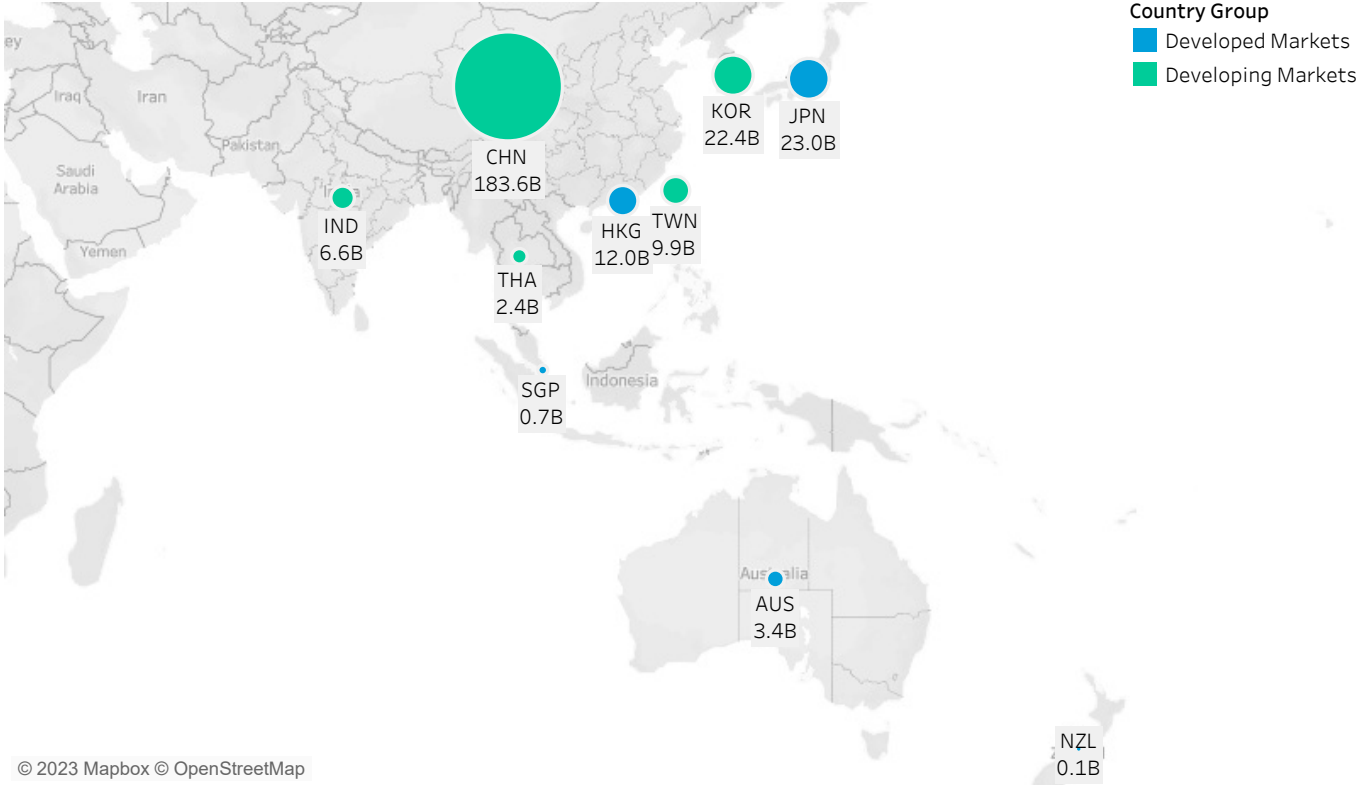


April 2023 APAC Market Structure Monthly

Average Daily Turnover (Notional USD)



© 2023 Mapbox © OpenStreetMap

Country Breakdowns

Hong Kong

China

Japan

Australia

South Korea

Taiwan

India

Thailand

New Zealand

Singapore

Apr 2023

AP Market Structure Monthly

MICROSTRUCTURE OBSERVATIONS

- Notional turnover in major equities market scaled back as most developed markets saw notable decreases in average daily turnover (ADT); ADT in Australia was down 31% MoM, followed by a decline of 14% MoM in Hong Kong and Japan.
- More favorable liquidity conditions were observed in Korea, where April saw YTD high ADT at US\$22.4B, with tightened intraday spreads and lower intraday volatility.
- Intraday spreads widened in Hong Kong; Mid Day spreads were up 6% to 14.5bps and Last Hour spreads were the highest since 4Q22 at 14.1bps.

AP MARKET STRUCTURE NEWS

Hong Kong-China Stock Connect Trading Calendar Enhancement Live

Trading under Stock Connect will now be allowed on all trading days where both the Hong Kong and Mainland China markets are open. According to HKEX, the first additional Northbound trading day into Mainland China exchanges would be on 25 May 2023 (Thursday).

Mainland China exchanges also announced the launch of this enhancement. According to Shenzhen Stock Exchange (SZSE) and Shanghai Stock Exchange (SSE), the first additional Southbound trading days were on 27 April and 28 April 2023, which enables mainland Chinese investors to trade into Hong Kong's stock market.

[https://www.hkex.com.hk/eng/prod/dataproduct/Documents/23-04-](https://www.hkex.com.hk/eng/prod/dataproduct/Documents/23-04-21%20Official%20Launch%20of%20Trading%20Calendar%20Enhancement%20for%20Stock%20Connect.pdf)

[21%20Official%20Launch%20of%20Trading%20Calendar%20Enhancement%20for%20Stock%20Connect.pdf](https://www.hkex.com.hk/eng/prod/dataproduct/Documents/23-04-21%20Official%20Launch%20of%20Trading%20Calendar%20Enhancement%20for%20Stock%20Connect.pdf)

http://www.szse.cn/English/about/news/szse/t20230424_600086.html

<http://english.sse.com.cn/news/newsrelease/c/5720573.shtml>

Korea Exchange Expands Price Limit for Newly Listed Stocks, Effective From 26 June 2023

On 13 April 2023, Korea Exchange (KRX) announced the expansion of the price limit for newly listed stocks on KOSPI and KOSDAQ markets, in a bid to improve price discovery on their listing day. Under the current price limit, a newly listing stock follows a two-stage price limit: 1) the opening price is determined within the 90 ~ 200% range of the Offering Price; 2) over the trading day, the price limit is +/- 30% of the opening price. Effective from 26 June 2023, the price limit during both Open Auction and the rest of the trading day will be 60 ~ 400% of the Offering Price.

<https://global.krx.co.kr/contents/GLB/02/0203/0203000000/GLB0203000000.jsp#ab8758eced0475769e200e7e309baf77=1&view=20715>

First Companies Listed Under China's Comprehensive Registration-based IPO System

On 4 April 2023, Shanghai Stock Exchange (SSE) announced that the first batch of ten companies under the Comprehensive Registration-based IPO system of the SSE and Shenzhen Stock Exchange (SZSE) have completed their issuance and are eligible for listing, with a listing ceremony held on Monday, 10 April, 2023.

On 7 April 2023, prior to the listing day of the first batch, SZSE also published an article titling "Initiative for Jointly Building a Transparent, Honest and Quality Registration-based IPO System". From a Hong Kong-China Stock Connect perspective, for Northbound Trading, Hong Kong Exchange and Clearing Limited (HKEX) arranged Post Release Test (PRT) on 8 April 2023 (Saturday) ahead of the go-live.

<http://english.sse.com.cn/news/newsrelease/c/5719418.shtml>

http://www.szse.cn/English/about/news/szse/t20230407_599818.html

<https://www.hkex.com.hk/-/media/HKEX-Market/Services/Circulars-and-Notices/Participant-and-Members-Circulars/SEHK/2023/CT04623E.pdf>

To learn more, contact your sales representative or call our desk at:

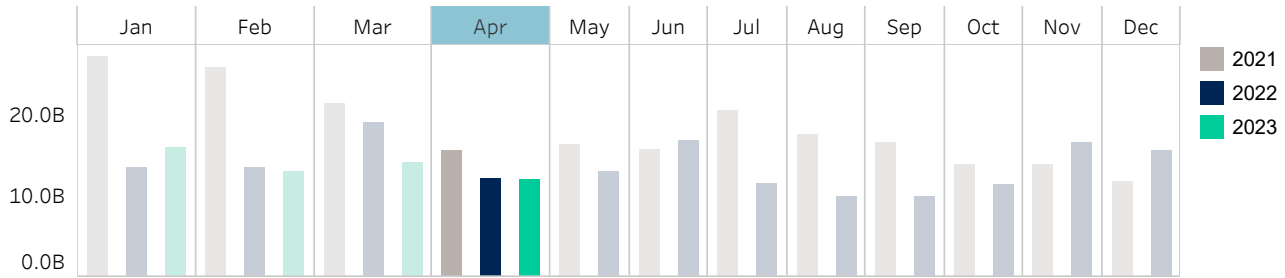
APAC +852.2846.3592 | **CAN** +1.416.874.0800 | **EMEA** +44.20.7670.4066 | **US** +1.646.682.6199
info@virtu.com | www.virtu.com

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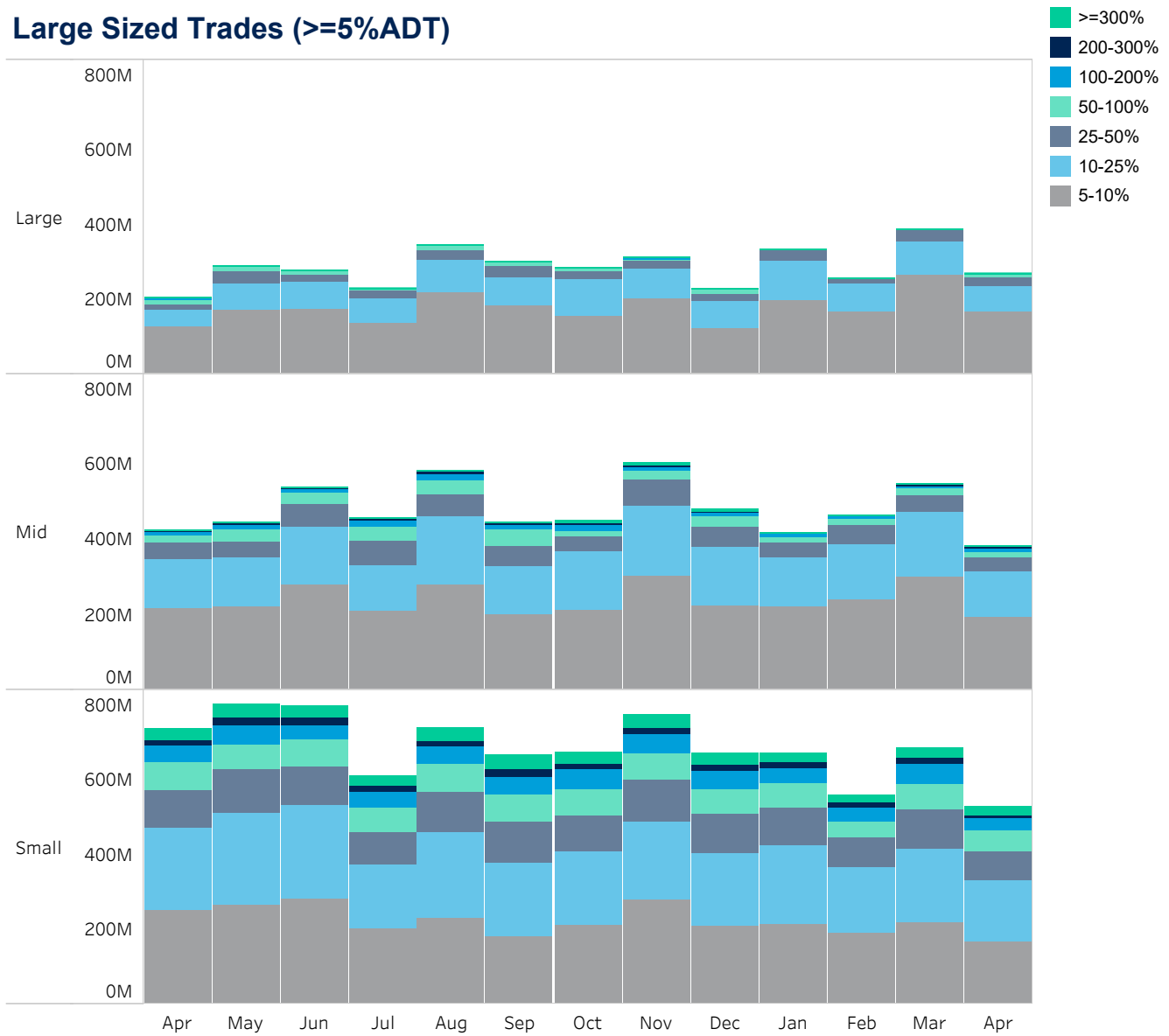
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Hong Kong

Average Daily Turnover (Notional USD)



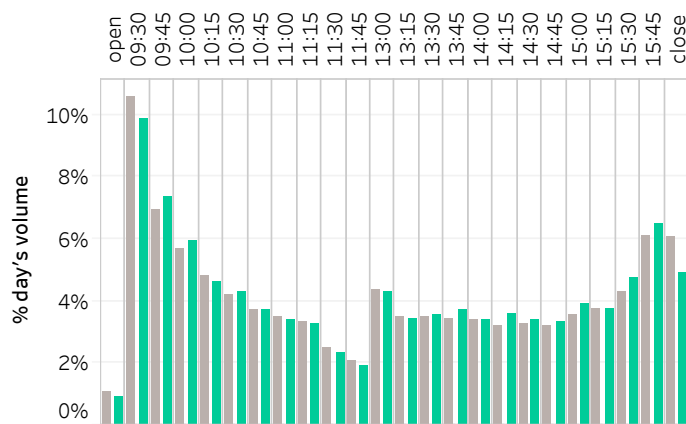
Large Sized Trades (>=5%ADT)



