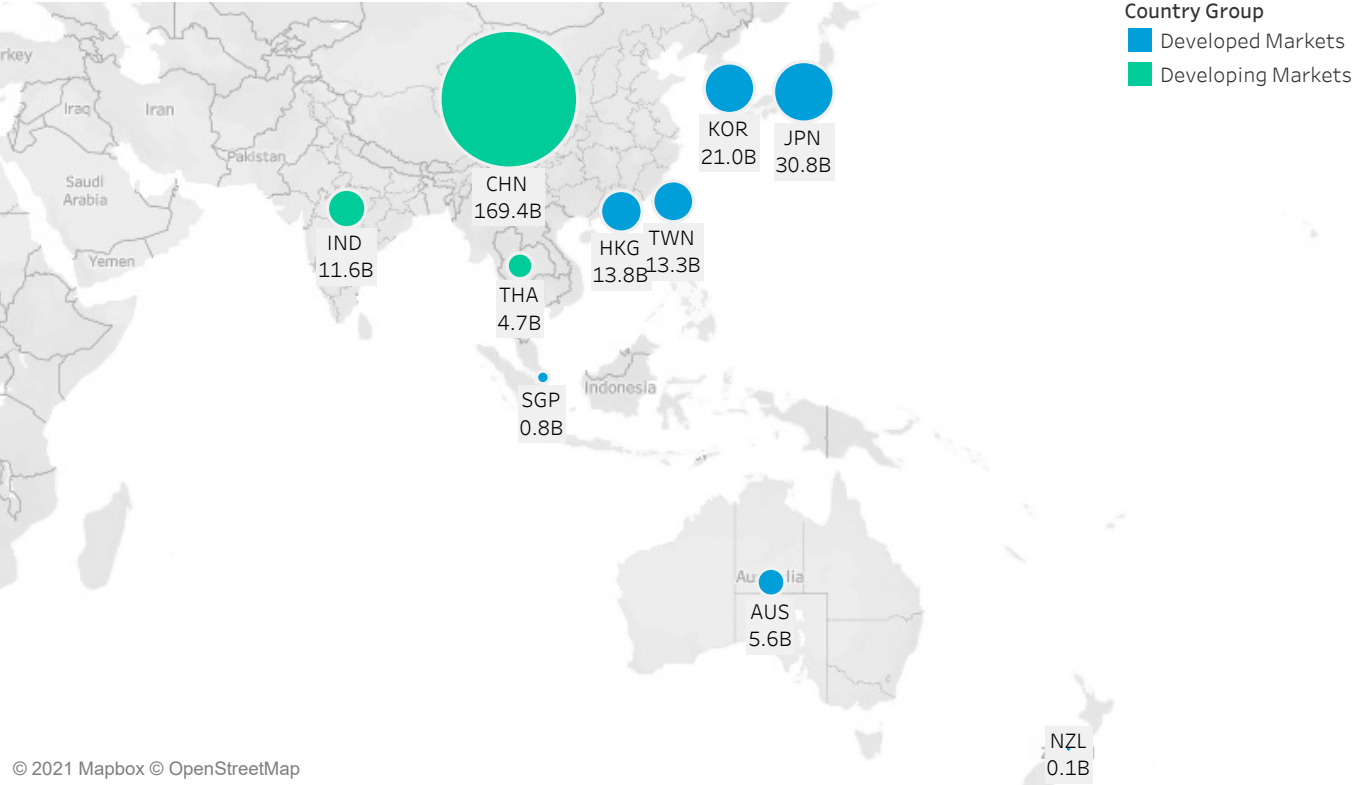


October 2021 APAC Market Structure Monthly

Average Daily Turnover (Notional USD)



© 2021 Mapbox © OpenStreetMap

Country Breakdowns

Hong Kong

China

Japan

Australia

South Korea

Taiwan

India

Thailand

New Zealand

Singapore

October 2021

APAC Market Structure Monthly

MICROSTRUCTURE OBSERVATIONS

- Most countries in our APAC universe saw lower monthly turnover. The largest decreases were in China and Japan, where turnover decreased 24% and 15% respectively MoM. An exception to this was India, where turnover increased by 17% MoM.
- The open auction in Hong Kong, China and South Korea saw higher turnover in October compared to the rolling 12-month average. In Singapore, 12% of daily turnover was completed in the first 30 minute bin, up from the 9% rolling average.
- While volatility and spreads remained consistent across most countries MoM, intraday volatility at 11 AM in Australia's market rose 10% to 14bps, and remained higher than the rolling 12-month average until 1:30PM. Midday One-minute volatility also elevated to Q1 levels.

APAC MARKET STRUCTURE NEWS

China's CSRC Publishes Rules for New Beijing Stock Exchange

On 30 October, the China Securities Regulatory Commission (CSRC) published a set of rules for the new Beijing Stock Exchange that focuses on supporting innovation and the development of small and medium enterprises in China. These rules aim to regulate initial public offering issuance processes, registration, management and information disclosure. The rules take effect on 15 November.

<https://www.reuters.com/article/us-china-stocks-exchange-idUSKBN2HK0E7>

(CHN) http://www.csrc.gov.cn/pub/newsite/zihxwfb/xwdd/202110/t20211030_407823.html

Hong Kong Exchanges and Clearing Limited Launches New Stock Connect Index Futures and Introduces Kill Switch

On 18 October, Hong Kong Exchanges and Clearing Limited (HKEX) launched a new China A-Shares derivatives contract, the MSCI China A 50 Connect Index Futures. This new product is based on a sector-balanced index that selects 50 of the largest market capitalisation names among listed in Shanghai and Shenzhen exchanges and available via Stock Connect, targeting at least two stocks from each of the 11 sectors.

On 22 October, HKEX announced its "Kill Switch" function, a risk management mechanism that allows exchange participants to quickly cancel outstanding orders by broker number through a dedicated OCG-C session in contingencies. Subscription to the service launched 1 November.

https://www.hkex.com.hk/News/News-Release/2021/211018news?sc_lang=en

<https://www.hkex.com.hk/-/media/HKEX-Market/Services/Circulars-and-Notices/Participant-and-Members-Circulars/SEHK/2021/CT13321E.pdf>

Singapore Exchange to Collaborate With Shanghai Stock Exchange Subsidiary to Distribute Market Data to Mainland Investors

The Singapore Exchange (SGX) has entered into an agreement with the Shanghai Stock Exchange's wholly owned subsidiary, China Investment Information Services (CIIS), to distribute its securities market data within Mainland China. According to the announcement, CIIS is expected to commence distributing SGX's securities market data effective on 1 November.

<https://www.sgx.com/media-centre/20211101-sgx-collaborate-shanghai-stock-exchange-subsiary-bring-securities-market>

ASIC Releases Guidance on Crypto-Asset Related Investment Products

On 29 October, the Australian Securities & Investments Commission (ASIC) released guidance for product issuers and market operators on how they can meet their regulatory obligations in relation to crypto-asset exchange traded products and other investment products. Key matters covered by ASIC's best practice guide include, admission and monitoring standards, custody of crypto-assets, pricing methodologies, disclosure and risk management.

<https://asic.gov.au/about-asic/news-centre/find-a-media-release/2021-releases/21-285mr-asic-releases-guidance-on-crypto-asset-related-investment-products/>

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

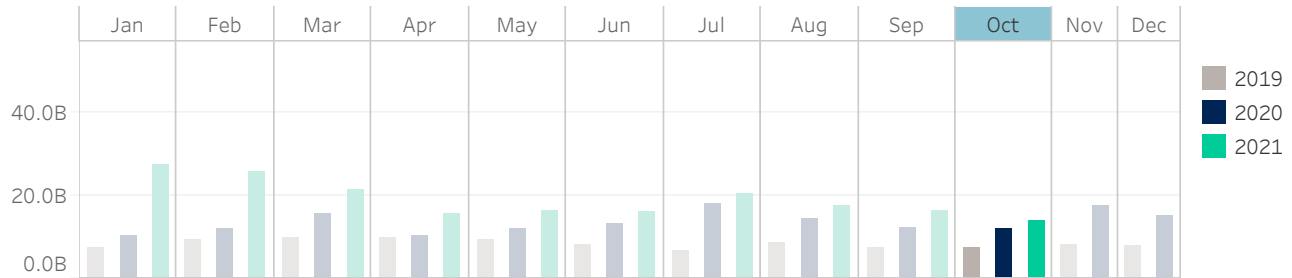
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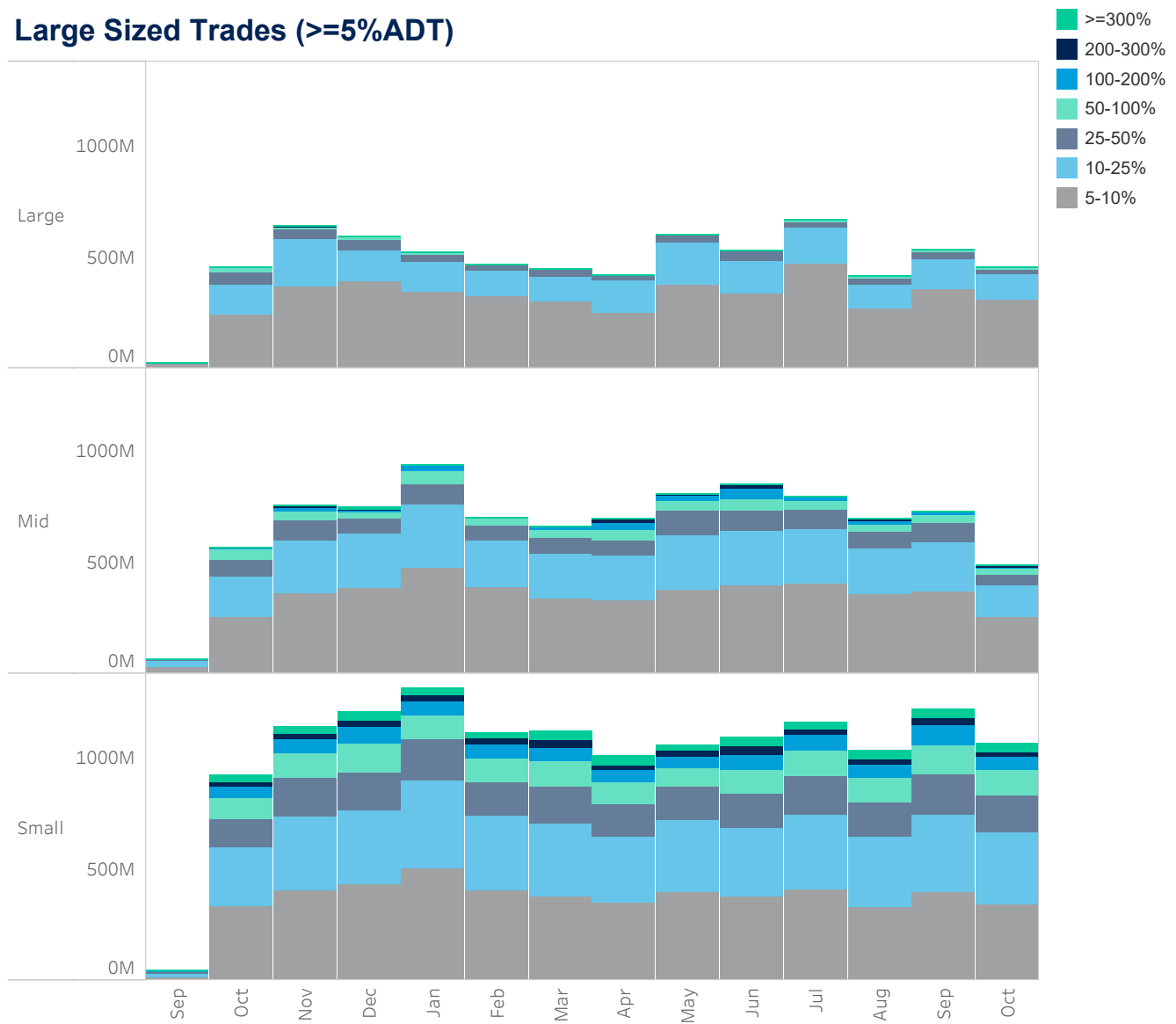
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Hong Kong

Average Daily Turnover (Notional USD)



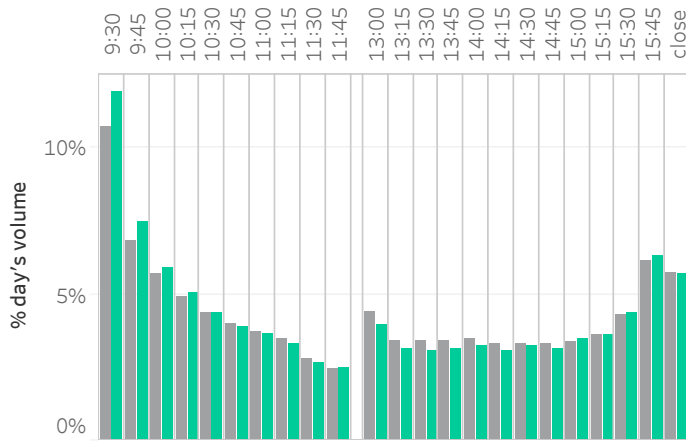
Large Sized Trades (>=5%ADT)



