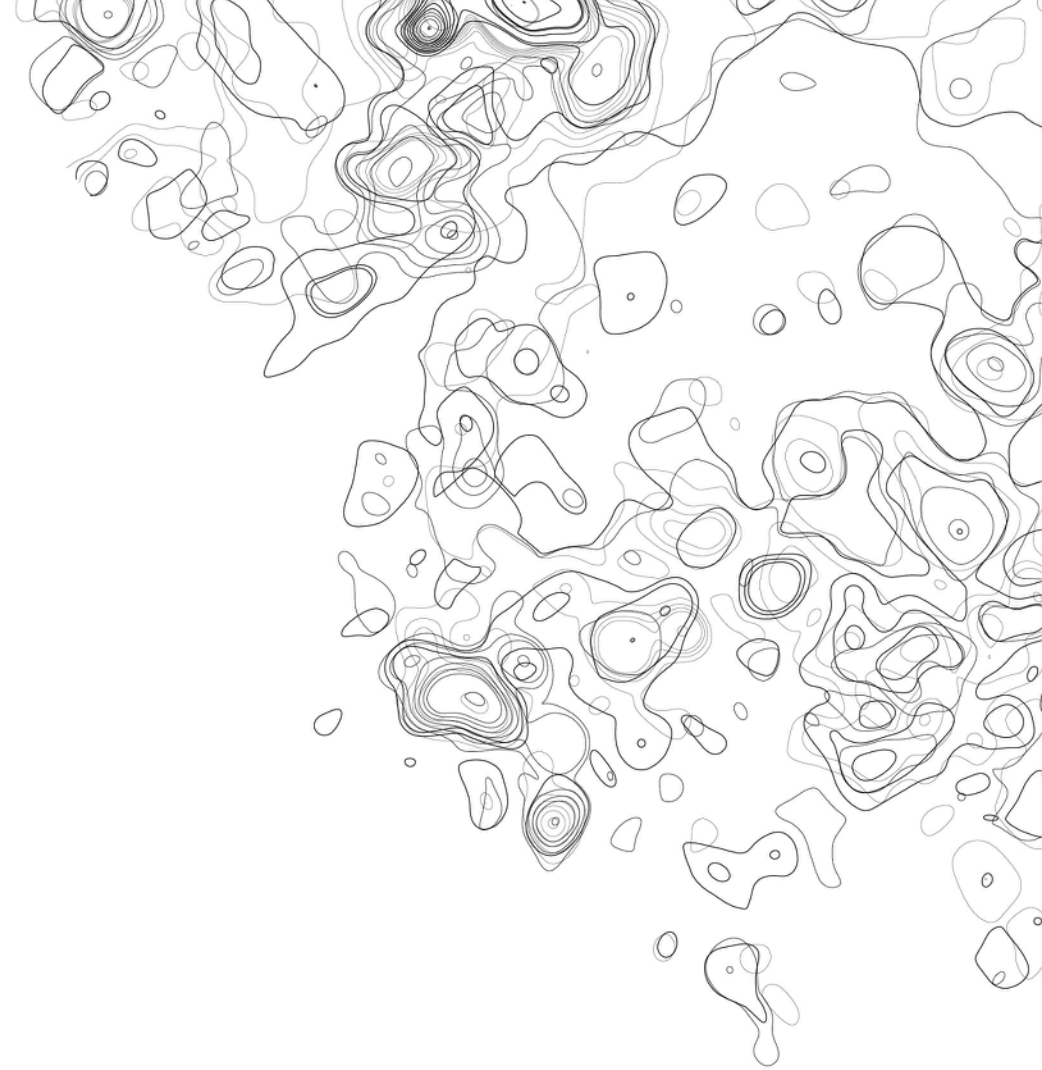


Tick Pilot Update

How has the program affected
institutional trading costs?

Phil Pearson
Director, ITG Algorithms
February 2017

STA Industry Call



Overview of Pilot Program and Test Group Buckets

Pilot started Oct. 3, lasts two years and affects stocks with:

