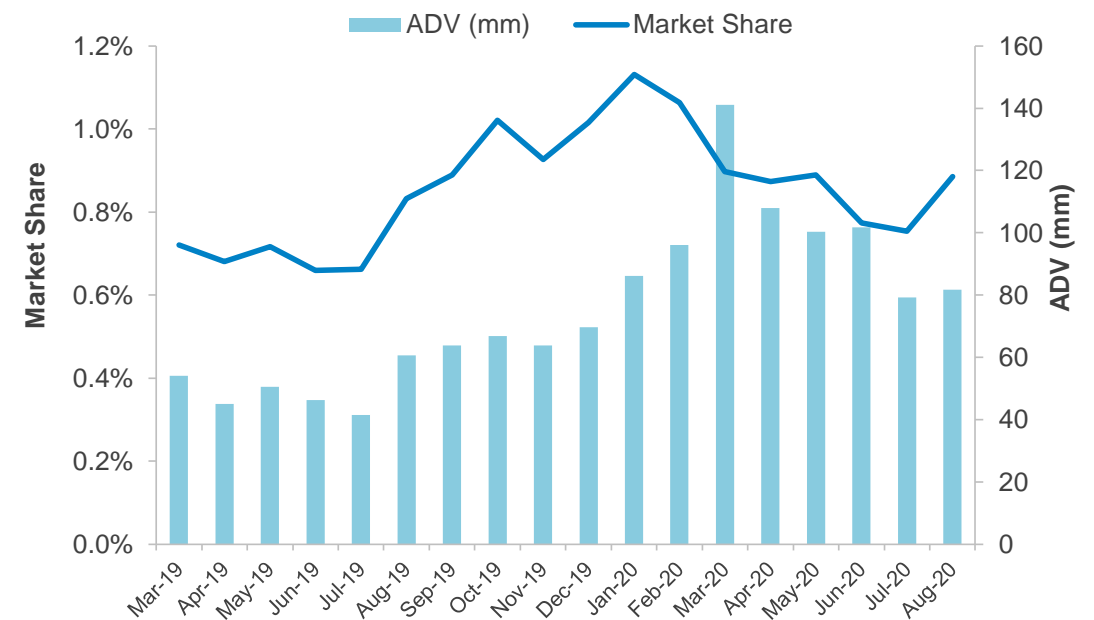


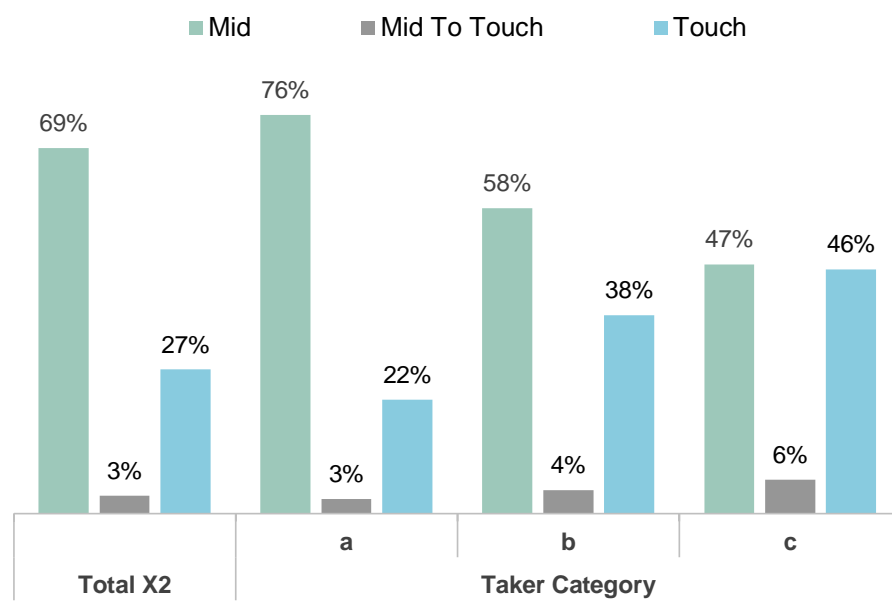
SUMMARY EXECUTION METRICS

Avg. daily volume (mm)	82
Total shares executed (mm)	1,714
Avg. daily notional (\$mm)	3,862
Avg. trade size (shares)	125
Total symbols traded	8,121
Market share	0.88%