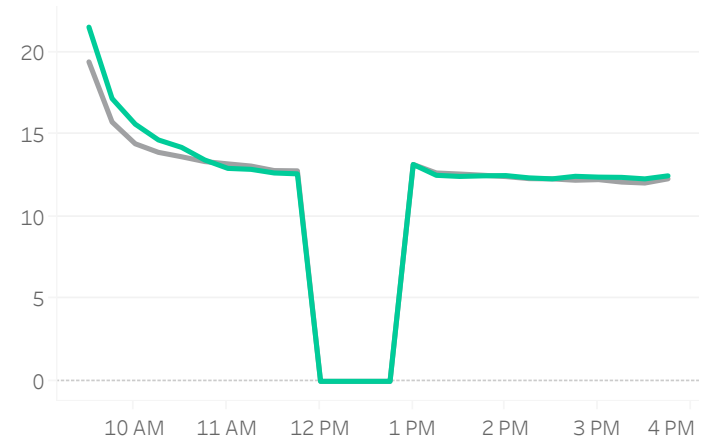
Source data: Virtu Financial

Hong Kong

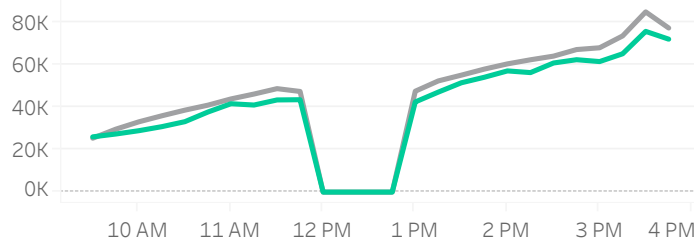
Volume Curve



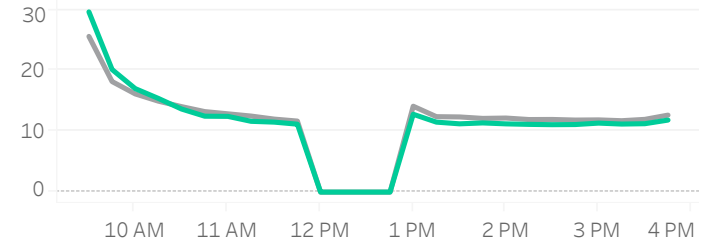
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	16.9	16.6	16.9	15.8	15.4	15.6	16.9	18.4	18.1	18.5
midday	13.4	13.0	12.5	12.4	11.7	11.9	13.1	13.7	12.9	12.7
lastHalfHour	12.5	12.1	11.7	11.7	11.3	11.5	12.3	12.6	12.3	12.3

One Minute Volatility Bps

firstHalfHour	17.6	16.8	18.5	12.2	11.8	11.6	15.8	16.7	17.5	18.2
midday	8.1	8.8	8.7	6.0	6.0	5.8	7.8	7.0	7.5	6.7
lastHalfHour	6.9	6.9	7.3	6.5	6.6	6.1	8.1	6.7	6.5	6.5

Quotesize in Shares

firstHalfHour	29,369	28,259	24,138	24,880	28,539	27,890	26,823	27,946	28,697	26,921
midday	52,420	49,671	39,835	49,281	59,450	57,843	49,961	47,200	49,020	47,554
lastHalfHour	80,787	82,321	70,652	79,757	92,195	85,221	76,912	80,882	77,790	75,001

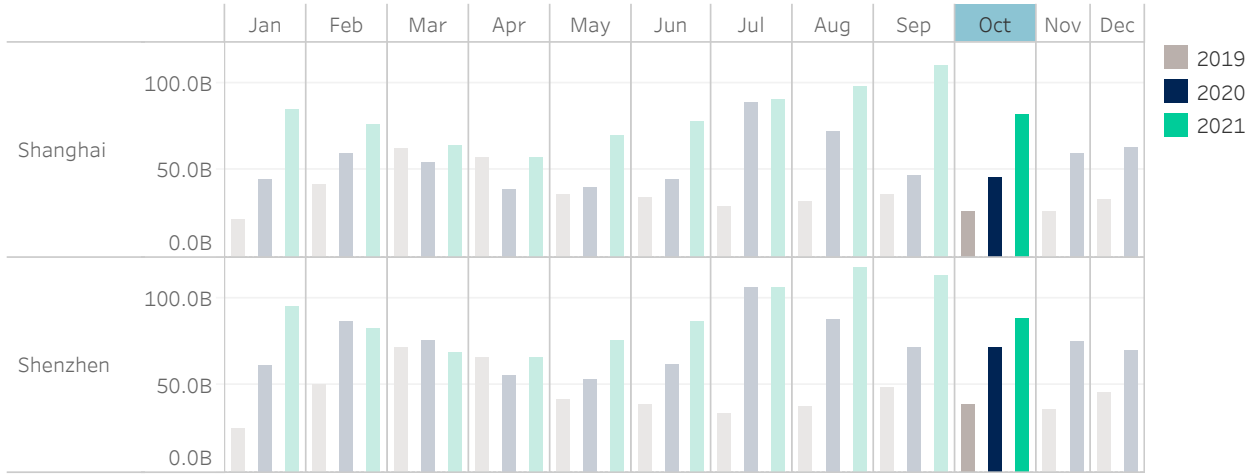
Median used for all metrics

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

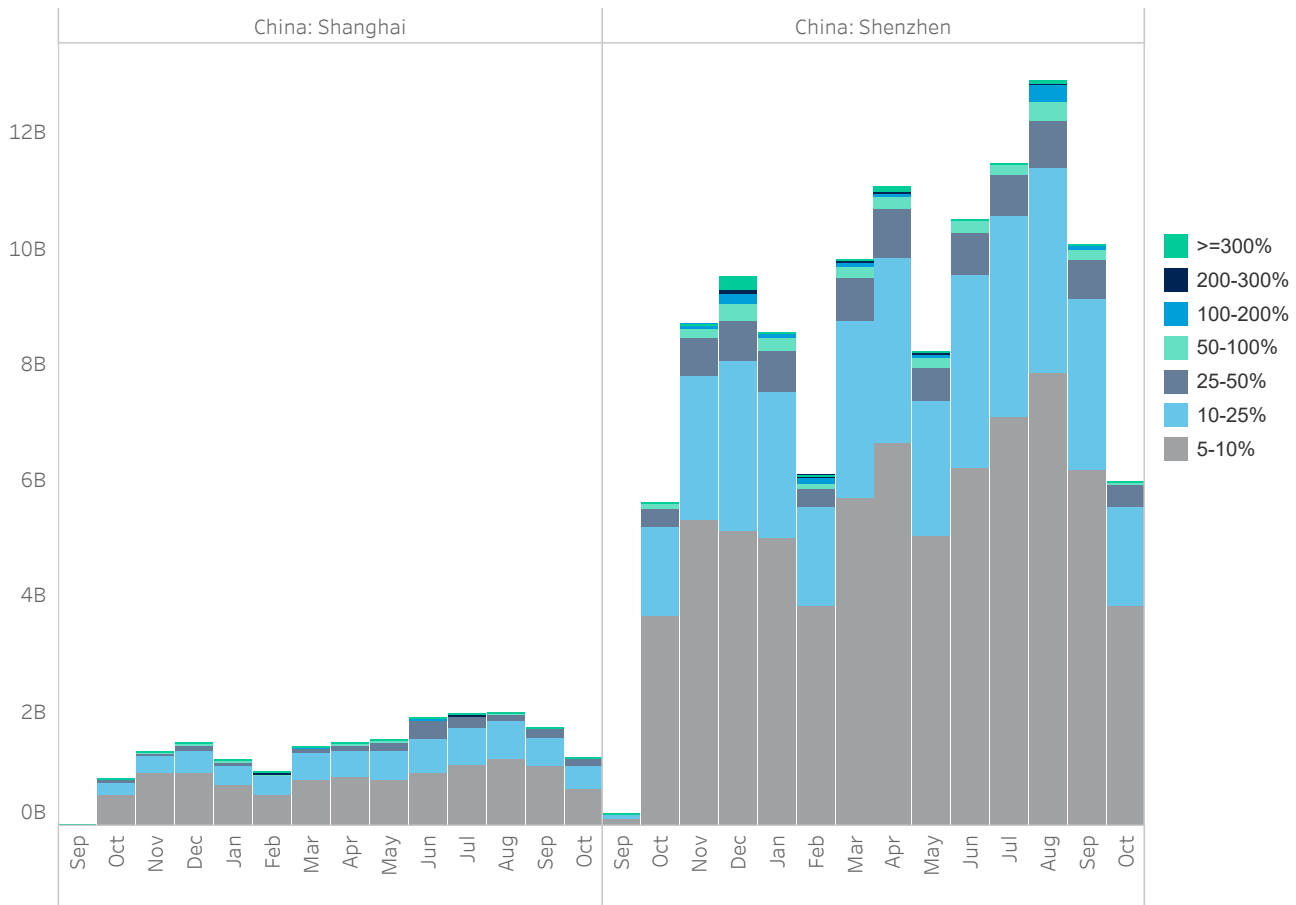
Source data: Virtu Financial

China

Average Daily Turnover (Notional USD)



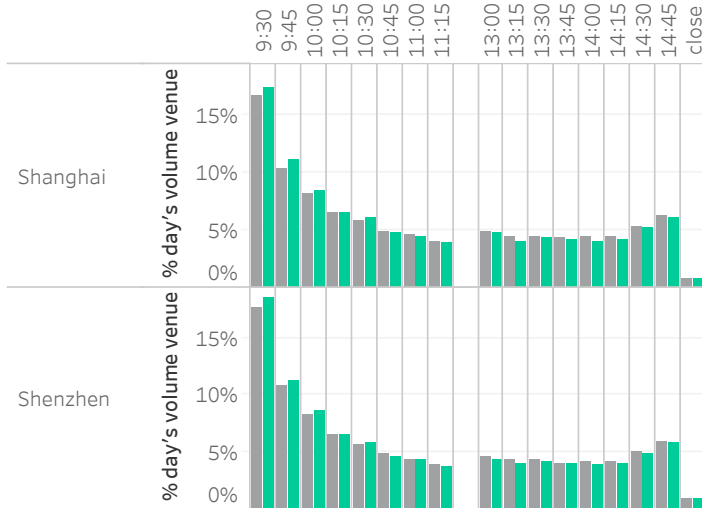
Large Sized Trades (>=5%ADT)



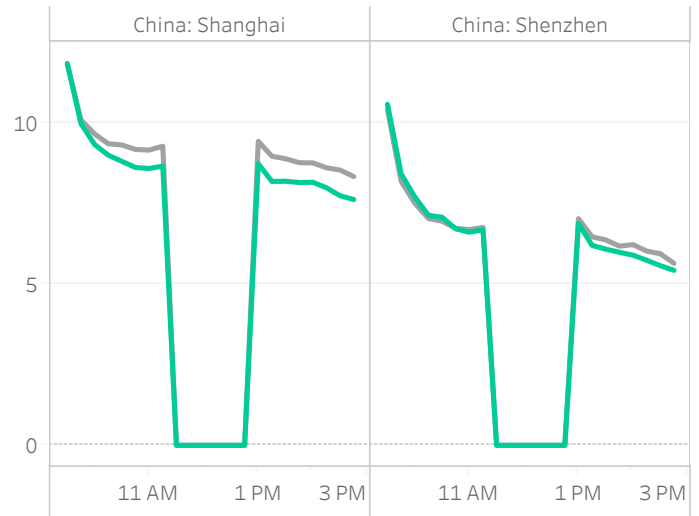
Source data: Virtu Financial

China

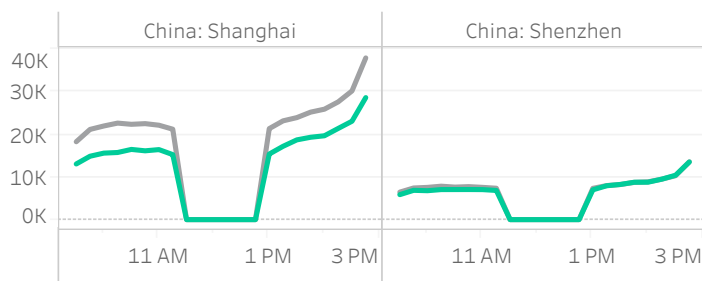
Volume Curve



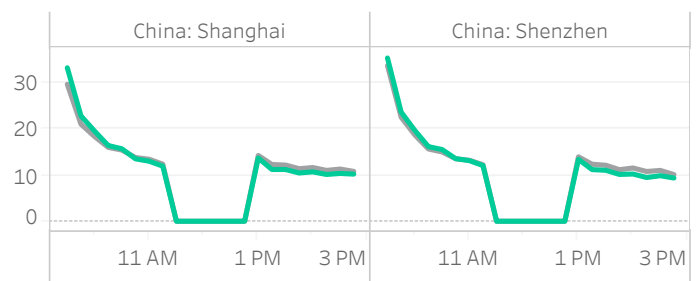
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	China: Shanghai										China: Shenzhen									
	21 Q1			21 Q2			21 Q3			21 ..	21 Q1			21 Q2			21 Q3			21 ..
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
firstHalfHour	10.6	10.8	10.2	10.1	10.3	9.9	10.5	10.8	10.7	10.3	9.3	9.3	8.8	8.1	8.4	8.3	8.8	9.3	9.3	9.0
midday	9.2	9.5	9.1	9.0	9.1	8.5	8.6	8.7	8.5	8.5	7.0	7.1	6.7	6.4	6.5	6.1	6.4	6.6	6.5	6.5
lastHalfHour	8.6	8.9	8.5	8.5	8.6	8.0	7.8	7.7	7.4	7.6	6.1	6.2	5.9	5.6	5.6	5.3	5.4	5.5	5.4	5.4

One Minute Volatility Bps

firstHalfHour	23.2	23.2	20.9	17.1	17.8	18.4	21.6	23.3	31.4	31.0	26.7	21.3	21.4	21.6	25.1	26.6
midday	11.6	11.4	9.5	7.0	7.8	8.0	9.2	10.0	15.0	14.7	12.2	9.1	9.5	9.5	11.1	11.7
lastHalfHour	9.7	9.6	7.9	6.3	6.3	6.5	7.7	7.5	12.0	12.2	9.5	7.5	7.5	7.5	8.2	8.2