- Market cap < \$3bn
- ADV < 1mm shares
- Share price > \$2.00

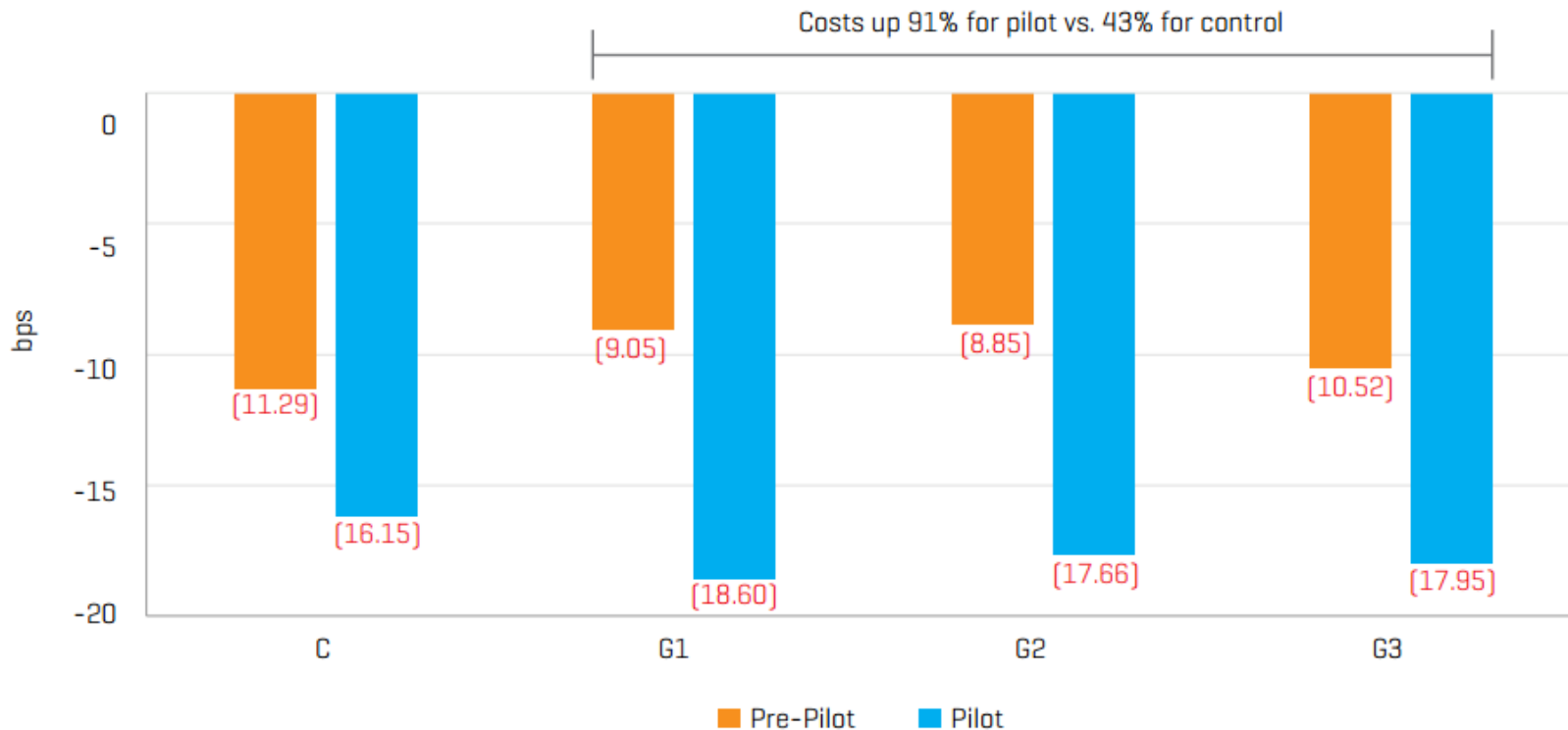
	# of Stocks	Quoting Increment	Trading Increment	Trade-at
Control Group	1,200	\$0.01 (no change)	No restrictions	No
Test Group1	400	\$0.05	No restrictions	No
Test Group 2	400	\$0.05	Bid, offer, midpoint	No
Test Group 3	400	\$0.05	Bid, offer, midpoint	Yes



Source: FINRA

Trading Costs Up ~50% Compared to Control Group

PEER AVERAGE IS COST



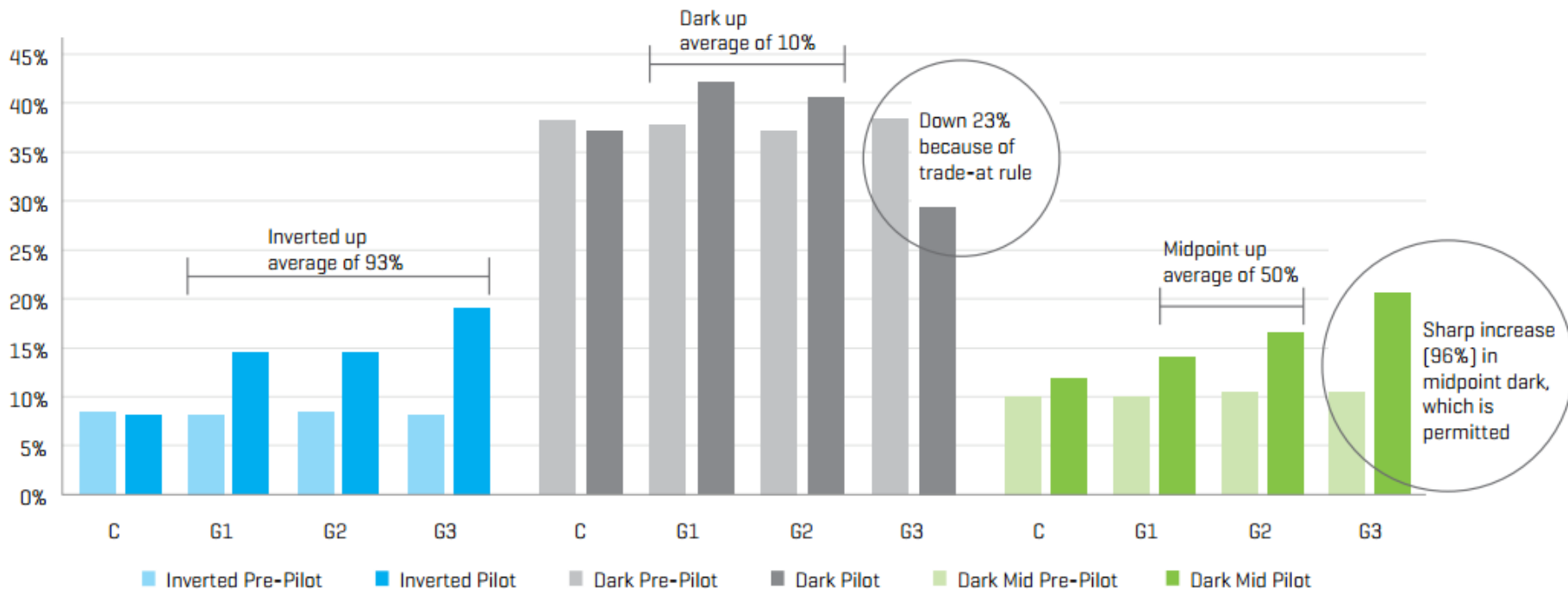
Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.



