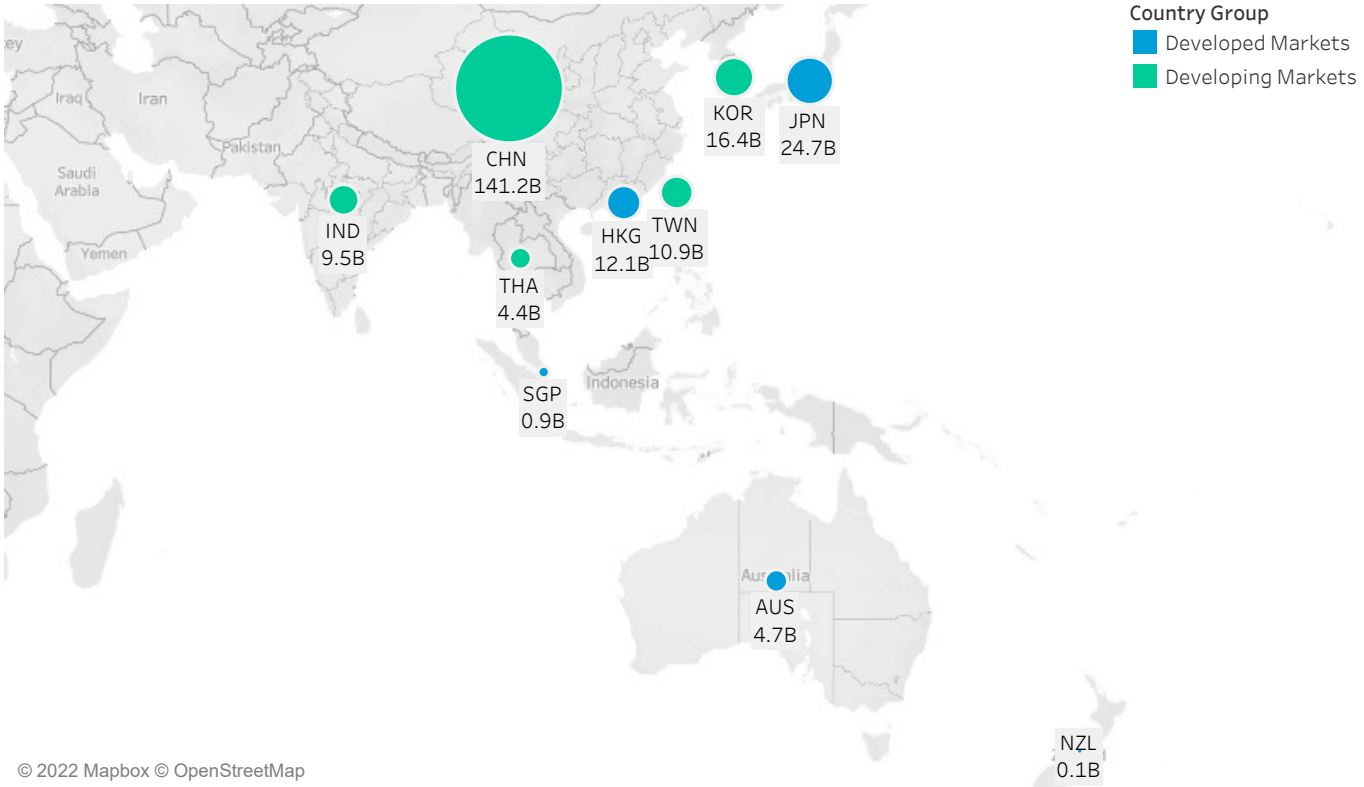


April 2022 APAC Market Structure Monthly

Average Daily Turnover (Notional USD)



© 2022 Mapbox © OpenStreetMap

Country Breakdowns

Hong Kong

China

Japan

Australia

South Korea

Taiwan

India

Thailand

New Zealand

Singapore

Apr 2022

AP Market Structure Monthly

MICROSTRUCTURE OBSERVATIONS

- Hong Kong, Japan, Australia, South Korea, Taiwan saw the lowest monthly notional turnover YTD, accompanied by overall decreases in trading activity across the region. In particular, Hong Kong and Japan led the greatest turnover decreases MoM at -36% and -24%.
- Intraday spread in China widened by ~5% MoM and one minute volatility in first half hour increased by ~10%, the highest since 2020 Q4 levels.
- In Hong Kong, 5-10% ADT trades in large cap names fell 54% MoM from US\$447M to US\$204M. Otherwise, trading volume in Large Sized Trades ($\geq 5\%$ ADT) consistently scaled back 20%-30% MoM.

AP MARKET STRUCTURE NEWS

Tokyo Stock Exchange's Cash Equity Market Introduces Three Market Segments: Prime Market, Standard Market, and Growth Market

On 4 April 2022, Japan Exchange Group (JPX) announced that it had completed the scheduled transition of its cash equity market, operated by the Tokyo Stock Exchange (TSE). The updated cash equity market is now divided into three segments: Prime Market, Standard Market and Growth Market. The restructuring is aimed at fostering listed companies' sustainable growth and long-term corporate value, thereby providing attractive markets that have been well received by both global and domestic investors.

<https://www.jpx.co.jp/english/corporate/news/news-releases/0060/20220404-01.html>

JPX Publishes Green Bond Framework

On 15 April 2022, JPX published its [Green Bond Framework](#) (in Japanese only). This Framework has been developed per the Green Bond Principles 2021 and the Green Bond Guidelines 2020 of the Japanese Ministry of the Environment. JPX's Green Bond Policies describe a) use of proceeds, b) evaluation and selection processes, c) management of proceeds and d) reporting.

<https://www.jpx.co.jp/english/corporate/news/news-releases/0090/20220415-01.html>

Hong Kong Exchanges and Clearing Limited Published Trading Arrangements of China-listed Exchange Traded Funds via China Stock Connect

On 22 April 2022, Hong Kong Exchanges and Clearing Limited (HKEX) published detailed trading arrangements for Shanghai Stock Exchange- (SSE-) listed Exchange Traded Funds (ETFs) and Shenzhen Stock Exchange- (SZSE-) listed ETFs via China Stock Connect (Northbound Trading).

HKEX noted that the trading arrangements of SSE-listed and SZSE-listed ETFs will largely follow the existing arrangements for A shares, while highlighting some notable differences for

ETF from A shares, including tick size, daily price limits, and SSE closing call auction eligibility, etc. According to HKEX circulate dated 24 December 2021 on the inclusion arrangements of Exchange Traded Funds (ETFs) in Stock Connect, the preparation before trading launch is expected to take around six months, which makes the expected go-live date around end of June 2022.

https://www.hkex.com.hk/-/media/HKEX-Market/Services/Circulars-and-Notices/Participant-and-Members-Circulars/HKSCC/2022/ce_HKSCC_SET1_014_2022.pdf

https://www.hkex.com.hk/-/media/HKEX-Market/Services/Circulars-and-Notices/Participant-and-Members-Circulars/HKSCC/2021/ce_HKSCC_SET1_043_2021.pdf

Hong Kong Investor Identification Regime Begins End-To-End Testing

On 21 April 2022, HKEX announced that its End-To-End (E2E) Test Session for Hong Kong Investor Identification Regime (HKIDR) will be held from 16 May to 15 July 2022. E2E test sessions are required for all relevant regulated intermediaries (RRIs). In 3Q 2022, market rehearsals (MR) will be arranged for RRIs to verify their readiness before the launch of the HKIDR. More details of the MR will be made public in due course.

<https://www.hkex.com.hk/-/media/HKEX-Market/Services/Circulars-and-Notices/Participant-and-Members-Circulars/SEHK/2022/CT03022E.pdf>

Shenzhen Stock Exchange Solicits Public Opinions on the Guidelines for the Newly Acquired Project of Infrastructure Real Estate Investment Trusts

On 15 April 2022, Shenzhen Stock Exchange (SZSE) publicly solicited opinions regarding the No. 3 Guidelines for Public Infrastructure Securities Investment Fund Business-Newly Acquired Infrastructure Project (Provisional) (Exposure Draft). In the Exposure Draft, specific arrangements (including additional share offerings, disclosure of information and decision-makers, and a review and approval processes) are laid out for newly acquired infrastructure projects of publicly traded infrastructure real estate investment trusts (REITs).

This is yet another move by SZSE to fulfill requirements relating to the sound development of infrastructure REITs (stated in the outline of the 14th Five-Year Plan) and make further progress in the trial of infrastructure REITs, further improve the ability of the capital market to serve the real economy, and better facilitate the virtuous cycle of infrastructure investment and financing.

http://www.szse.cn/English/about/news/szse/t20220418_592433.html

Entry Barrier for Investing in Korea New Exchange Will Be Lowered Significantly by the End of May 2022

On April 27, 2022, the Financial Services Commission (FSC) of Korea approved a set of revised operational, disclosure and listing rules for the Korea New Exchange (KONEX) and its secondary trading board, Securities Dealers Automated Quotations (KOSDAQ) market. The revision follows up on the measures to revive the KONEX market introduced in January of this year to promote the growth of small and medium enterprises (SMEs).

<https://www.fsc.go.kr/eng/pr010101/77725?srchCtgr=&curPage=&srchKey=&srchText=&srchBginDt=&srchEndDt=>

<https://www.fsc.go.kr/eng/pr010101/77203>

First Low Carbon Exchange Traded Fund Listed on Singapore Exchange

On 28 April 2022, Lion Global Investors and OCBC Securities launched the Lion-OCBC Securities Singapore Low Carbon Exchange Traded Fund (ETF) on Singapore Exchange (SPX). At launch, the Lion-OCBC Securities Singapore Low Carbon Exchange Traded Fund (ETF), had an AUM of S\$60M (US\$43.M) which reflects investors' growing interest in sustainable investing and low-carbon trades. Including this launch, SGX reports that sustainability-linked ETFs listed on its exchange now has a total global AUM of over S\$700M (US\$507M).

<https://corp.sgx.com/media-centre/20220428-sgx-securities-and-ocbc-group-deepen-partnership-singapores-first>

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

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info@virtu.com | www.virtu.com

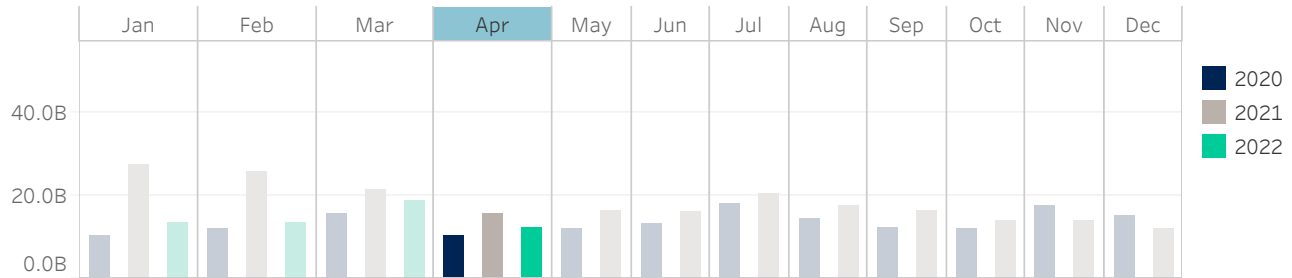
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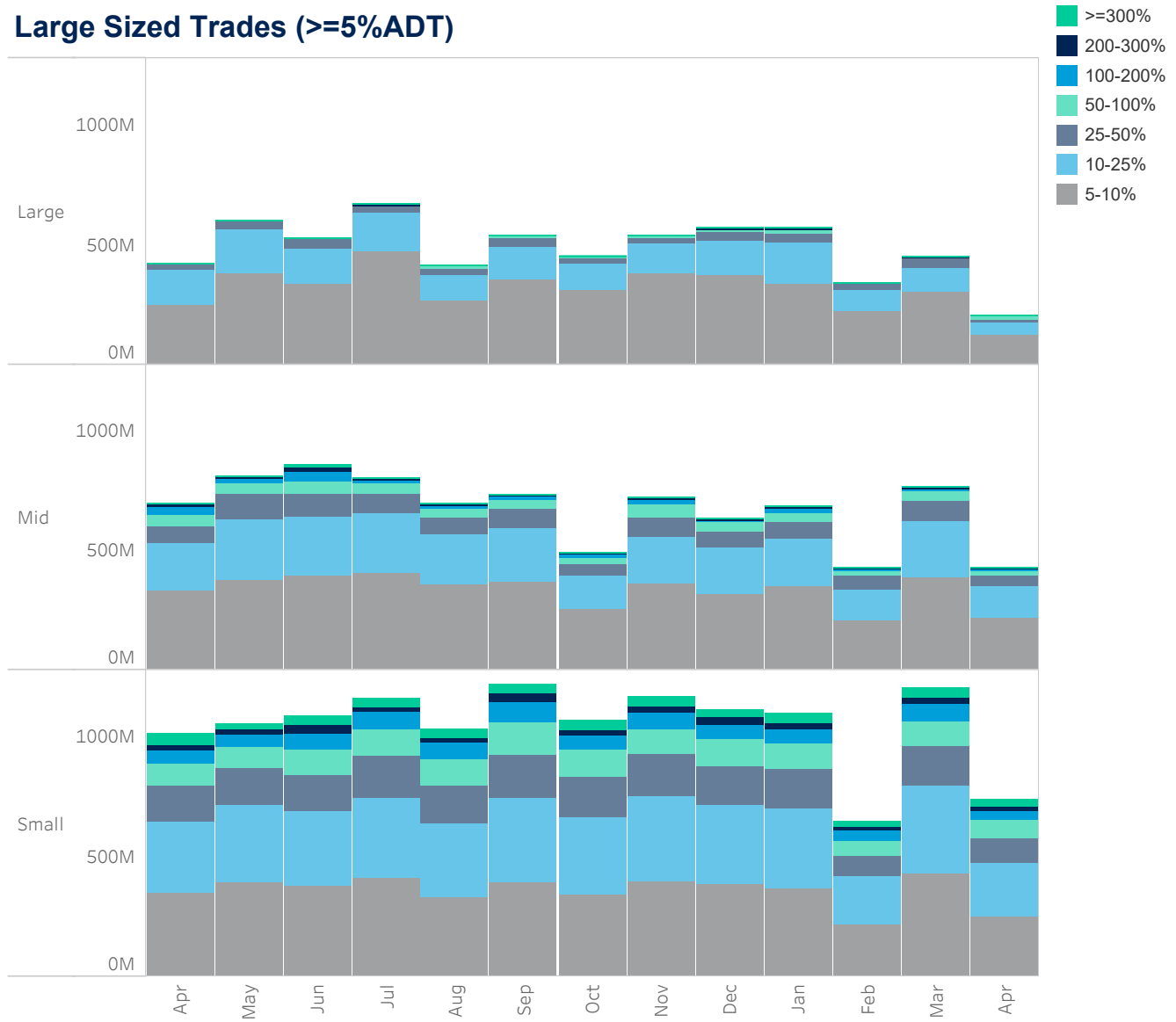
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Hong Kong