Quotesize in Shares

firstHalfHour	19K	18K	18K	20K	22K	19K	17K	17K	17K	14K	7K	7K	6K	7K	8K	7K	7K	7K	7K	6K
midday	21K	20K	21K	25K	27K	23K	21K	21K	18K	17K	8K	7K	7K	8K	9K	8K	8K	8K	8K	8K
lastHalfHour	31K	29K	31K	37K	40K	34K	31K	33K	29K	26K	11K	10K	10K	13K	13K	12K	12K	13K	13K	12K

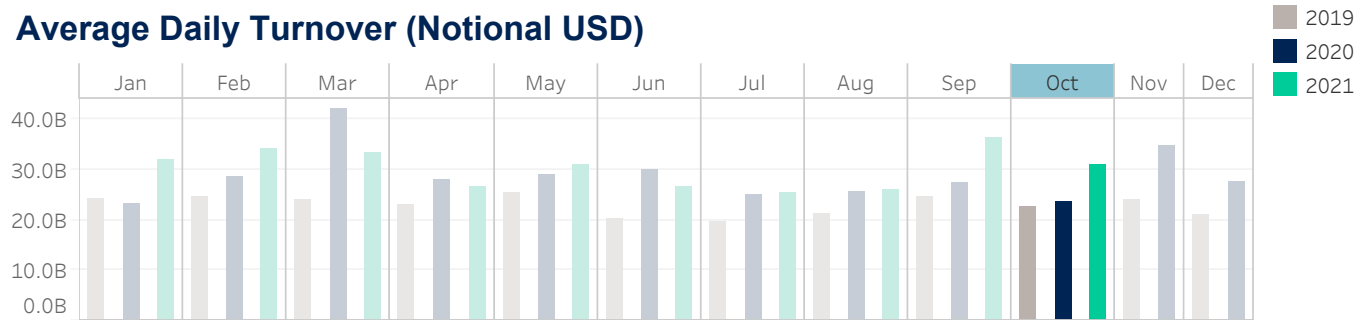
Median used for all metrics

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

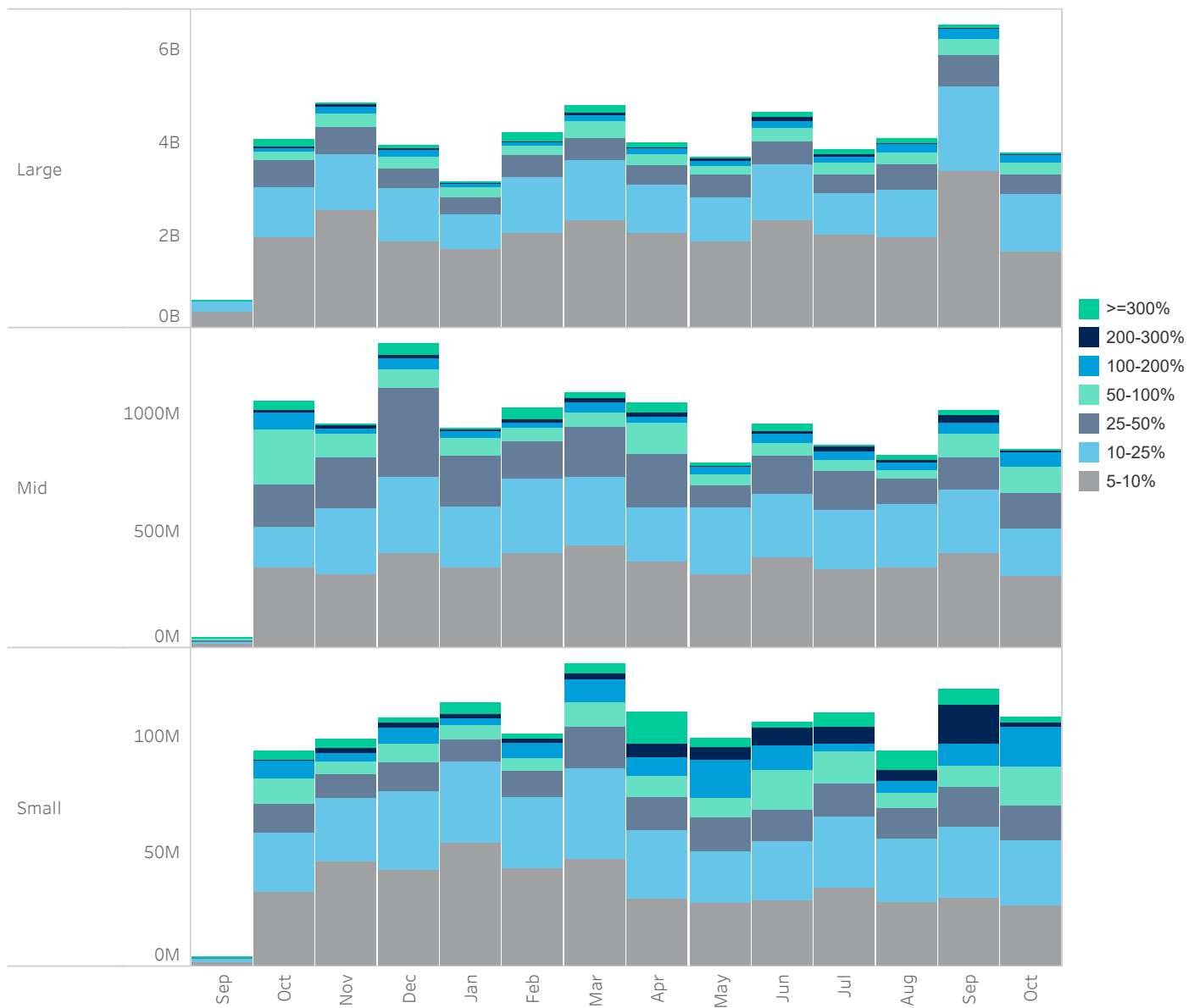
Source data: Virtu Financial

Japan

Average Daily Turnover (Notional USD)



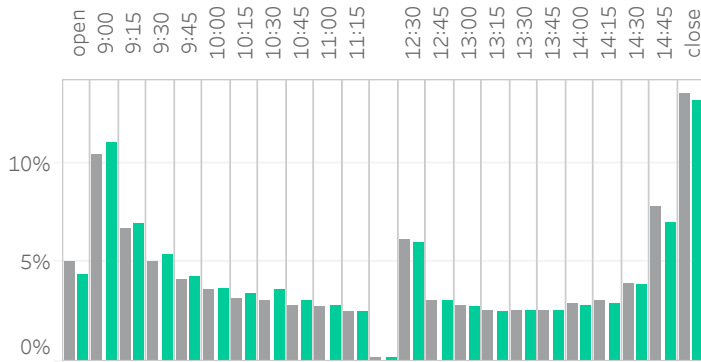
Large Sized Trades (>=5%ADT)



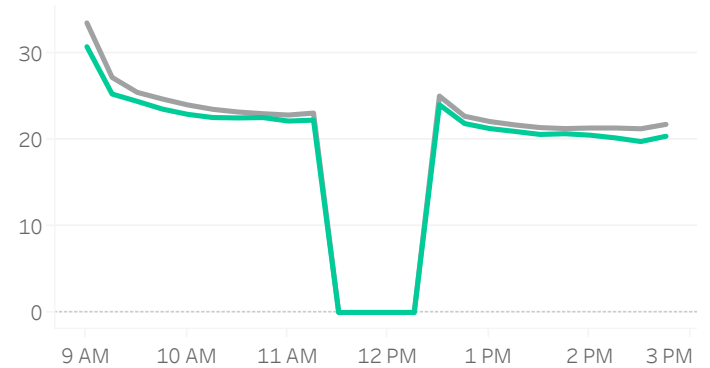
Source data: Virtu Financial

Japan

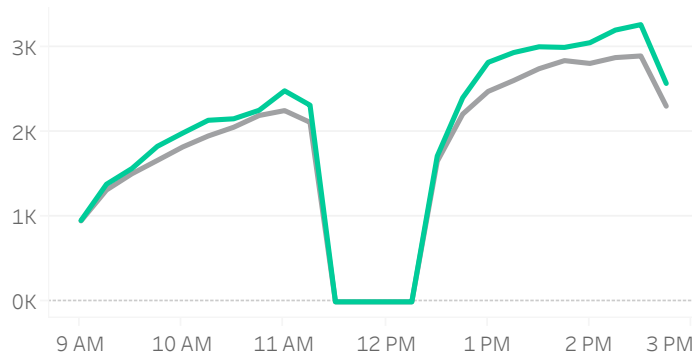
Volume Curve



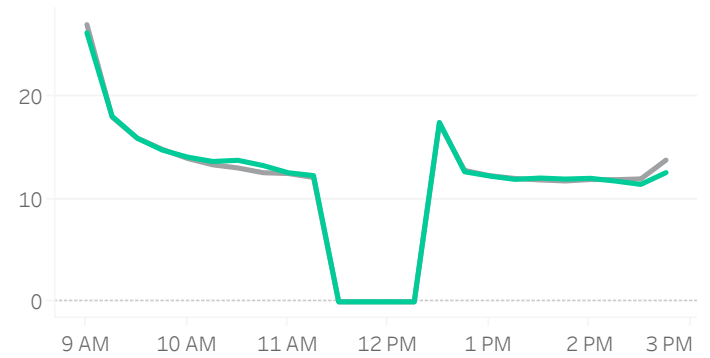
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4	
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	
firstHalfHour	29.3	33.1	32.7	29.4	28.2	26.6	25.6	27.3	25.8	26.7	
midday	22.9	24.6	24.8	22.9	21.7	21.0	20.7	21.4	21.1	21.9	
lastHalfHour	21.7	22.6	22.5	21.1	20.5	19.8	19.6	19.9	19.8	19.7	

One Minute Volatility Bps

firstHalfHour	15.1	15.7	15.9	14.7	15.9	13.0	12.1	12.6	12.4	14.5
midday	6.8	6.5	6.9	6.3	6.8	5.9	6.2	5.9	6.0	7.1
lastHalfHour	7.3	6.7	6.6	6.5	7.0	6.5	11.5	7.9	7.9	6.8

Quotesize in Shares

firstHalfHour	1,202	1,248	1,170	1,198	1,120	1,295	1,334	1,280	1,380	1,263
midday	2,260	2,167	1,921	2,163	2,147	2,573	2,700	2,525	2,630	2,521
lastHalfHour	2,814	2,559	2,177	2,622	2,582	3,165	3,218	3,328	3,397	3,161

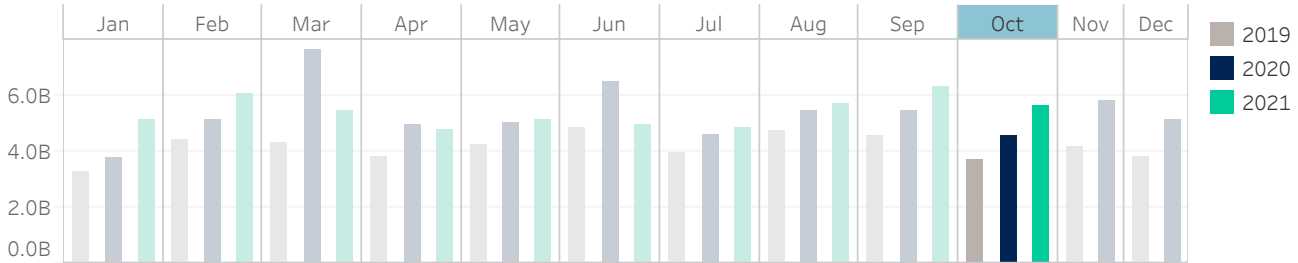
Median used for all metrics

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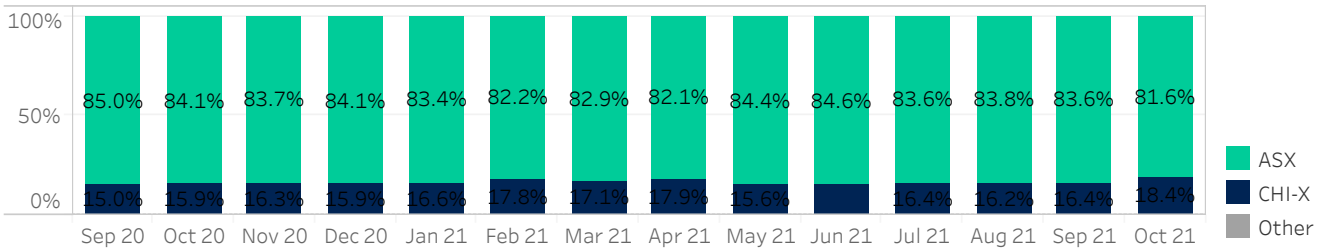
Source data: Virtu Financial