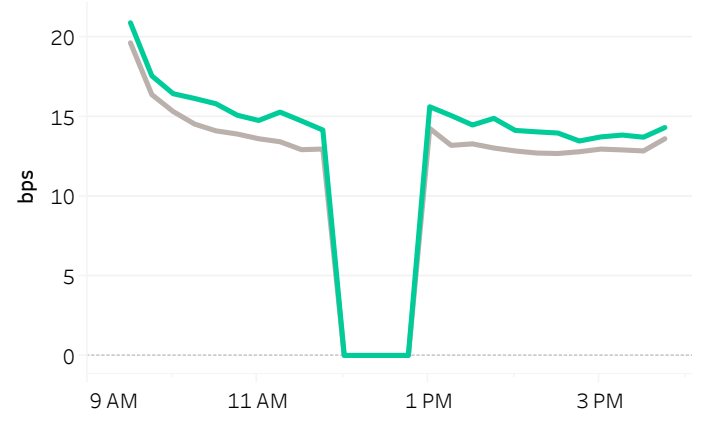
Source data: Virtu Financial

Hong Kong

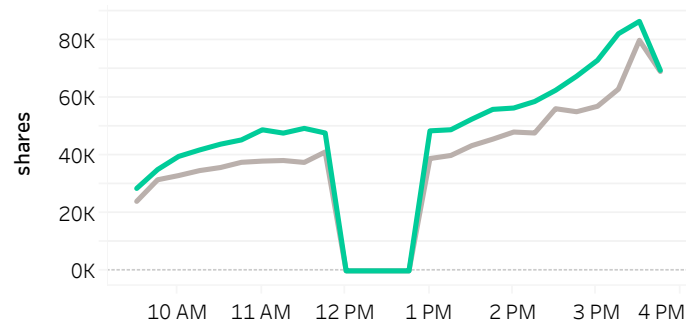
Volume Curve



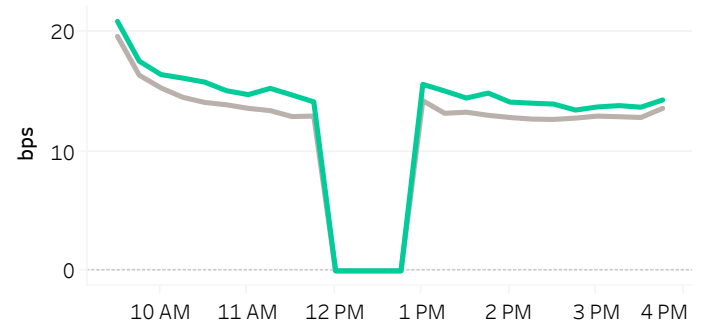
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	19.2	20.4	19.7	18.3	18.0	19.3	19.5
MidDay	14.0	14.6	14.0	13.1	12.8	13.7	14.5
LastHalfHour	13.7	14.0	14.0	13.0	13.2	14.0	14.1

One Minute Volatility Bps

FirstHalfHour	26.4	25.3	28.1	30.5	33.8	29.1	25.8
MidDay	17.0	15.9	16.2	18.5	20.1	18.3	16.1
LastHalfHour	16.5	16.7	17.3	18.0	19.1	18.6	16.4

Quotesize (shares)

FirstHalfHour	27,135	28,857	29,077	29,622	27,296	30,646	31,145
MidDay	39,201	38,664	40,980	46,105	44,622	43,572	50,780
LastHalfHour	71,053	67,304	66,542	78,406	74,936	77,473	76,329

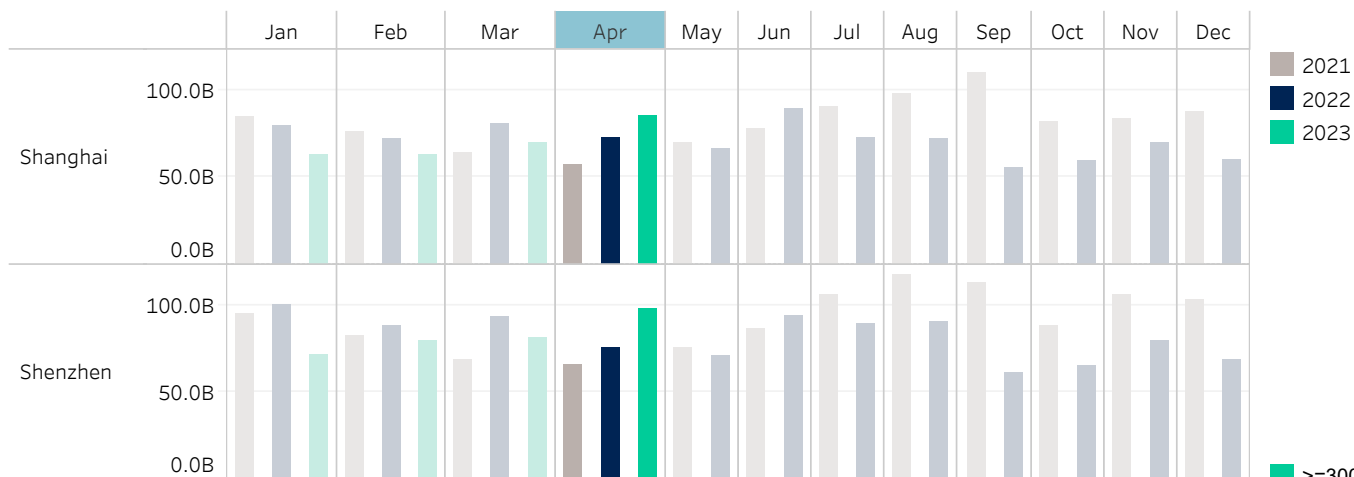
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

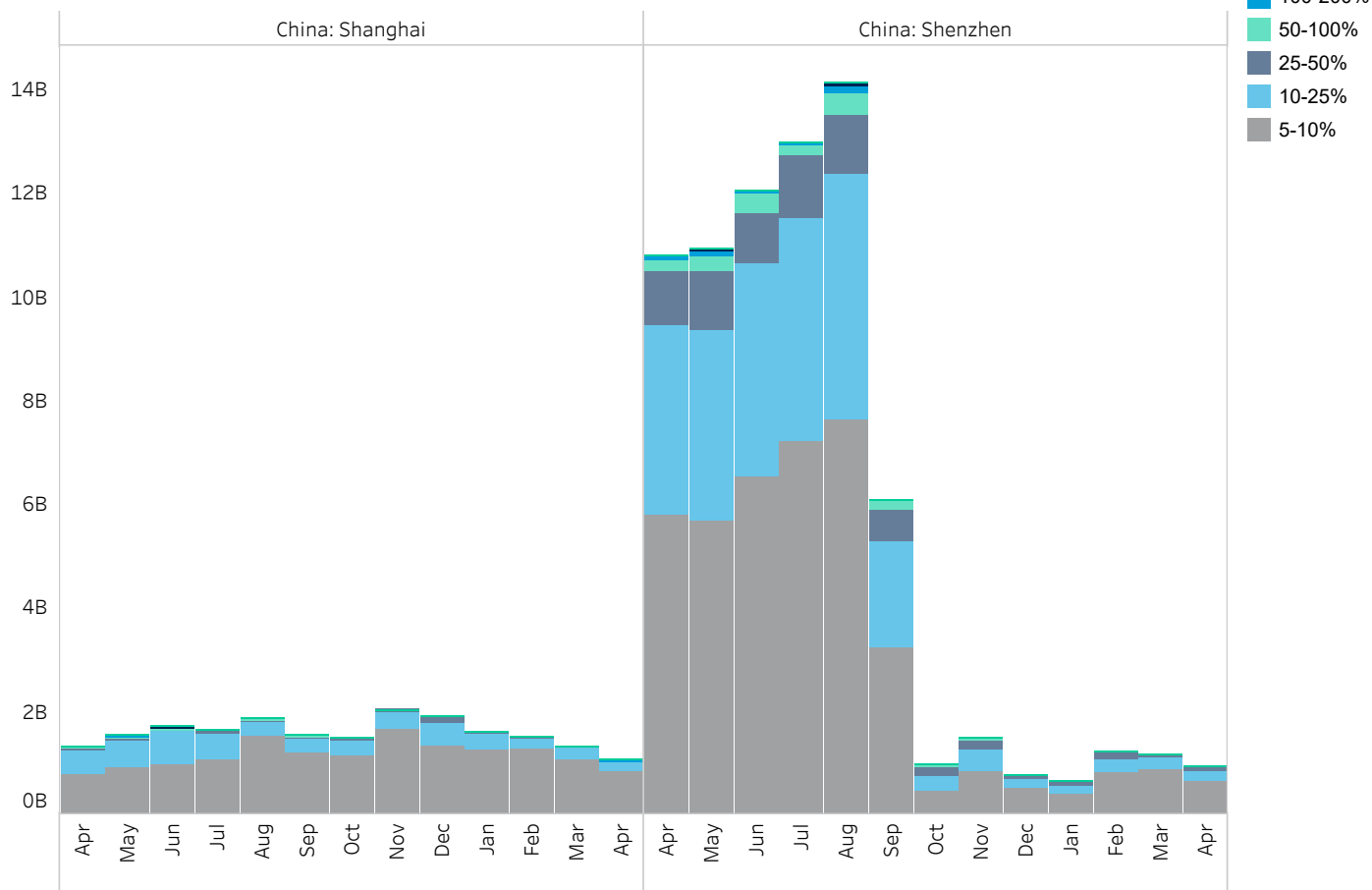
Source data: Virtu Financial

China

Average Daily Turnover (Notional USD)



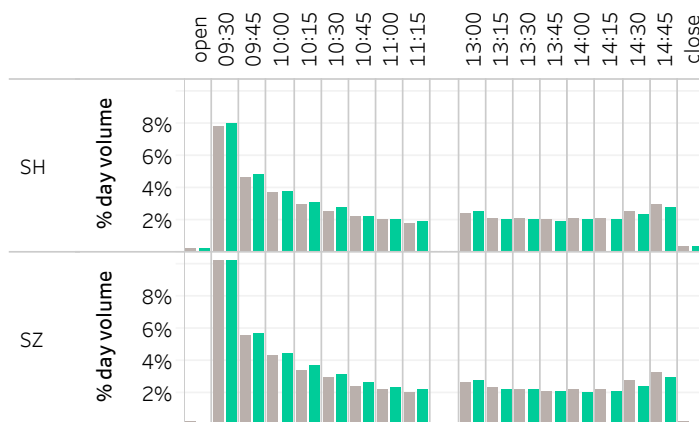
Large Sized Trades (>=5%ADT)



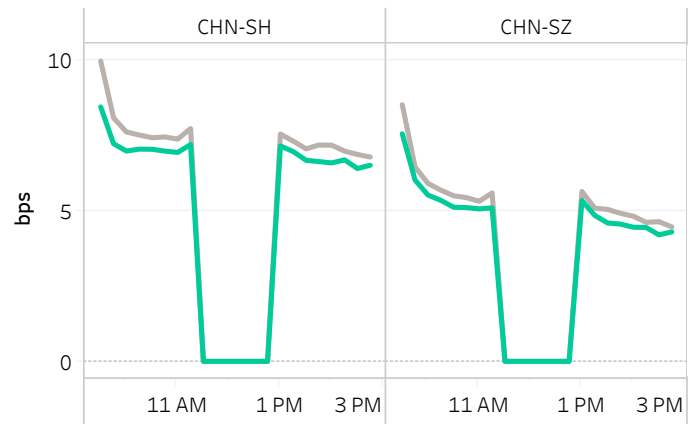
Source data: Virtu Financial

China

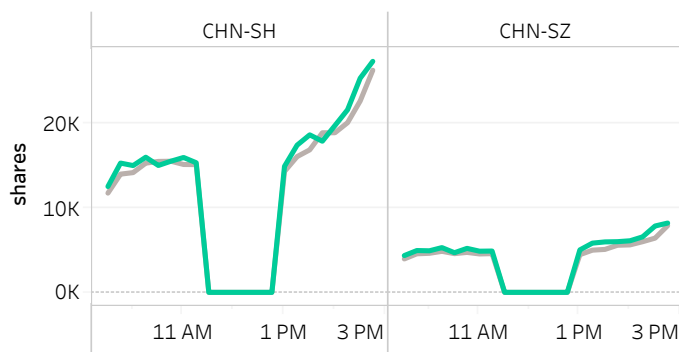
Volume Curve



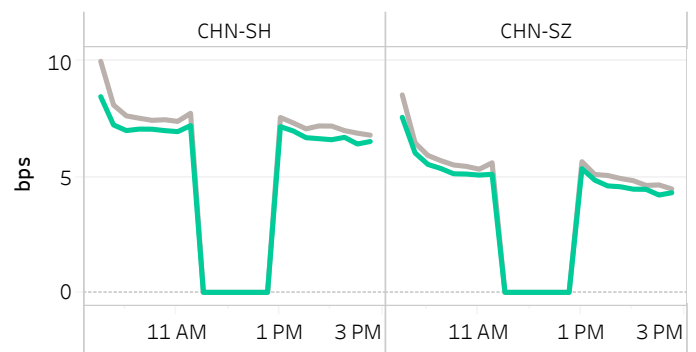
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	CHN-SH								CHN-SZ							
	2022			2023					2022			2023				
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
FirstHalfHo..	10.1	9.6	9.4	8.9	8.1	8.2	8.1	8.6	8.0	7.6	7.4	6.6	6.7	7.0		
MidDay	8.5	8.3	8.0	7.4	7.2	7.2	7.1	6.3	5.9	5.6	5.2	4.9	5.2	5.3		
LastHalfHo..	7.7	7.4	7.2	6.7	6.6	6.6	6.5	5.1	4.9	4.8	4.4	4.3	4.4	4.3		