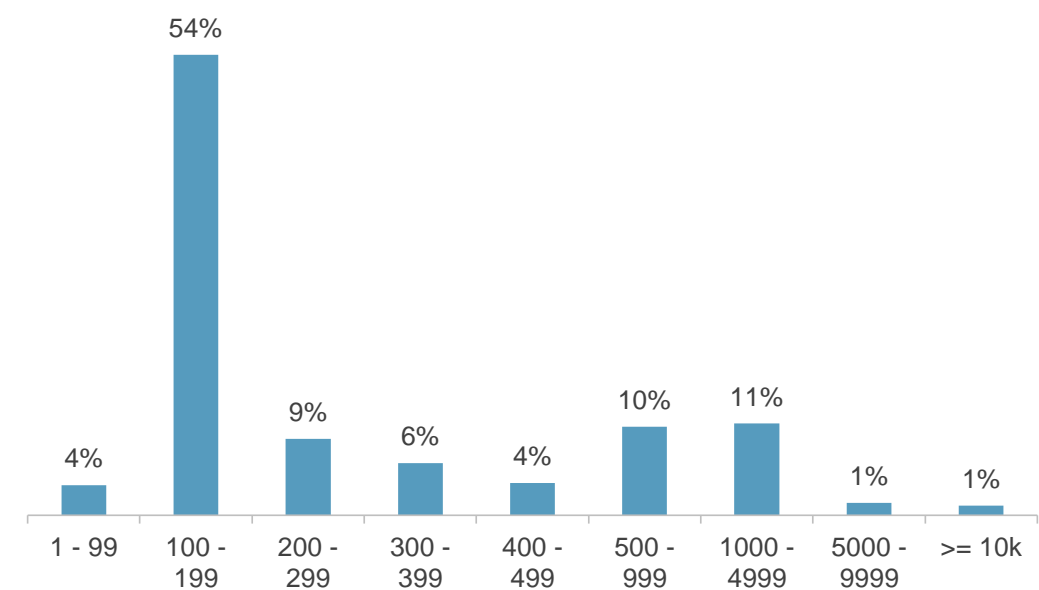
AVERAGE DAILY VOLUME BY MONTH



EXECUTIONS BY PRICE RELATIVE TO NBBO



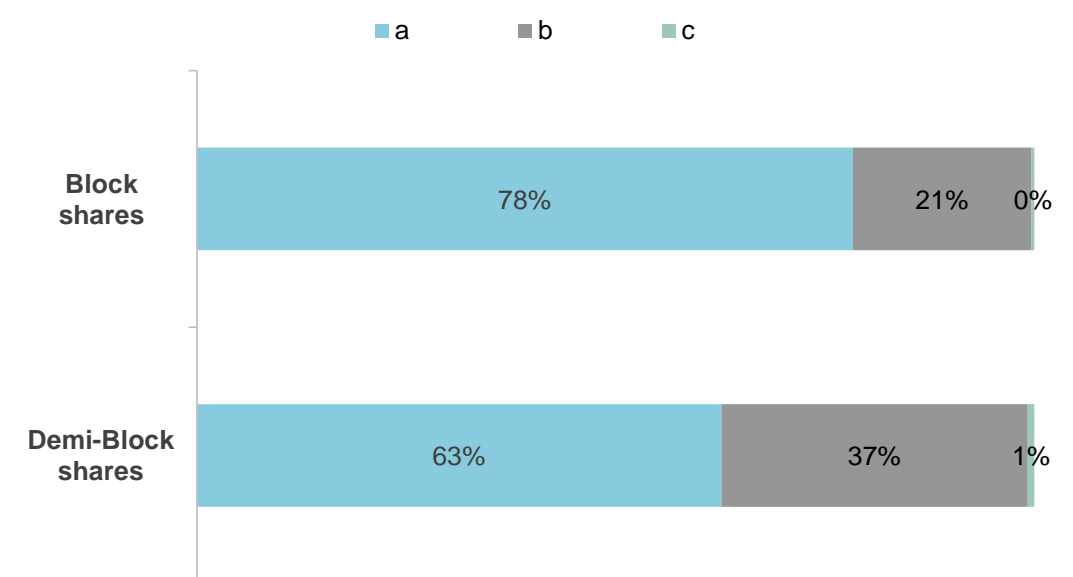
TRADE SIZE DISTRIBUTION



BLOCK METRICS

Avg. block size (10K+ shares)	17,158
% of shares (10K+ shares)	1%
% of shares (>\$200K)	2%
Avg. demi-block size (2K-9.9K shares)	3,189
% of shares demi-block (2K-9.9K shares)	6%
% of shares demi-block (\$100K-\$200K)	2%

BLOCK DISTRIBUTION BY TAKER CATEGORY¹



¹ Sigma X²'s Counterparty Classification Framework segments liquidity-taking Participants into three Taker Categories based on an objective post-trade mark-out analysis performed by GSCO. Please see additional Notes & Definitions on page 3. Unless otherwise noted, the metrics refer to the month listed at the top right of this publication. Past performance is not indicative of future results. Please read in conjunction with Sigma