Australia

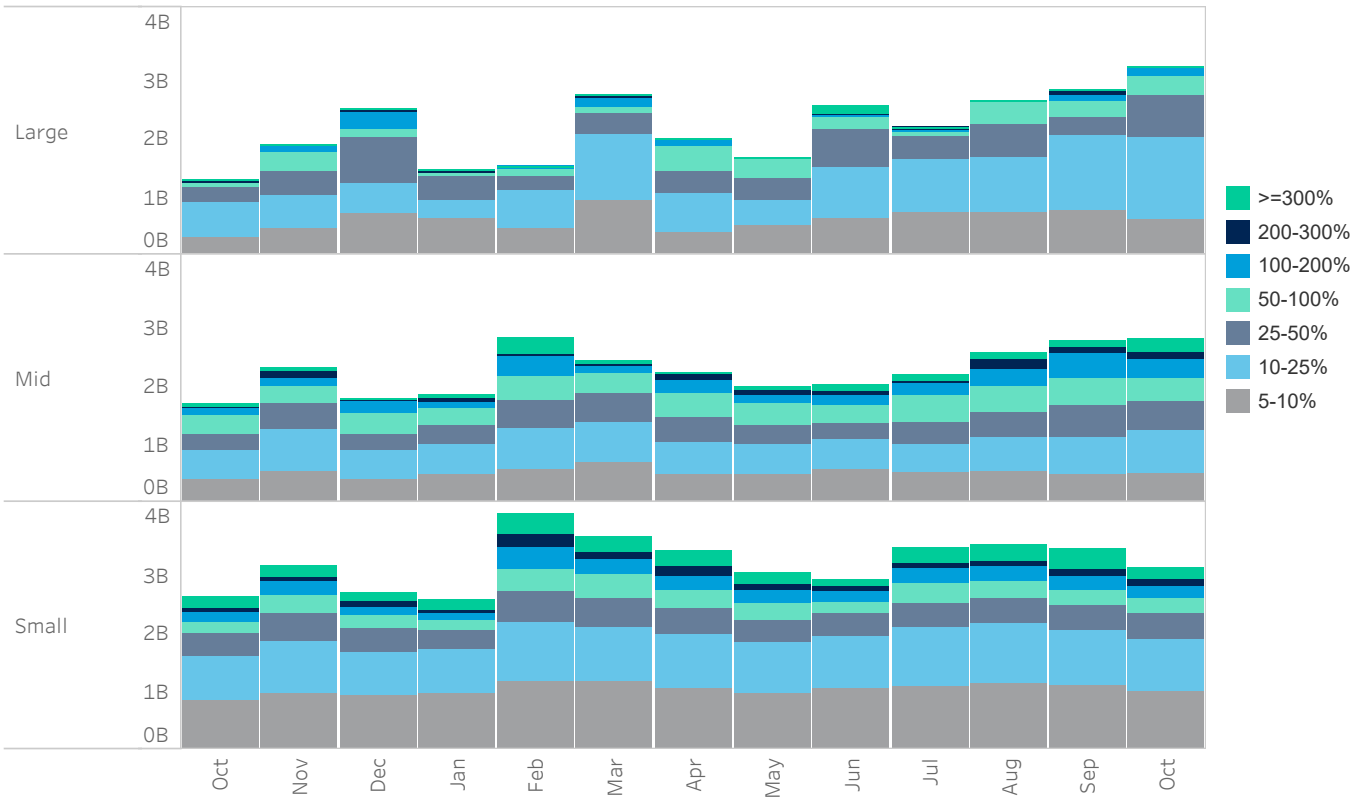
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



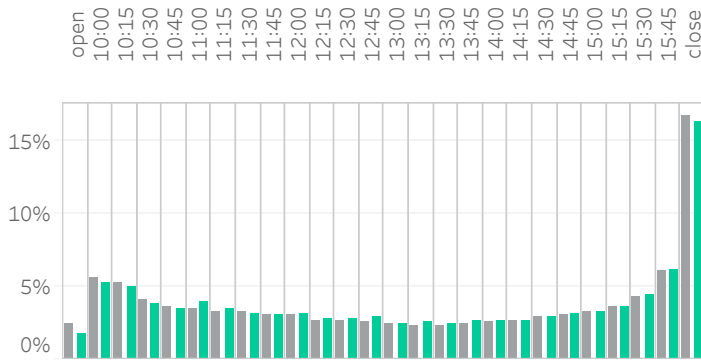
Large Sized Trades (>=5%ADT)



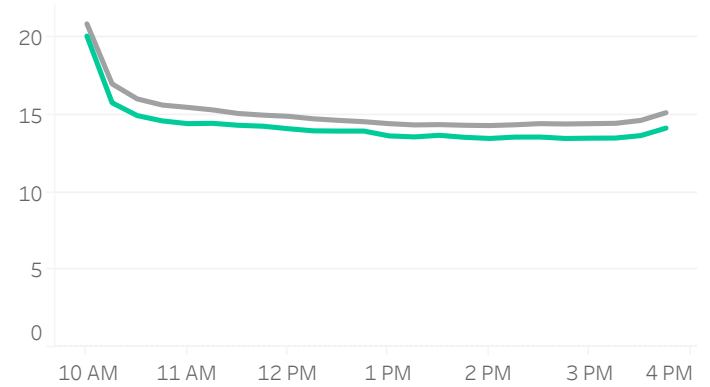
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Australia

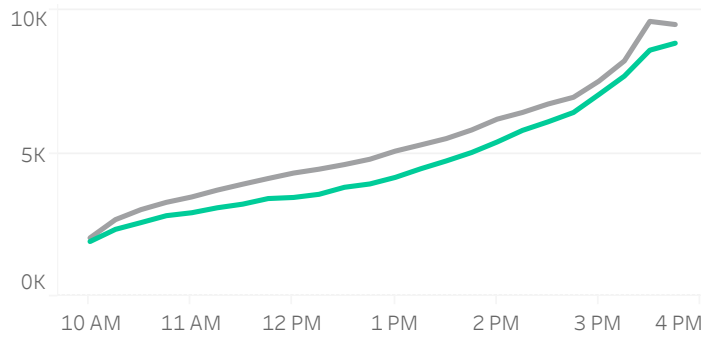
Volume Curve



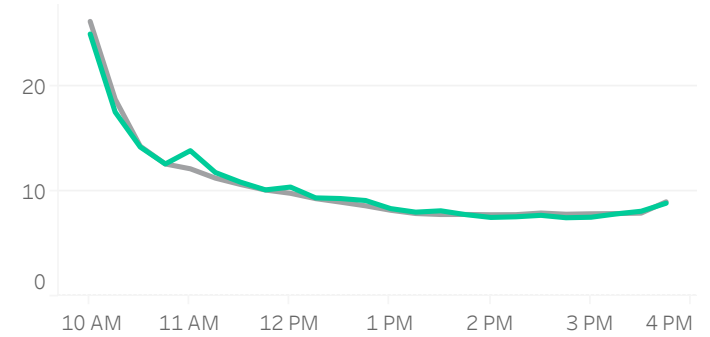
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4	
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	
firstHalfHour	19.8	20.2	20.0	18.3	18.9	17.5	17.1	16.5	16.9	16.9	
midday	15.0	15.5	15.6	14.7	14.9	14.1	13.8	13.7	14.1	13.9	
lastHalfHour	15.0	15.5	15.6	14.9	14.9	14.3	13.9	13.8	14.2	13.8	

One Minute Volatility Bps

firstHalfHour	14.4	16.6	16.8	16.0	17.5	17.4	15.5	15.5	17.0	15.8
midday	4.1	4.6	4.8	3.7	3.9	3.8	3.6	3.6	4.0	4.4
lastHalfHour	3.7	3.4	3.7	3.4	3.6	3.2	3.3	2.6	3.6	4.0

Quotesize in Shares

firstHalfHour	2,583	2,326	2,194	2,218	2,190	2,320	2,426	2,388	2,351	2,165
midday	5,358	4,931	4,686	4,526	4,489	4,747	4,584	4,807	4,549	4,211
lastHalfHour	11,014	9,734	9,100	8,141	8,231	9,230	8,943	9,020	8,495	8,962

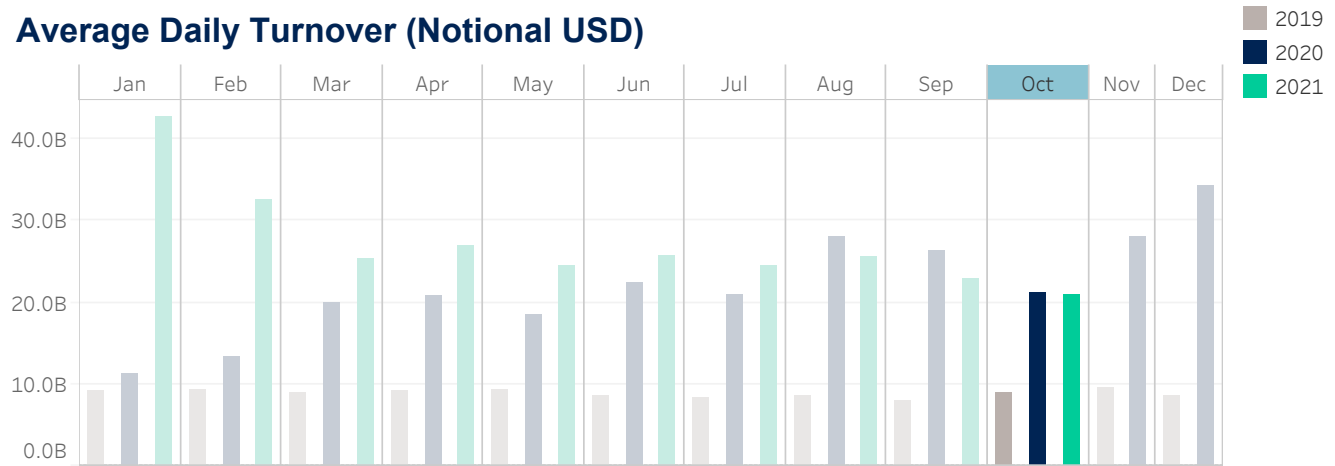
Median used for all metrics

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

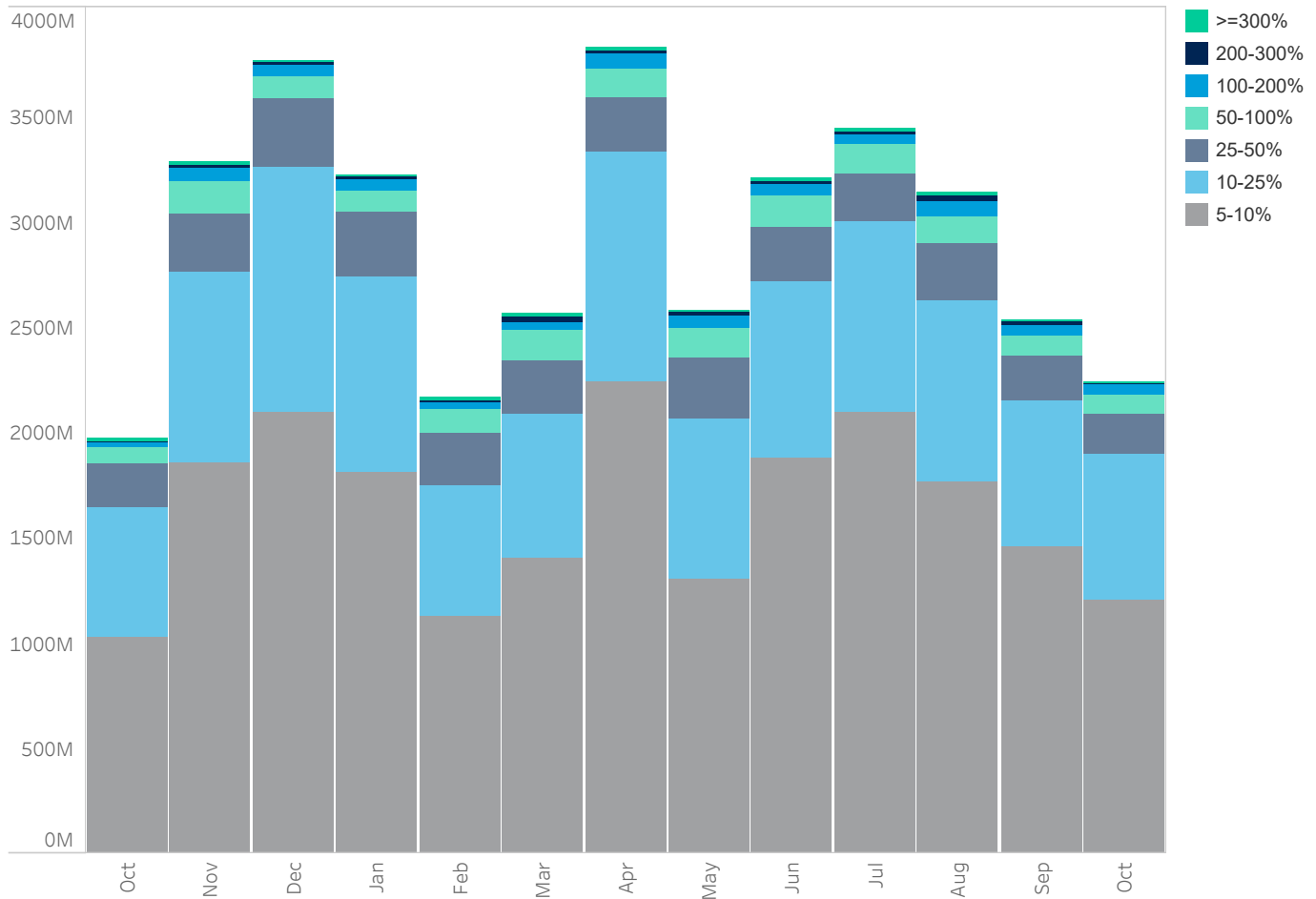
Source data: Virtu Financial

South Korea

Average Daily Turnover (Notional USD)



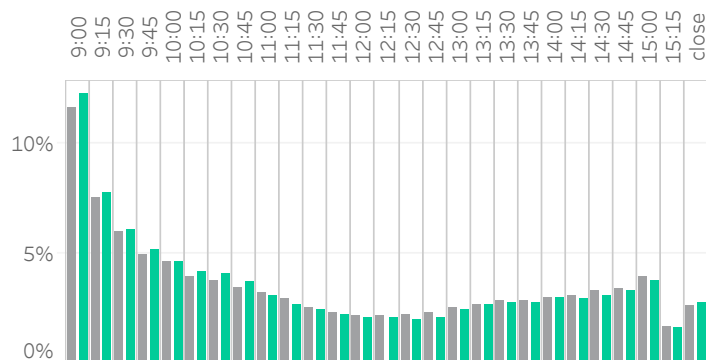
Large Sized Trades (>=5%ADT)