One Minute Volatility Bps

FirstHalfHo..	26.9	22.9	26.2	32.5	30.2	28.6	29.2	27.9	24.9	25.5	37.5	32.7	28.9	30.3
MidDay	15.1	14.3	15.1	17.8	17.3	16.1	15.8	14.0	12.2	13.0	16.8	15.2	14.1	14.5
LastHalfHo..	13.9	13.7	14.0	16.6	15.5	15.1	14.2	11.1	11.1	11.1	14.6	12.9	11.9	11.8

Quotesize (shares)

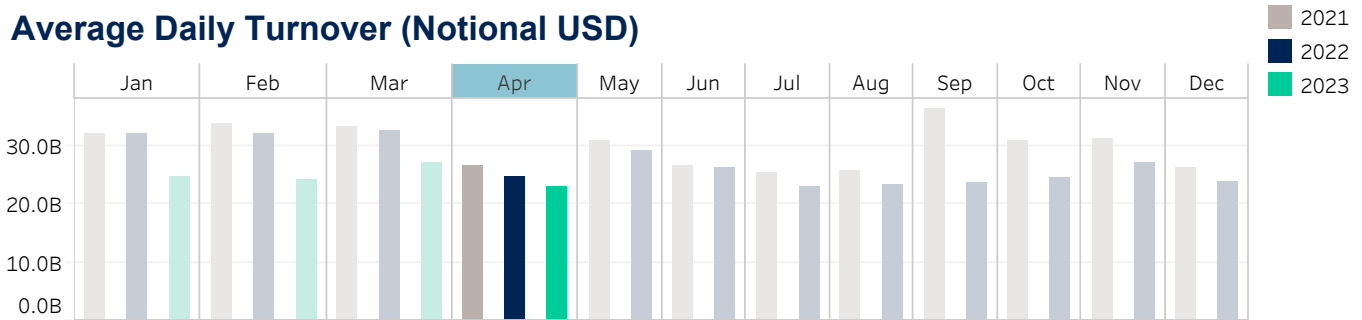
FirstHalfHo..	11,703	13,524	10,302	11,776	13,865	13,413	13,565	4,175	4,523	3,794	4,051	4,423	4,390	4,663
MidDay	14,484	15,699	12,904	15,847	17,474	15,741	15,771	4,539	5,072	4,328	5,045	5,182	4,883	5,174
LastHalfHo..	22,349	25,496	19,414	26,563	26,960	25,234	26,364	6,815	8,062	6,496	7,804	7,344	7,267	7,784

Median used for all metrics

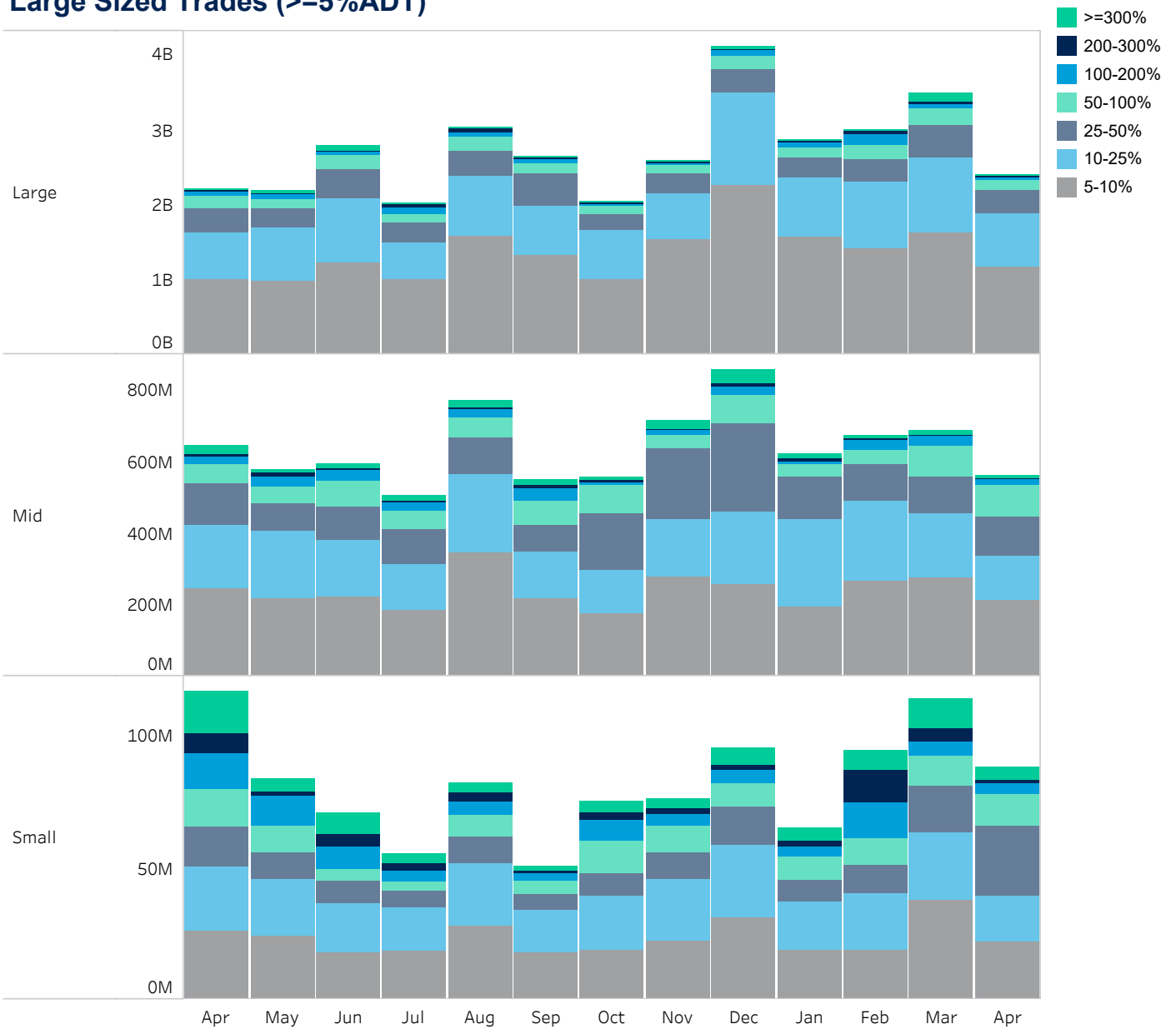
One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP..

Japan

Average Daily Turnover (Notional USD)



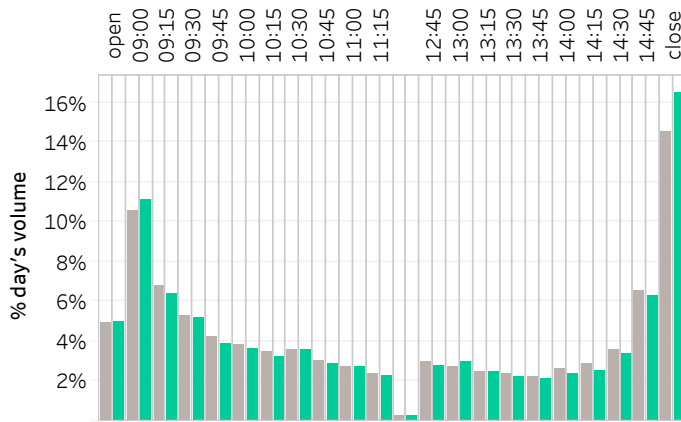
Large Sized Trades (>=5%ADT)



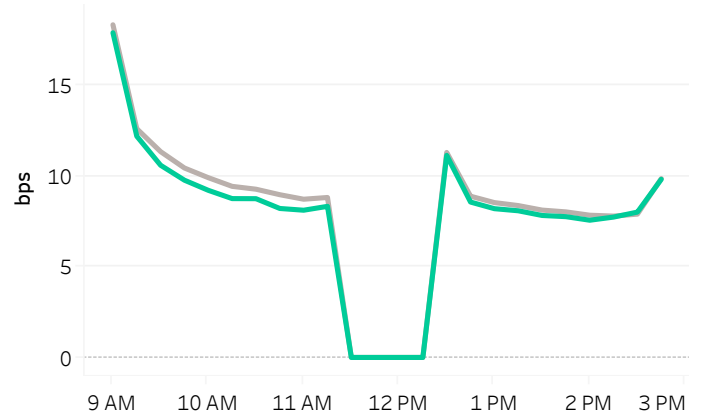
Source data: Virtu Financial

Japan

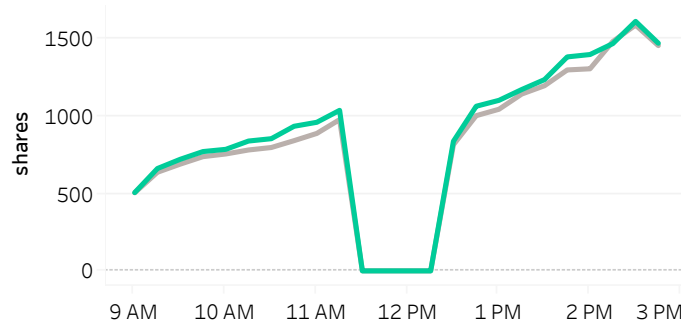
Volume Curve



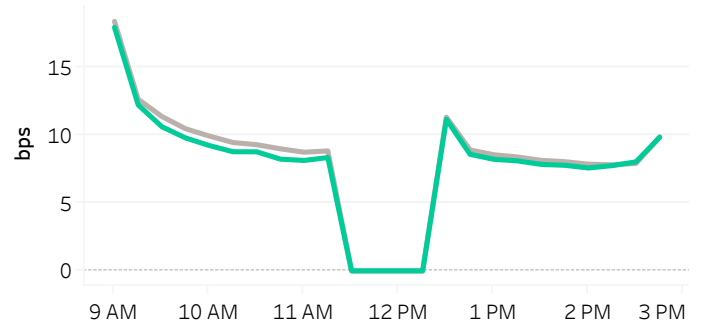
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	16.4	16.2	15.9	15.6	15.3	16.0	15.3
MidDay	9.3	9.3	9.0	8.6	8.8	9.1	8.5
LastHalfHour	9.6	9.4	9.4	9.1	9.1	9.5	9.2

One Minute Volatility Bps

FirstHalfHour	17.6	17.7	16.1	16.2	16.1	16.3	15.4
MidDay	8.5	8.7	8.4	8.0	8.3	8.4	7.7
LastHalfHour	9.7	9.7	9.5	9.3	9.3	9.4	8.9

Quotesize (shares)

FirstHalfHour	531	563	561	550	593	556	564
MidDay	809	927	902	897	1,012	891	951
LastHalfHour	1,375	1,572	1,441	1,414	1,620	1,387	1,495

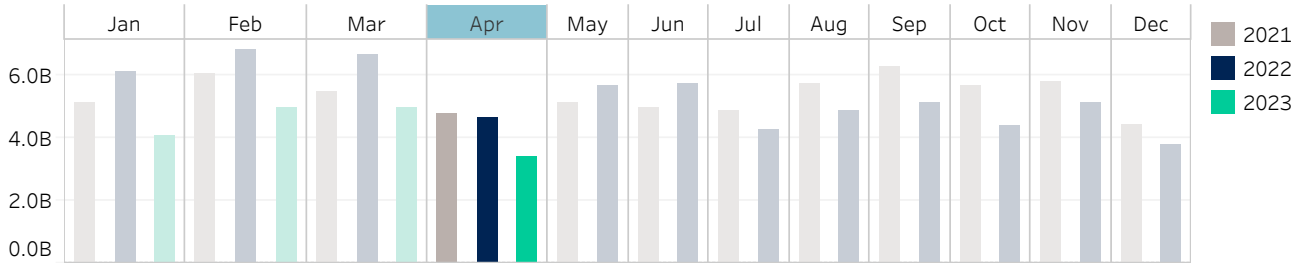
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