Increased Use of Dark and Inverted Exchanges

In an effort to capture spread

INVERTED EXCHANGES AND DARK POOL MARKET SHARE

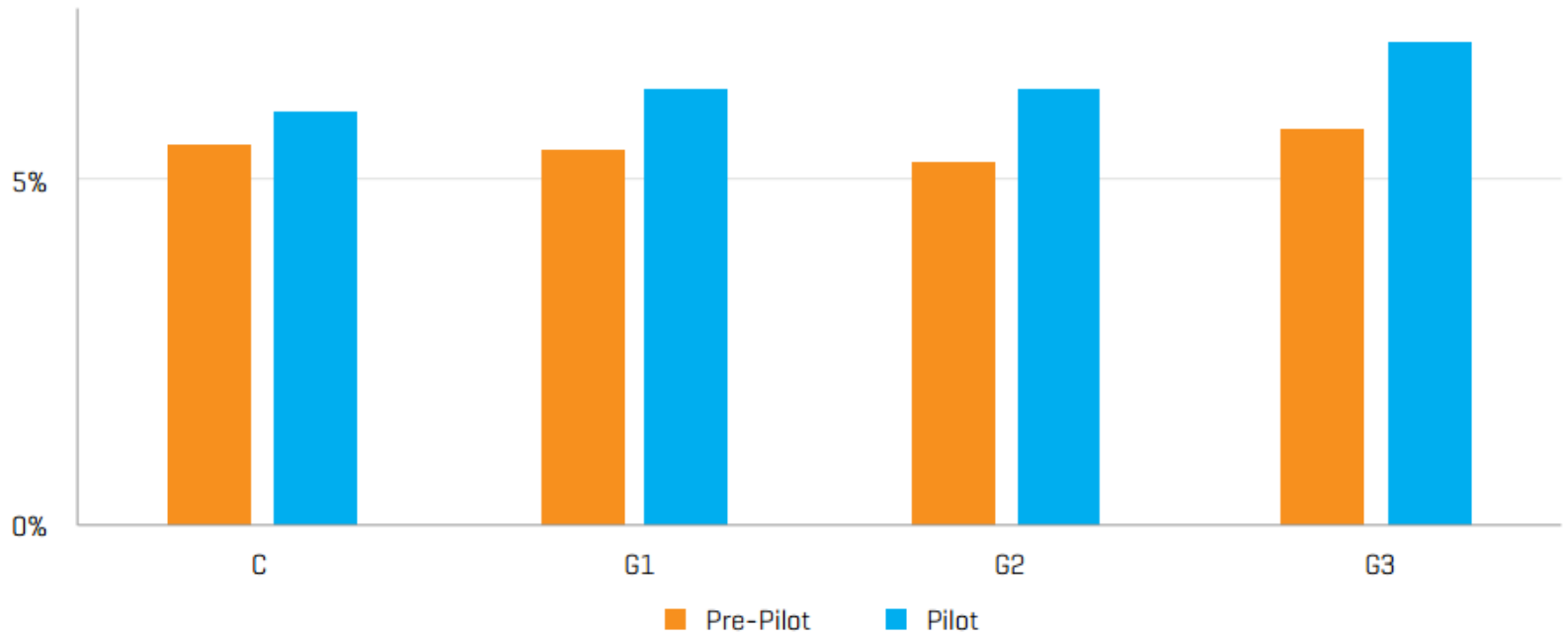


Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

Increase in Blocks as a Percentage of Trading Volume

G3 up 24% (15% when adjusted for growth in control group)