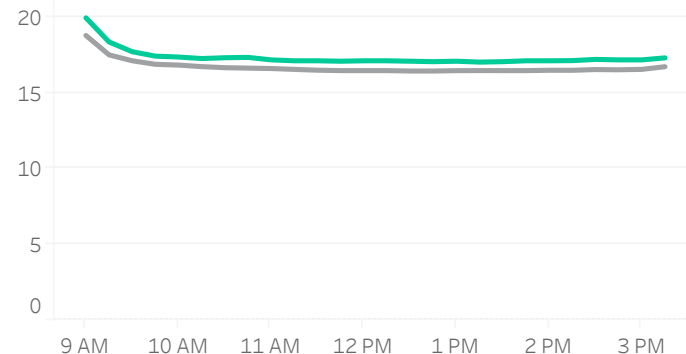
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South Korea

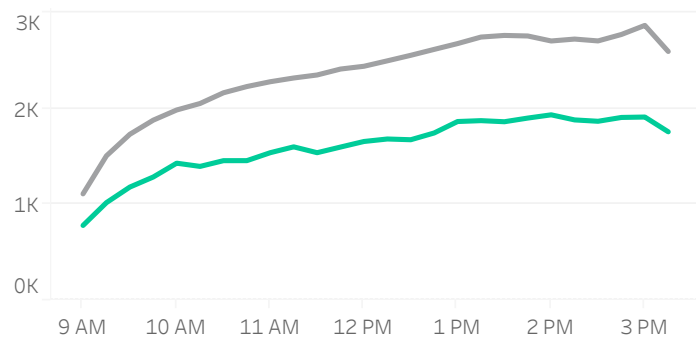
Volume Curve



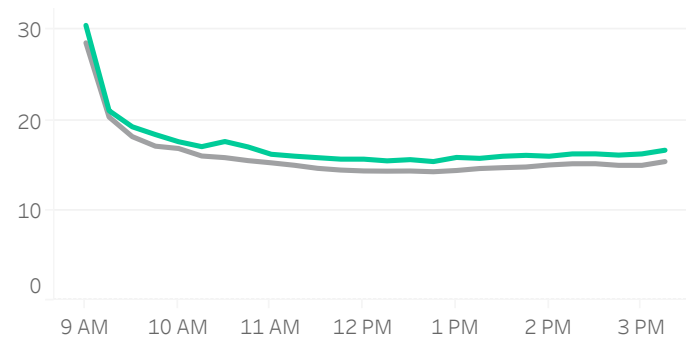
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	18.0	17.4	17.1	17.1	18.3	18.3	18.3	18.5	18.7	18.9
midday	15.9	15.6	15.8	16.2	17.2	17.6	17.7	17.3	17.6	17.2
lastHalfHour	15.8	15.6	15.8	16.3	17.2	17.6	17.8	17.3	17.6	17.2

One Minute Volatility Bps

firstHalfHour	20.9	18.0	15.1	12.7	15.6	13.2	13.0	15.8	15.1	16.5
midday	11.4	11.1	11.0	10.5	10.9	10.5	10.5	11.1	10.1	10.7
lastHalfHour	11.3	11.2	14.2	19.7	16.7	26.5	22.9	15.0	19.0	12.7

Quotesize in Shares

firstHalfHour	1,352	1,140	1,138	1,384	1,302	1,675	1,526	1,053	1,012	890
midday	2,400	1,995	1,986	2,504	2,462	3,161	2,812	2,004	2,023	1,653
lastHalfHour	2,905	2,454	2,358	2,702	2,864	3,744	3,230	2,336	2,362	1,871

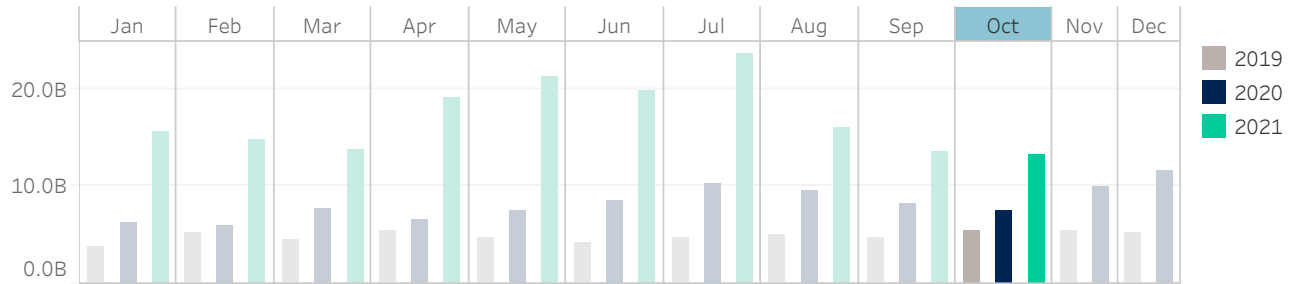
Median used for all metrics

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

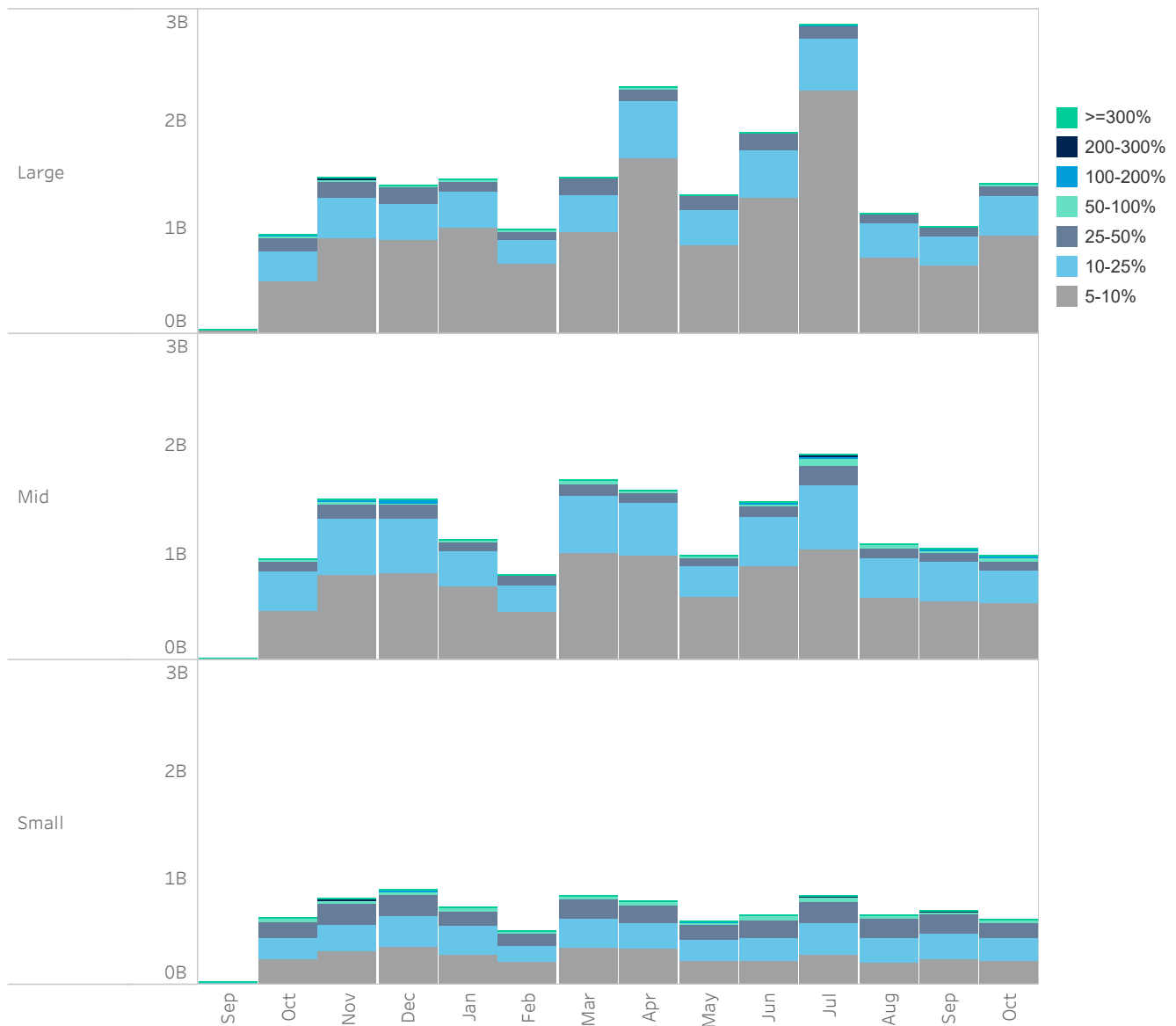
Source data: Virtu Financial

Taiwan

Average Daily Turnover (Notional USD)



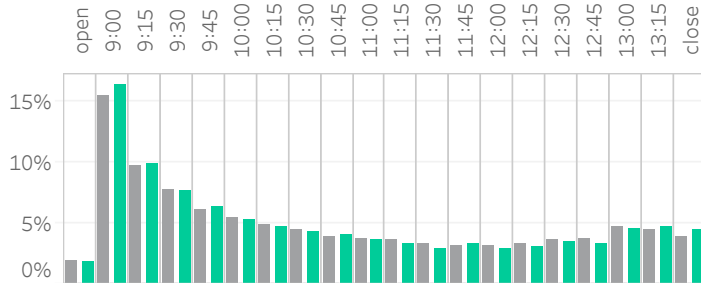
Large Sized Trades (>=5%ADT)



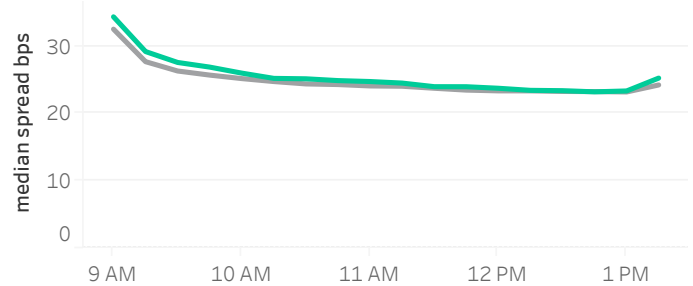
Source data: Virtu Financial

Taiwan

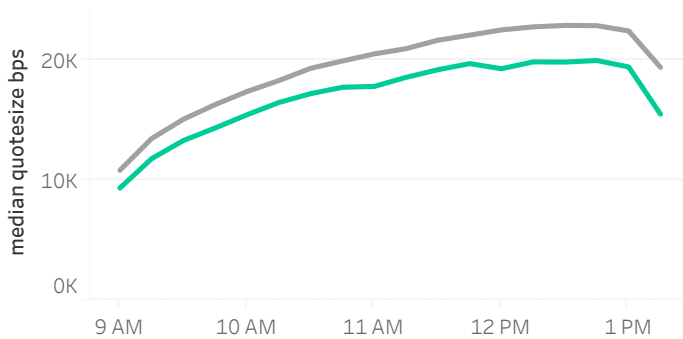
Volume Curve



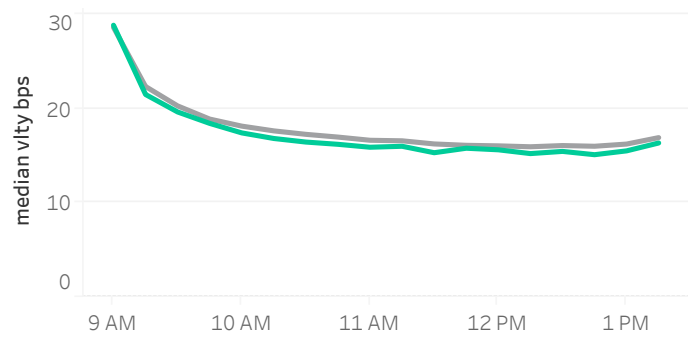
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	28.5	28.3	26.1	27.4	35.2	28.7	29.0	30.1	29.1	30.4
midday	24.0	23.3	22.2	22.9	27.8	23.4	23.6	24.1	23.2	24.2
lastHalfHour	24.1	23.1	22.0	22.3	27.0	23.2	22.7	23.8	23.4	23.8

One Minute Volatility Bps

firstHalfHour	15.5	15.7	12.5	16.2	27.1	15.6	17.1	17.1	14.7	15.5
midday	7.2	6.8	6.6	8.2	11.2	7.6	7.5	7.6	6.8	7.2
lastHalfHour	7.7	8.4	8.4	9.0	10.4	6.7	7.9	7.8	7.9	8.1

Quotesize in Shares

firstHalfHour	12,798	12,216	14,419	14,883	9,069	12,568	12,027	10,553	11,061	10,944
midday	20,042	21,454	25,453	24,145	13,090	21,194	18,860	17,088	19,152	18,385
lastHalfHour	20,321	22,767	26,000	24,740	13,874	21,503	20,270	17,592	18,484	18,001