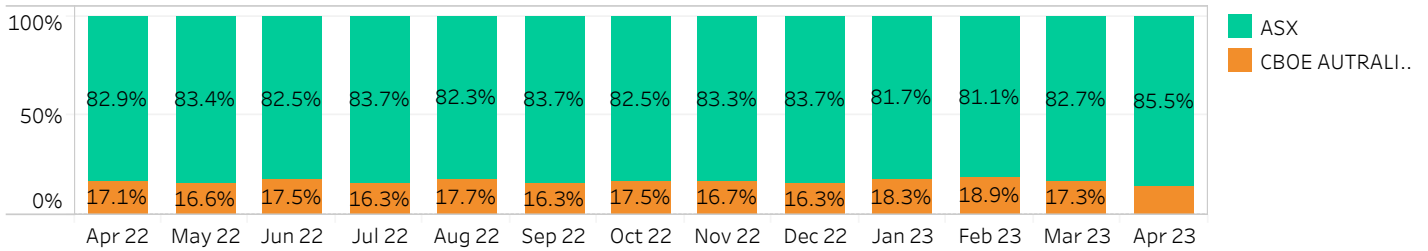
Source data: Virtu Financial

Australia

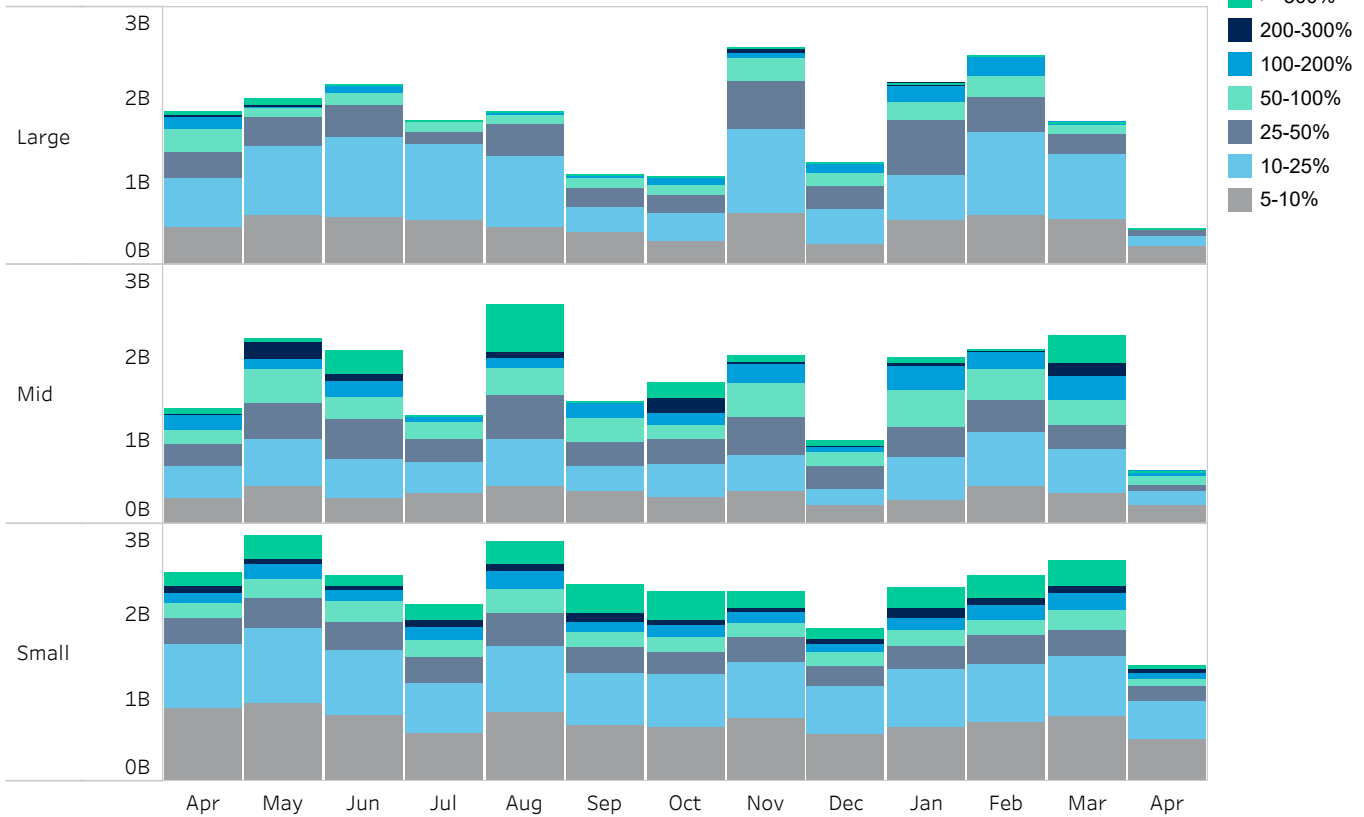
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



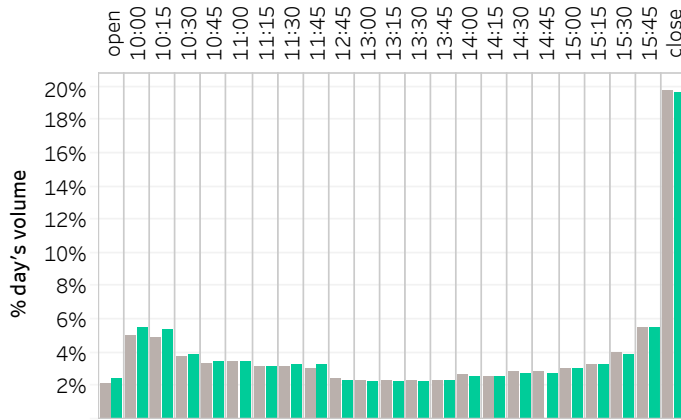
Large Sized Trades (>=5%ADT)



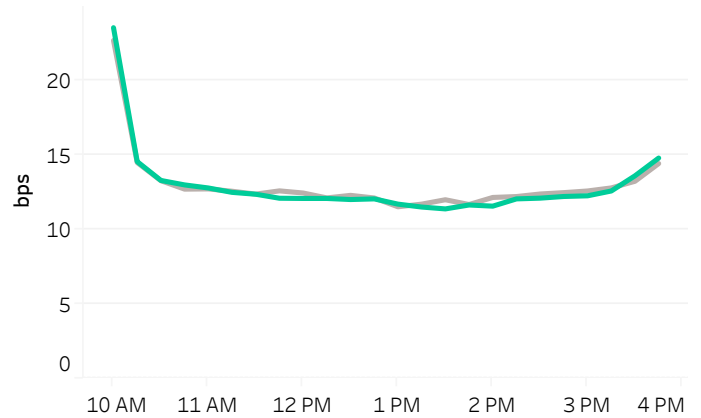
Source data: Virtu Financial

Australia

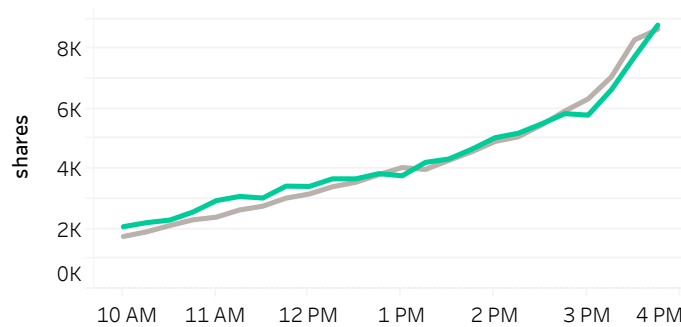
Volume Curve



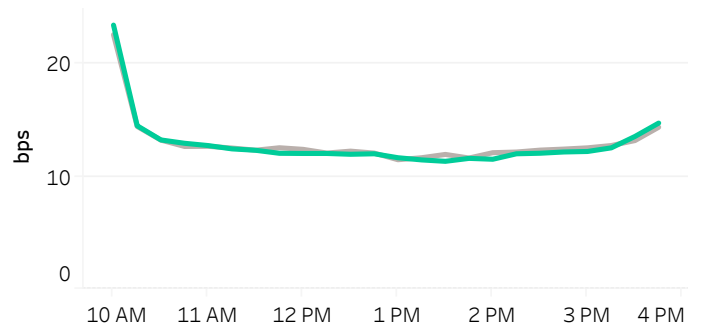
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	18.9	17.5	16.6	15.9	16.8	17.4	17.4
MidDay	13.0	12.5	12.1	11.1	11.6	12.4	12.1
LastHalfHour	14.9	13.9	13.7	13.1	13.8	14.3	14.3

One Minute Volatility Bps

FirstHalfHour	19.1	21.3	21.7	22.9	21.5	20.4	20.6
MidDay	9.9	10.3	10.7	12.3	11.4	10.5	9.5
LastHalfHour	12.2	12.5	13.2	13.8	12.9	12.6	12.4

Quotesize (shares)

FirstHalfHour	1,938	2,000	1,772	1,629	1,640	1,864	2,108
MidDay	4,056	4,453	3,558	3,279	3,260	3,759	3,968
LastHalfHour	9,008	9,111	7,705	6,643	7,185	8,215	8,141

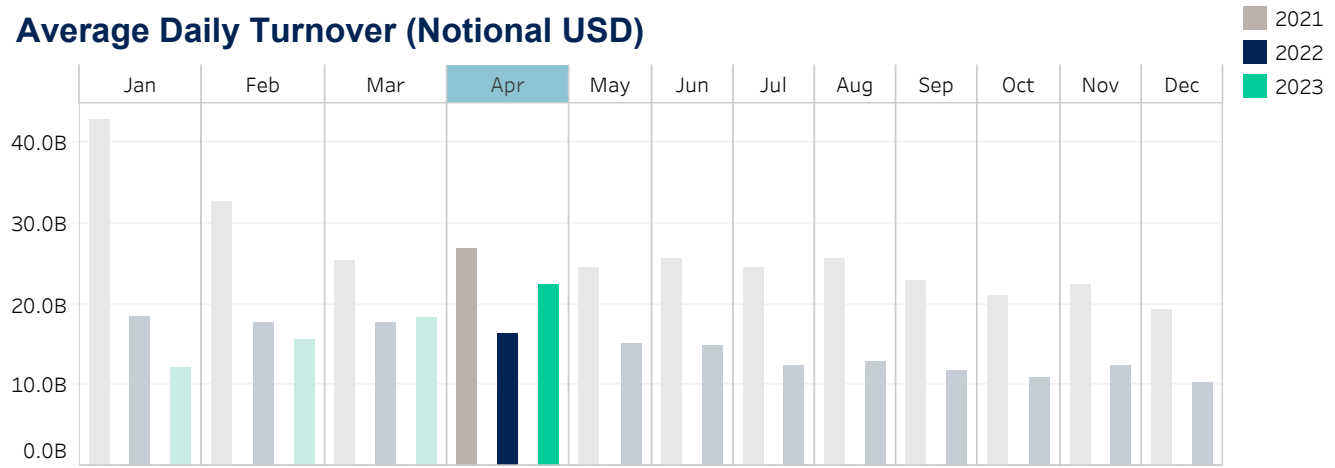
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

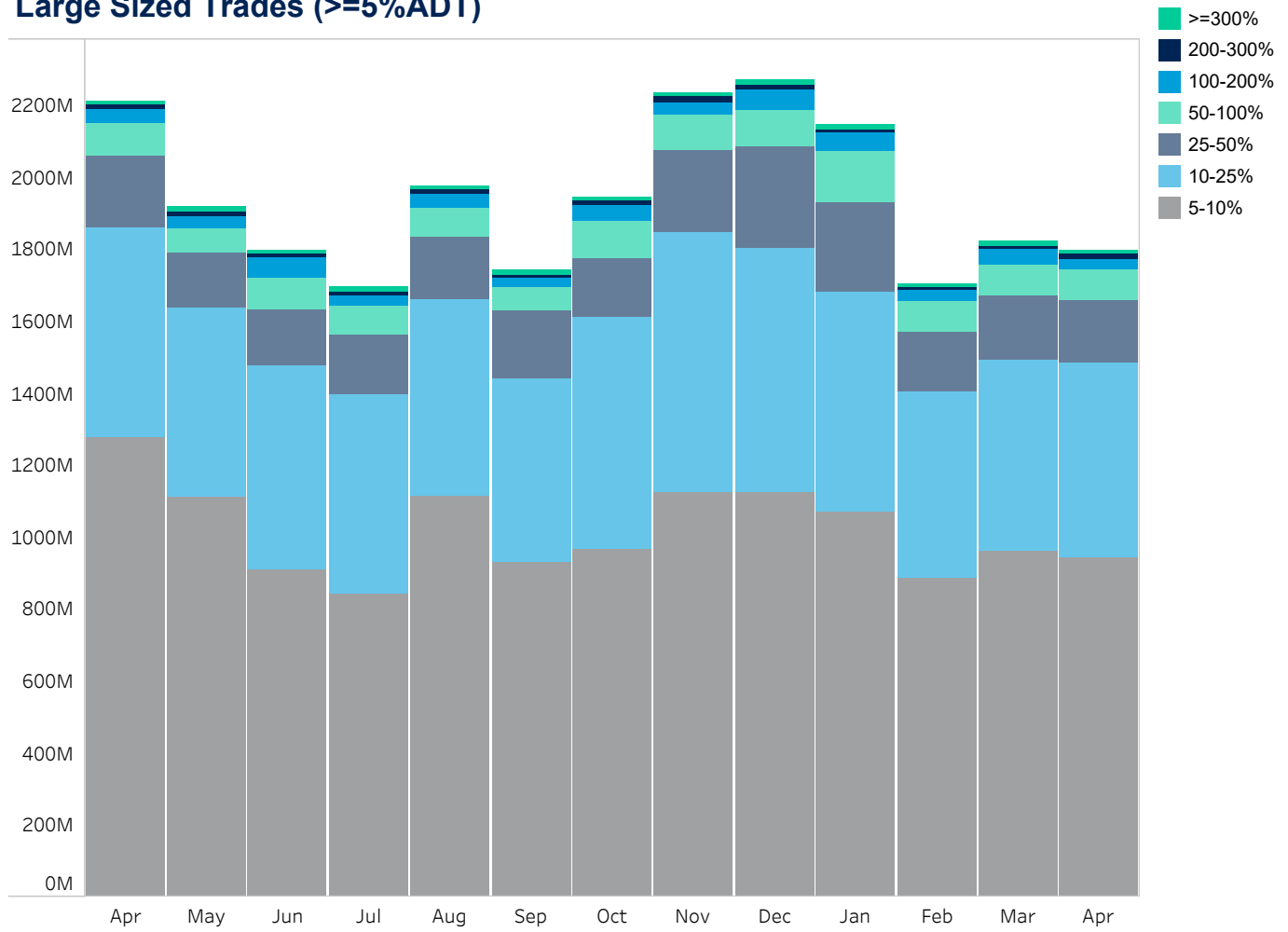
Source data: Virtu Financial

South Korea

Average Daily Turnover (Notional USD)



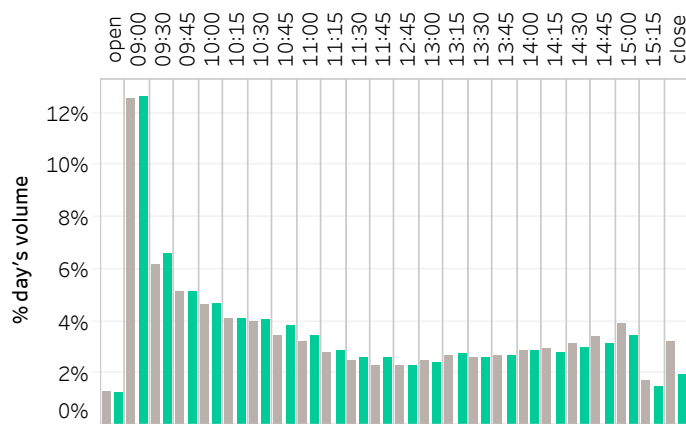
Large Sized Trades (>=5%ADT)



