

ITG Primer

# Auctions (Opening and Close) in NYSE and NASDAQ

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# Background

## What is an Auction Market?

- Floor based market, participants congregate in one area and announce the bid/ask prices.
- Trade price = highest bid/lowest Ask.

## Traffic Control

- Specialists/Designated Market makers : Auctioneer, Agent, Catalyst and Principal.

## Advantages

Convergence Of Buyers/Sellers → Mutually Agreeable Prices → Enhanced Price Improvement.

## What is a Dealer's market?

- Dealers are assigned for specific securities, no central location, participants connected through electronic networks.
- Market participants sell to and buy from a dealer and not between each other.

## Traffic Control

- Market Maker -- broker-dealer firms.
  - Commit Capital to add liquidity.
  - Provide firm bid and ask prices.
  - Profits through the spread b/w their buy/sell prices.

## Advantages

The market makers compete amongst themselves → competitive prices → best price for individual investors.



# Opening and Closing Auction

- NYSE and Nasdaq both have an Opening Auction and a Closing Auction in addition to Continuous trading.
- Single price auction where, buy and sell orders matched at a price that maximizes the amount of tradable stock.

## Significance

- **True price discovery** representing supply and demand.
- **Resolve natural order imbalances** in critical events, such as index rebalances.
- **Robust prices, making price manipulations more difficult.**

# NYSE

- **NYSE is a very good example of an auctions market.**
- **We'll consider NYSE Arca itself since its easier to explain the process.**
- **Market Order Auction, Continuous Trading and Closing Auction.**

## **Eligible Orders for Closing Auction:**

- All the live-displayed orders traded on the continuous trading session.
  - MOC -- Market Orders executed in closing auction only.
  - LOC -- Limit orders executed in closing auction only.
  - Auction Only Orders -- A market order that is to be executed in auction only.
- **Closing Auction Time-Table NYSE Arca:**

<b>Initial Order collection</b>	<b>9:30 A.M ET</b>
<b>Initial broadcast of Imbal Info</b>	<b>3:00 P.M ET</b>
<b>Freeze Period begins</b>	<b>3:59 P.M ET</b>
<b>Closing Auction run</b>	<b>4:00 P.M ET</b>

## NYSE contd....

### ▪ **Closing Auction Time-Table in NYSE:**

- MOC/LOC imbalances of  $\geq 50,000$  shares are published on the tape as soon as practicable after 3:40 p.m.
- An additional publication is required as soon as practicable after 3:50 p.m., for any stock which had an imbalance publication at 3:40 p.m.
- With respect to the 3:50 p.m. publication:
  - The **size and side of the imbalance would be published** if the **imbalance  $\geq 50,000$  shares**,
  - If the **imbalance  $< 50,000$  shares**, a “**no imbalance**” status would be published;
  - If the **imbalance  $< 50,000$  shares**, Floor Official approved size and side of the imbalance could however be published.
- Publications every **15 secs between 3:40 p.m. and 3:50 p.m.**, and every **5 secs between 3:50 p.m. and 4:00 p.m.**
- Offsetting MOC, LOC orders accepted beyond 3:40 P.M ET for issues having  $\geq 50000$  shares.
- All orders entered after 3:40 PM ET will be rejected where no imbalance is published.
- Exchange will reject all post-3:50 PM cancel requests for MOC and LOC orders :
  - Entered prior to 3:40 PM or
  - After 3:40 PM, entered to offset previously published imbalances.
- All MOC and LOC order acceptance and rejection will be based independently on the two published regulatory imbalances, at 3:40 and 3:50 PM, respectively.

# NYSE contd...

## Publishing Order Imbalances

- Market Imbalance
- Total Imbalance
- Matched Volume
- Indicative match price

## Determining Auction price:

- Core trading orders continue to execute till 4:00 p.m. ET.
- **The order imbalance is offset by:**
  - MOC orders, Limit orders on book and LOC orders in that order.
- **If there is no imbalance,**
  - All MOC orders are executed at the **indicative match price**
  - **Multiple such prices, the indicative price = closest to the last consolidated tape price/best price where no trade through occurs.**
- **If an imbalance exists,**
  - Maximum possible buy/sell MOC orders executed on a time priority basis at:
    - 4:00 PM ET, **mid-point of NBBO** if its **not locked or crossed**
    - If the **NBBO is locked**, at the locked price at 4:00 PM
    - If the **NBBO is crossed:**
      - Bid (offer) side of the BBO** crossed with NBBO when the **crossed market is posted**
      - Last Price** on the consolidated tape when the **crossed market is not posted**

