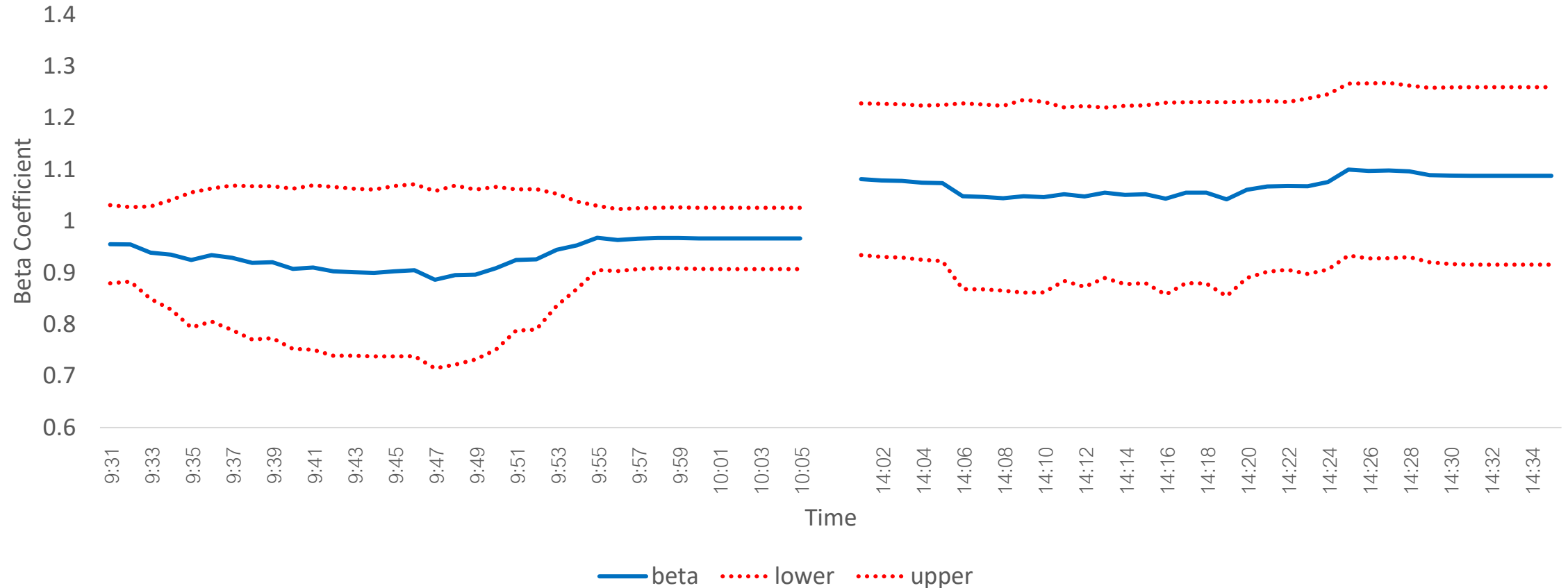
Regression of Call Auction on WPC

Parameter	Model1		Model2	
Intercept	0.5708	***	2.8258	
Projected Quantity	51.161	***	55.406	***
Imbalance	-2.394	***	-0.458	
Reversal	0.0028	***	0.0016	***
Afternoon Call	-0.9806	***	-0.9740	***
Market Cap.			0.0543	
Daily Volume			0.9222	***
Share Outstanding			-0.854	***

Conclusions

- New order submission and matching are less in the afternoon call.

- Changes in *spreads, depths* and *volatility* in the morning session may indicate higher asymmetric information compared to the afternoon session.

- Afternoon call auction does not contribute significantly to the price discovery process.

Recommendations

- Lunch break is not a universal pattern of equity market trading

- A handful of markets maintain the lunch break, e.g. Singapore attempted to adjust the lunch break but eventually re-instated it.

- Lunch break may be a social norm in Asian countries.

- Alternatively, adjust the lunch break with three directions.
  - 1) Lunch break replace with Call Auction (Singapore)
  - 2) Maintain the current protocols with shortened lunch break (Hong Kong, Tokyo – 60 min , Shanghai/Shenzhen, Ho Chi Minh – 90 min)
  - 3) Continuously trading to the afternoon (eliminate the break at all).

Thank you