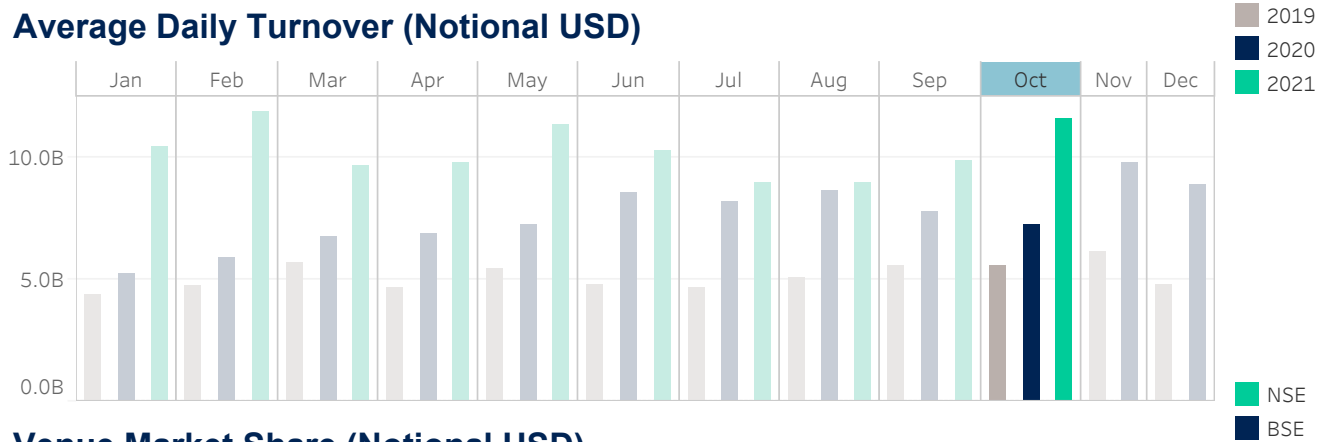
Median used for all metrics

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

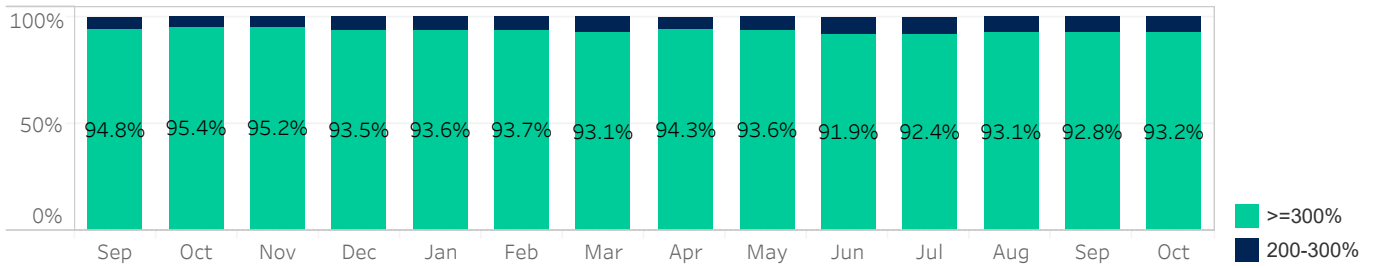
Source data: Virtu Financial

India

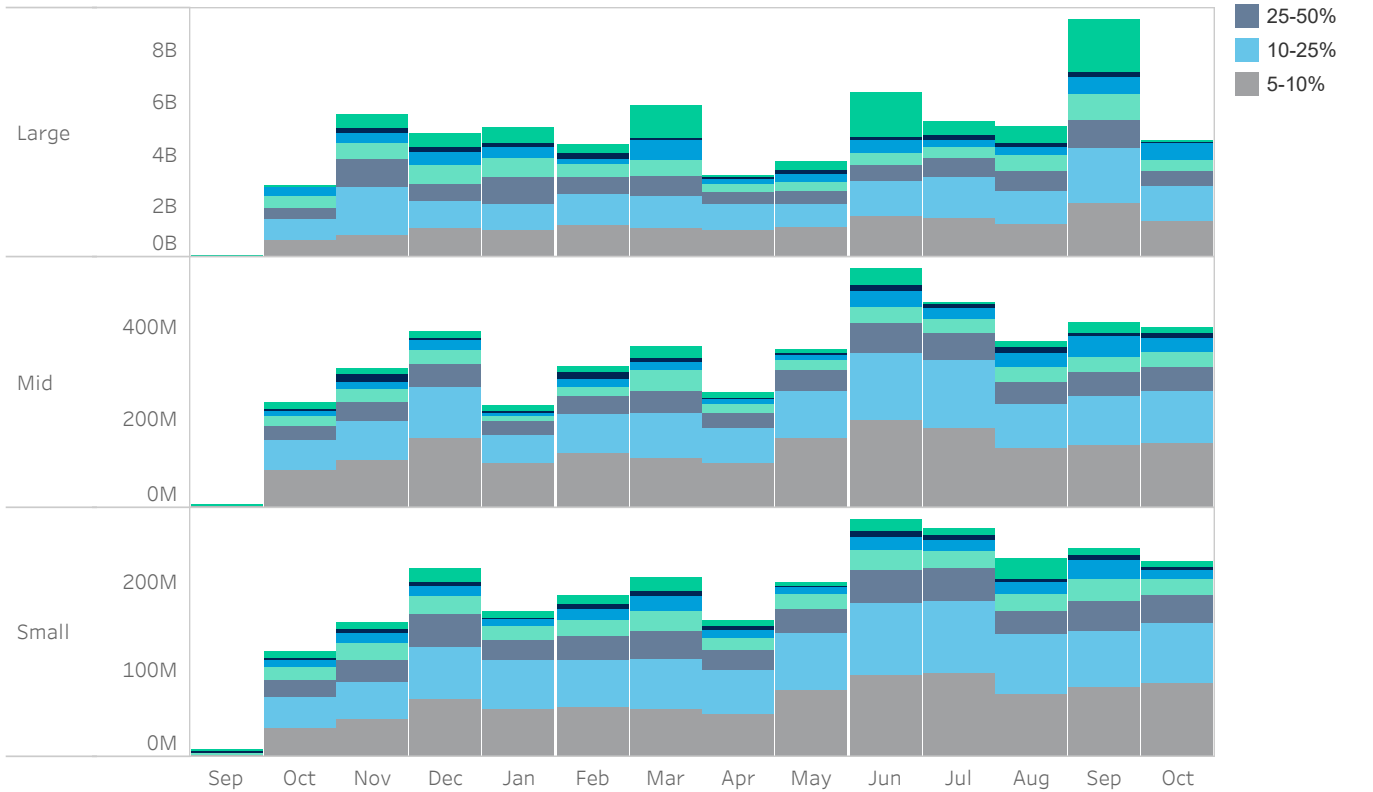
Average Daily Turnover (Notional USD)



Venue Market Share (Notional USD)



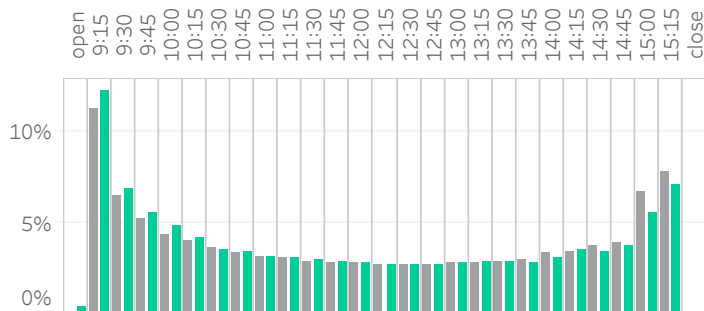
Large Sized Trades (>=5%ADT)



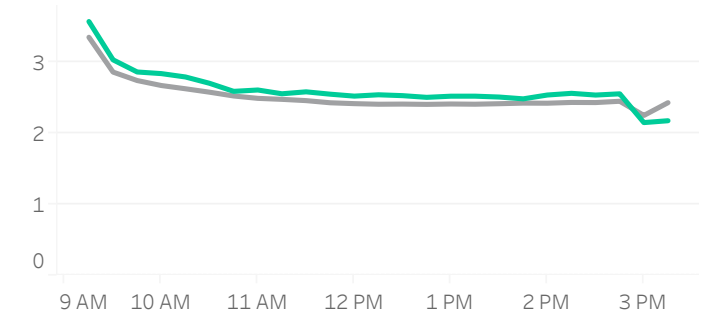
Source data: Virtu Financial

India

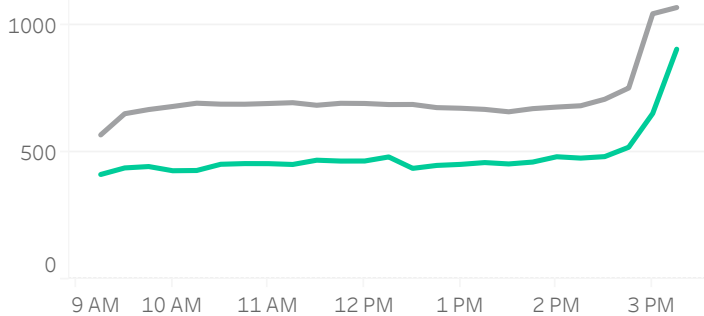
Volume Curve



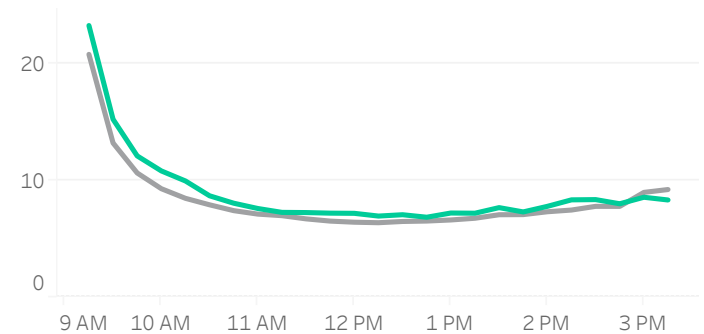
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	3.1	3.2	3.0	3.1	2.9	2.8	2.6	2.8	2.8	3.2
midday	2.7	2.6	2.5	2.5	2.3	2.2	2.2	2.4	2.3	2.6
lastHalfHour	2.5	2.6	2.3	2.3	2.2	2.1	2.0	2.1	1.9	2.1

One Minute Volatility Bps

firstHalfHour	17.3	19.8	17.6	17.7	16.1	12.5	10.5	12.6	12.7	16.9
midday	7.8	8.8	8.2	7.6	6.4	5.3	4.7	5.5	5.8	7.3
lastHalfHour	10.1	11.0	10.6	8.9	8.2	7.1	6.1	6.8	6.4	7.7

Quotesize in Shares

firstHalfHour	684	626	680	559	541	548	533	527	526	425
midday	781	757	695	650	630	584	593	583	540	459
lastHalfHour	1,080	1,041	1,074	974	918	903	952	929	946	780