BLOCK MARKET SHARE

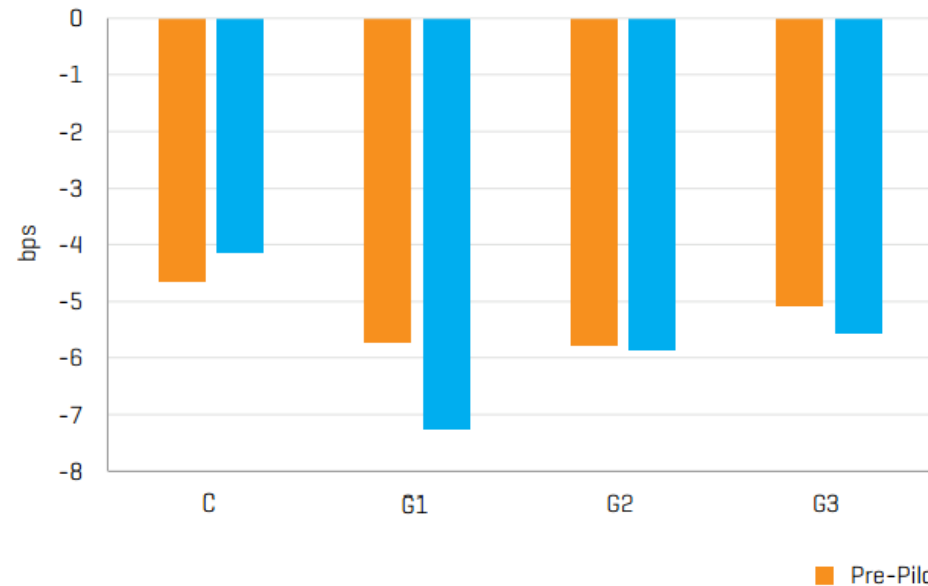


Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

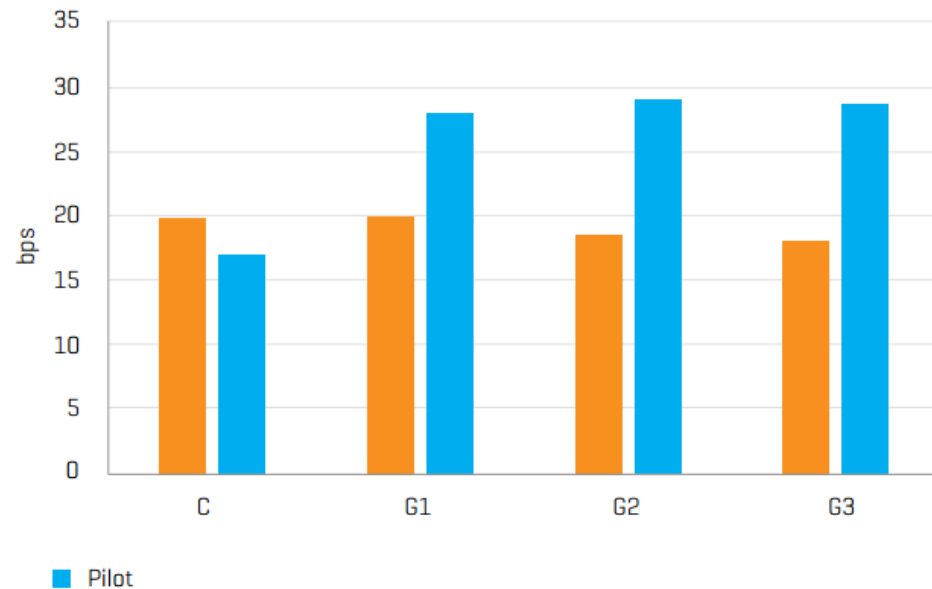
Interval VWAP Slippage Increases by ~2 Basis Points