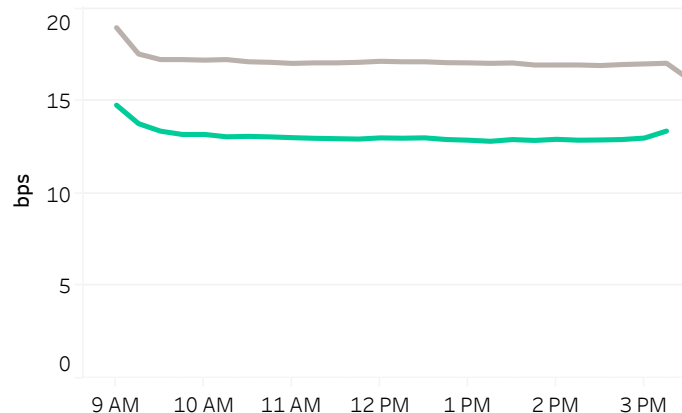
Source data: Virtu Financial

Korea

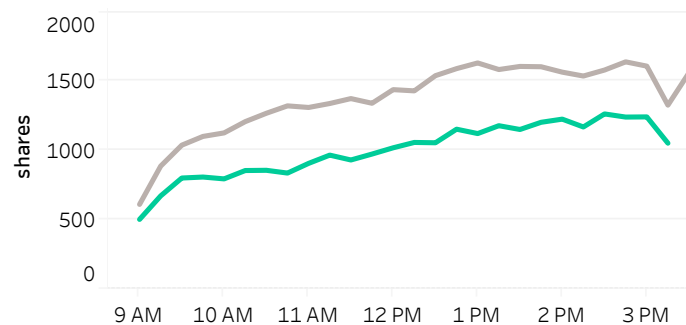
Volume Curve



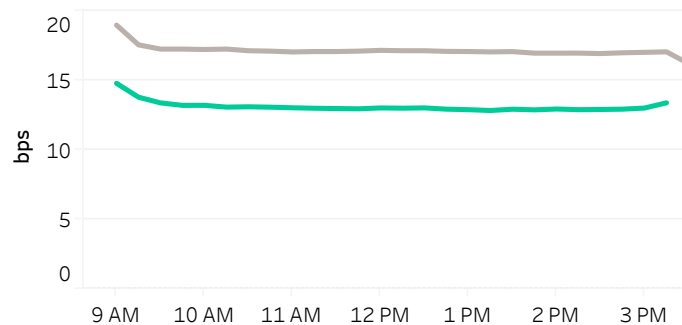
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	19.1	18.1	18.1	17.4	14.7	14.7	14.3
MidDay	17.5	16.7	17.1	16.5	13.5	13.4	12.9
LastHalfHour	17.5	16.2	17.1	16.5	13.7	13.5	13.1

One Minute Volatility Bps

FirstHalfHour	29.4	23.6	24.9	32.7	31.4	29.5	25.6
MidDay	18.1	14.9	15.0	19.6	18.7	18.7	14.8
LastHalfHour	18.9	15.6	16.0	20.8	19.7	20.6	15.9

Quotesize (shares)

FirstHalfHour	704	716	803	727	655	595	579
MidDay	1,415	1,541	1,721	1,396	1,188	1,025	1,014
LastHalfHour	1,529	1,360	1,628	1,506	1,447	1,390	1,189

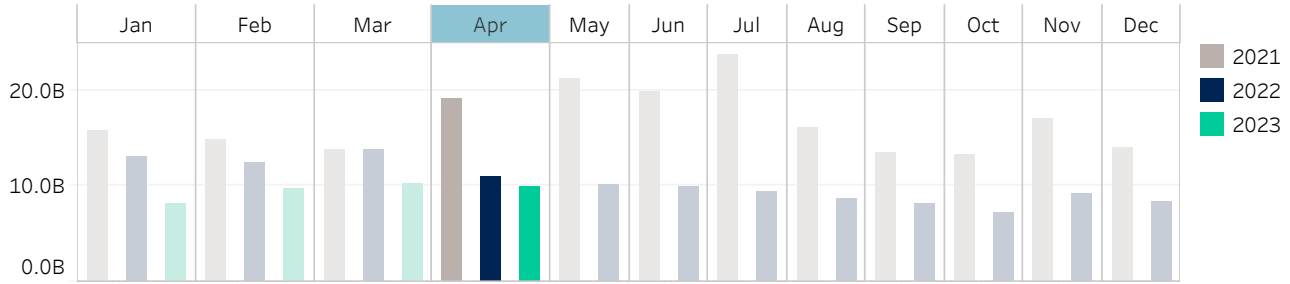
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

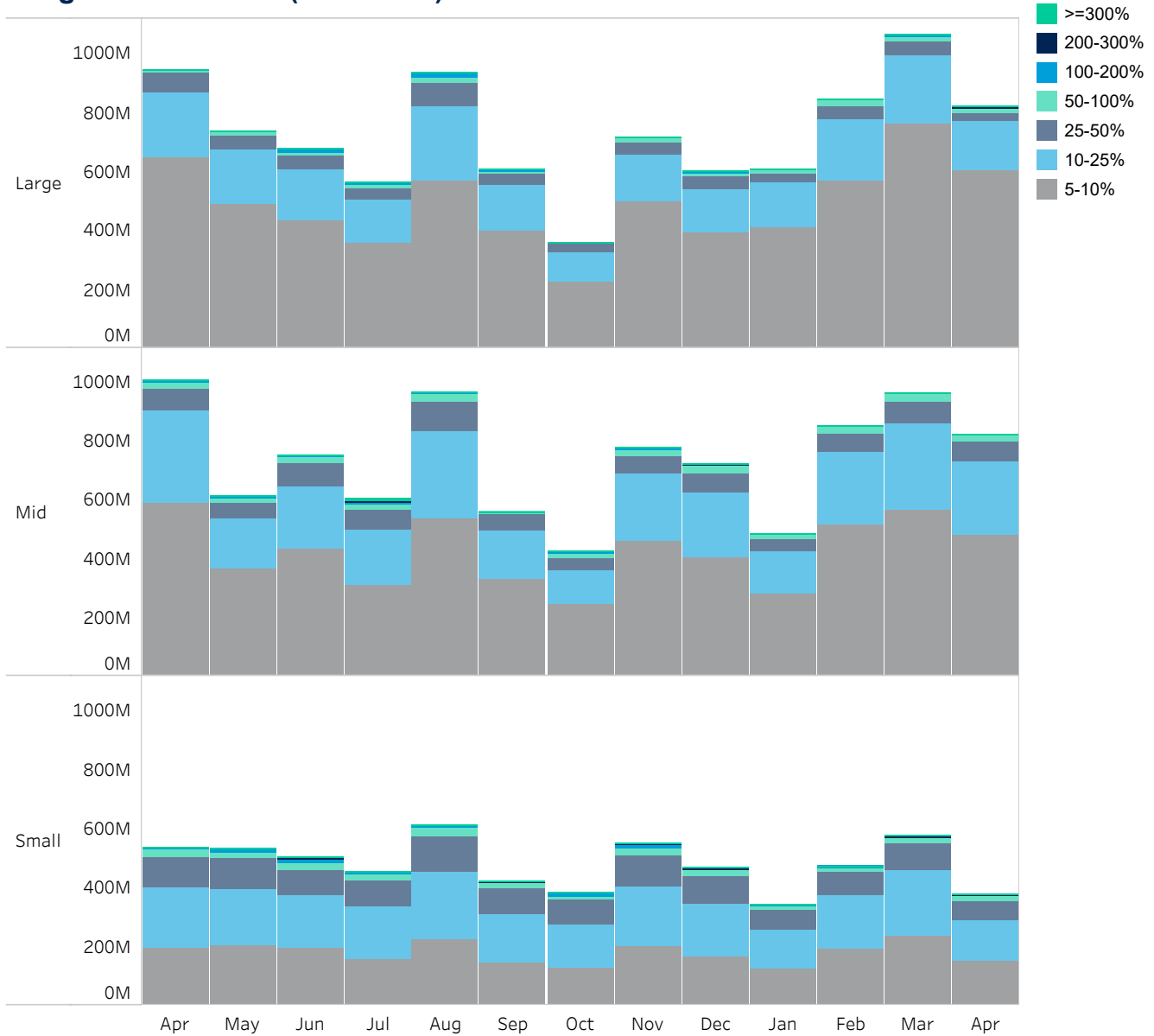
Source data: Virtu Financial

Taiwan

Average Daily Turnover (Notional USD)



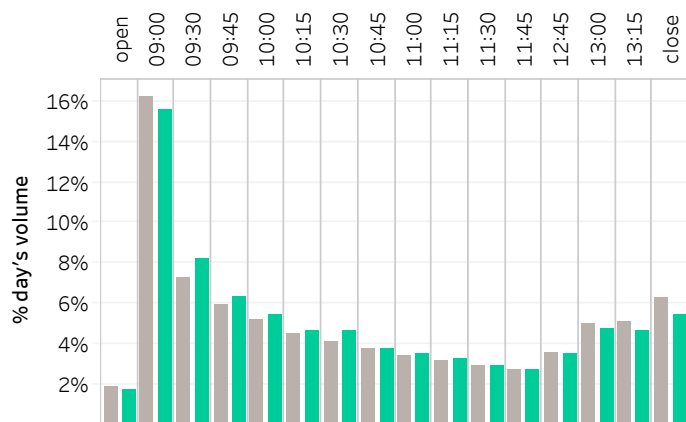
Large Sized Trades (>=5%ADT)



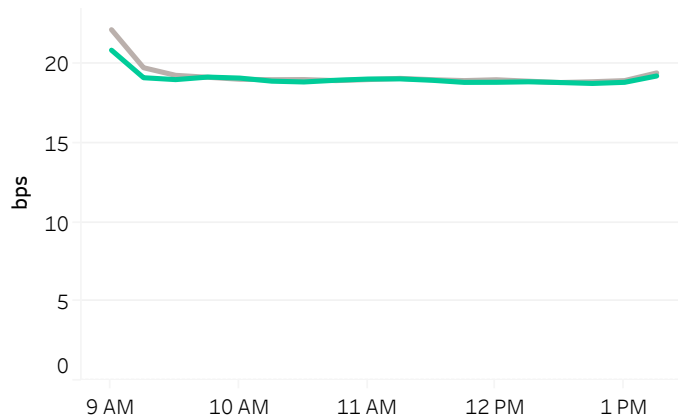
Source data: Virtu Financial

Taiwan

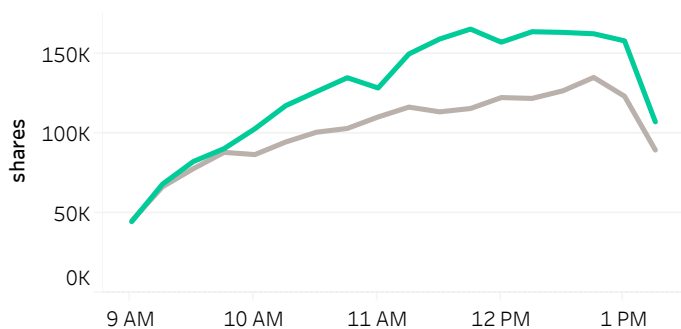
Volume Curve



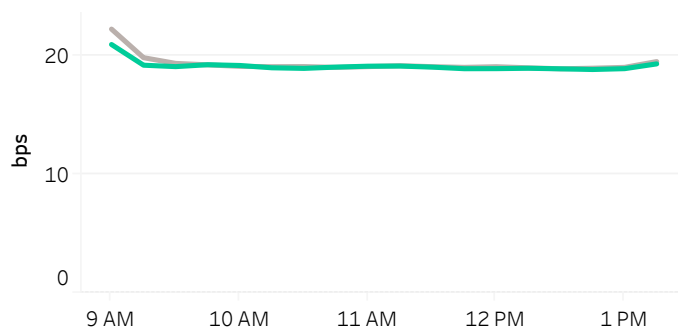
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg (Grey line) April 2023 (Green line)

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	24.0	21.5	20.9	20.2	20.6	20.1	19.9
MidDay	20.9	19.1	19.2	18.5	18.9	19.0	18.9
LastHalfHour	21.2	19.2	19.2	18.7	18.9	19.1	19.0

One Minute Volatility Bps

FirstHalfHour	31.1	31.3	31.6	34.5	30.8	31.0	30.3
MidDay	28.9	28.9	29.1	25.8	23.4	28.6	28.8
LastHalfHour	29.0	28.9	29.6	26.7	23.6	28.9	29.2

Quotesize (shares)

FirstHalfHour	42,999	52,487	55,849	59,008	57,971	61,802	53,240
MidDay	77,390	113,736	109,432	118,834	117,559	138,448	125,681
LastHalfHour	81,045	112,549	102,743	113,870	116,979	124,571	121,314

