

The Evolution of Electronic Trading in Agricultural Markets

The Role of Match Algorithms

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What is a Match Algorithm?

In an open outcry market, “matching” took place when a buyer and seller in the pit agreed to a price and quantity

- Matching could be a parallel process with multiple trades taking place at the same time
- Brokers decided who to trade with and how to split up volume across multiple counterparties based on subjective criteria
- Only the best bid and offer were shown

In an electronic market, a set of rules must be established to make matching decisions

- Transactions must take place as a serial process
- How volume is split must be determined by objective rules
- Multiple levels of the order book are shown and actionable

The Match Algorithm implements those rules.....

K Matching Algorithm in Grain Futures

TOP –

The first order to “better the market” is eligible for TOP allocation. The most any order can be allocated is controlled by TOP MAX. TOP MAX in grain outrights is 100 contracts and 1000 contracts in grain spreads.

FIFO (40%) –

40% of the incoming aggressing order is allocated by timestamp. The order with the oldest timestamp at that price level is first in the queue.

Pro-Rata (60%) –

60% of the incoming aggressing order is allocated based on the size of the resting orders. The largest order receives the largest allocation, followed by the second largest order, etc. (example to follow).

Leveling (outright/inter-commodity spreads) –

A means by which residual quantity from rounding during the Pro-Rata step are distributed. Any order that did not participate in the Pro-Rata pass is eligible for rounding with a maximum of 1 contract allocated per order.

FIFO Residual –

Any residual quantity remaining is filled FIFO.

Pro-Rata Example

6 Lot Aggressing Order



<u>Offer (60 Total)</u>	<u>Order</u>	<u>% of Offer</u>	<u>Allocation</u>
10	Order A	16.7%	1
10	Order B	16.7%	1
10	Order C	16.7%	1
10	Order D	16.7%	1
10	Order E	16.7%	1
10	Order F	16.7%	1

In a simple Pro-Rata example, a 6 lot can be equally distributed across the resting top of book resulting in each order getting a 1 lot allocation.