Average Daily Turnover (Notional USD)



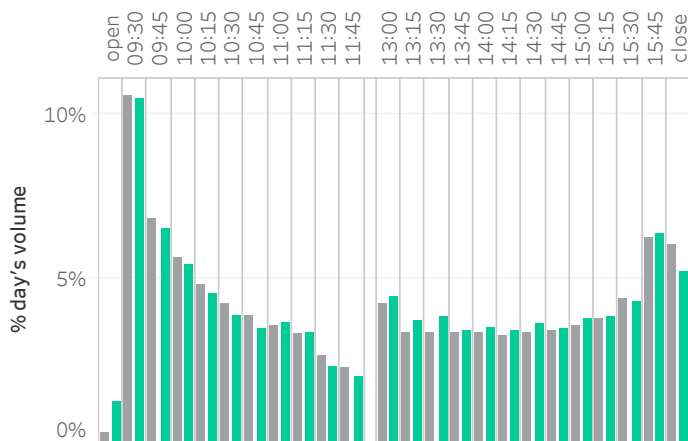
Large Sized Trades (>=5%ADT)



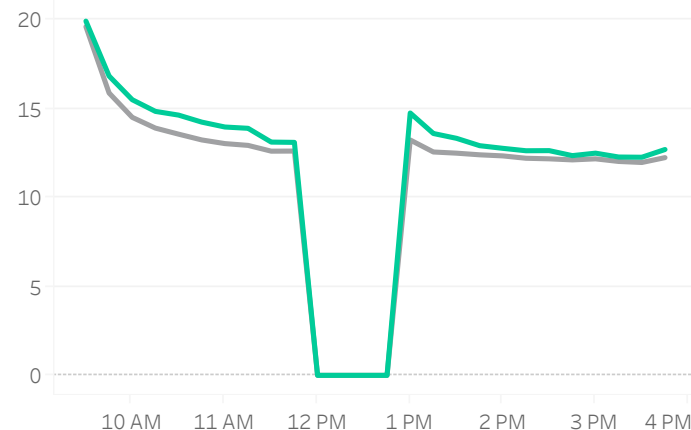
Source data: Virtu Financial

Hong Kong

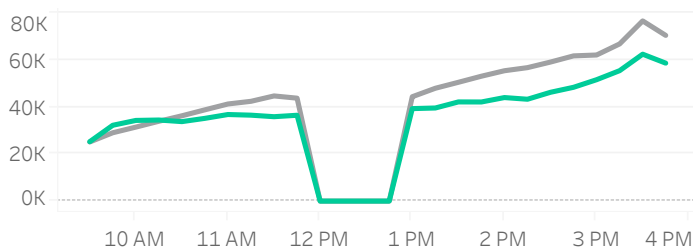
Volume Curve



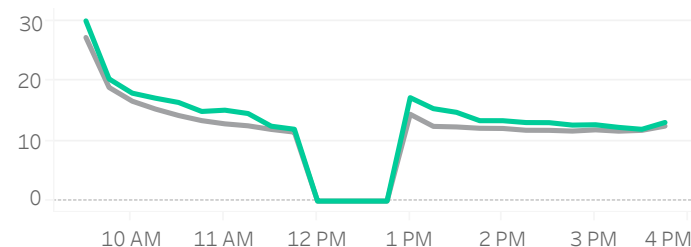
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	18.5	17.3	17.3	16.2	15.8	17.8	17.6	
midday	12.7	12.8	12.5	11.9	12.0	13.4	13.3	
lastHalfHour	12.3	12.5	12.4	11.6	11.7	12.6	12.3	

One Minute Volatility Bps

firstHalfHour	18.2	13.8	14.7	15.5	15.1	21.2	17.7
midday	6.7	6.1	6.3	6.4	6.5	9.7	8.4
lastHalfHour	6.5	6.0	5.8	6.1	6.9	7.8	6.5

Quotesize in Shares

firstHalfHour	26,921	27,455	23,936	28,480	27,737	29,034	28,977
midday	47,554	47,292	35,935	47,428	46,616	40,716	40,059
lastHalfHour	75,001	72,389	54,283	70,843	71,318	65,291	62,184

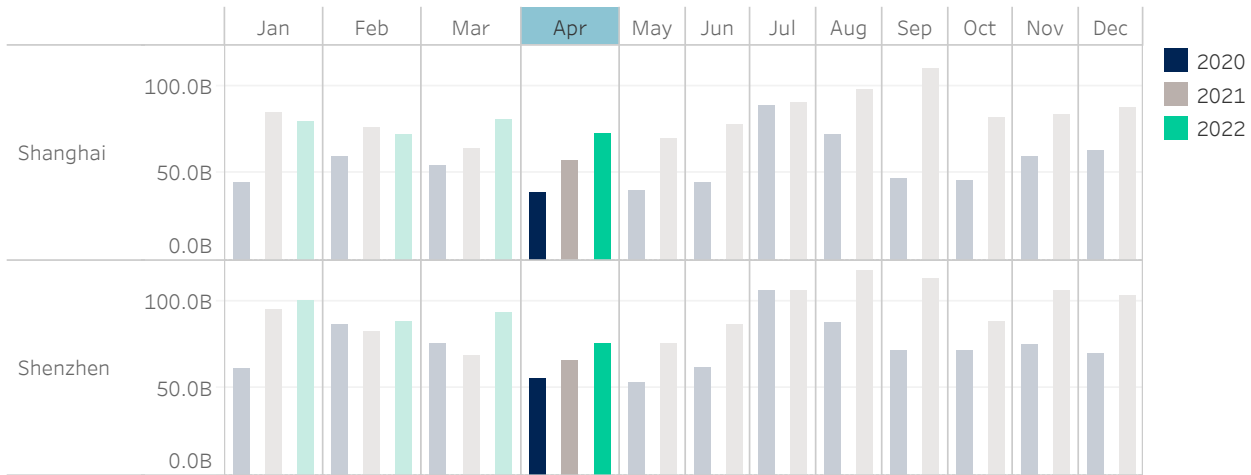
Median used for all metrics

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

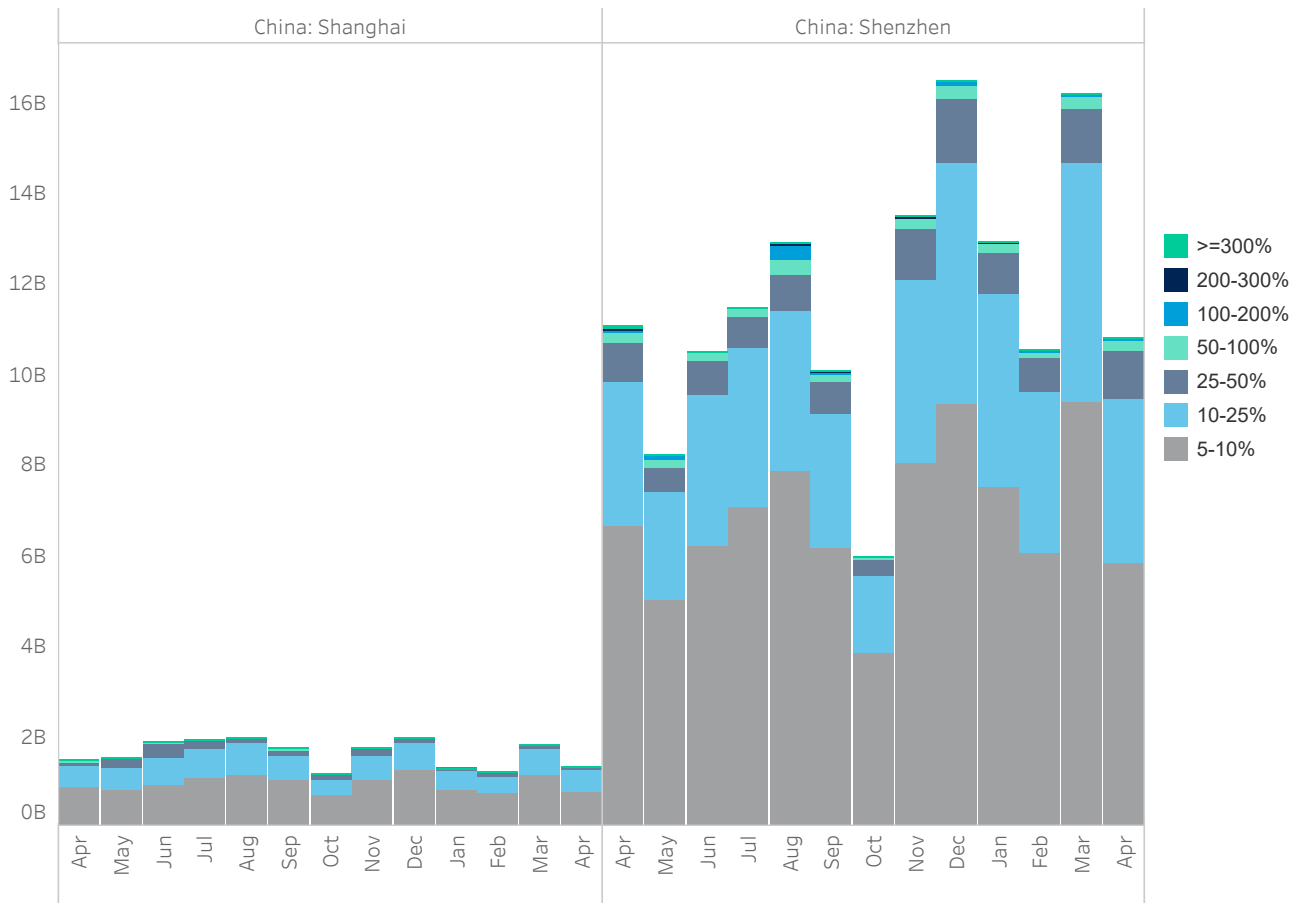
Source data: Virtu Financial

China

Average Daily Turnover (Notional USD)



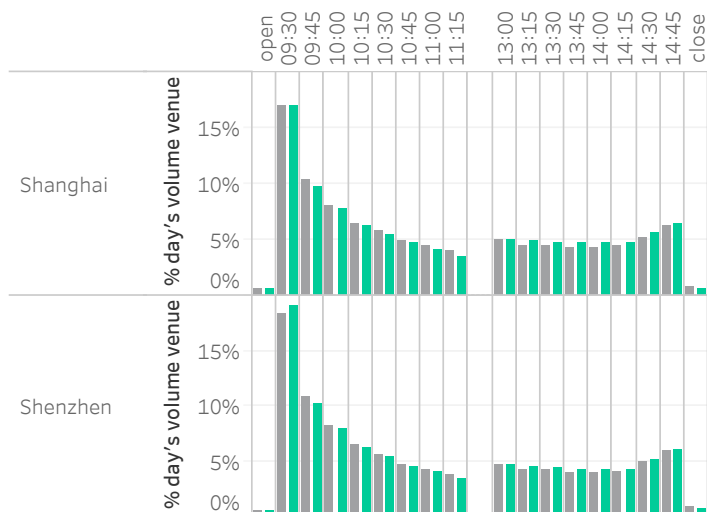
Large Sized Trades (>=5%ADT)