# NYSE contd...

## Example 1: No Imbalance

1. Market Order Imbal: 0
2. Matched Volume: 3000 shares
3. Total Imbal: 0
4. Indicative Match Price: \$41.25, if consolidated Tape last sale was \$41.25

Multiple prices → last sale is used for auction price

Buy Volume	Price	Sell Volume	Order Type
3000	Market		MOC
	Market	1000	MOC
	\$41.00	1000	LOC
	\$41.25	1000	LOC

## Example 2: Imbalance Exists

1. Market Order Imbal: 1000
  2. Matched Volume: 1000 shares
  3. Total Imbal: 6000
  4. Indicative Match Price: \$49.75
- With only these 3 orders, LOC with 5000 shares only sets the auction price and doesn't by itself participate in the auction.

Buy Volume	Price	Sell Volume	Order Type
1000	\$50.00		LOC
	\$49.75	5000	LOC
	Market	2000	MOC

# NASDAQ

- **NASDAQ is a very good example of a dealers market.**
- **Consists of Opening Cross, Continuous Trading and Closing Cross.**

## **Eligible Orders for Closing Cross:**

- On-Close (OC) Orders, ask for execution at the Closing Price – MOC, LOC order types.
- Imbalance Only (IO) Orders, limit order type that offset OC orders, executed only during the cross. They execute at or below/above the 4:00 P.M ET, NASDAQ bid/ask.
- Aggressively priced IO orders will be re-priced to the NASDAQ best bid or offer prior to the Closing Cross calculation.

## **Closing Cross Time Table:**

<b>Initial Order collection both IO and OC order types</b>	<b>7:00 A.M to 3:50 P.M, ET</b>
<b>No order updates, entering new IO orders permitted</b>	<b>After 3:50 P.M ET</b>
<b>Broadcast of Imbal and Price Info</b>	<b>Every 5 secs from 3:50 P.M ET till 4:00 P.M</b>
<b>Closing Cross run</b>	<b>4:00 P.M ET</b>



# NASDAQ contd...

## Publishing Imbalance Information

Imbal info is disseminated on numerous MD distributors, the Cross Net Order Imbalance Indicator (NOII) website and so on every 5 seconds between 3:50 P.M and 4:00 P.M ET.

### NOII has the following information:

- Near Clearing Price
- Far Clearing Price
- Inside Bid/Ask
- Current Reference Price -- A price within the NASDAQ Inside at which **paired shares are maximized, the imbalance is minimized** and the **distance from the bid-ask midpoint is minimized**, in that order.
- Number of Paired Shares
- Imbalance Quantity

## NASDAQ contd...

### Determining Closing price:

- If **far price < inside bid**, then **Current Reference Price = inside bid**.
- In this case, we have **sell side imbalance** in the **closing book**.
- Imbalance could be reduced by **entering more buy IO orders** or by **moving the inside bid towards far price** itself.
- At 4:00 P.M ET, the near price, current reference price should be very close to each other else it would lead to a risk less arbitrage opportunity.