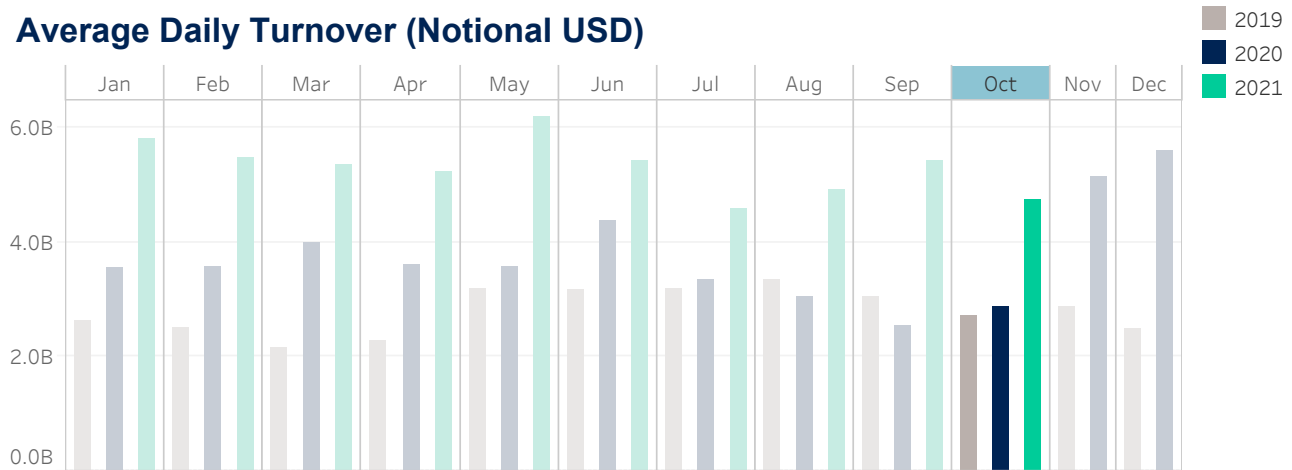
Median used for all metrics

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

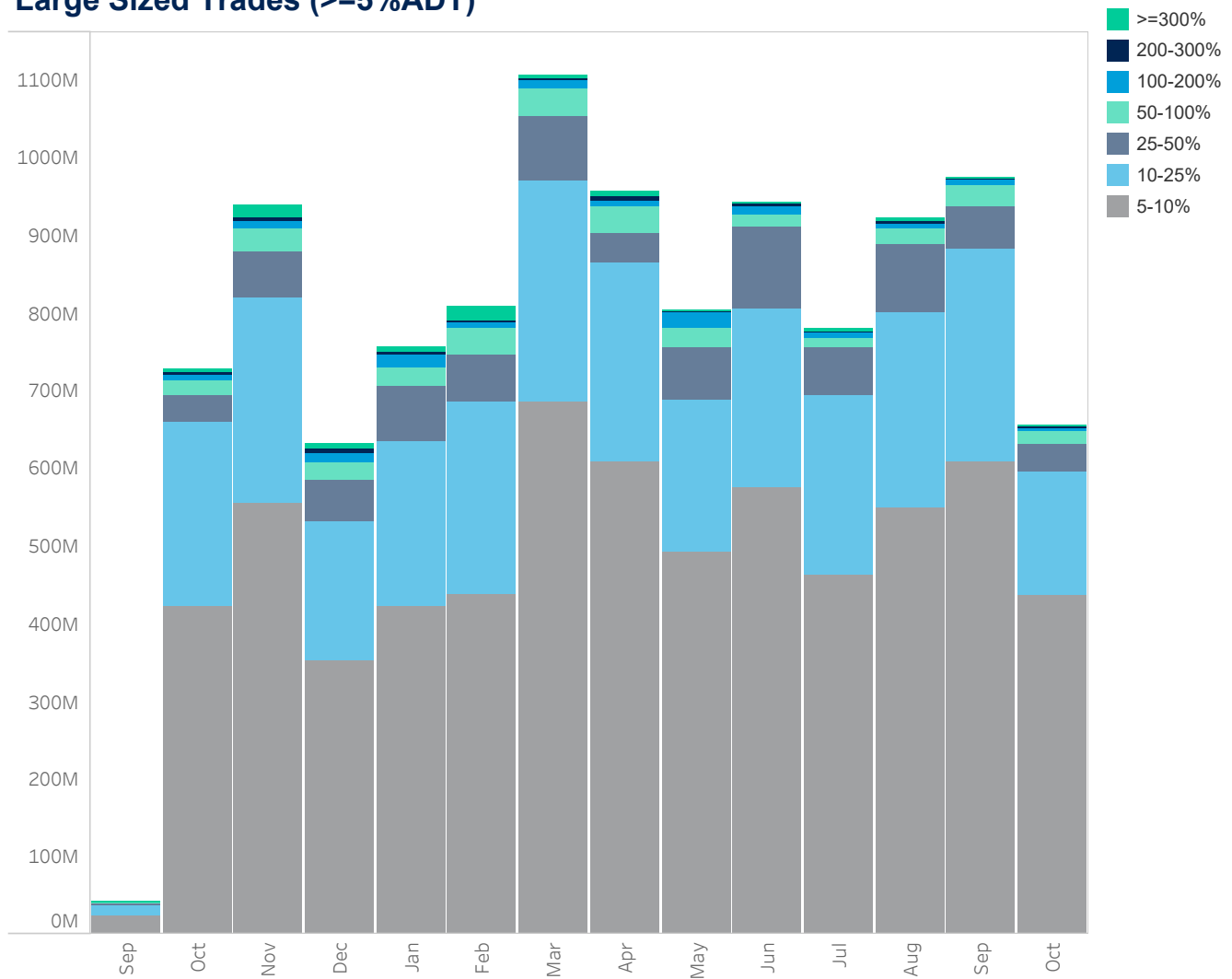
Source data: Virtu Financial

Thailand

Average Daily Turnover (Notional USD)



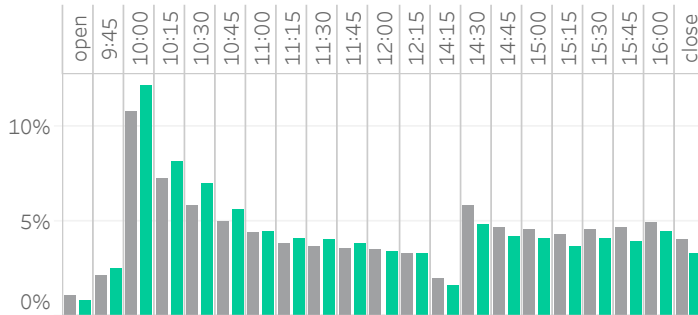
Large Sized Trades (>=5%ADT)



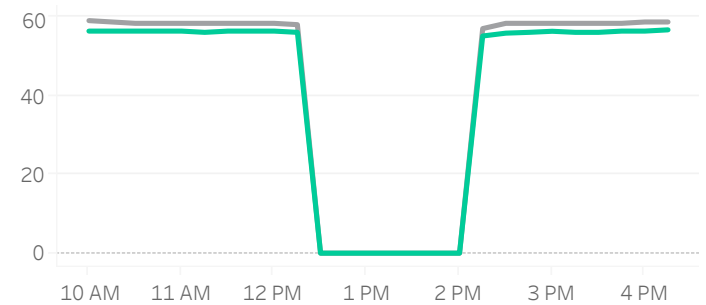
Source data: Virtu Financial

Thailand

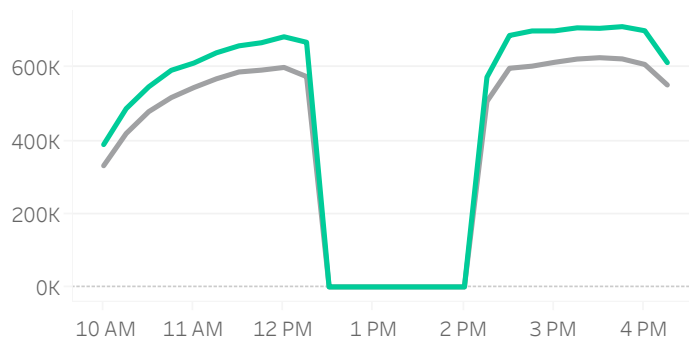
Volume Curve



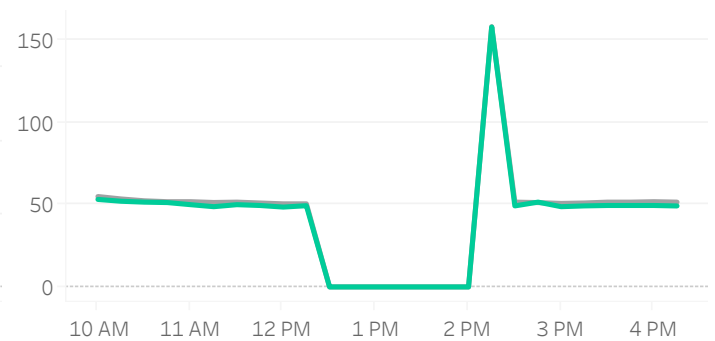
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4	
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	
firstHalfHour	59.5	61.8	58.7	57.6	58.1	57.0	58.5	57.3	55.9	56.3	
midday	58.8	61.3	58.4	57.5	57.4	56.5	58.0	56.8	55.6	56.2	
lastHalfHour	59.5	61.5	58.6	57.8	57.6	56.9	58.7	57.1	55.9	56.5	

One Minute Volatility Bps

firstHalfHour	163.6	249.4	233.7	232.1	230.9	177.0	159.4	162.4	168.7	180.7
midday	229.8	231.9	224.9	223.9	223.2	164.5	130.5	159.5	164.4	167.5
lastHalfHour					11.0					

Quotesize in Shares

firstHalfHour	329,239	333,863	415,974	396,954	369,050	405,115	327,728	343,555	393,145	415,379
midday	511,597	531,652	673,700	702,142	632,652	659,585	550,461	566,015	644,261	663,065
lastHalfHour	524,220	541,490	680,594	713,523	624,167	686,033	542,139	571,302	629,320	657,872

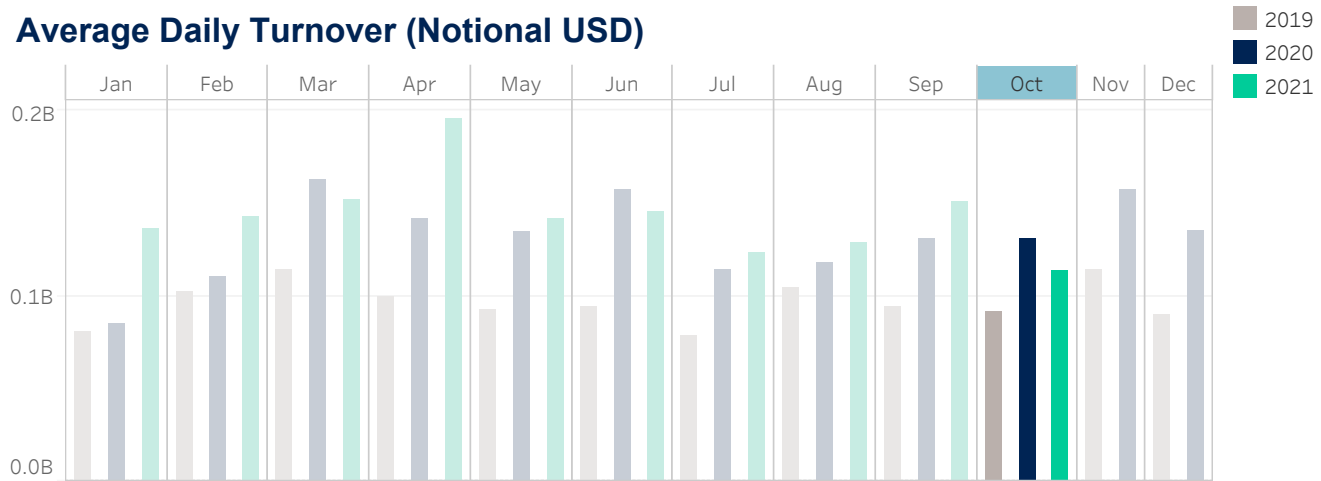
Median used for all metrics

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

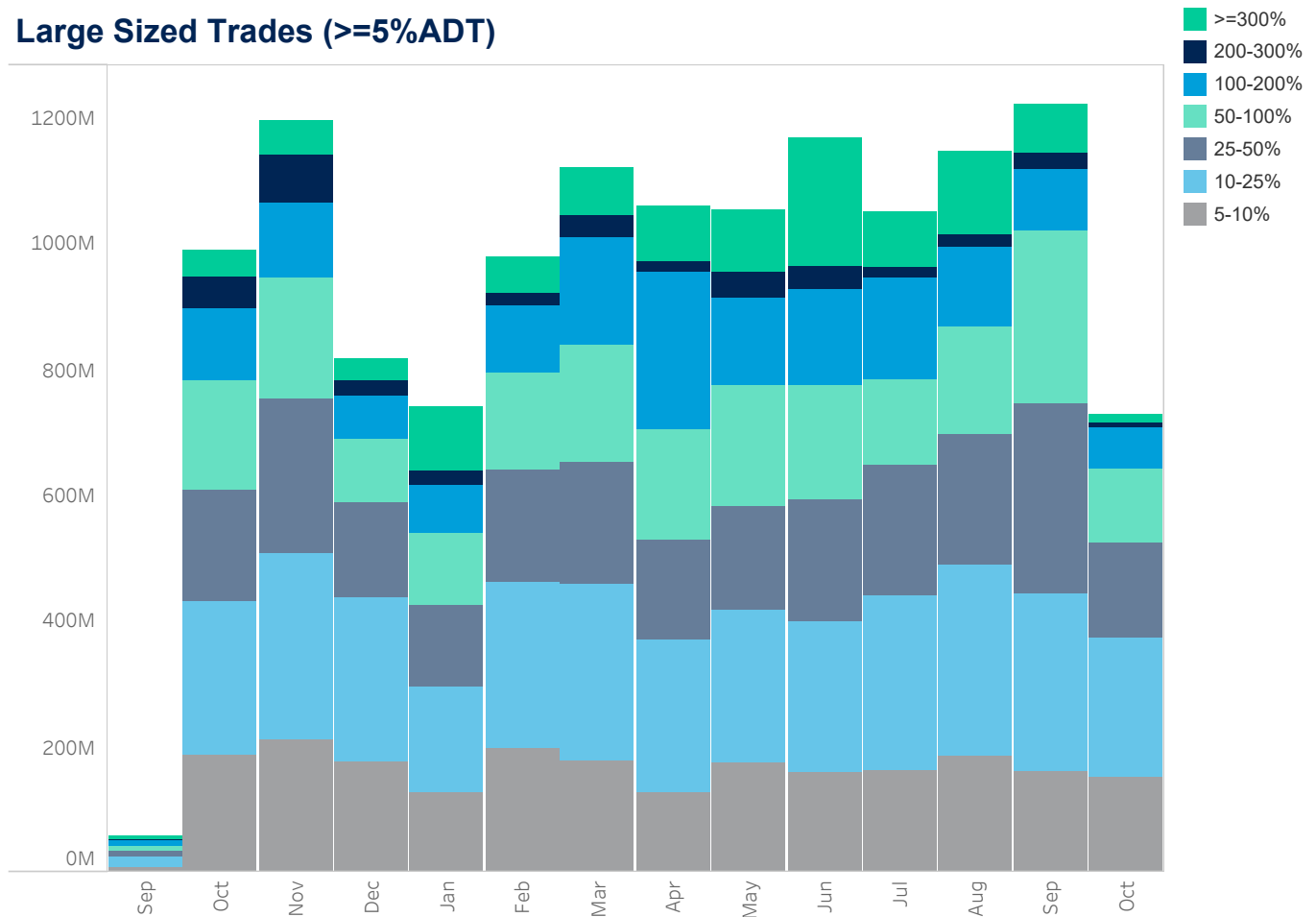
Source data: Virtu Financial

New Zealand

Average Daily Turnover (Notional USD)



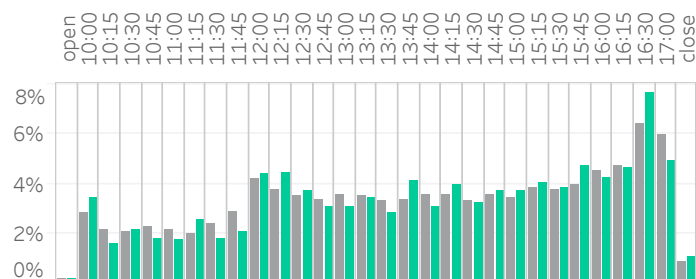
Large Sized Trades (>=5%ADT)