X²'s Form ATS-N posted on the Goldman Sachs Equity Execution Services website. You should periodically review the website for updates.

<http://www.goldmansachs.com/what-we-do/securities/gset/equities/liquidity-access/index.html>

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Sources: Goldman Sachs Global Markets



DISTRIBUTION BY ORDER TYPE

Order Type	Executed Shares	% Executed Shares	Average Trade Size	Average Spread (bps)
Peg Mid	2,311,698,083	67.4%	132	6.55
Limit	743,327,978	21.7%	107	8.39
Peg Primary	238,394,373	7.0%	121	5.90
Peg Market	135,343,998	3.9%	144	8.04

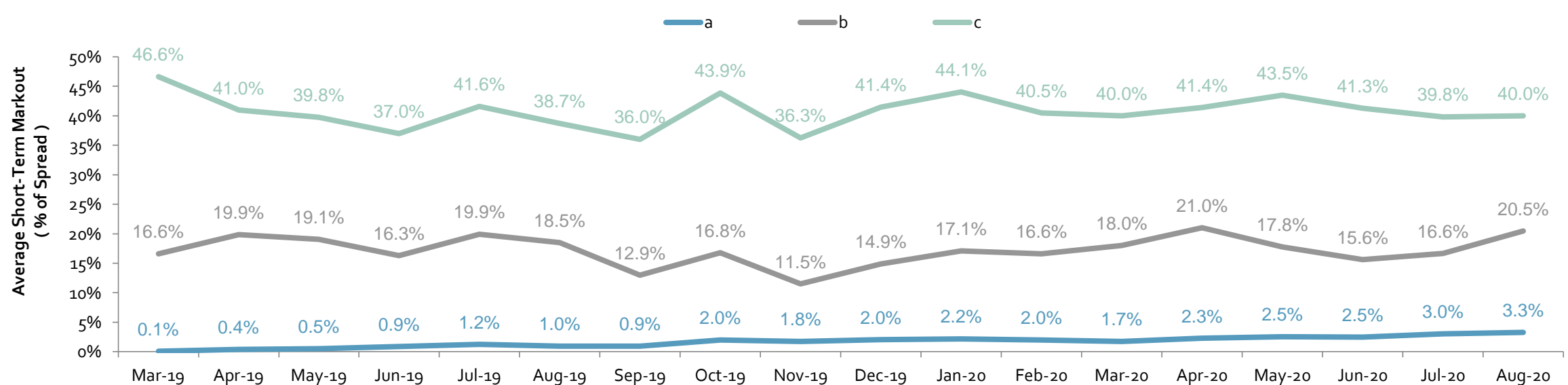
DISTRIBUTION BY TAKER CATEGORY²

Taker Category	Executed Shares	% Executed Shares	Average Trade Size	Average Spread (bps)	Average Short Term Mark-out (% of spread)
a	1,124,229,388	65.6%	116	7.20	3.3%
b	556,110,312	32.4%	151	7.05	20.5%
c	34,042,516	2.0%	107	5.29	40.0%