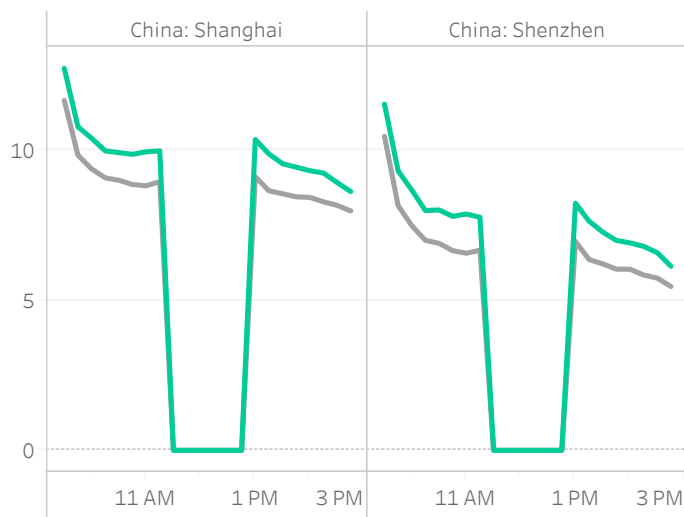
Source data: Virtu Financial

China

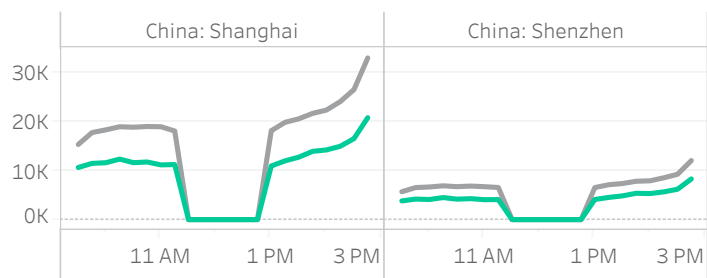
Volume Curve



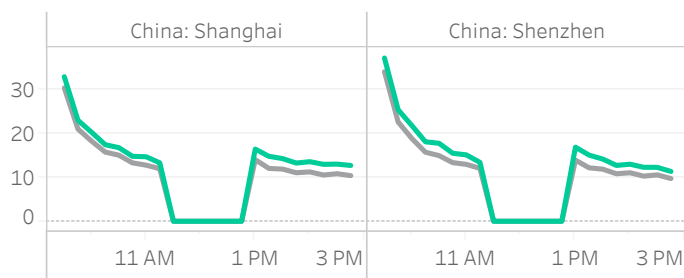
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	China: Shanghai							China: Shenzhen						
	21 Q4			22 Q1			22 Q2	21 Q4			22 Q1			22 Q2
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Oct	Nov	Dec	Jan	Feb	Mar	Apr
firstHalfHour	10.3	9.8	9.3	10.0	9.9	10.9	11.1	9.0	8.4	7.8	9.0	8.3	9.1	9.9
midday	8.5	8.3	8.0	8.2	8.4	9.4	9.7	6.5	6.2	5.8	6.3	6.2	7.0	7.4
lastHalfHour	7.6	7.6	7.3	7.7	7.7	8.3	8.4	5.4	5.3	4.9	5.3	5.2	5.9	6.2

One Minute Volatility Bps

firstHalfHour	22.8	19.2	17.8	20.5	18.5	21.7	23.8	26.3	24.1	21.8	27.0	22.1	24.2	27.8
midday	9.0	7.5	7.3	8.4	7.8	10.1	11.6	10.4	9.6	9.2	11.3	9.8	11.9	13.1
lastHalfHour	7.1	5.9	5.9	7.4	6.4	8.3	9.3	7.9	7.2	7.1	8.8	7.6	8.7	9.8

Quotesize in Shares

firstHalfHour	14K	16K	16K	13K	13K	13K	11K	13K	6K	7K	5K	4K	4K	4K	4K
midday	17K	19K	19K	16K	16K	14K	12K	14K	8K	8K	6K	4K	5K	5K	5K
lastHalfHour	26K	31K	30K	23K	23K	22K	19K	21K	12K	13K	9K	6K	7K	7K	7K

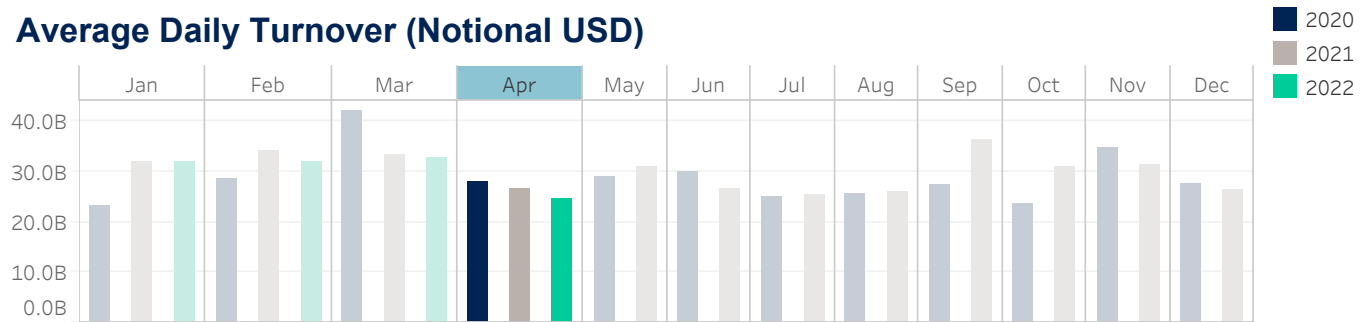
Median used for all metrics

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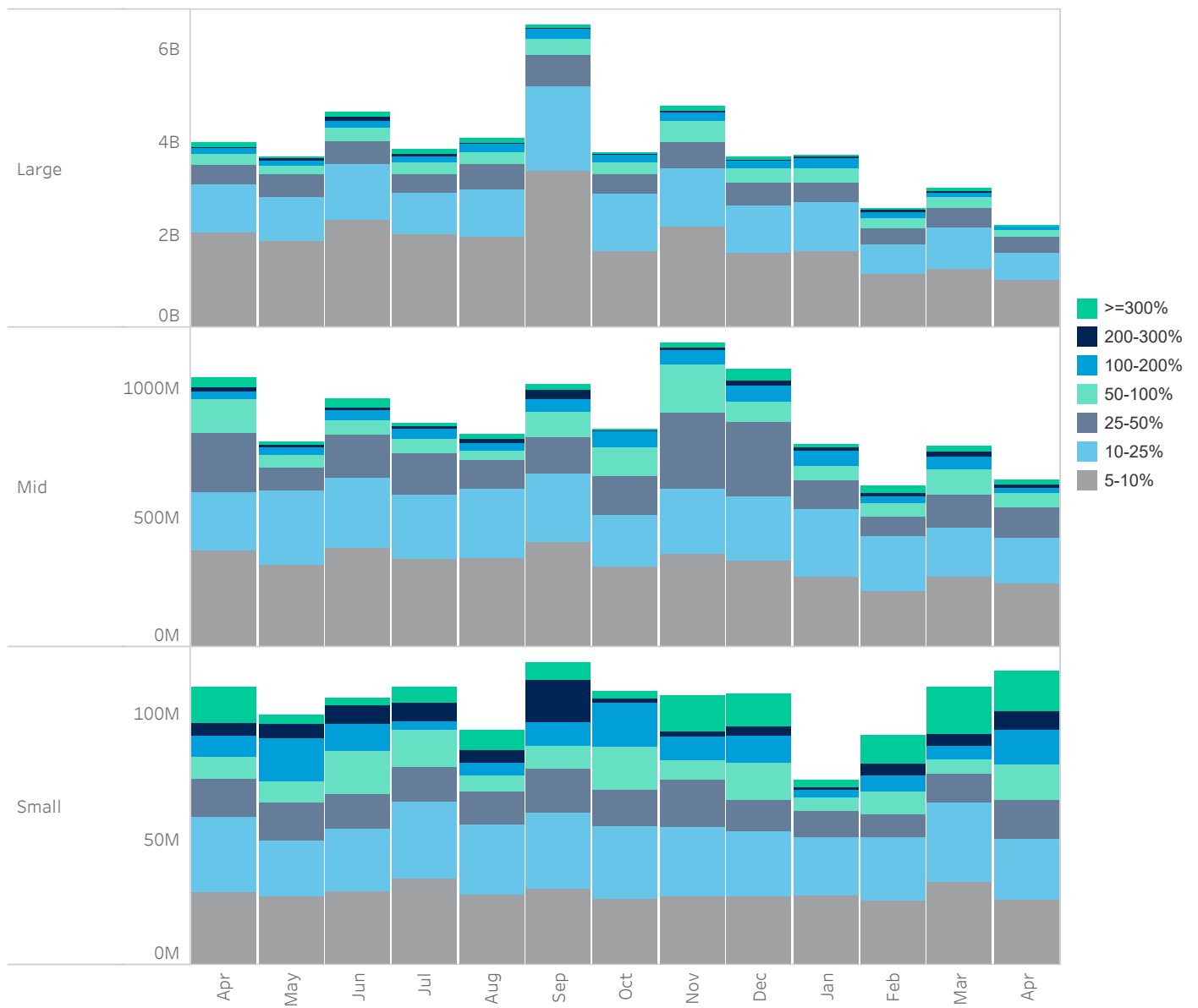
Source data: Virtu Financial

Japan

Average Daily Turnover (Notional USD)



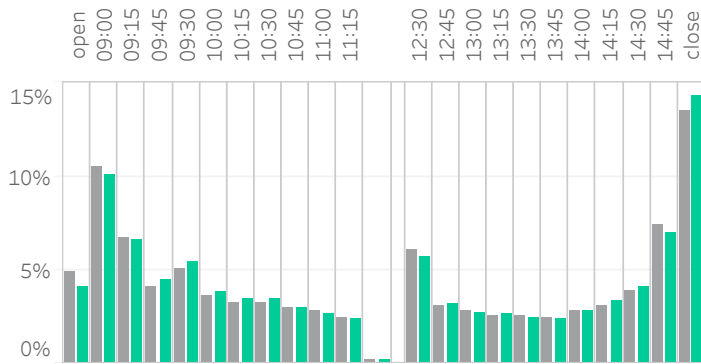
Large Sized Trades (>=5%ADT)



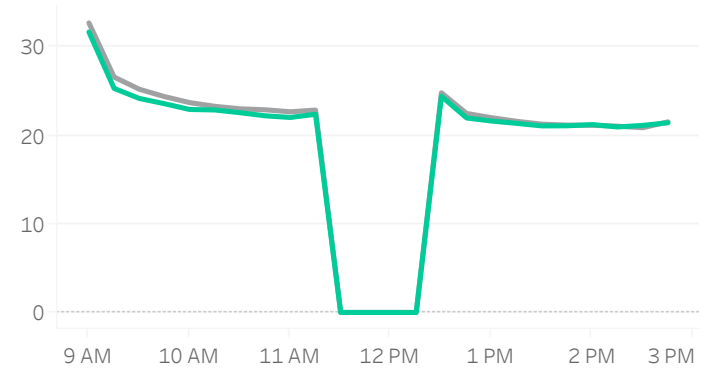
Source data: Virtu Financial

Japan

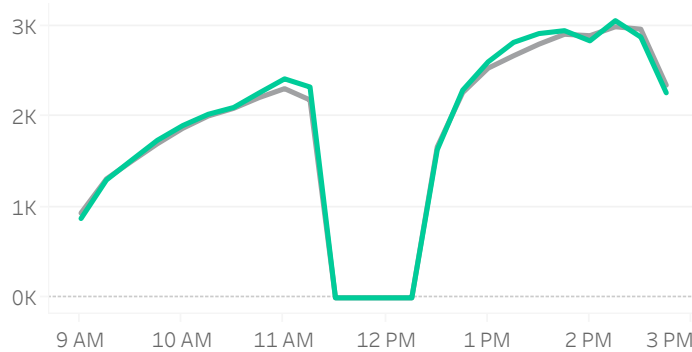
Volume Curve



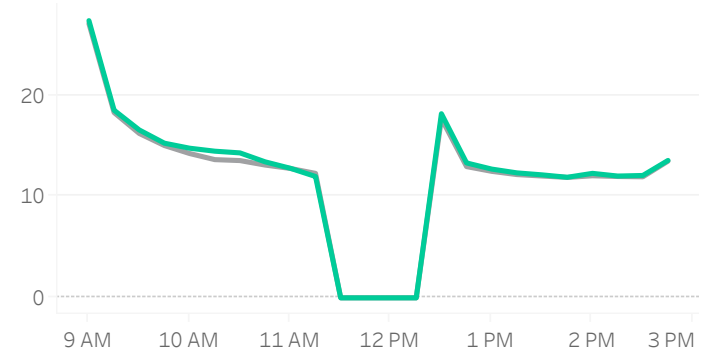
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22
firstHalfHour	26.7	27.2	28.7	29.4	28.2	28.4	26.8
midday	21.9	22.1	22.5	23.3	22.7	22.7	22.1
lastHalfHour	19.7	20.2	20.7	21.6	21.2	21.2	20.6

One Minute Volatility Bps

firstHalfHour	14.5	13.2	14.6	16.5	17.0	17.5	15.2
midday	7.1	6.1	6.4	7.7	7.6	8.9	7.0
lastHalfHour	6.8	10.1	6.1	6.5	7.1	8.0	6.4

Quotesize in Shares

firstHalfHour	1,263	1,289	1,136	1,084	1,033	1,019	1,160
midday	2,521	2,700	2,453	2,128	2,031	2,109	2,379
lastHalfHour	3,161	3,282	2,896	2,602	2,605	2,496	2,872