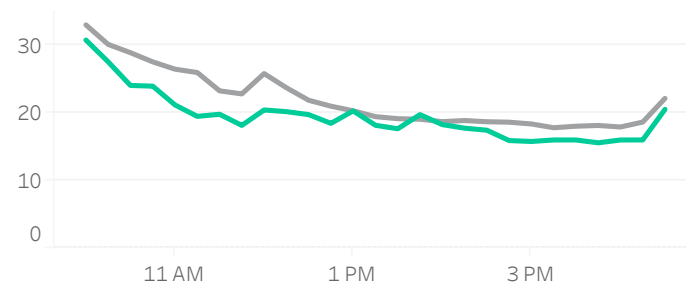
Source data: Virtu Financial

New Zealand

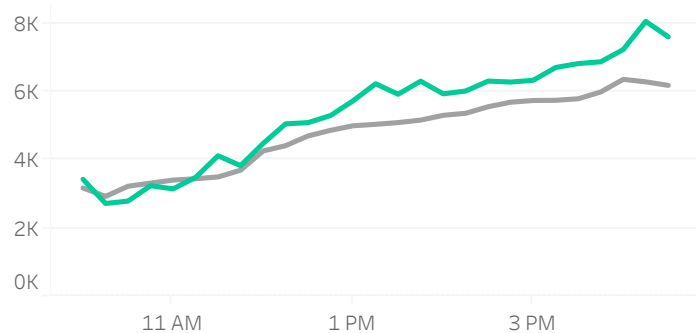
Volume Curve



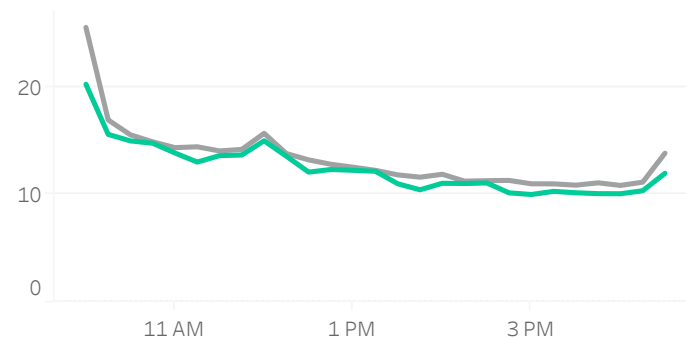
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



■ Rolling 12 Months Avg ■ October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	33.6	32.4	32.9	29.1	30.1	29.9	30.8	31.6	29.0	29.1
midday	22.0	22.2	21.3	19.3	20.5	18.4	19.0	21.0	19.5	18.2
lastHalfHour	22.0	22.2	21.1	21.1	19.6	17.7	19.0	20.0	19.7	18.3

One Minute Volatility Bps

firstHalfHour	6.0	7.4	7.2	5.7	6.8	5.7	6.1	7.0	6.0	7.5
midday	3.7	3.6	3.5	3.6	3.5	3.5	3.4	3.6	3.3	3.3
lastHalfHour	4.7	4.4	6.7	4.0	5.3	4.4	4.0	3.8	3.6	4.3

Quotesize in Shares

firstHalfHour	2,934	2,863	3,226	3,083	2,848	2,985	2,792	3,149	3,533	3,090
midday	4,261	4,306	4,708	5,232	5,145	5,287	5,453	5,494	5,752	5,679
lastHalfHour	5,198	5,319	6,011	6,862	6,538	6,859	7,213	6,762	7,042	7,910

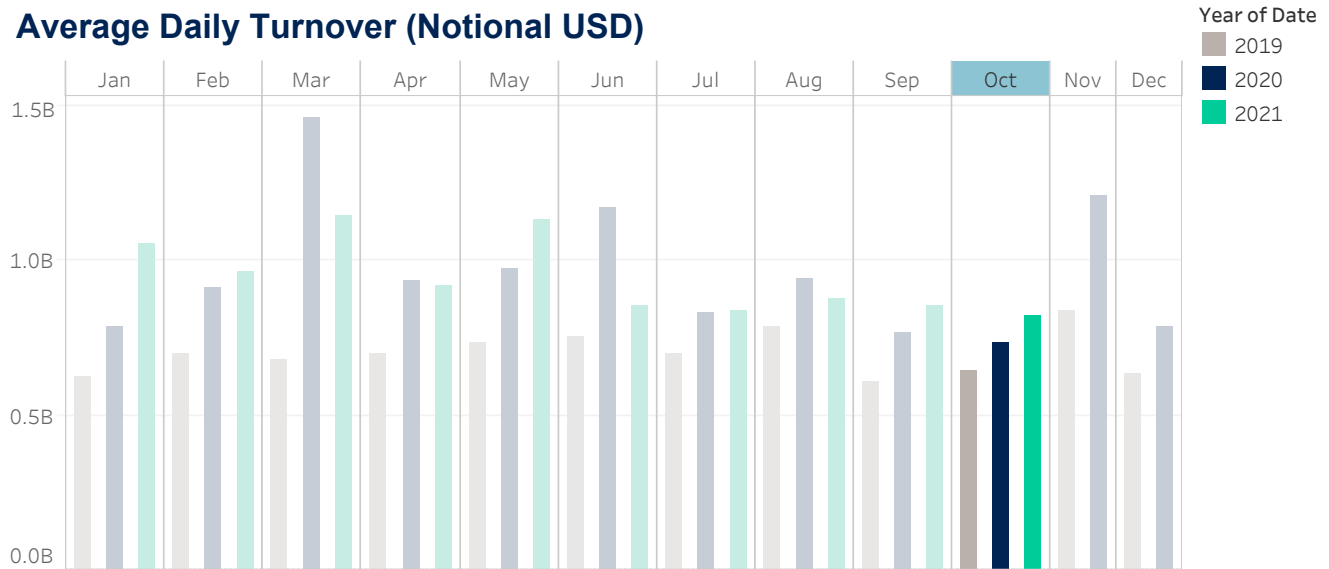
Median used for all metrics

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

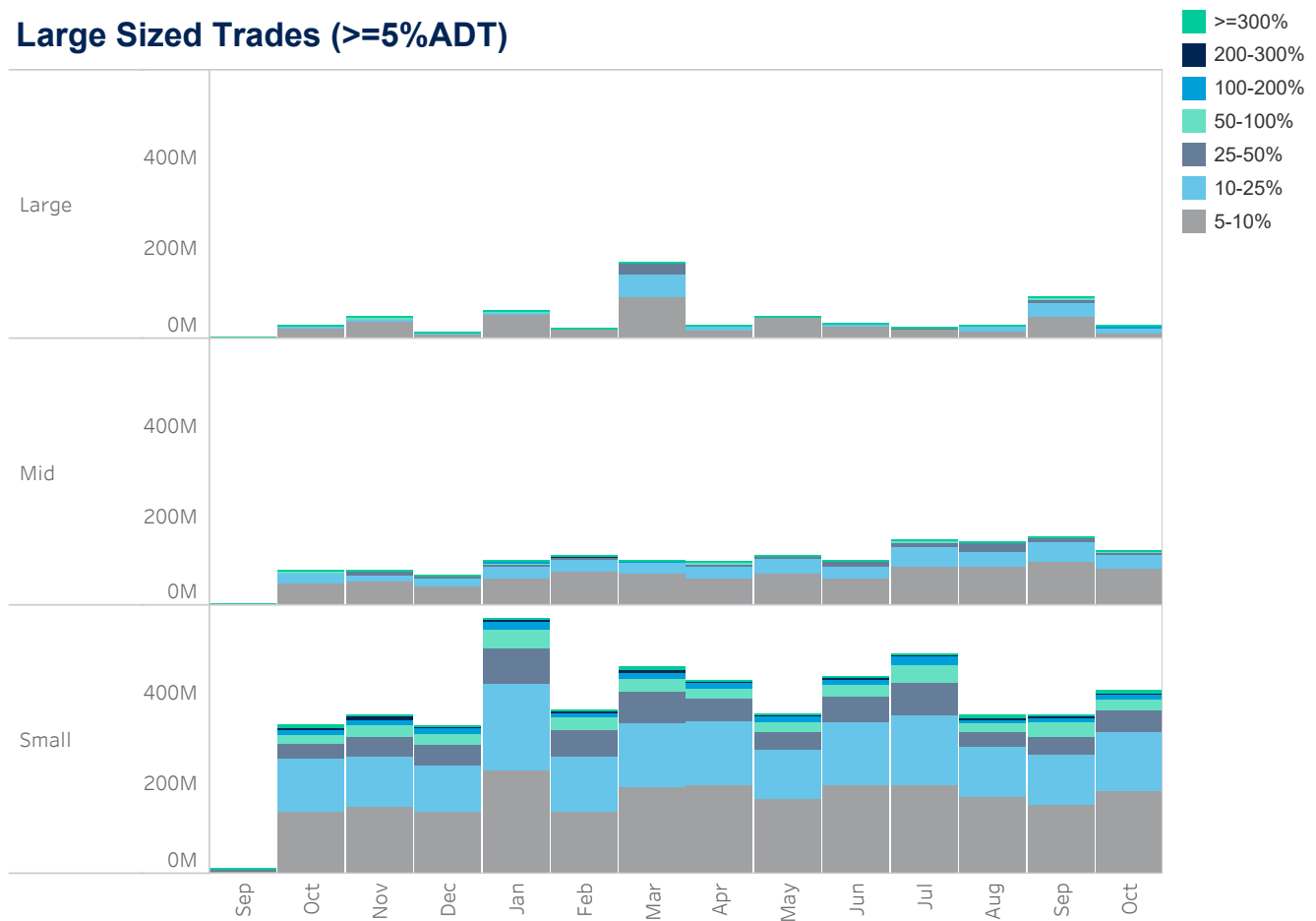
Source data: Virtu Financial

Singapore

Average Daily Turnover (Notional USD)



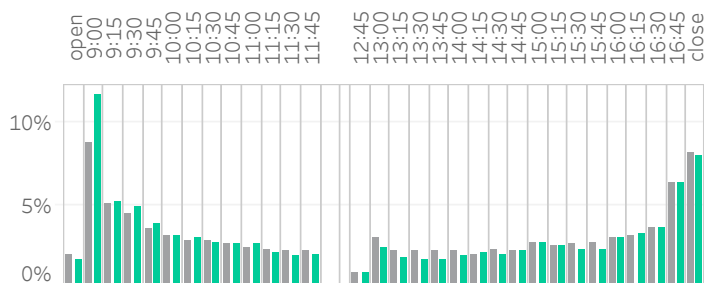
Large Sized Trades (>=5%ADT)



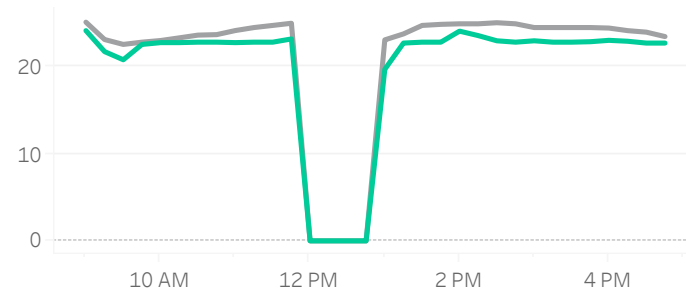
Source data: Virtu Financial

Singapore

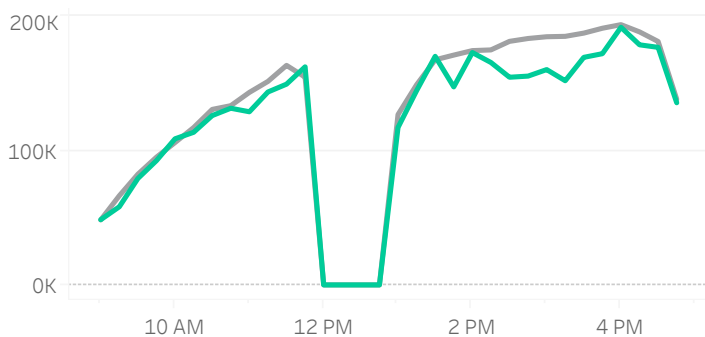
Volume Curve



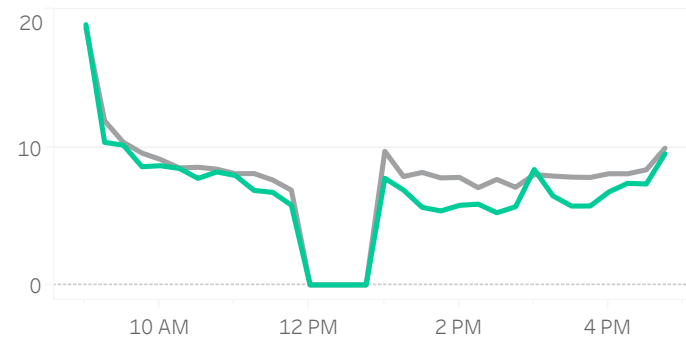
Intraday Spread (bps)



Intraday Quotesize (Shares)



Intraday Volatility (bps)



Rolling 12 Months Avg October 2021

Spread Bps

	21 Q1			21 Q2			21 Q3			21 Q4
	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21
firstHalfHour	23.4	24.7	22.2	21.8	24.1	23.0	22.9	21.6	23.3	22.7
midday	24.4	25.3	22.6	22.5	24.5	22.5	22.7	22.4	24.1	22.8
lastHalfHour	24.3	24.0	22.2	21.0	23.3	21.4	22.3	22.5	23.1	22.0

One Minute Volatility Bps

firstHalfHour	7.1	7.7	6.1	5.1	7.2	6.7	6.6	7.7	6.6	7.3
midday	5.4	5.7	4.5	5.6	6.6	4.1	4.5	3.9	3.3	3.3
lastHalfHour	5.7	3.9	5.2	5.3	6.6	3.8	4.9	1.6	3.4	4.8

Quotesize in Shares

firstHalfHour	59,630	65,948	58,395	76,129	61,752	55,719	51,982	58,984	61,969	54,873
midday	161,583	189,564	171,200	197,195	181,346	141,942	122,557	127,510	145,217	150,127
lastHalfHour	180,964	195,173	162,162	180,880	165,147	134,075	118,307	142,612	146,413	158,656

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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