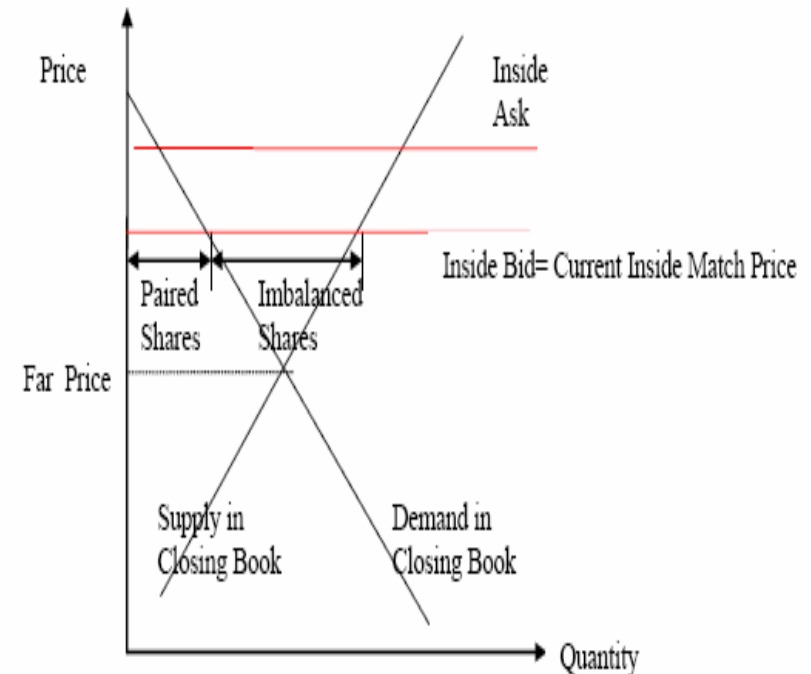


Figure 1: A sell side imbalance

# NASDAQ contd...

## Determining Closing price:

- At 4:00 P.M ET, all orders and quotes are consolidated into a single book and are cleared at one price called NOCP (Nasdaq Official Close Price) if **> 100 shares** are paired.
- NOCP is determined by the following algorithm:
  - The match engine will first search for the price or prices that will maximize the number of shares traded.
  - If Step 1 results in 2 or more prices, it will choose the one that minimizes the imbal of OC orders.
  - If Step 2 results in more than one price then the NOCP will be the one closest to the bid/ask mid-pt at 4:00 PM

## Opening Cross

- MOO, LOO and IO order types participate

Initial Order collection	7:00 A.M, ET
NASDAQ opens/ enters quotes for participants with no open interest	9:25 A.M, ET
Broadcast of Imbal and Price Info	9:28 A.M, ET
Opening Cross run	9:30 A.M, ET

# Share Volume in MOO and MOC

## NYSE

Date	Symbol	Volume	Opening Size	Closing Size	Opening Size as a % Daily Vol	Closing Size as a % Daily Vol
2009/08/26	IBM	1,313,000	123,900	284,300	8.99	19.1
2009/09/01	IBM	1,854,700	57,700	331,500	3.11	17.87
2009/08/26	ITG	767,00	1,500	7,700	1.96	10.03
2009/09/01	ITG	142,500	1,000	30,700	0.7	21.54

## NASDAQ

Date	Symbol	Volume	Opening Size	Closing Size	Opening Size as a % Daily Vol	Closing Size as a % Daily Vol
2009/08/26	MSFT	13,091,300	502,381	835,231	3.83	6.38
2009/09/01	MSFT	20,043,020	521,077	5,193,985	2.6	25.91
2009/08/26	GOOG	654,645	12,296	24,679	1.87	3.7
2009/09/01	GOOG	948,626	10,620	100	1.11	0.01



## MOO and MOC in EU and Asia Pac

- **In EU and AP, large % of overall traded stock volume.**
- **For stocks like VODAFONE, 1.6% of ADV in MOO and 19.6% of ADV in MOC in EU.**
- **In AP, ~ 30+ % of overall traded stock volume.**
- **Large Volumes provide more opportunity, could get more done.**
- **Specific to DIS,**
  - In EU, passive participation to honor cash-constraints.
  - In AP, its more complicated – nature of auction itself in various countries.
  - AP requires a dynamic logic and advanced auction allocation.

# Conclusion

- **Auction Market – Floor Based, participants buy/sell each other through a specialist.**
  - NYSE
    - Has Open auction, Continuous trading and Close auction.
    - Auction only limit orders, Limit Orders on Book and market orders are included in the auction.
    - Open/Close auction help arrive at a single indicative match price which would maximize the amount of tradable stock.
- **Dealer Market – Electronic Network, participants buy from and sell to a Market Maker.**
  - NASDAQ
    - Has Open Cross, Continuous trading and Close Cross
    - MOO/MOC, LOO/LOC and IO orders are included in the crosses.
    - Open and Close crosses leads to more representative and transparent market close/open value.

## References

- [www.nasdaqtrader.com](http://www.nasdaqtrader.com)
- [www.nyse.com](http://www.nyse.com)
- [One Stock, Five Prices: Price Discovery in Opening and Closing](#) -- Mao Ye, Cornell University



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