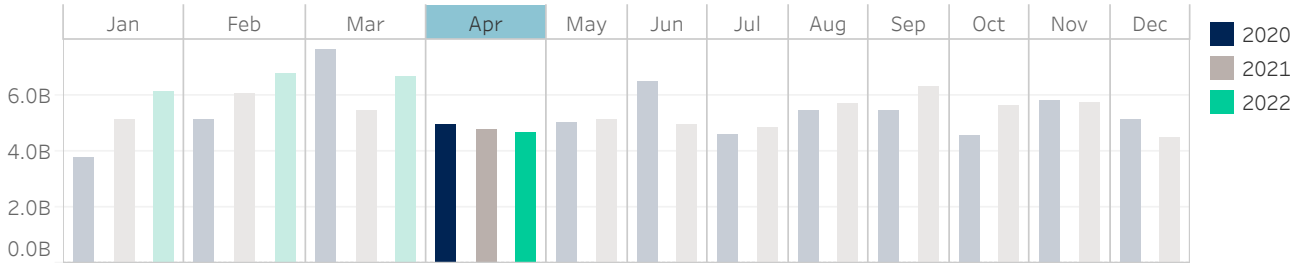
Median used for all metrics

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

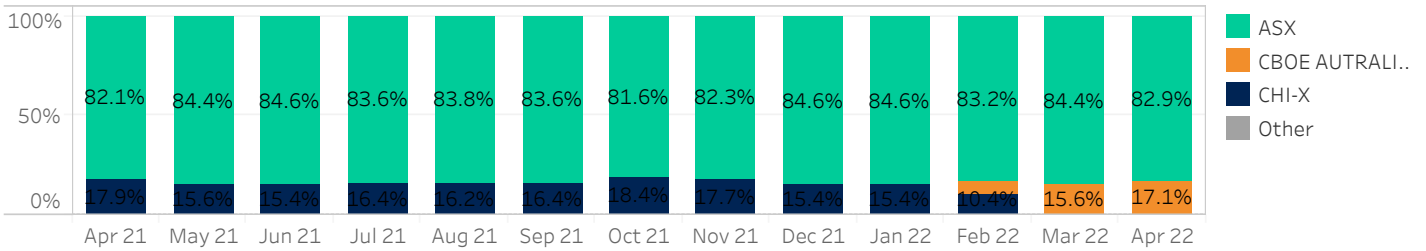
Source data: Virtu Financial

Australia

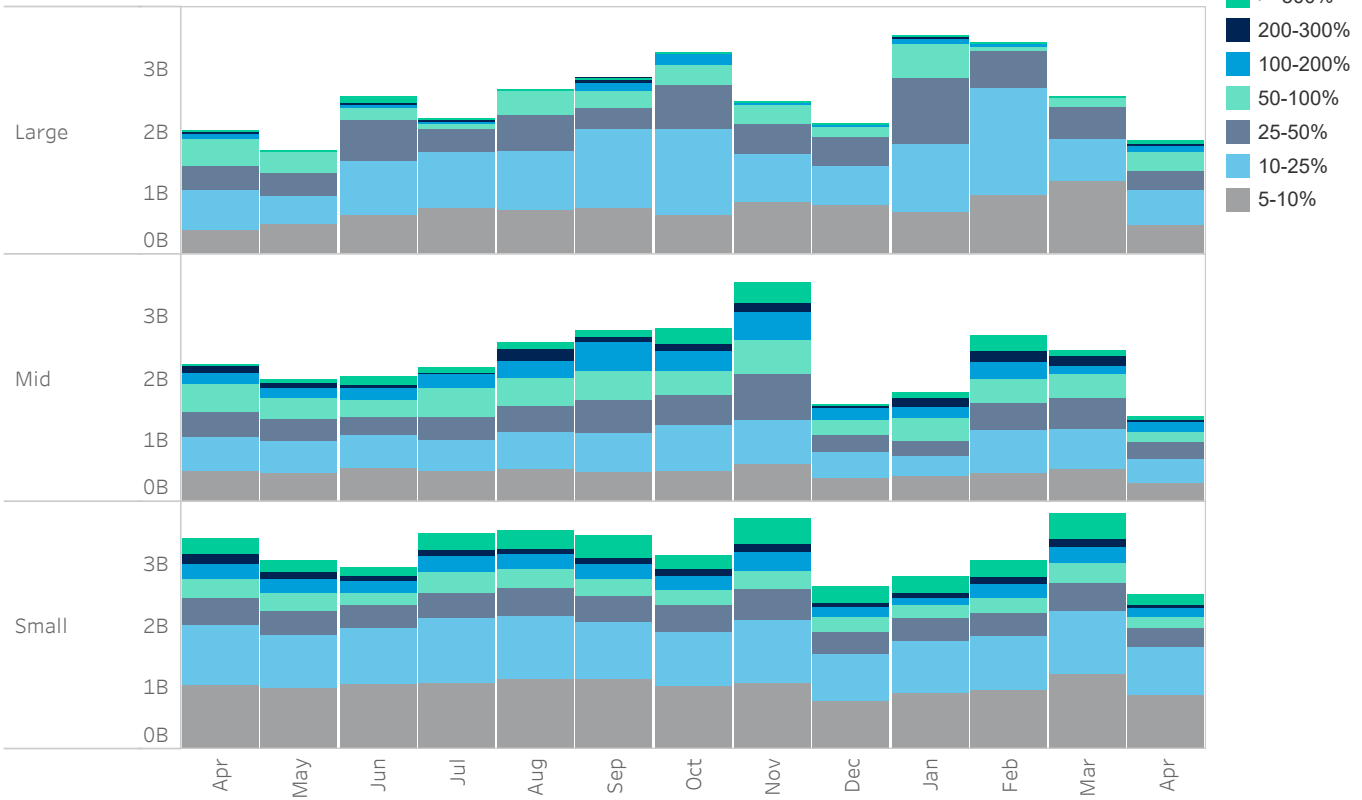
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



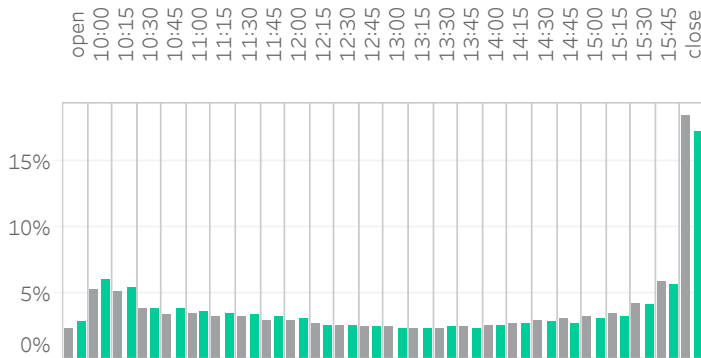
Large Sized Trades (>=5%ADT)



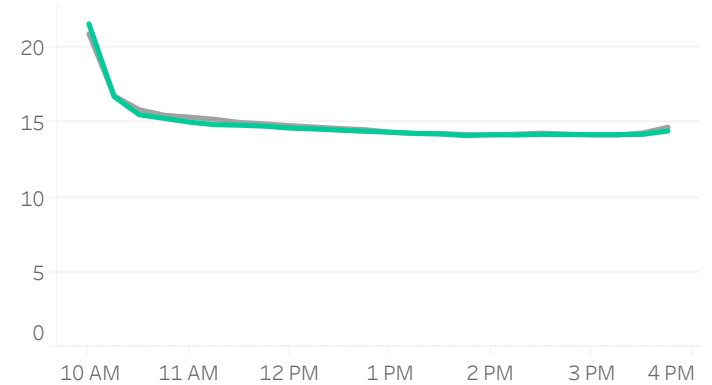
Source data: Virtu Financial

Australia

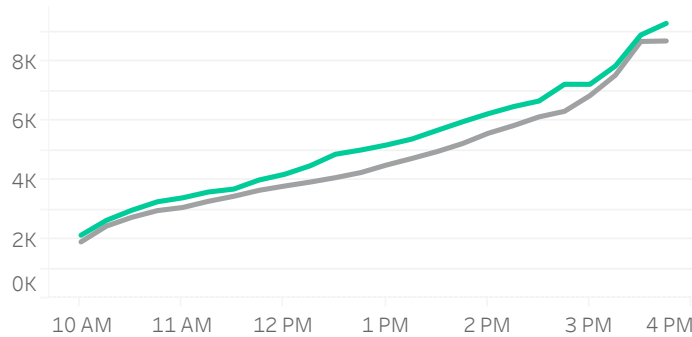
Volume Curve



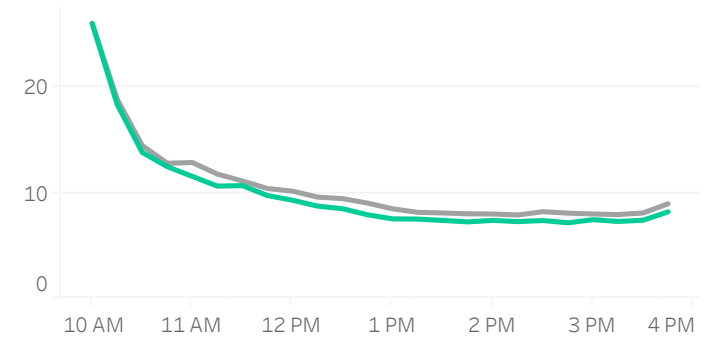
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	16.9	17.0	17.6	17.9	18.9	18.5	18.3	
midday	13.9	14.0	14.5	14.5	14.9	15.0	14.5	
lastHalfHour	13.8	14.1	14.0	14.0	14.2	14.4	14.3	

One Minute Volatility Bps

firstHalfHour	15.6	15.6	15.9	16.5	20.7	18.7	15.9
midday	4.4	4.2	4.2	5.4	6.1	5.1	4.2
lastHalfHour	3.8	3.5	3.2	4.9	3.9	3.7	3.2

Quotesize in Shares

firstHalfHour	2,151	2,097	1,921	1,969	2,066	2,207	2,360
midday	4,220	4,365	4,063	3,897	3,959	4,663	5,082
lastHalfHour	9,069	9,121	8,286	7,966	8,557	9,438	9,297

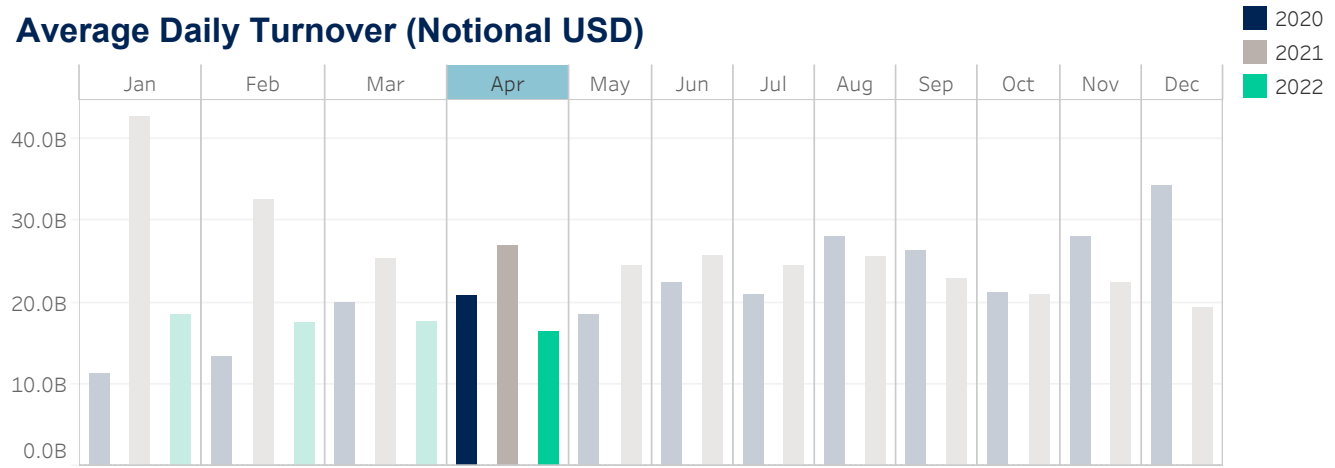
Median used for all metrics

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

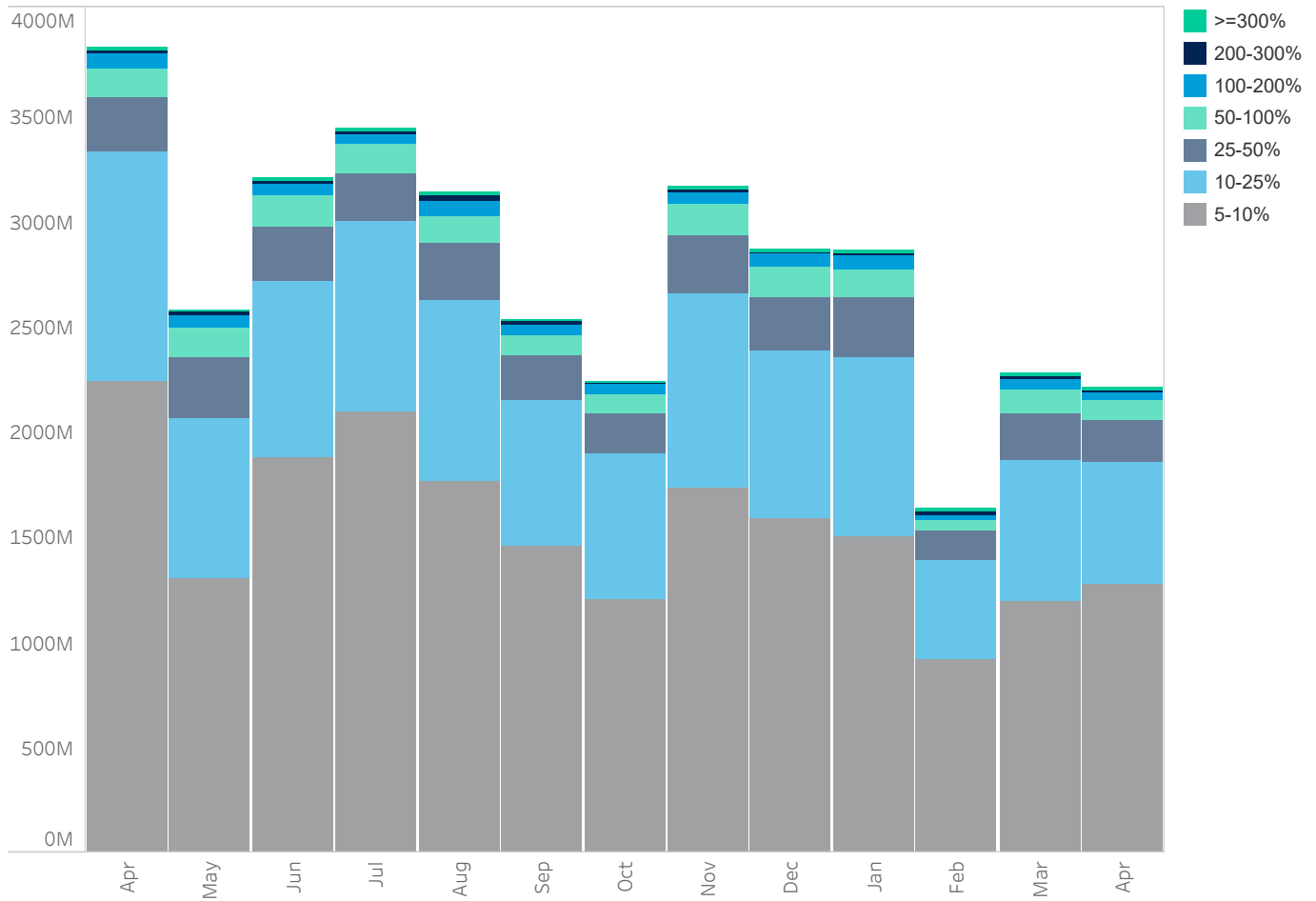
Source data: Virtu Financial

South Korea

Average Daily Turnover (Notional USD)