Midpoint and aggressive orders are more costly with wider spreads

VWAP ALGO PERFORMANCE



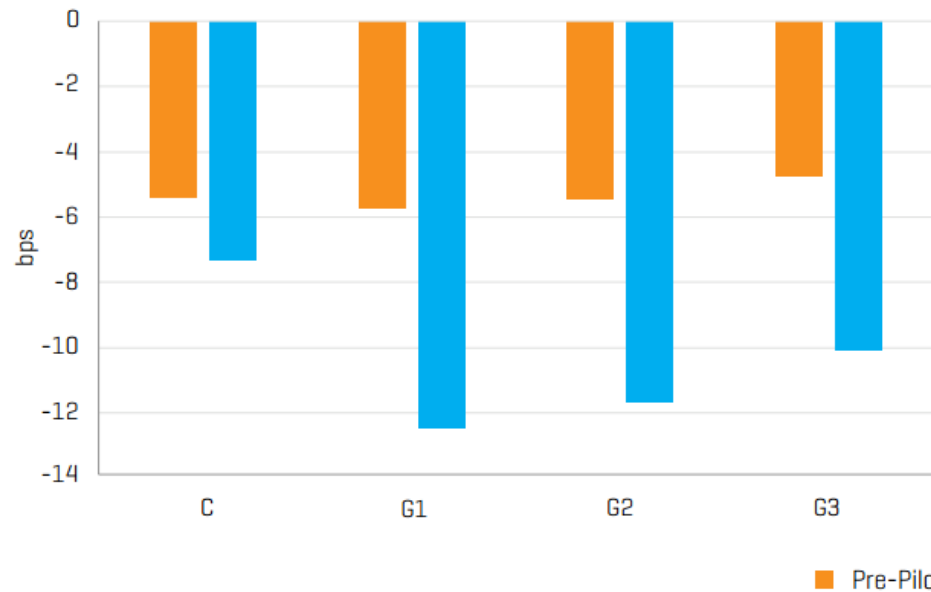
TRADE WEIGHTED SPREAD FOR VWAP ORDERS



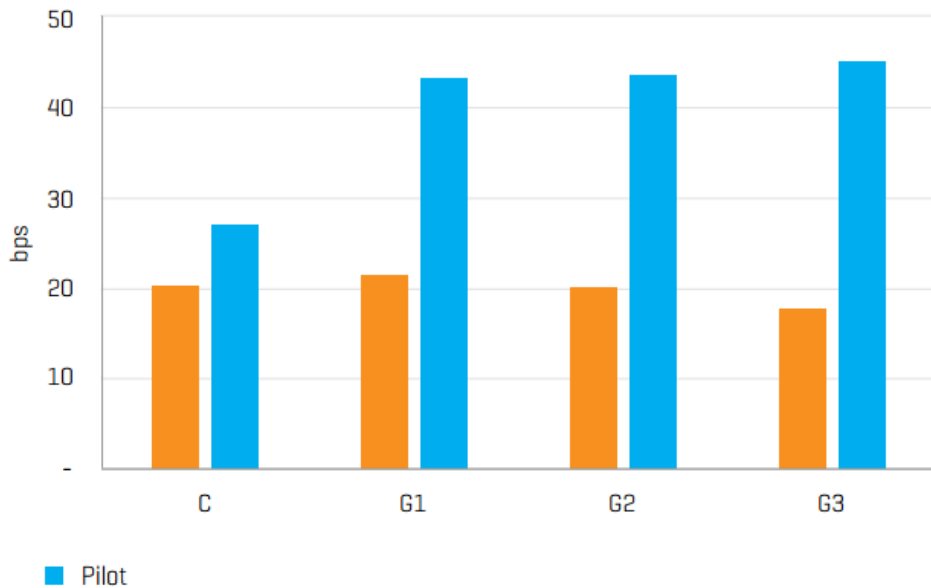
Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