DISTRIBUTION BY CONTRA CATEGORY²

Contra Category Requested	Taker Category	Executed Shares	% Executed Shares	Average Trade Size	Average Spread (bps)	Average Short Term Mark-out (% of spread)
a		850,154,599	49.6%	114	6.63	-3.4%
	a	850,154,599	100.0%	114	6.63	-3.4%
b		535,437,631	31.2%	143	7.92	-13.8%
	a	170,581,834	31.9%	119	8.83	-2.9%
	b	364,855,797	68.1%	158	7.33	-22.3%
c		328,789,986	19.2%	133	6.62	-16.3%
	a	103,492,955	31.5%	132	7.95	-3.5%
	b	191,254,515	58.2%	140	6.48	-16.4%
	c	34,042,516	10.4%	107	5.29	-40.0%

AVERAGE SHORT-TERM MARK-OUT TREND BY TAKER CATEGORY³



² Sigma X²'s Counterparty Classification Framework segments liquidity-taking Participants into three Taker Categories based on an objective post-trade mark-out analysis performed by GSCO. Please see additional Notes & Definitions on page 3.

³ Taker Category segmentation, based upon an objective post-trade mark-out analysis, was initiated on July 17, 2017. Figures referenced here represent Taker Category data for the last 18 months. GSCO performs and refreshes the mark-out analysis routinely.

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What types of participants use Sigma X²?

The Sigma X² participant base consists primarily of institutional customers and broker-dealers, including equity and options market makers and specialists, and introducing brokers. These clients, along with GSCO (on behalf of itself as principal or its customers as agent) and GSCO affiliates are collectively referred to herein as "Participants." Participants may access Sigma X² directly ("Direct Subscribers") or indirectly ("Indirect Subscribers").

How can Sigma X² be accessed?

Direct Subscribers access Sigma X² via a FIX connection. Indirect Subscribers access Sigma X² indirectly via non-ATS GSCO offered products and services, which may include:

i. GSCO Algorithms, which accept parent-level orders and can send portions of such orders (i.e., child orders) to GSCO's smart order router (SOR). GSCO's SOR may route such orders to Sigma X² or other market centers, as described below;

ii. The GSCO SOR, which can route various orders to Sigma X² or other market centers or may route directed orders to Sigma X² through routing logic known as Blacklight, GSCO's dark routing logic; and

iii. The GSCO Direct Market Access ("DMA") System, which GSCO clients may use to direct orders to Sigma X² or other market centers using their own algorithms, i.e., non-GSCO algorithms. Orders routed via the GSCO DMA System do not pass through, and are not known by, GSCO's SOR.

Orders routed to Sigma X² via GSCO's SOR, including those referred to in i. and ii. above, are known by the SOR. GSCO's SOR is aware of orders it has posted in all venues, including Sigma X². GSCO's SOR uses knowledge of such orders to predict venue-level fill rates. This data is not communicated outside of the SOR.

How do we define executions by price relative to NBBO?

Price relative to NBBO is determined by the NBBO of Sigma X² at the time of execution. Executions at NBB or NBO are executed at the national best bid or offer respectively. Executions at Mid are executed directly at the midpoint. Executions at Inside are executed within the NBBO excluding the midpoint.

Transactions in Sigma X² are executed using an NBBO constructed by Operations and Compliance Network, LLC ("Ocean"), a third party technology provider for X². Ocean constructs the NBBO using a combination of direct market data feeds and market data disseminated by the Securities Information Processors ("SIPs") (a "Constructed NBBO"). If there is an issue with the Constructed NBBO, transactions in Sigma X² will be priced solely using the NBBO disseminated by the SIPs. Accordingly, all executions in Sigma X² are programmed to match at or within the Constructed NBBO or the SIP NBBO.