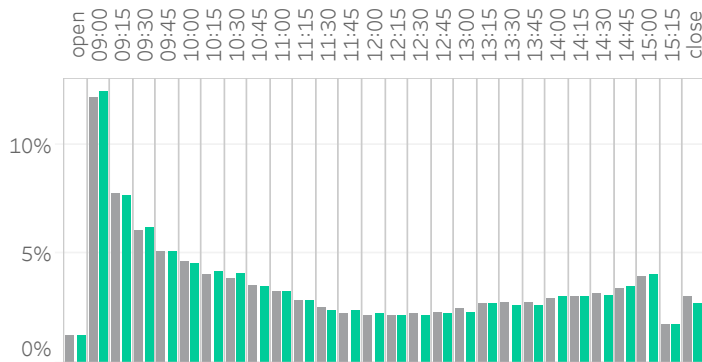
Large Sized Trades (>=5%ADT)



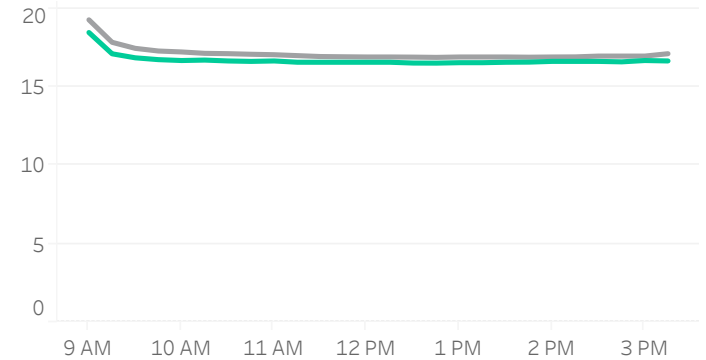
Source data: Virtu Financial

South Korea

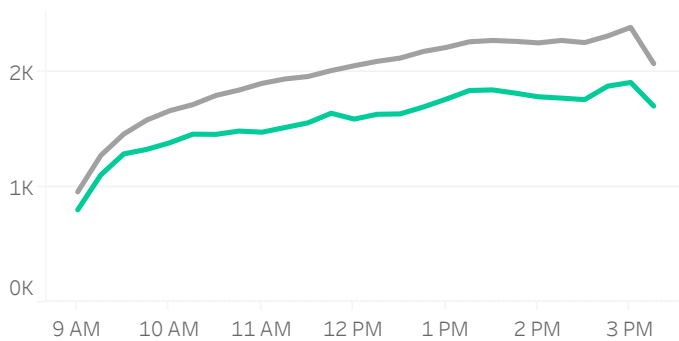
Volume Curve



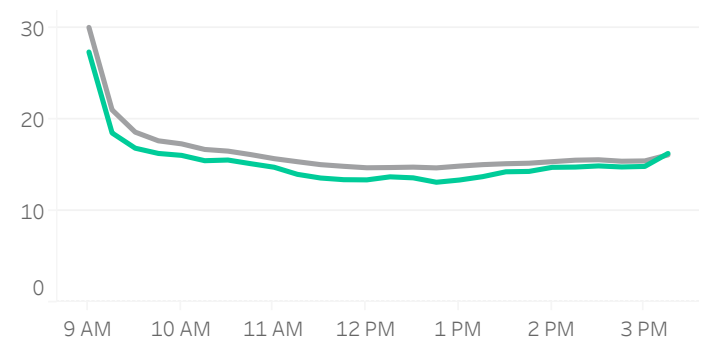
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	18.9	19.8	18.3	18.9	18.8	17.9	17.5	
midday	17.2	17.9	17.2	17.4	17.4	17.0	16.6	
lastHalfHour	17.2	17.9	17.3	17.4	17.3	17.0	16.7	

One Minute Volatility Bps

midday	10.7	11.2	10.6	11.9	11.5	10.3	10.2
firstHalfHour	16.5	16.9	14.9	18.2	17.6	15.1	13.1
lastHalfHour	12.7	15.6	25.1	13.0	13.3	25.4	23.1

Quotesize in Shares

firstHalfHour	890	909	899	813	822	931	945
midday	1,653	1,773	1,608	1,528	1,313	1,669	1,603
lastHalfHour	1,871	2,018	1,807	1,727	1,598	1,929	1,900

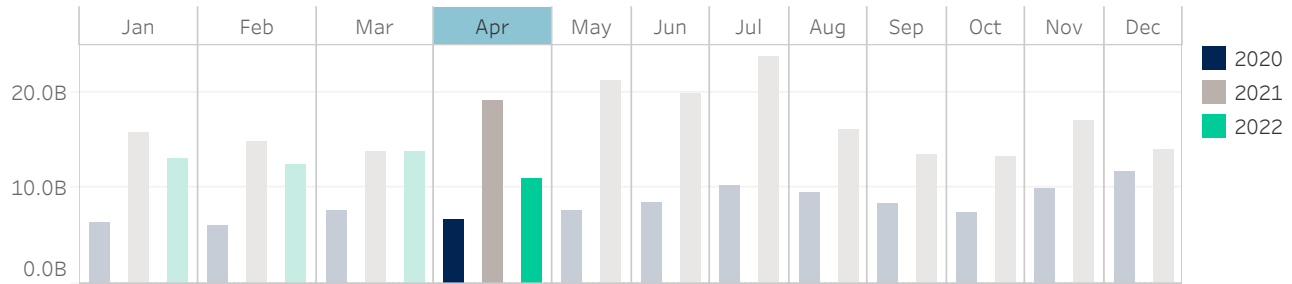
Median used for all metrics

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

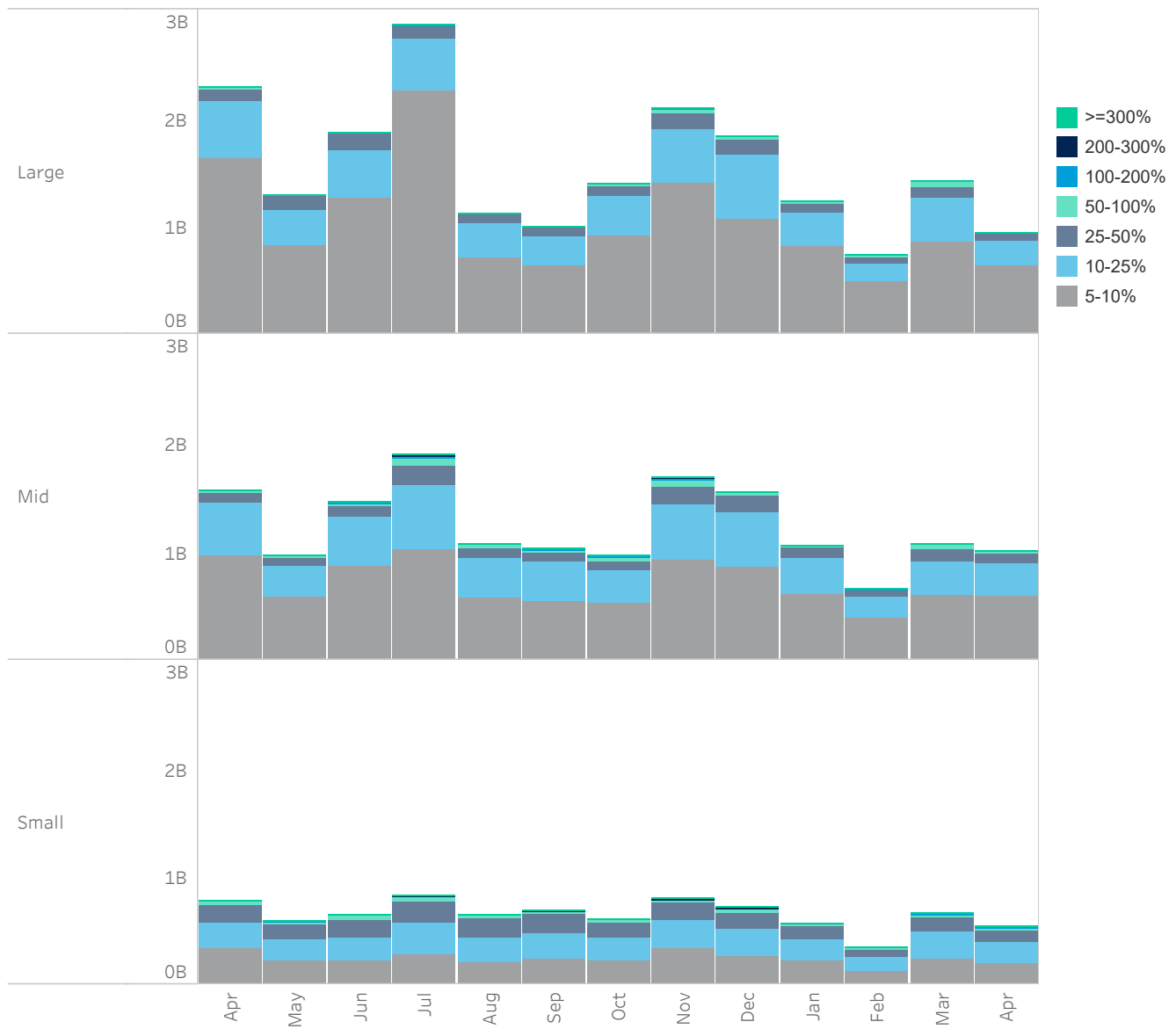
Source data: Virtu Financial

Taiwan

Average Daily Turnover (Notional USD)



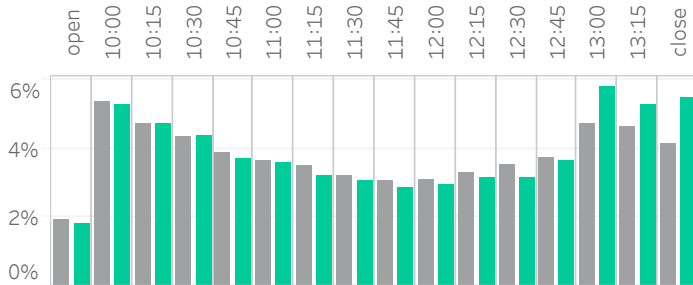
Large Sized Trades (>=5%ADT)



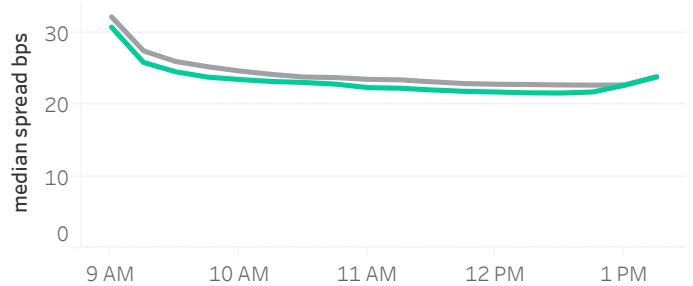
Source data: Virtu Financial

Taiwan

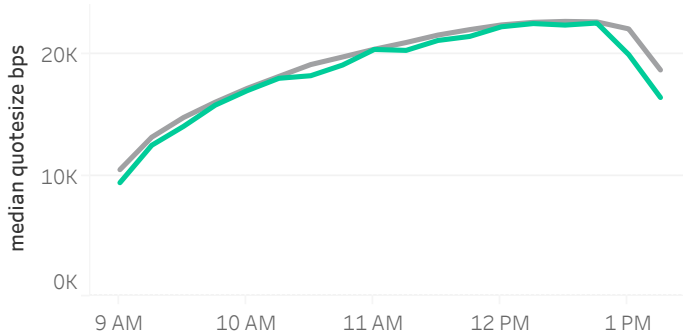
Volume Curve



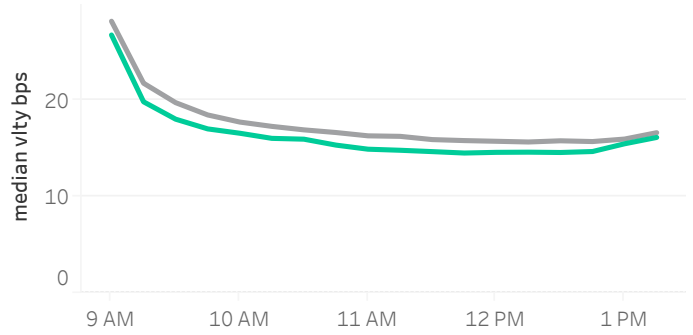
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22
firstHalfHour	30.4	28.0	26.5	28.6	26.7	26.6	26.7
midday	24.2	22.5	21.7	22.2	21.9	21.7	22.4
lastHalfHour	23.8	22.4	21.6	22.6	22.3	22.2	23.0