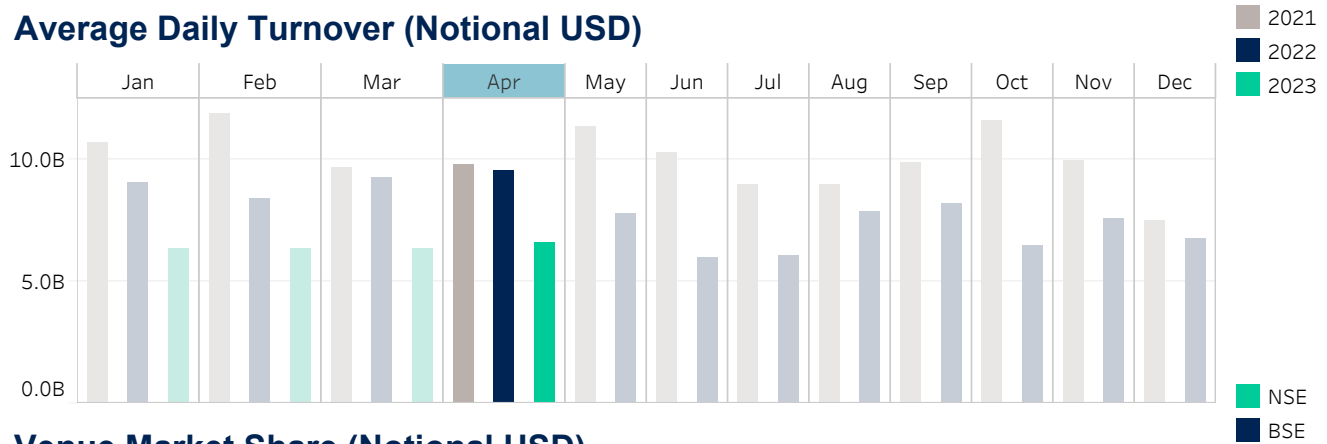
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

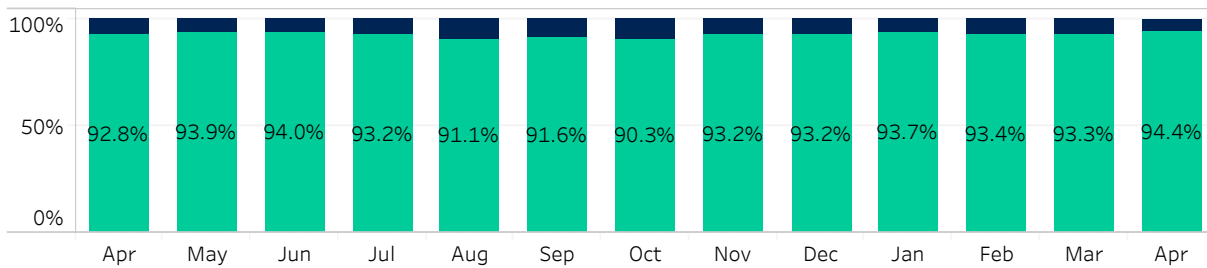
Source data: Virtu Financial

India

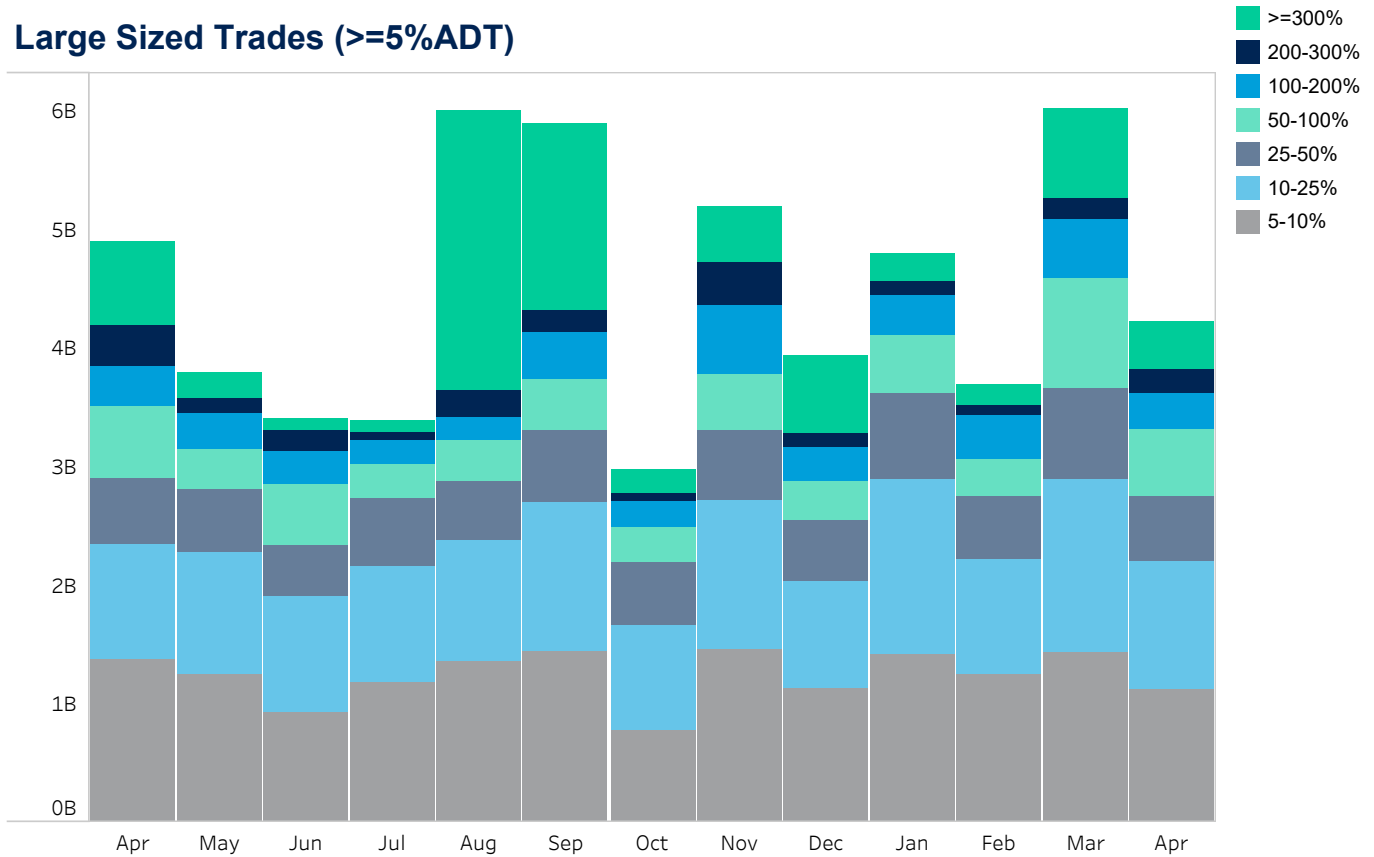
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



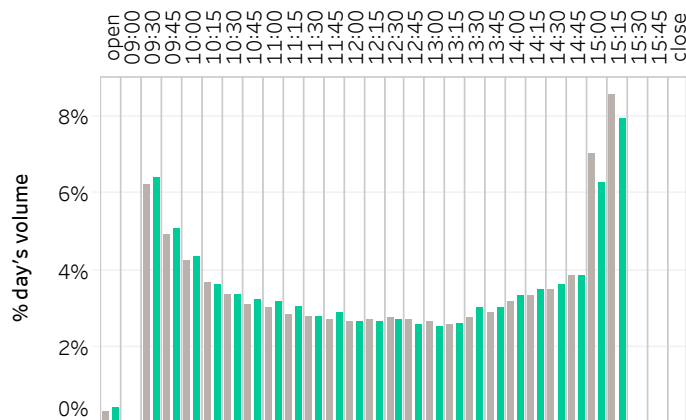
Large Sized Trades (>=5%ADT)



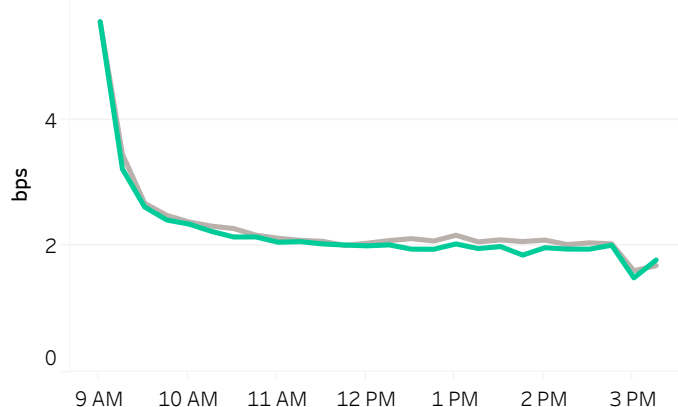
Source data: Virtu Financial

India

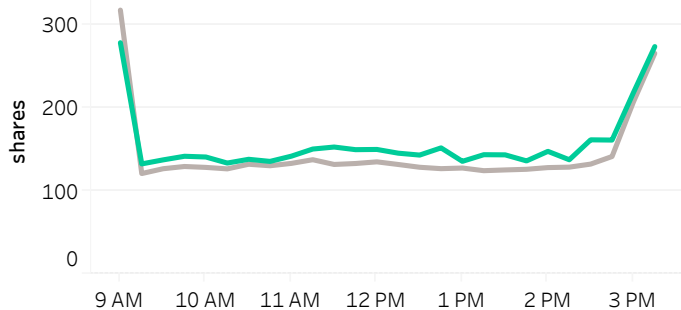
Volume Curve



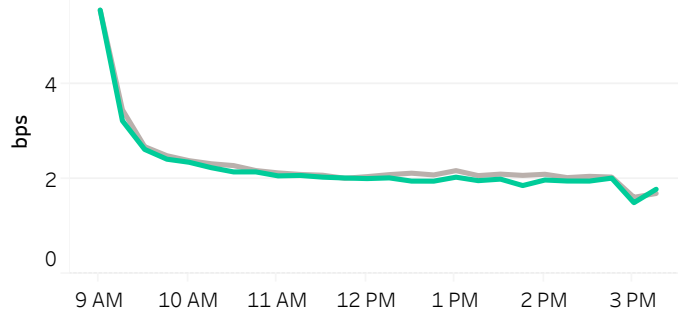
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	3.5	3.3	3.4	3.5	3.7	3.4	3.4
MidDay	2.1	1.9	2.0	2.1	2.2	2.1	2.1
LastHalfHour	1.6	1.6	1.6	1.7	1.8	1.7	1.7

One Minute Volatility Bps

FirstHalfHour	18.8	19.7	19.1	20.3	18.4	18.0	17.2
MidDay	8.2	8.4	8.2	8.2	7.4	7.7	7.1
LastHalfHour	10.1	10.3	10.5	10.2	9.7	10.2	9.1

Quotesize (shares)

FirstHalfHour	125.4	138.7	120.1	121.8	119.8	123.5	133.9
MidDay	131.3	143.8	122.4	128.7	124.1	124.2	143.1
LastHalfHour	243.8	257.7	257.9	228.8	249.5	253.0	256.4

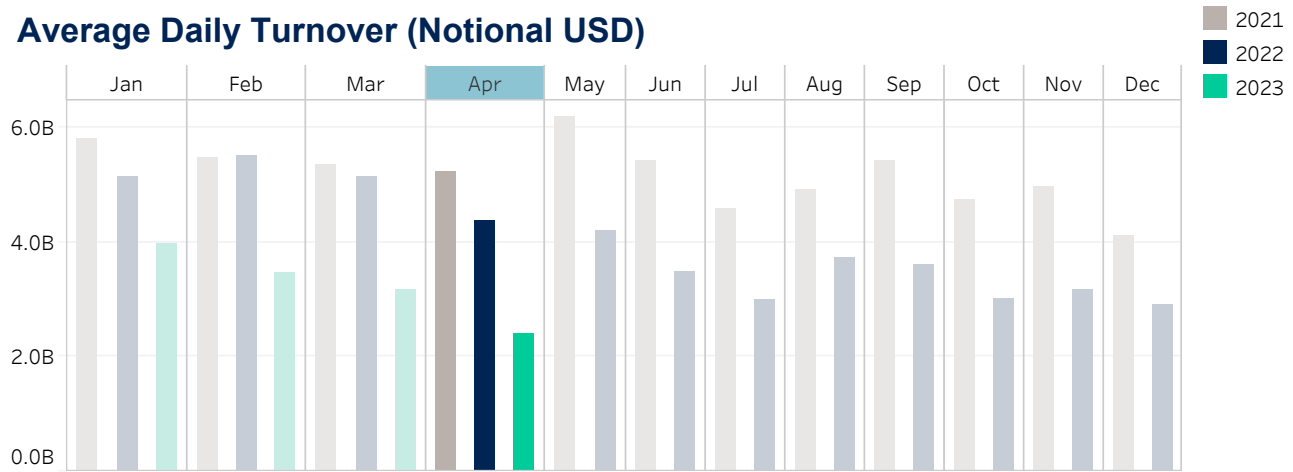
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