5 Lot Aggressing Order

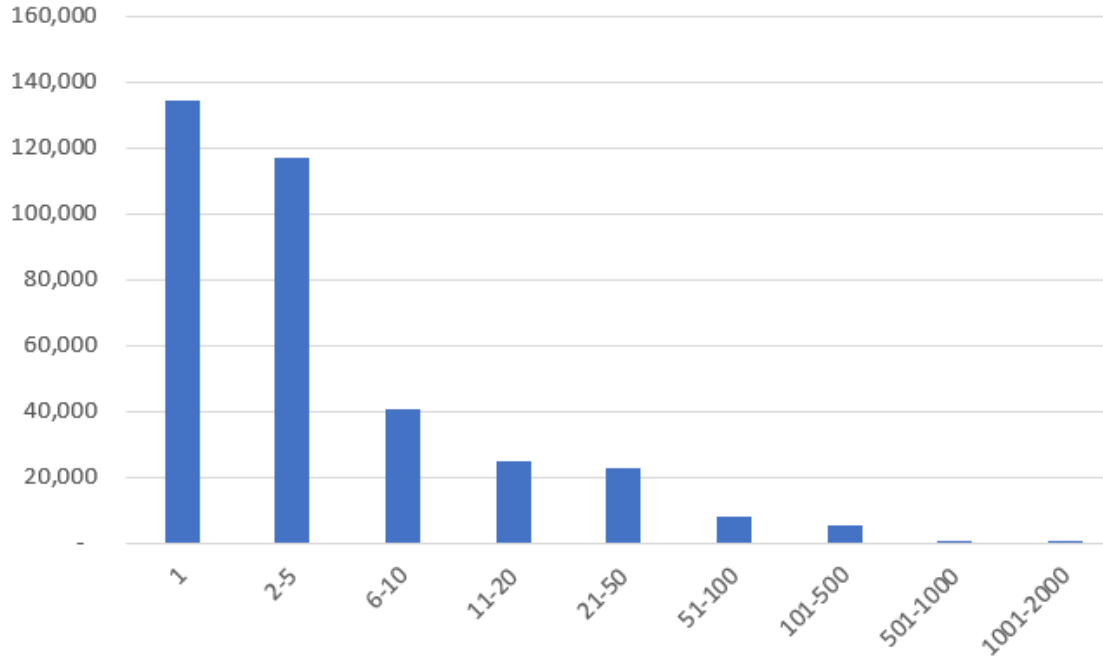


<u>Offer (60 Total)</u>	<u>Order</u>	<u>% of Offer</u>	<u>Allocation</u>
10	Order A	16.7%	0
10	Order B	16.7%	0
10	Order C	16.7%	0
10	Order D	16.7%	0
10	Order E	16.7%	0
10	Order F	16.7%	0

However changing the incoming order to a 5 lot completely changes the allocation. 5 cannot be equally split amongst 6 equal shares resulting in no Pro-Rata allocation and this 5 lot moves to either Leveling or FIFO.

Realized Allocations

ZC Aggressive Order Size Frequency
January 2019



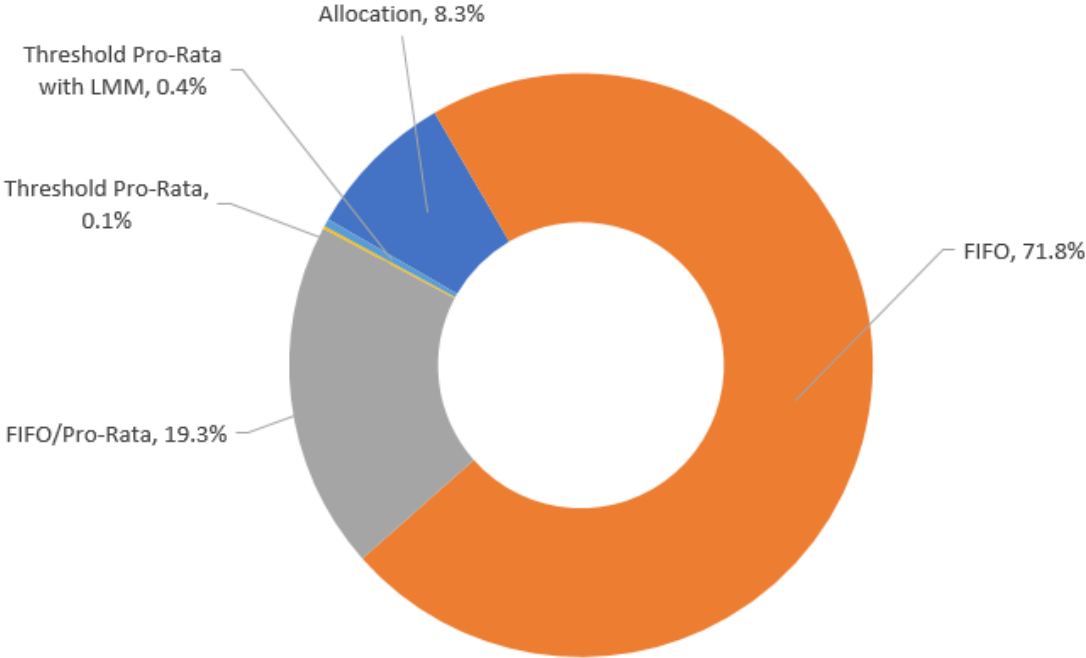
Allocations

- ~7% TOP
- ~56% FIFO
- ~23% Pro-Rata
- ~14% Leveling

Trade Practice Reviews & Match Algorithms

Spoofing Citations by Match Algorithm

January 2018 - March 2019



Useful Links

Matching Algorithms Home Page

<https://www.cmegroup.com/confluence/display/EPICSANDBOX/CME+Globex+Matching+Algorithms!>

Supported Matching Algorithms

<https://www.cmegroup.com/confluence/display/EPICSANDBOX/Supported+Matching+Algorithms>

Matching Algorithm Steps

<https://www.cmegroup.com/confluence/display/EPICSANDBOX/CME+Globex+Matching+Algorithm+Steps>

Matching Algorithm Video

<https://www.cmegroup.com/education/matching-algorithm-overview.html>