One Minute Volatility Bps

firstHalfHour	15.5	14.4	11.7	13.6	11.9	12.2	13.2
midday	7.2	6.6	6.6	7.6	6.5	6.5	6.8
lastHalfHour	8.1	9.3	9.2	7.8	9.1	8.1	8.1

Quotesize in Shares

firstHalfHour	10,944	12,921	13,588	12,185	11,983	12,049	11,350
midday	18,385	22,487	24,891	22,588	22,644	24,091	20,379
lastHalfHour	18,001	22,498	24,520	21,888	20,421	22,083	18,462

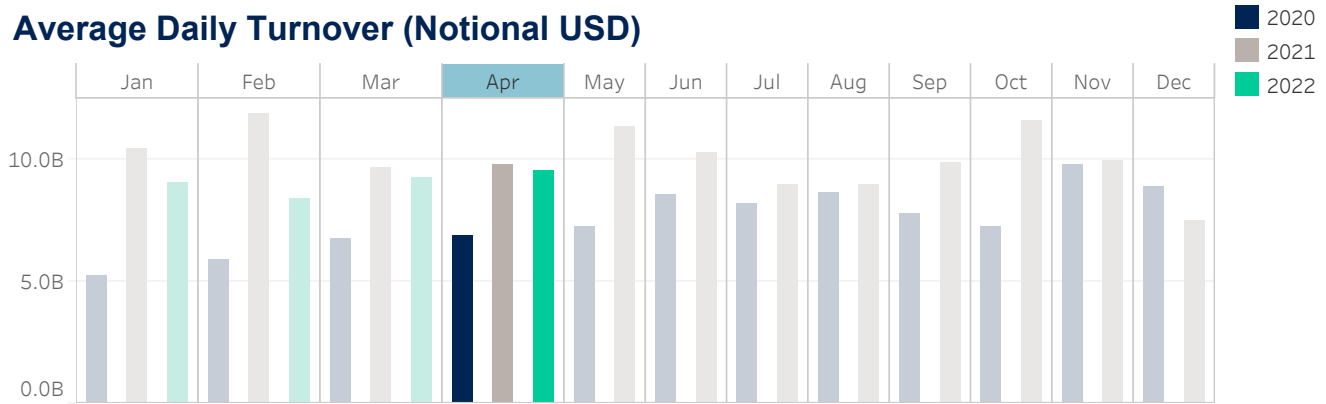
Median used for all metrics

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

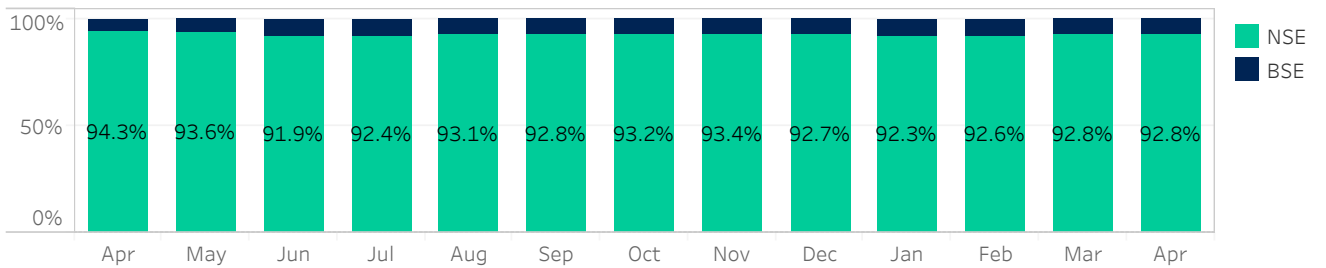
Source data: Virtu Financial

India

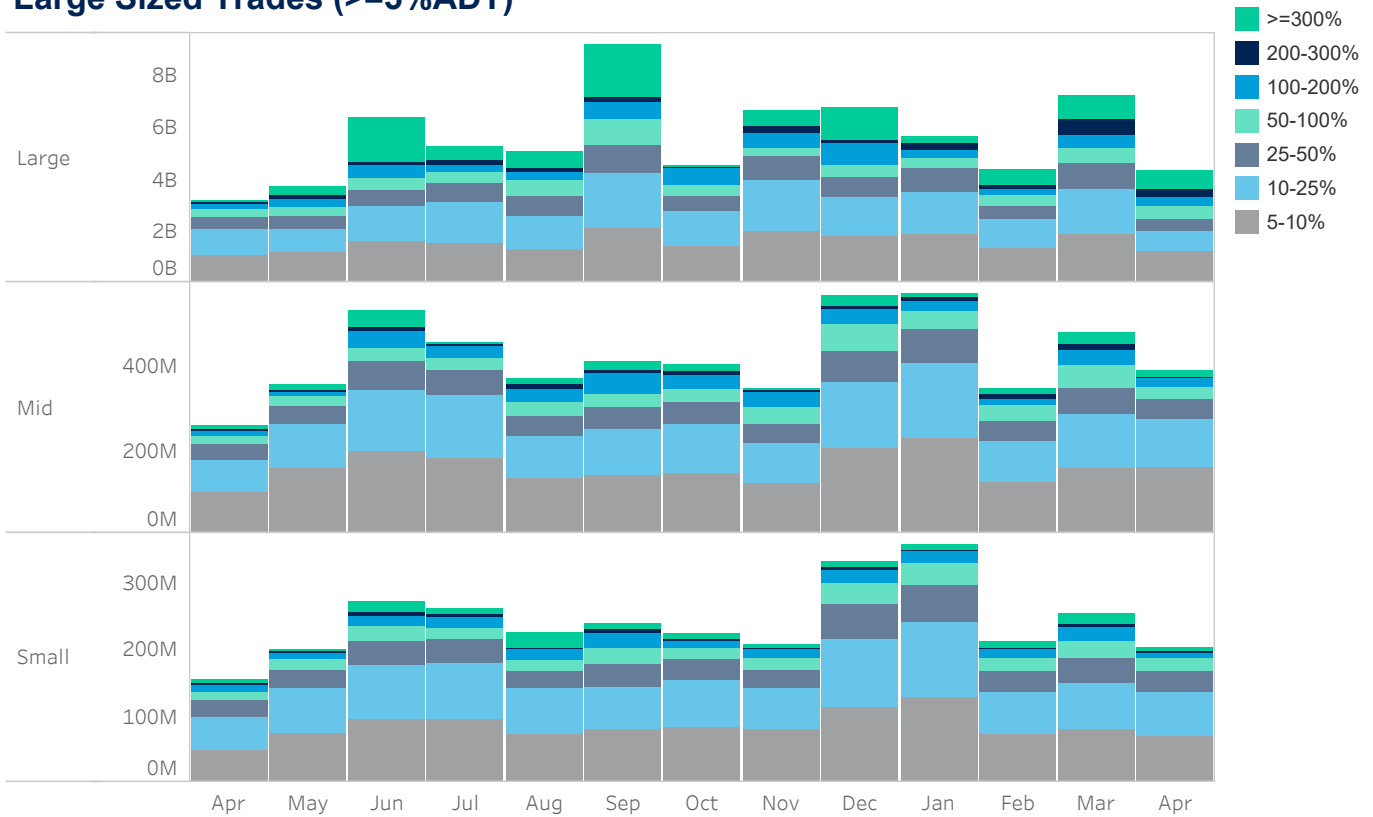
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



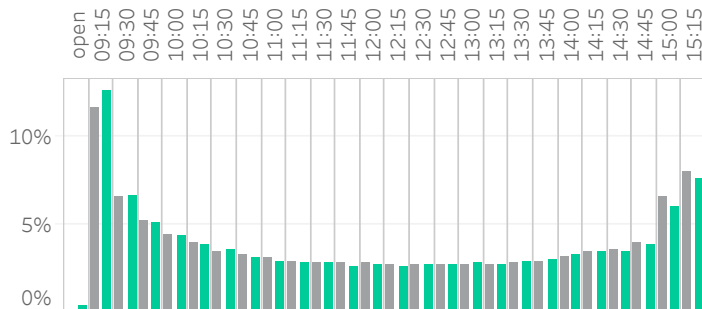
Large Sized Trades (>=5%ADT)



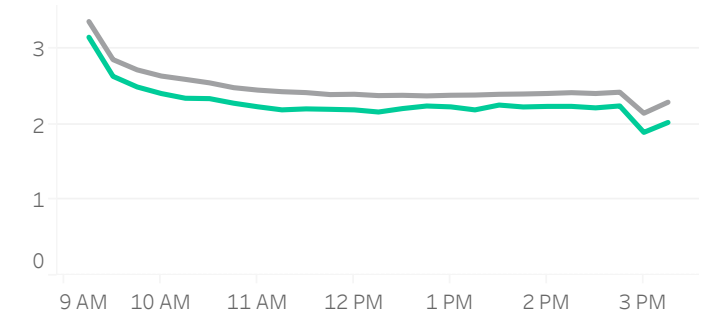
Source data: Virtu Financial

India

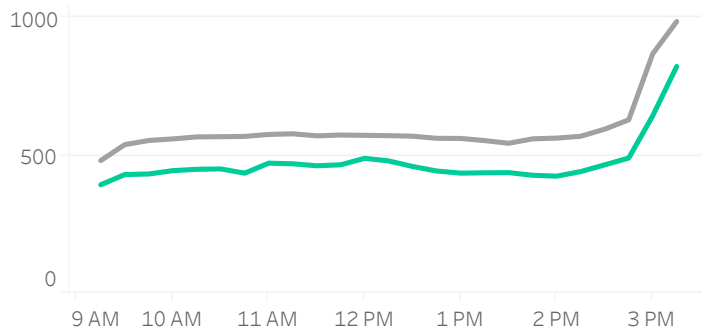
Volume Curve



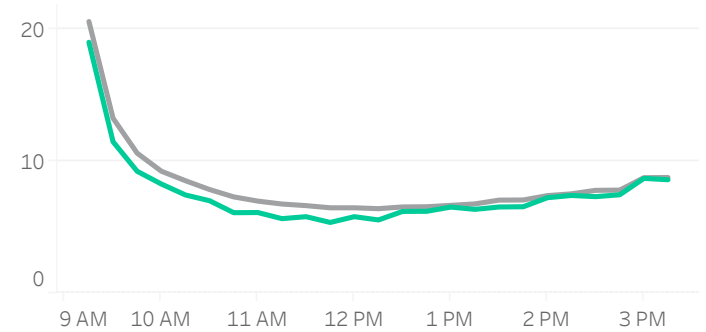
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	3.2	3.1	3.0	3.1	3.1	2.9	2.8	
midday	2.6	2.5	2.4	2.4	2.5	2.4	2.2	
lastHalfHour	2.1	2.0	2.0	2.0	2.0	2.0	1.9	