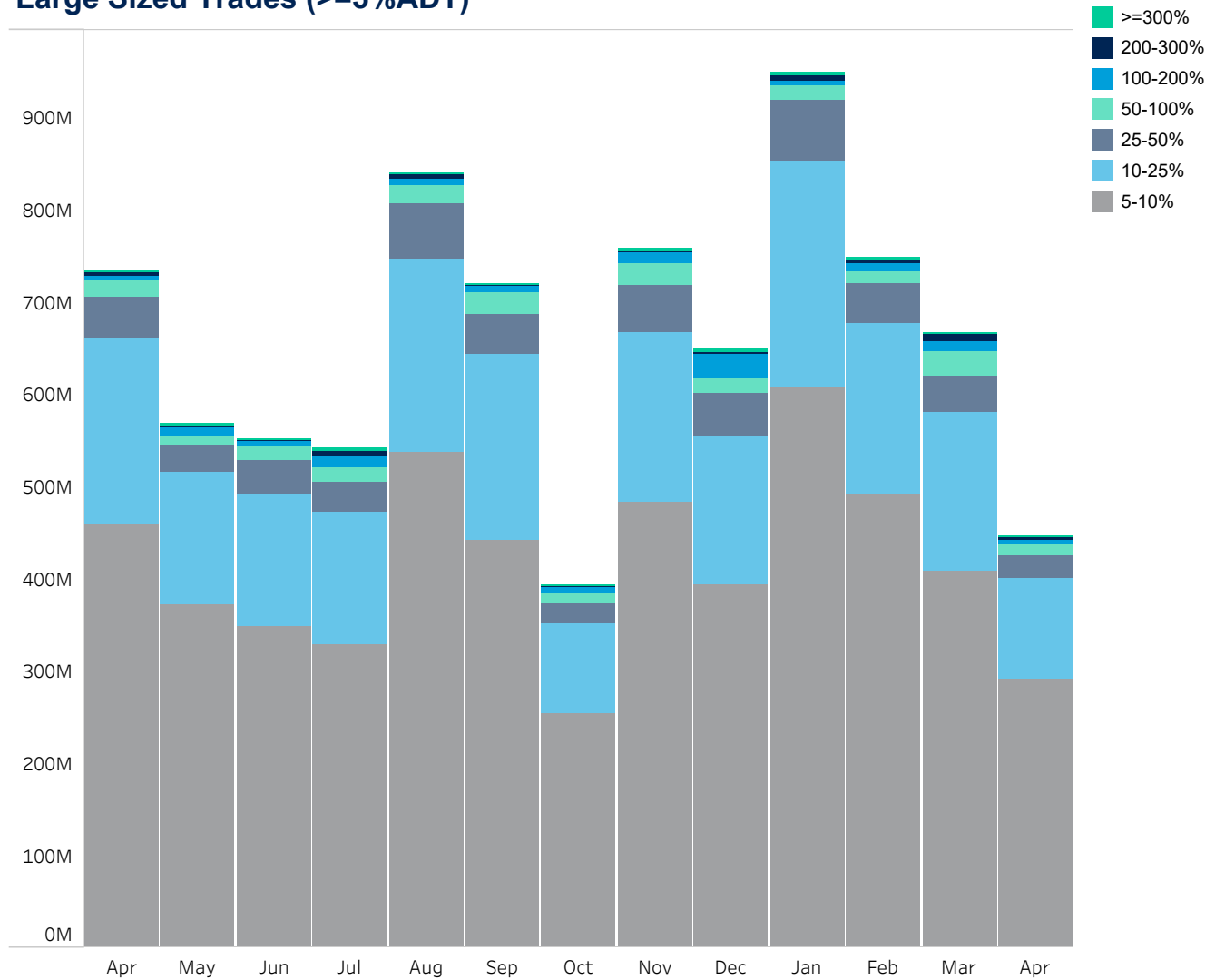
Source data: Virtu Financial

Thailand

Average Daily Turnover (Notional USD)



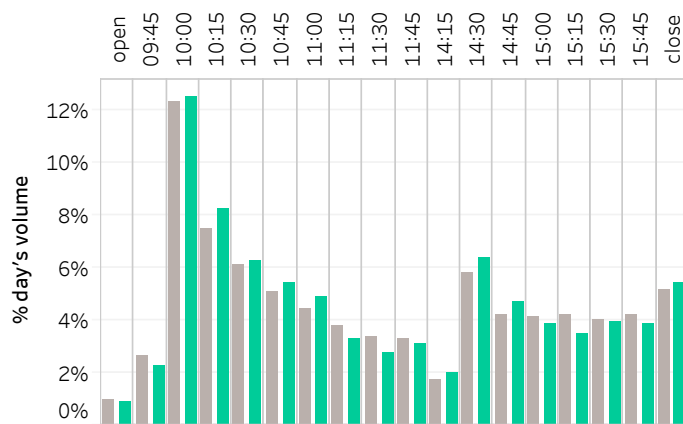
Large Sized Trades (>=5%ADT)



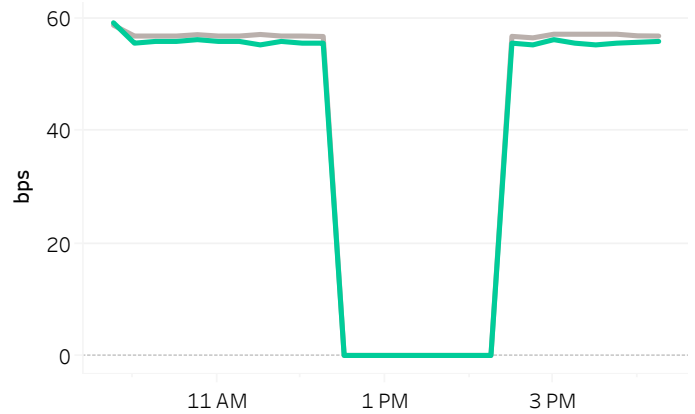
Source data: Virtu Financial

Thailand

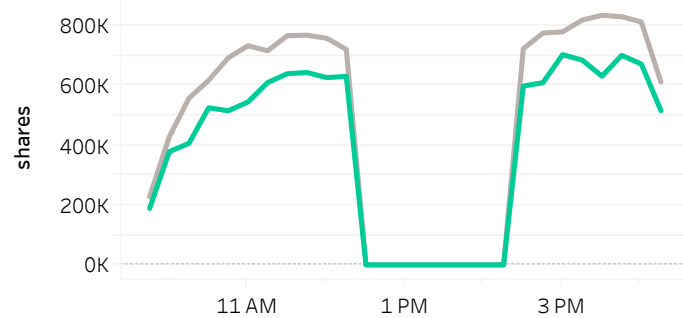
Volume Curve



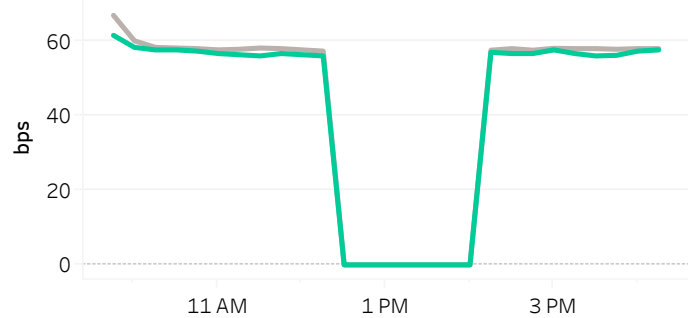
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg (brown line) April 2023 (green line)

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	61.2	61.0	58.1	58.0	56.4	59.5	59.2
MidDay	59.2	57.6	55.9	54.1	54.1	56.0	55.8
LastHalfHour	59.7	57.3	55.7	54.2	54.8	56.7	56.0

One Minute Volatility Bps

FirstHalfHour	64.3	61.9	67.8	74.9	71.7	74.1	60.8
MidDay	55.4	55.4	57.6	60.8	58.3	56.7	57.0
LastHalfHour	56.0	56.0	58.3	60.4	58.0	56.7	57.6

Quotesize (shares)

FirstHalfHour	217,331	227,211	245,311	284,548	236,082	219,491	200,957
MidDay	691,861	760,712	805,102	865,107	737,967	634,271	624,930
LastHalfHour	620,002	675,335	738,049	812,231	679,491	552,716	570,432

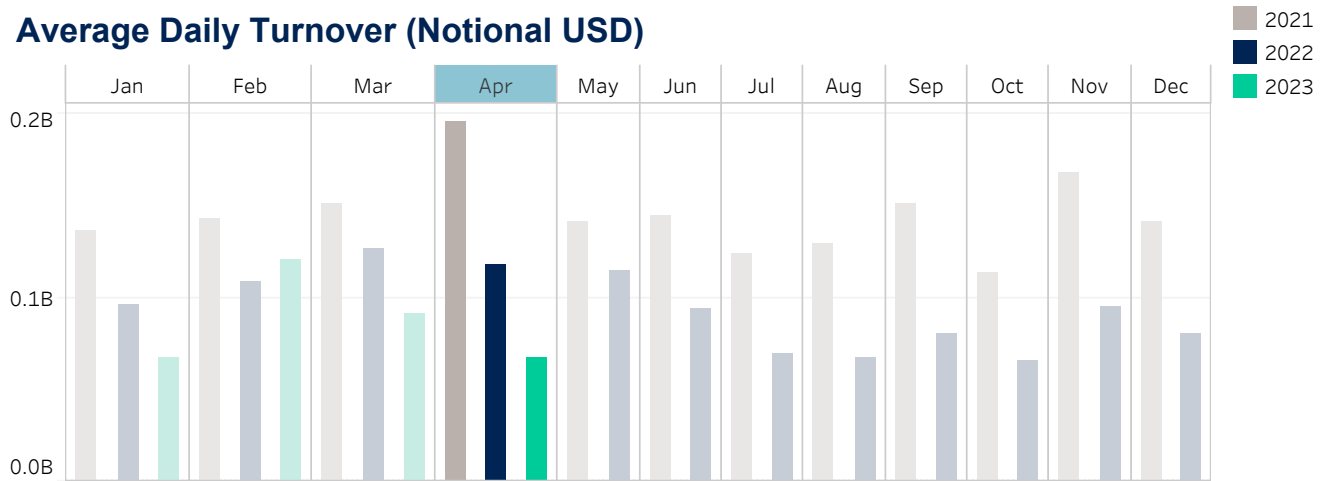
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

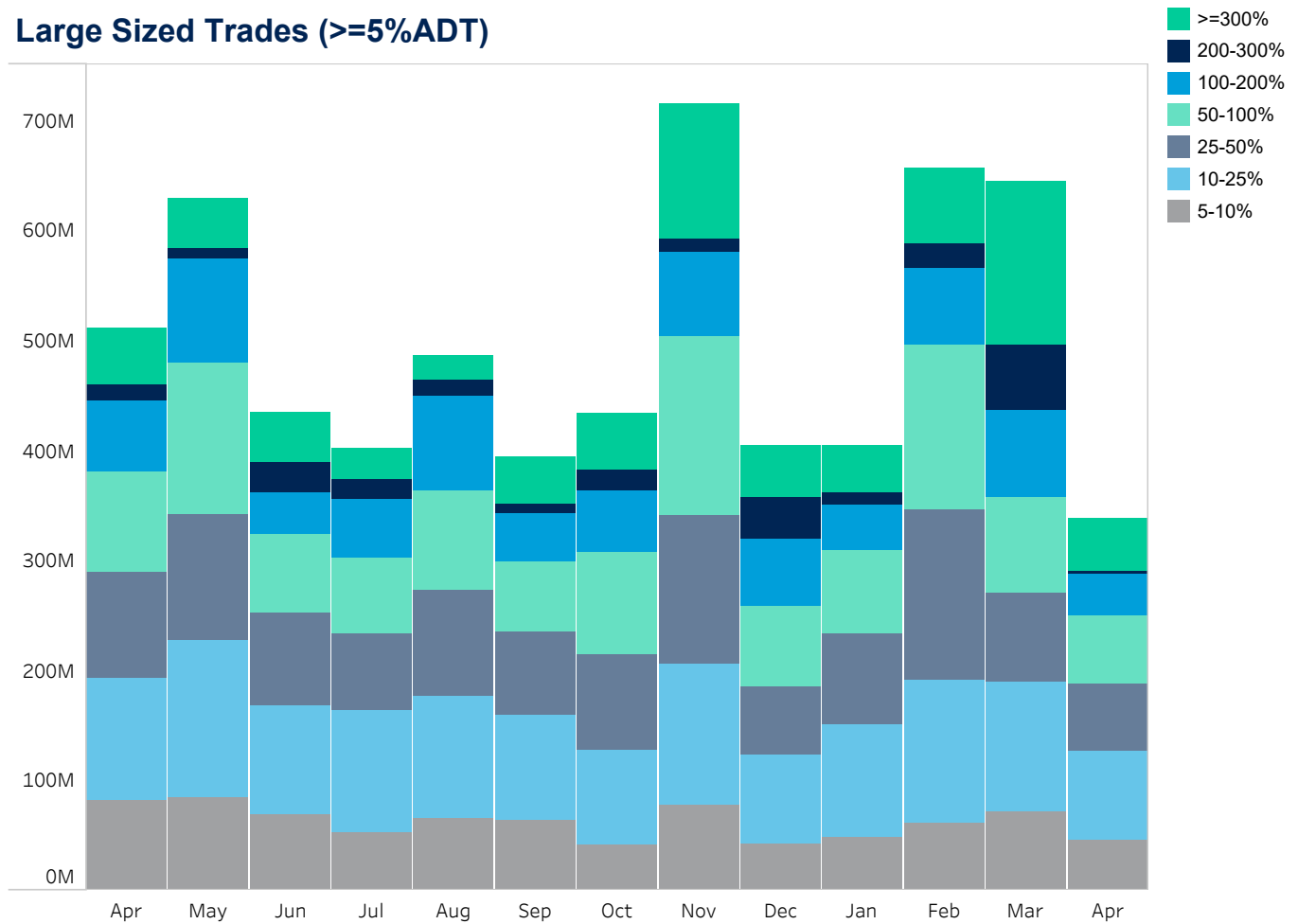
Source data: Virtu Financial

New Zealand

Average Daily Turnover (Notional USD)



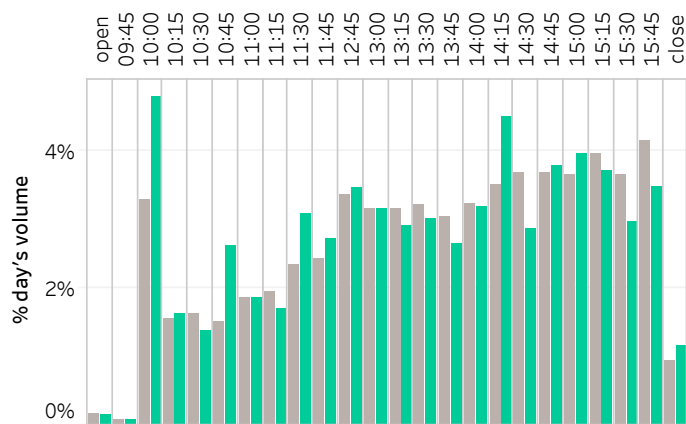
Large Sized Trades (>=5%ADT)