Arrival-Price Algo IS Costs Rose More Than 4 BPS

ARRIVAL-BASED ALGO IS COST



TRADE WEIGHTED SPREAD FOR ARRIVAL-BASED ORDERS

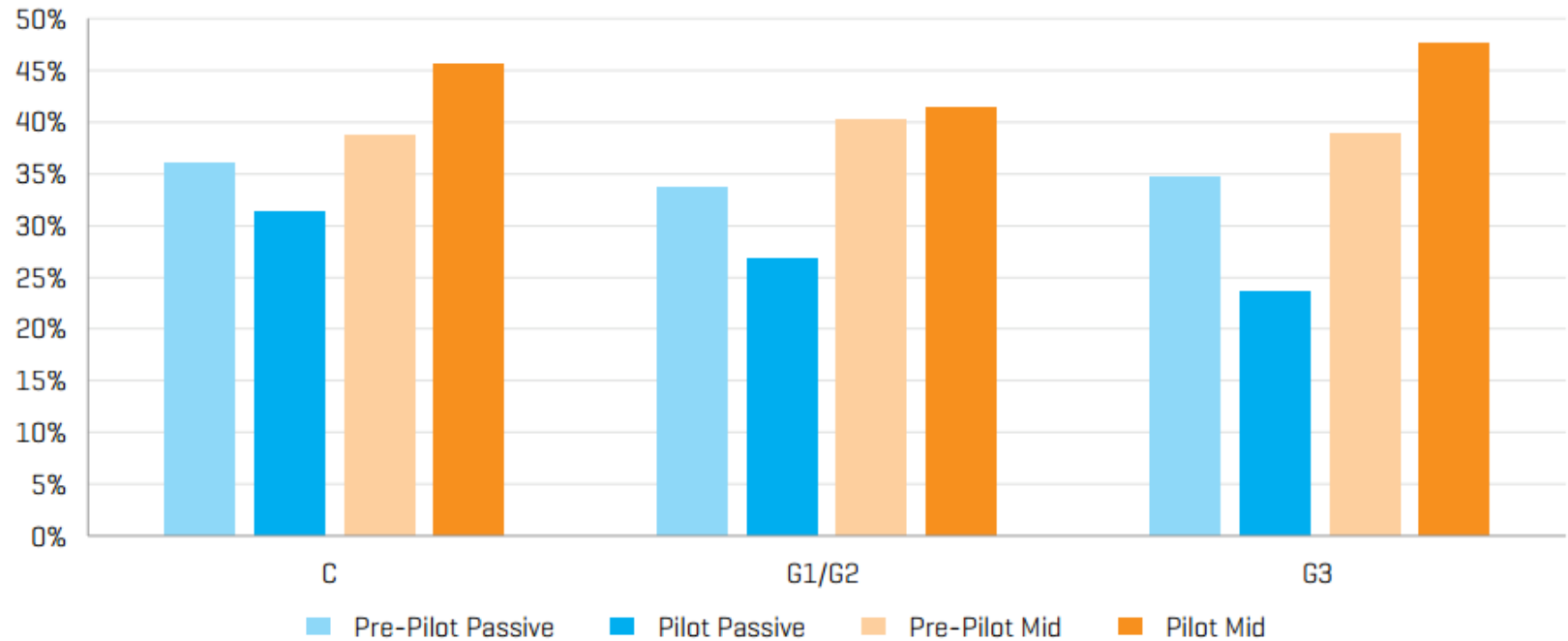


Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

Shift From Passive to Midpoint and Aggressive Trading

Passive trading lower in all test groups, down 30% in G3