One Minute Volatility Bps

	21 Q4	22 Q1	22 Q2
firstHalfHour	16.9	14.7	13.7
midday	7.3	6.5	5.6
lastHalfHour	7.7	7.3	7.0

Quotesize in Shares

	21 Q4	22 Q1	22 Q2
firstHalfHour	425	408	416
midday	459	444	502
lastHalfHour	780	826	856

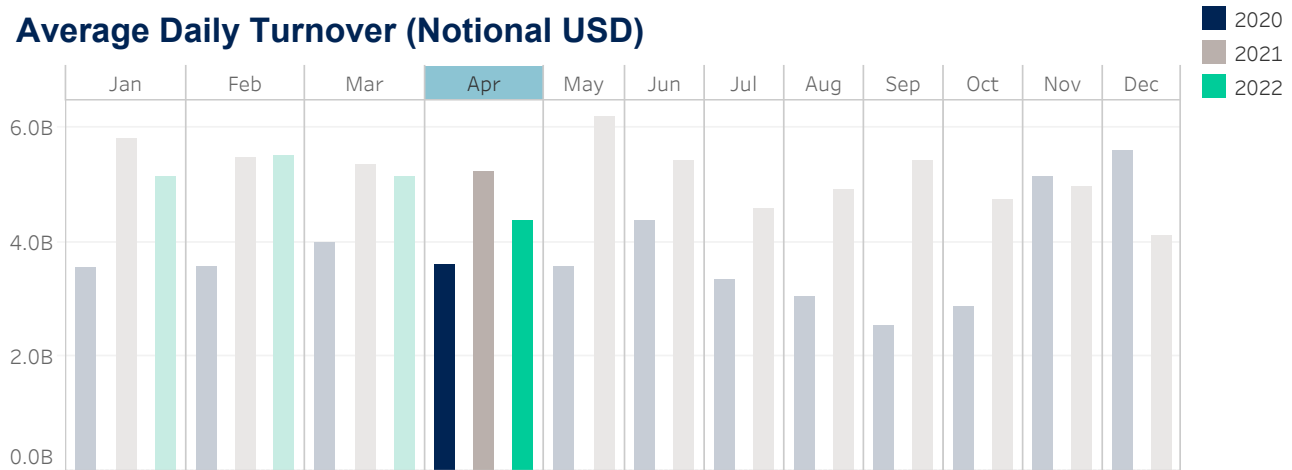
Median used for all metrics

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

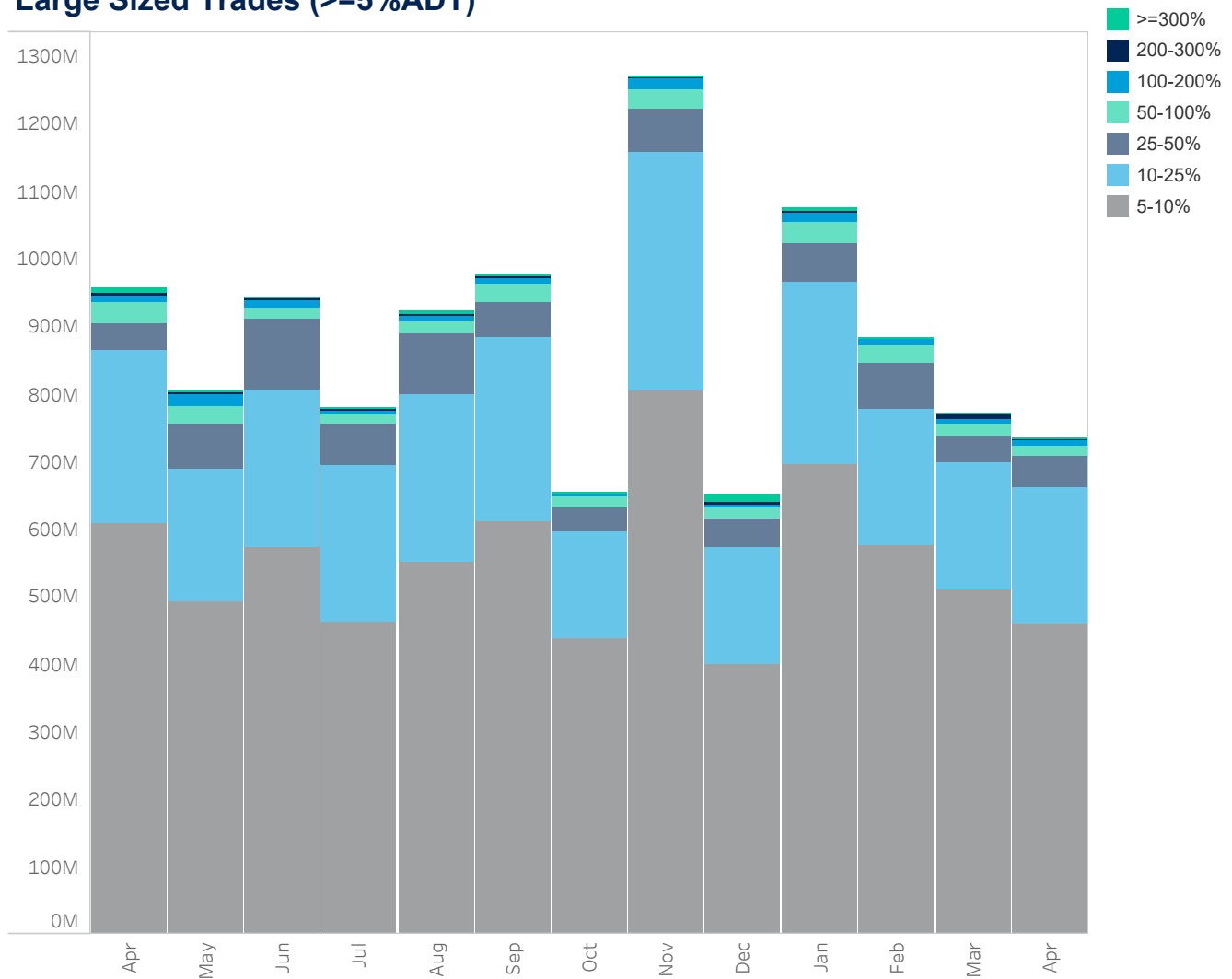
Source data: Virtu Financial

Thailand

Average Daily Turnover (Notional USD)



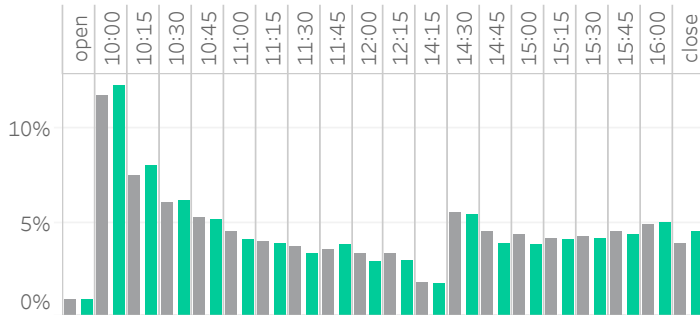
Large Sized Trades (>=5%ADT)



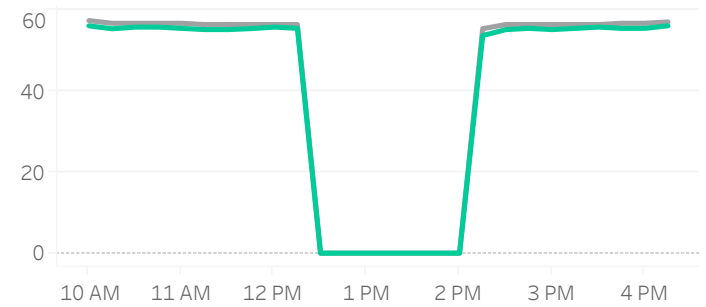
Source data: Virtu Financial

Thailand

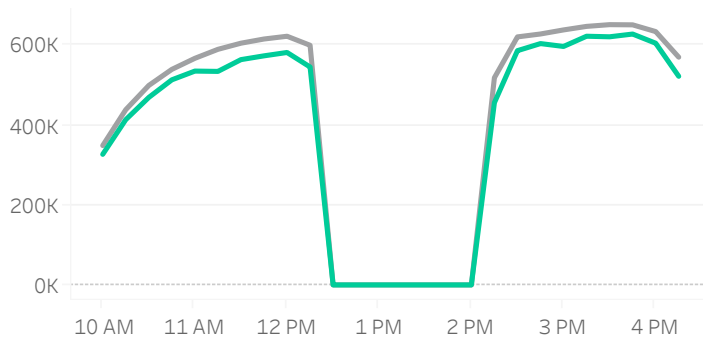
Volume Curve



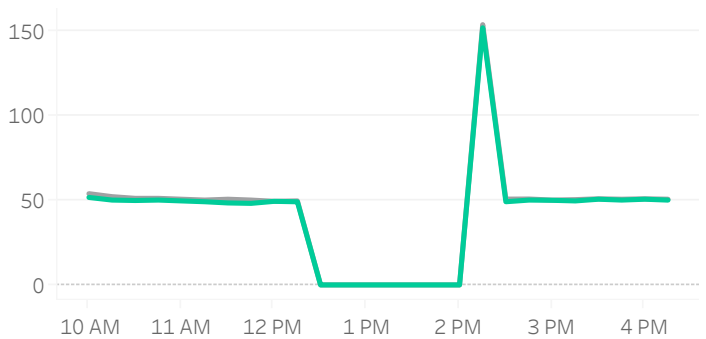
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	56.5	55.2	54.1	54.5	55.2	56.2	55.8	
midday	56.3	54.6	53.4	54.3	54.9	55.6	55.4	
lastHalfHour	56.5	55.1	53.8	54.4	55.2	55.7	55.9	

One Minute Volatility Bps

firstHalfHour	181.9	182.6	120.6	145.0	151.1	54.1	158.6
midday	168.2	158.8	152.8	152.7	158.8	152.0	157.2
lastHalfHour							

Quotesize in Shares

firstHalfHour	416,429	402,253	360,899	385,390	374,157	334,148	350,199
midday	669,728	654,185	562,512	617,268	597,117	540,531	568,254
lastHalfHour	656,823	637,808	551,613	606,051	597,584	539,031	562,618

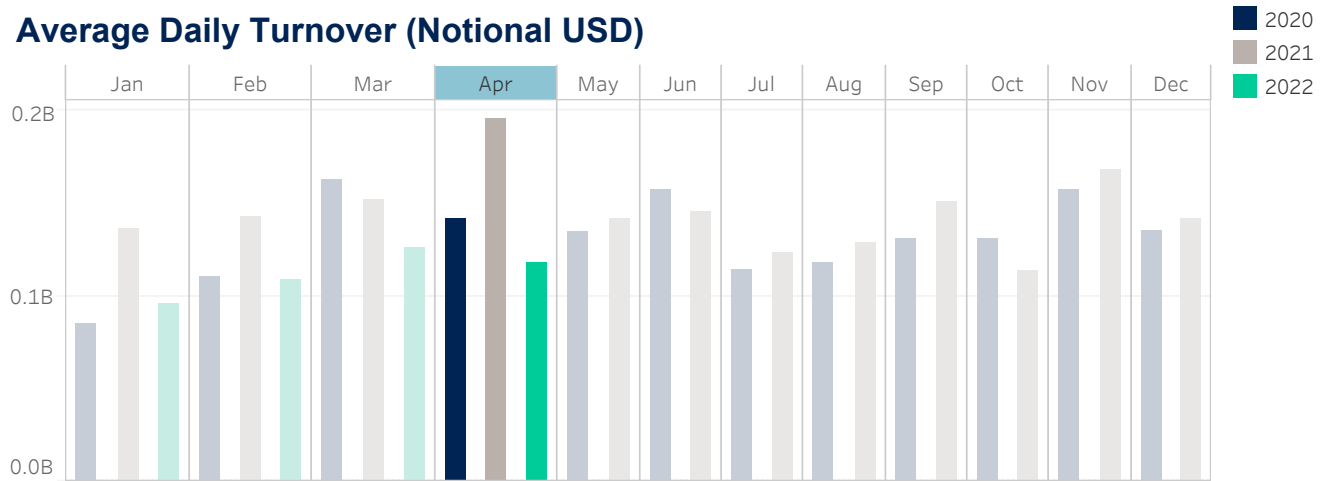
Median used for all metrics

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

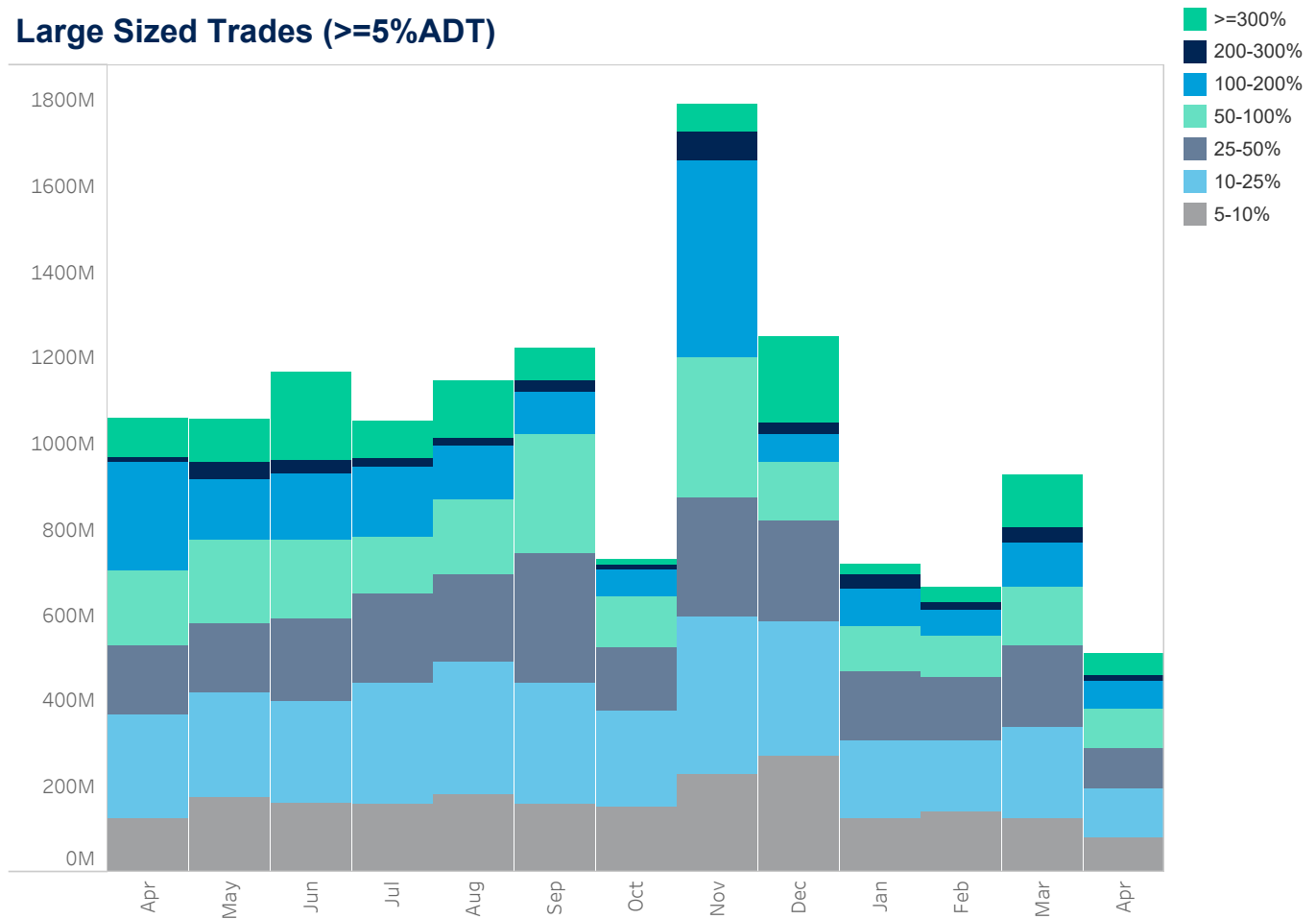
Source data: Virtu Financial

New Zealand

Average Daily Turnover (Notional USD)



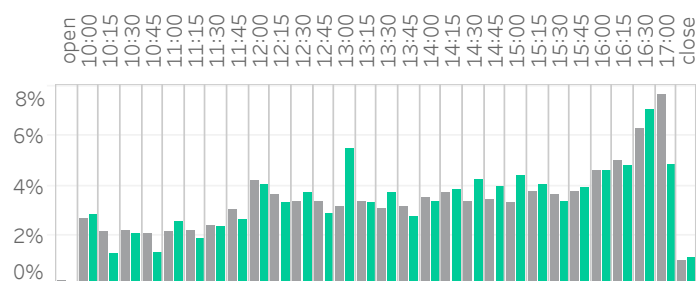
Large Sized Trades (>=5%ADT)