How is liquidity-taking and liquidity-providing defined?

Orders in Sigma X² are treated as liquidity-taking or liquidity-providing orders based on their time of order arrival. When Sigma X² assesses two orders for a potential match, the liquidity-providing order is the order that was first-in-time, and the liquidity-taking order is the order that was second-in-time.

What is average spread?

Average spread is the average difference in bid and ask prices measured in bps at execution time.

How do we define block distribution by Taker Category?

Block distribution by Taker Category defines the percentage of total executed shares that are executed in block size by each Taker Category ("a," "b" or "c"). Block trades are defined as executions comprised of 10K+ shares and demi-block trades are defined as executions comprised of 2K-9.999K shares.

How are order types classified?

Upon receipt of each order, Sigma X² will determine and apply an "Assigned Limit Price." The Assigned Limit Price of an order is the highest price for a buy order (lowest for a sell order) at which the order may be executed at or within the National Best Bid and Offer ("NBBO") after applying the constraints selected by the Participant (e.g., limit price or peg type). Assigned Limit Prices will be reevaluated and updated as may be necessary with each change in the NBBO.

Primary Peg orders are pegged to the near side of the NBBO (e.g., best bid for a buy order). Mid Peg orders are pegged to the midpoint of the NBBO.

Market Peg orders are pegged to the far side of the NBBO (e.g., best offer for buy order). Limit orders, which are determined by the Participant, are posted to the Sigma X² order book with an Assigned Limit Price equal to the order's Limit Price with the following exception: Orders with prices outside the NBBO (i.e., at prices higher than the NBBO for buy orders and lower than the NBBO for sell orders) are given an Assigned Limit Price at the NBBO. For example, if the NBBO is \$10.00 x \$10.02, a buy order with a limit price of \$10.03 will have an Assigned Limit Price of \$10.02.

What is average short-term mark-out?

The average short-term mark-out is a calculation of notionally-weighted average "mark-outs" (in bps) divided by notionally-weighted average spread (in bps). A "mark-out" is a standardized assessment of the short term price movement in a security (i.e., impact on the security's mid-quote) that is measured within a particular time horizon surrounding an execution.

How are Taker Categories defined?

Order flow for liquidity-taking orders placed by a Participant is mapped into three Taker Categories (i.e. "a," "b" and "c") based on a post-trade mark-out analysis performed by GSCO. The mark-out analysis is a standardized assessment, across all securities, of the short-term price movement in a security (i.e., impact on the security's mid-quote) that is measured within a particular time horizon surrounding an execution. As further described in Sigma X²'s Form ATS-N, GSCO performs and refreshes the mark-out analysis for all liquidity-taking orders on approximately a monthly basis (and for new order flow, on an ad-hoc basis). In addition, GSCO may periodically, as needed, reassess and modify the factors used to determine the three Taker Categories. On April 3, 2020, GSCO modified the metrics used to determine the Taker Categories, and continues its routine monitoring of the Counterparty Classification Framework.

How are Contra Categories defined?

Sigma X² offers Participants the ability to restrict the interaction of their liquidity-providing orders with a specified category (or categories) of liquidity-taking orders (i.e., Taker Categories "a," "b," or "c") through the designation of a "Contra Category." A Participant's Contra Category selection ("a," "b," or "c") for a liquidity-providing order determines the Taker Category (or Taker Categories) with which the liquidity-providing order may interact. When a Participant sending a liquidity-providing order selects Contra Category "a," the Participant's order will only interact with Taker Category "a" orders. If a Participant sending a liquidity-providing order selects Contra Category "b," the Participant's order may potentially interact with Taker Category "a" or "b" orders. If a Participant sending a liquidity-providing order selects Contra Category "c," the Participant's order may potentially interact with Taker Category "a," "b," or "c" orders. Subscribers that route liquidity-providing orders and have not selected a Contra Category will be defaulted to Contra Category "c".

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