Source data: Virtu Financial

New Zealand

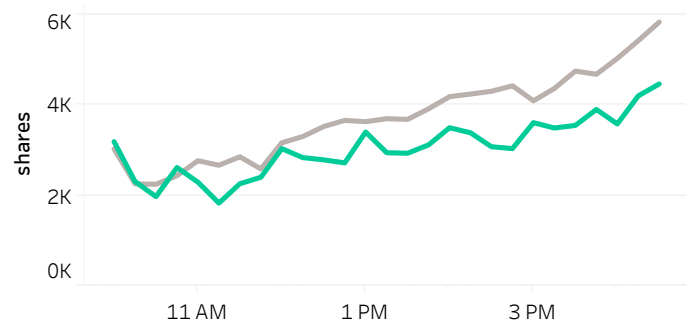
Volume Curve



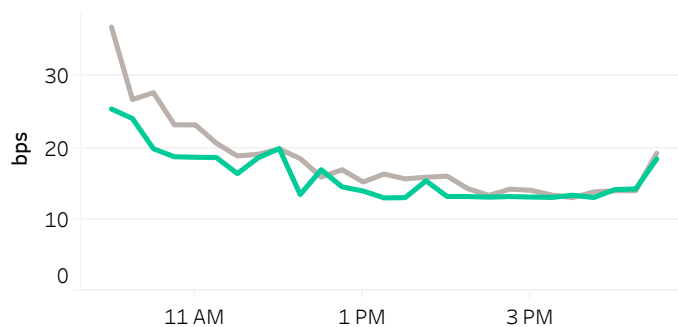
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	34.5	38.8	33.0	28.6	36.2	32.4	23.3
MidDay	17.2	17.4	14.4	13.0	14.2	13.5	13.8
LastHalfHour	20.3	19.7	19.9	17.6	19.1	17.5	18.4

One Minute Volatility Bps

FirstHalfHour	19.2	20.9	23.1	25.5	25.6	20.2	19.0
MidDay	12.9	15.1	13.8	17.7	17.3	14.7	15.2
LastHalfHour	18.7	23.1	19.7	21.5	22.0	21.1	19.0

Quotesize (shares)

FirstHalfHour	2,695	2,859	2,800	2,352	2,572	2,470	2,669
LastHalfHour	5,615	5,396	6,890	5,554	6,137	4,537	5,071
MidDay	3,955	3,593	3,663	2,964	3,634	3,092	3,102

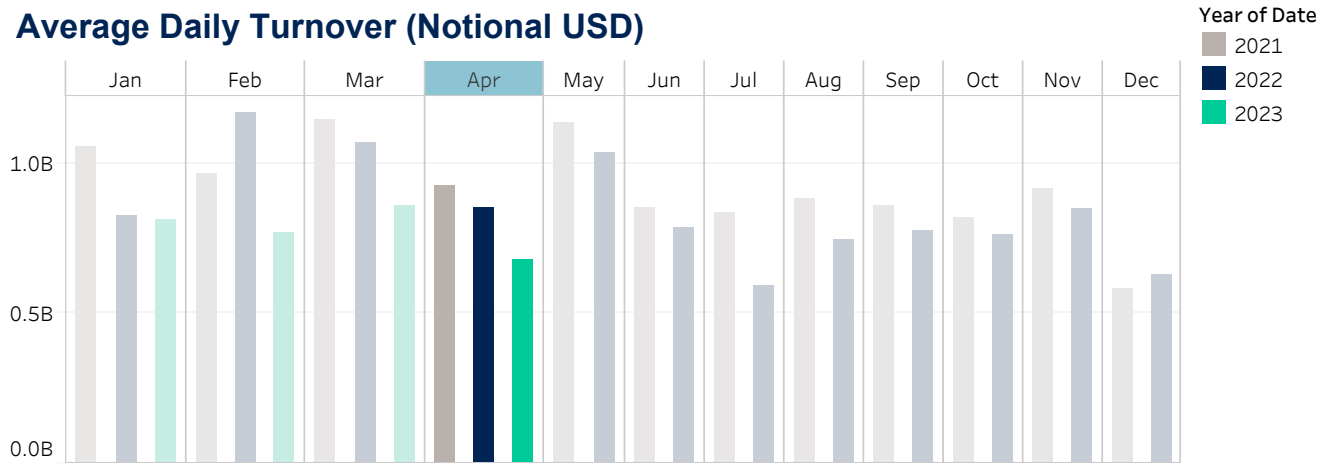
Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

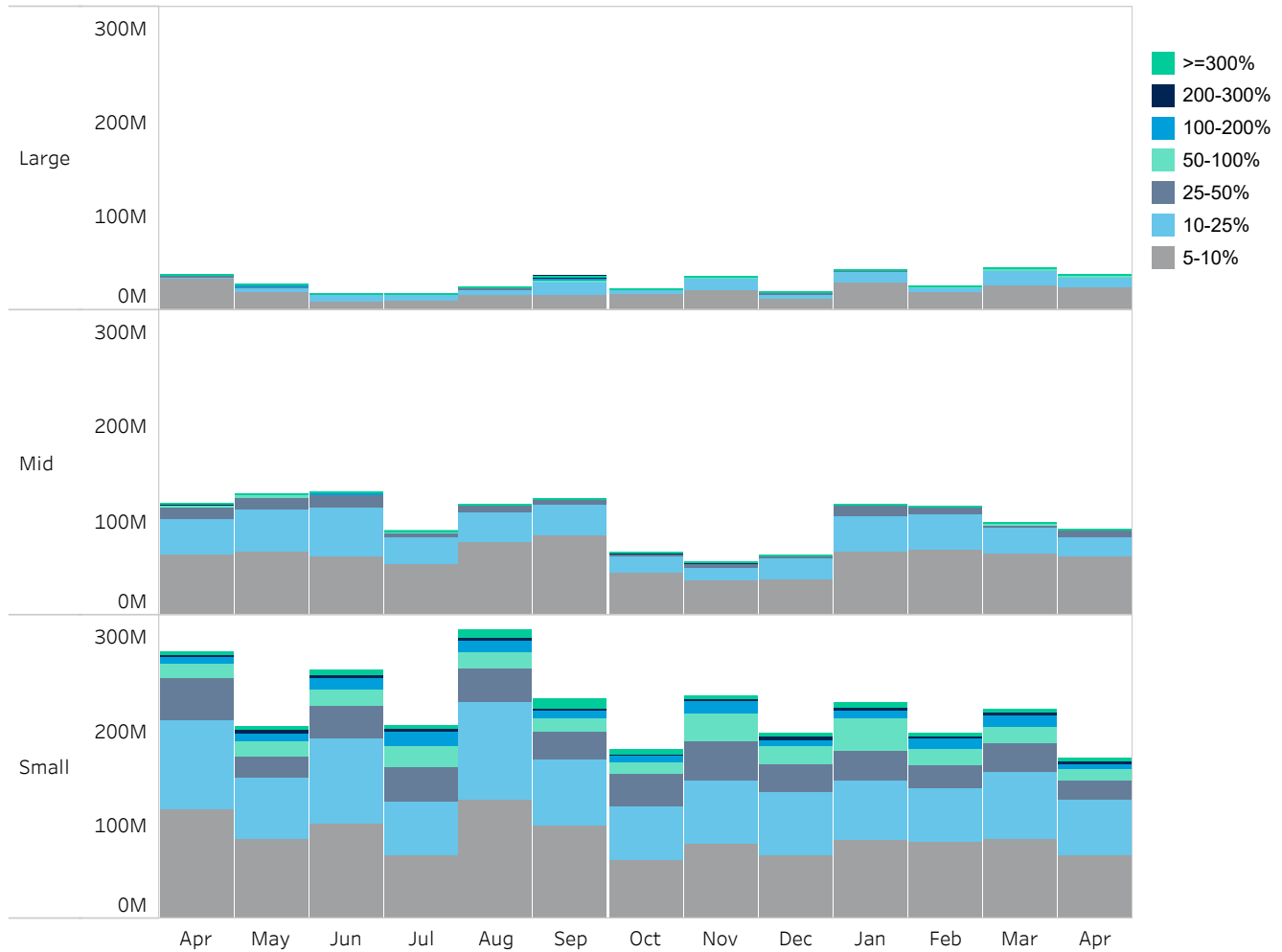
Source data: Virtu Financial

Singapore

Average Daily Turnover (Notional USD)



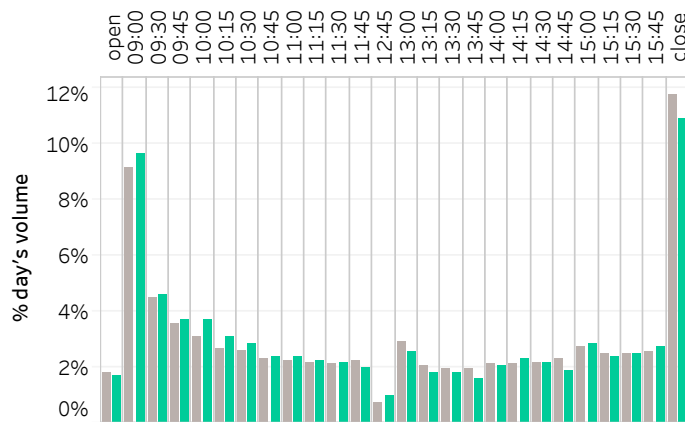
Large Sized Trades (>=5%ADT)



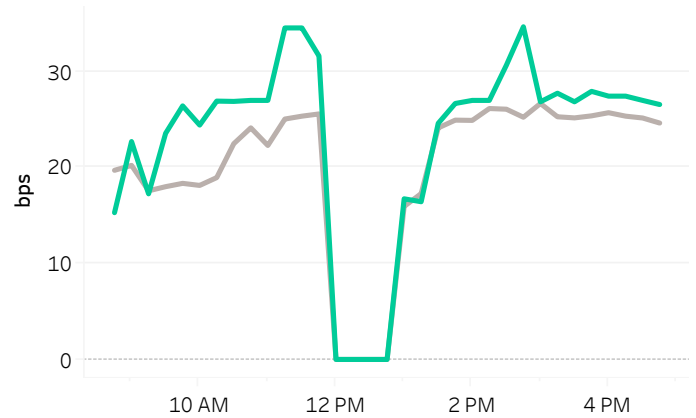
Source data: Virtu Financial

Singapore

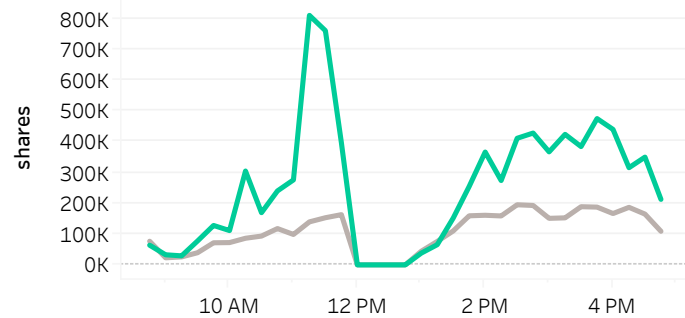
Volume Curve



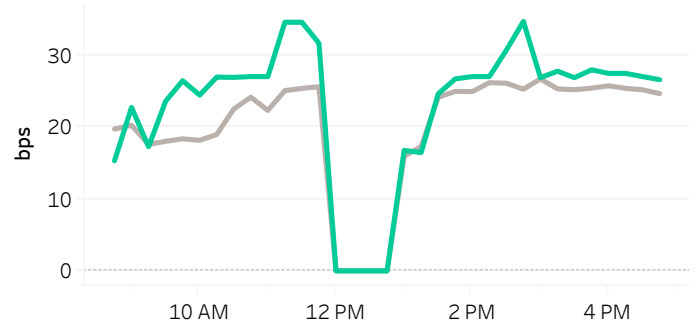
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2023

Spread Bps

	2022			2023			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FirstHalfHour	19.2	16.5	18.0	19.8	14.5	16.6	14.2
MidDay	22.8	22.3	24.2	24.3	25.0	27.2	27.0
LastHalfHour	27.8	20.3	24.4	24.2	25.1	25.3	26.8

One Minute Volatility Bps

FirstHalfHour	37.7	43.5	34.5	66.4	44.0	34.5	34.4
MidDay	25.2	25.4	28.4	26.6	25.3	24.6	27.6
LastHalfHour	24.8	25.5	27.6	28.5	24.7	27.1	27.1

Quotesize (shares)

FirstHalfHour	41,303	59,495	65,760	55,481	49,035	126,098	48,869
MidDay	89,492	106,664	123,584	140,704	159,315	169,961	327,685
LastHalfHour	121,825	94,969	128,454	109,921	138,744	141,752	256,196

Median used for all metrics

One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

Source data: Virtu Financial

Glossary

Volume curve - average of value traded during the month, per 15-minute time bin.

Intraday volatility - Median of difference between the high and low price within a one minute time bin, divided by that bin's VWAP

Spread - median of bid-ask spread of the index.

Quotesize - Median bid and ask size of all stocks in the index.

Average daily turnover - average daily value traded in the market.

Indices used:

Australia: ASX 200

Japan: TOPIX

China: CSI 300

Hong Kong: Hang Seng Index

Taiwan: TWSE

India: NIFTY 50

Korea: MSCI Korea 25/50 Index

New Zealand: MSCI New Zealand IMI 25/50 Index

Singapore: MSCI Singapore Index

Thailand: MSCI Thailand IMI 25/50 Index

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