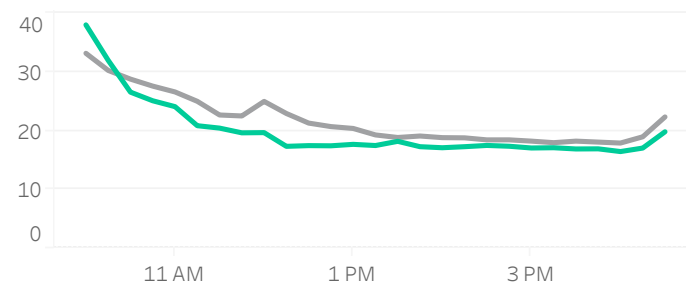
Source data: Virtu Financial

New Zealand

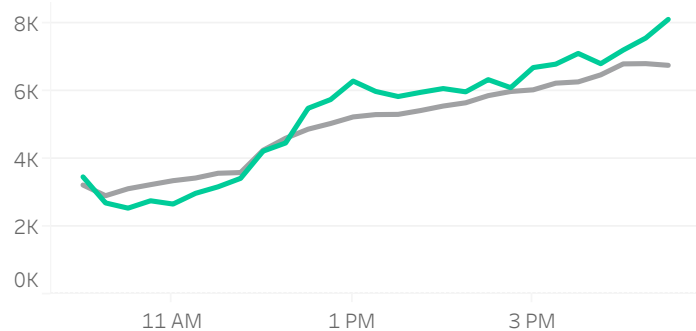
Volume Curve



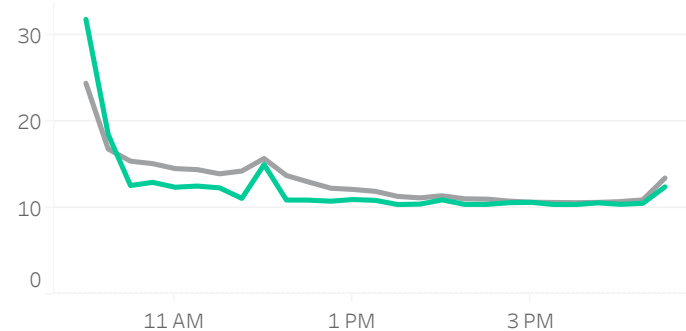
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22
firstHalfHour	29.1	31.3	34.0	33.3	32.2	30.8	34.0
midday	18.2	20.0	21.7	21.6	20.8	19.3	17.7
lastHalfHour	18.3	18.7	20.5	21.3	23.6	19.3	18.0

One Minute Volatility Bps

firstHalfHour	7.5	7.4	9.1	9.6	8.8	7.1	6.3
midday	3.3	4.0	4.2	4.3	4.8	4.3	3.2
lastHalfHour	4.3	3.5	4.1	3.3	4.7	4.8	3.7

Quotesize in Shares

firstHalfHour	3,090	3,356	3,316	2,843	3,412	3,092	3,044
midday	5,679	5,456	5,315	5,011	5,684	5,284	5,456
lastHalfHour	7,910	6,898	7,038	6,831	7,951	8,238	7,811

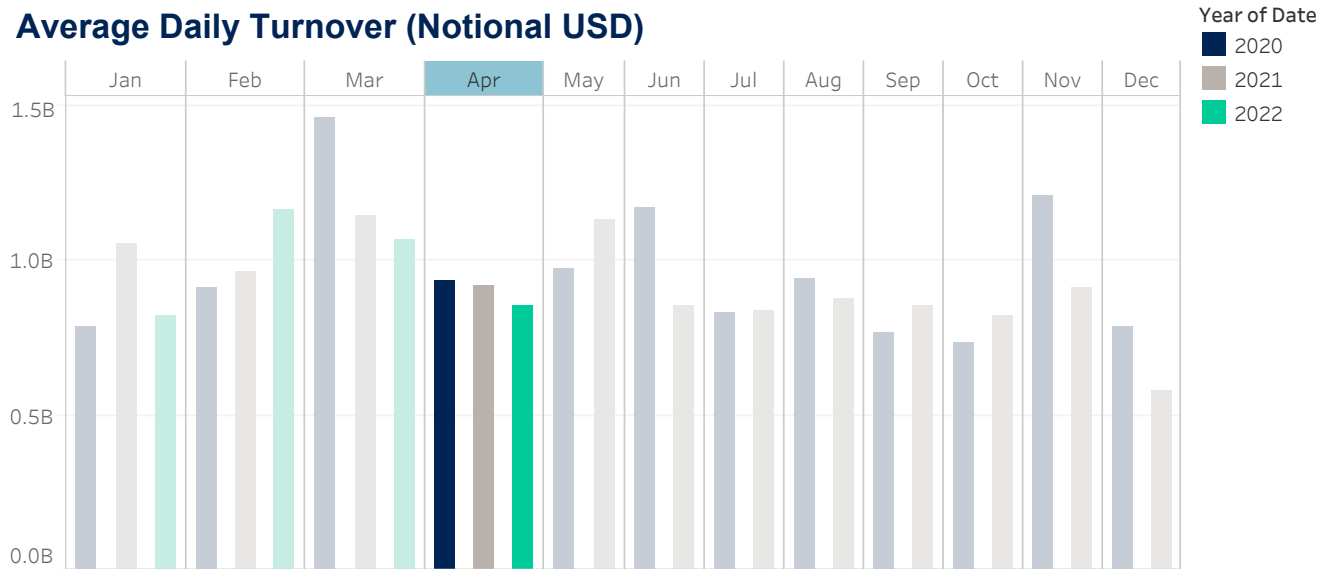
Median used for all metrics

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

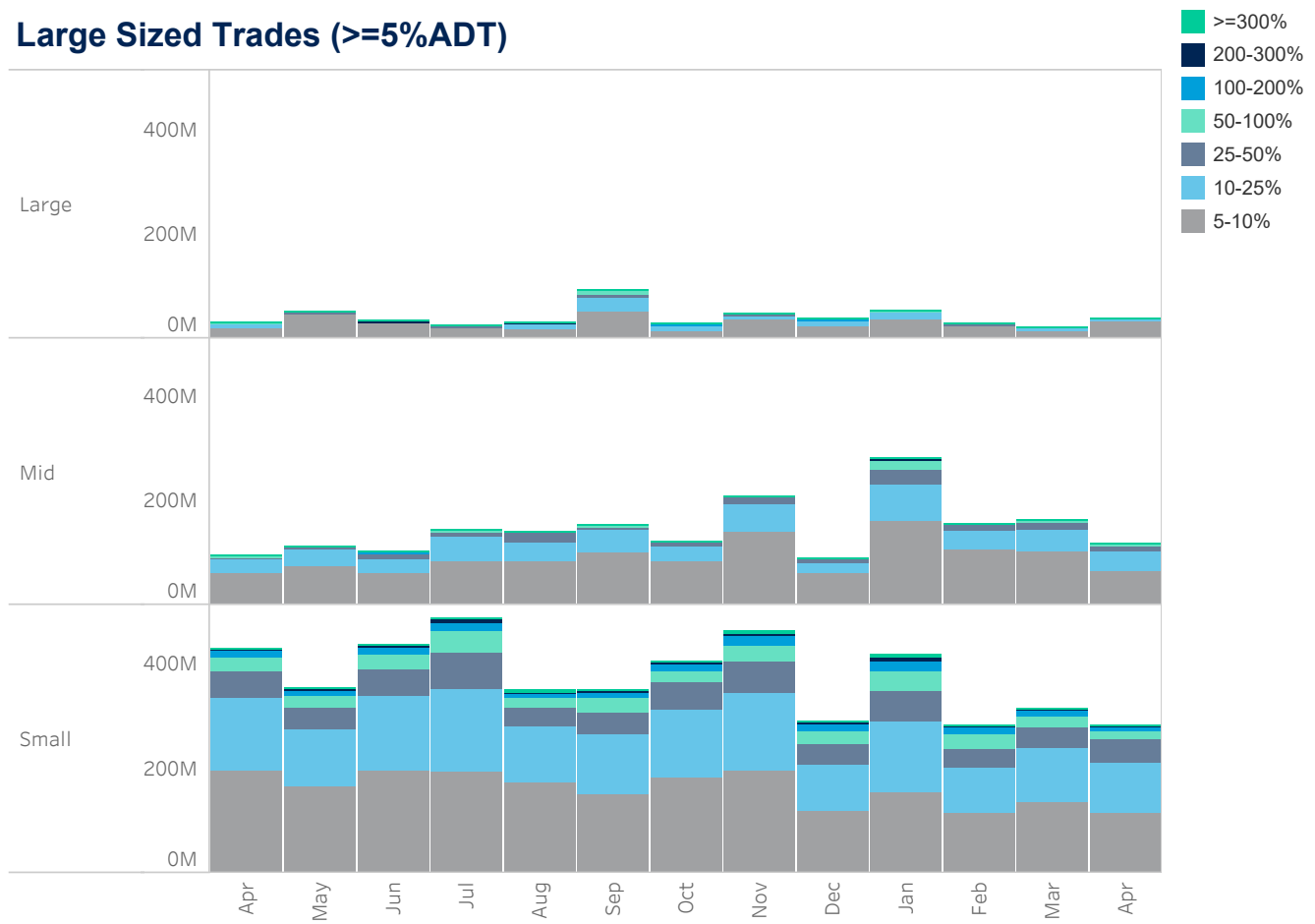
Source data: Virtu Financial

Singapore

Average Daily Turnover (Notional USD)



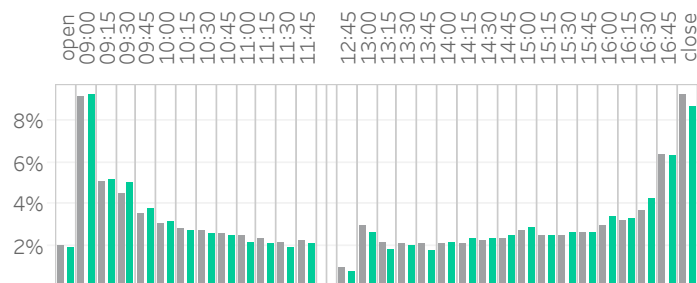
Large Sized Trades (>=5%ADT)



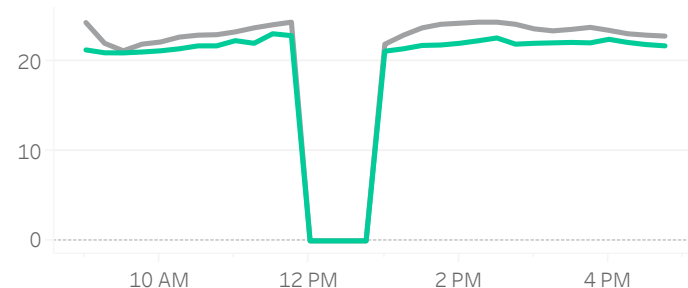
Source data: Virtu Financial

Singapore

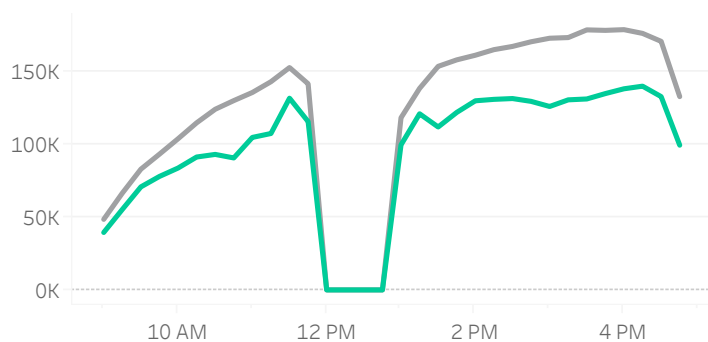
Volume Curve



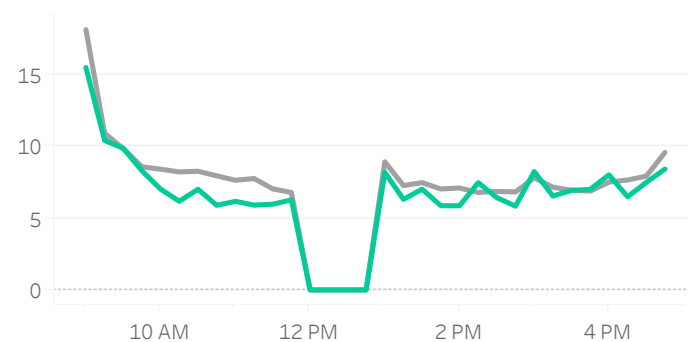
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ April 2022

Spread Bps

	21 Q4			22 Q1			22 Q2	
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	
firstHalfHour	22.7	21.6	23.6	22.5	21.3	21.0	20.5	
midday	22.8	22.2	24.2	23.4	21.6	21.2	21.8	
lastHalfHour	22.0	22.1	22.7	21.9	21.2	20.8	21.1	

One Minute Volatility Bps

firstHalfHour	7.3	6.4	5.3	5.5	7.6	8.7	5.7
midday	3.3	5.5	3.7	4.1	5.3	5.0	4.5
lastHalfHour	4.8	4.0	2.9	4.6	2.7	3.7	4.9

Quotesize in Shares

firstHalfHour	54,873	78,883	58,696	57,597	62,465	51,450	48,491
midday	150,127	165,639	146,991	140,047	127,607	119,649	116,792
lastHalfHour	158,656	183,894	150,357	134,260	152,729	122,584	122,775

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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