ALGORITHM PASSIVE AND MID USAGE

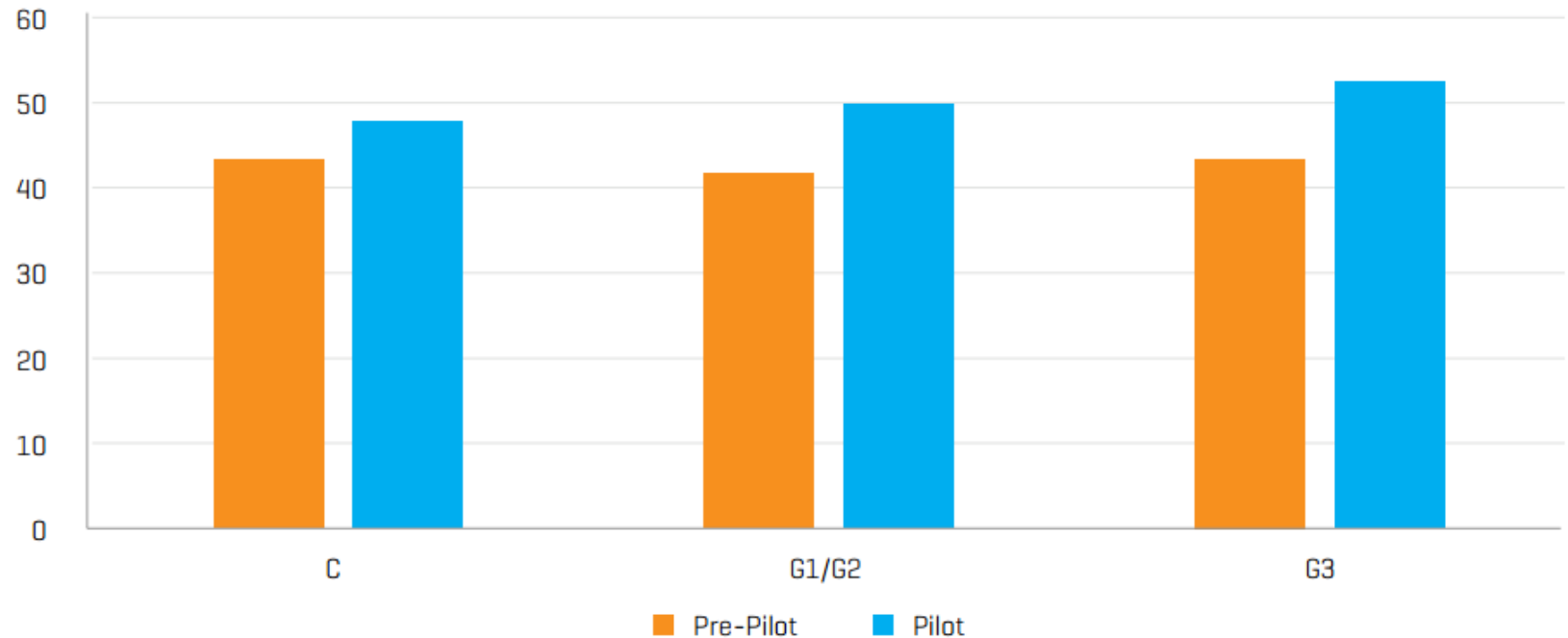


Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

Algo Orders Are Taking Longer to Finish

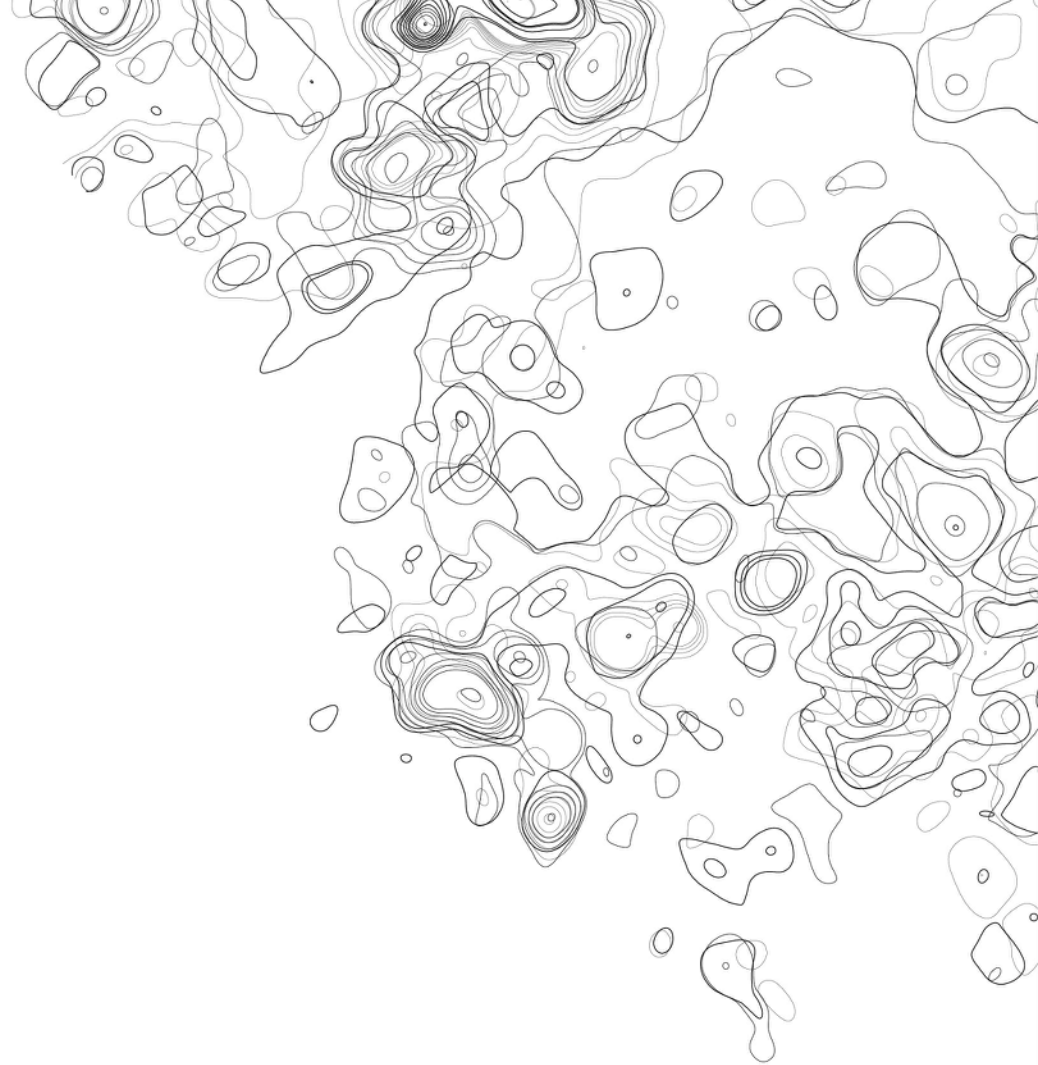
Arrival-price algos had the most notable increase

AVERAGE ALGO ORDER DURATION (IN MINUTES)



Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

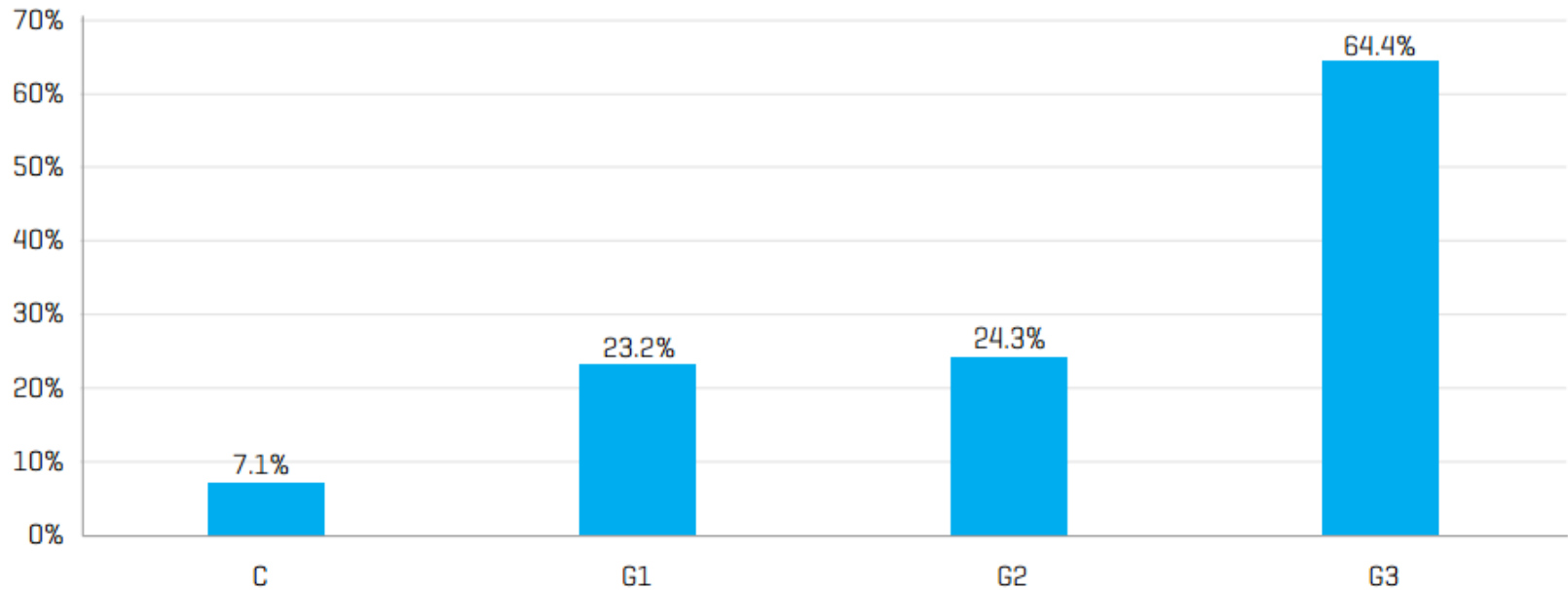
ITG Brokerage Trends



Uptick in Use of Inverted Venues

G1 and G2 increase almost 25%, G3 up 64%

SLIMIT INCREASE IN INVERTED VENUES FOR TICK PILOT STOCKS

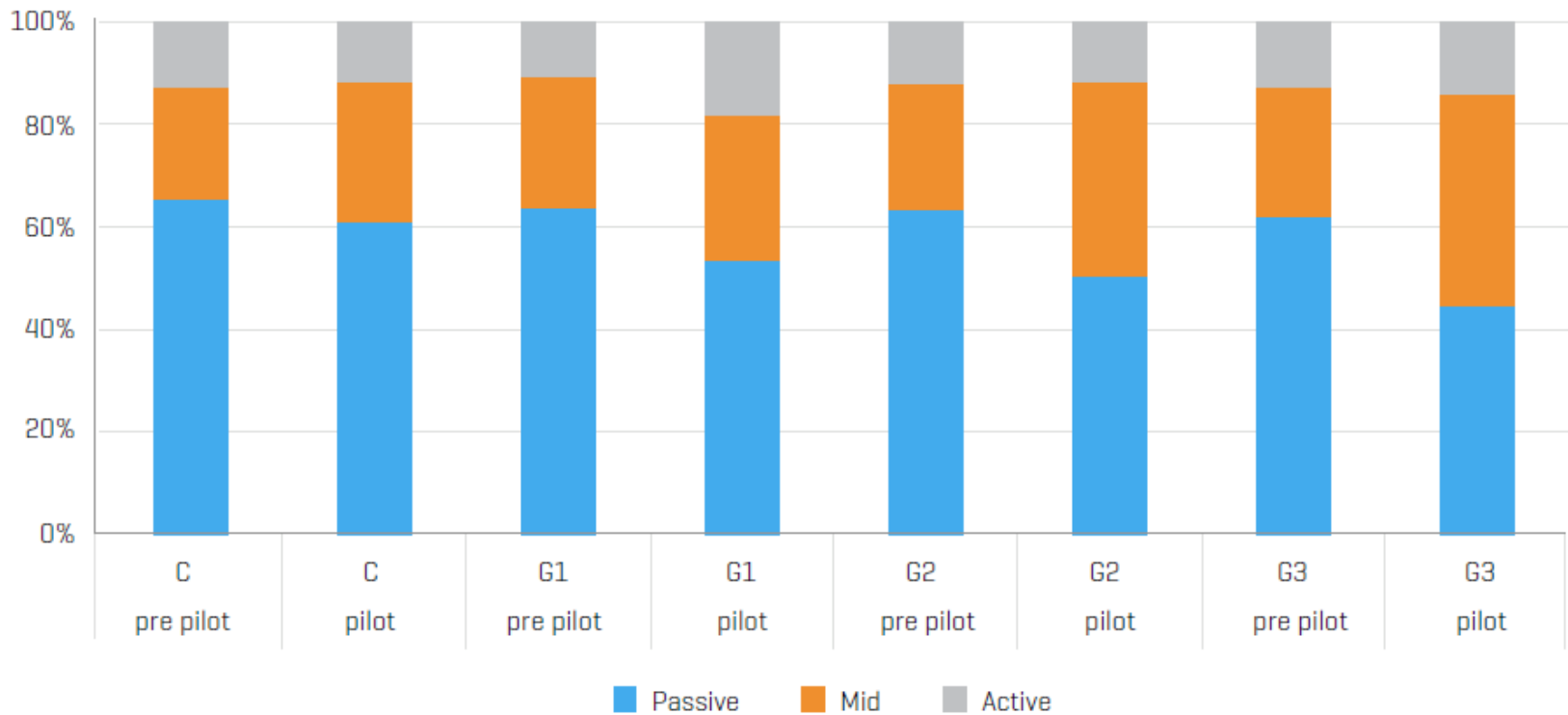


Source: ITG. Compares pre-pilot data for August and September 2016 to pilot data for November and December 2016.

Passive Trading Becomes More Competitive

Almost all shares lost on passive side have moved to midpoint

VWAP TRADING WITHIN THE SPREAD



Source: ITG. Pre-pilot data includes August and September 2016. Pilot data includes November and December 2016.

Advice For Trading Tick Pilot Names

- **Favor algorithms with effective passive routing strategies;** many brokers are struggling to execute passively.
- **Increase routing to inverted pricing** (i.e., taker-maker) venues. Inverted venue usage is up almost 65% for the test groups, primarily because of large queues on the NBBO.
- **Avoid liquidity-seeking algorithms that don't post** and only cross the spread. With wider spreads and higher costs, these algorithms are more expensive, as there are not opportunities to trade with narrow spreads.
- **We recommend dark algorithms** to take advantage of the increased dark liquidity in tick pilot stocks and spread savings at midpoint. Be sure your settings are set to peg midpoint.

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