



# TRADING THE AUCTIONS:

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Taking Advantage of  
Trading Market Anomalies.

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# TRADING THE AUCTIONS: Taking Advantage of Trading Market Anomalies.

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## ABSTRACT

The increase in complexity in today's U.S. equity markets gave rise to many different trading strategies that attempt to exploit inefficiencies in the markets. One such area that has generally been overlooked by traders is the price formation during auctions. As the useful information concerning imbalance dissemination is scattered among different regulations, few people learn to profit out of a trading strategy with surprisingly consistent results. However, such results can only be achieved if traders know "the game" details, including the process of price formation, applicable regulations, order types and a fitting trading strategy. This paper outlines the fundamentals and offers practical advice to those who wish to benefit from trading market imbalances.



# Basics of Market Structure

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Before I get stuck into the specifics of Market Imbalances, I will discuss some basics with regards to the market structure of U.S. stock exchanges. Although the complexity of the market structure has increased dramatically with the rise of electronic trading, high-frequency algorithms, various order types, dark pools, etc., the focus here will be on the fundamentals relevant to the opening and closing crosses.

Firstly, every stock has a primary listing exchange. Using market lingo, all stocks are divided into Tape A, B and C securities, which means that they are listed on NYSE ARCA, AMEX and NSDQ OMX respectively. Out of these three, the first two are called the “Consolidated Tape” and are overseen by the Consolidated Tape Association. Those two markets are largely humanly operated, meaning Specialists and Designated Market Makers<sup>1</sup> (DMMs) oversee the process of price formation during the trading day. They can halt the trading activity during the day if the price action reaches volatility limits or if there is fundamental news pending. On the other hand, Nasdaq’s market is mostly rule-based and electronically sustained and involves less human intervention. This results in quite different order behaviour, auctions, and pricing of the NSDQ listed stocks.

Reg NMS<sup>2</sup> (Regulation National Market Structure) gives formal definition to a lot of the processes among different exchanges. That being said, today’s speed of interaction and information flow between venues gives rise to different arbitrages<sup>3</sup> and inefficiencies that traders and high-frequency algorithms try to exploit.

Although a stock might trade on multiple venues during different times, its official opening and closing price for the day will be determined by the opening and closing auctions that occur solely on the primary exchange. For many market participants, clearing houses and brokerages, those two prices are the most important valuations of the day and understanding their formation is crucial. U.S. exchanges utilize a double-auction model that allows potential buyers and sellers to simultaneously submit their bid and ask prices for the opening and closing crosses. Below there is a detailed explanation of the intricate process of order-matching.



# Trading schedule

Since the very inception of modern day equity markets, stocks trading takes place over the six hours and thirty minutes between 09:30 a.m. and 04:00 p.m. EST. Today, this is called the core trading session; it begins with an opening auction and ends with a closing auction. Trading of any stock can be halted at any time intraday for a variety of reasons. One such reason could be an announcement made by the issuing company. The stock will resume trading with a Reopening auction that works the same way as the Opening auction.

Electronic trading also made possible extended sessions, i.e. pre-market and after-hours from 4:00 a.m. to 8:00 p.m. EST. If a stock is prompted to open much higher on the primary exchange, e.g. in case of good earnings release, its price in pre-market trading will reflect the new information as traders will try to predict where the stock will open.





# Double auction

Here is how an auction on the NYSE works.

NYSE first starts accepting orders at 7:30 a.m. with the following order types eligible to participate in the opening cross<sup>4</sup>:

- Limit Orders<sup>5</sup>(later referred to as “DAY” or “GTC”);
- Market Orders<sup>6</sup>;
- Market on Open (later referred to as “MOO”);
- Limit on Open (later referred to as “LOO”);
- Immediate or Cancel Orders (later referred to as “IOC”);
- Intermarket Sweep Orders (later referred to as “ISO”);

Orders can be entered and cancelled until the DMM opens the stock, even if this occurs after 9:30 a.m.

For example, a theoretical Stock XYZ that has a closing price of \$20.10 and the following orders have been submitted. (*See Example 1 below*)

There are buy-orders for 17,100 shares priced above yesterday’s closing price; this means that the stock will have to open higher (on a chart this will occur as a “gap”). The first 4,200 shares are Market-On-Open, i.e. they want to have the stock regardless of the price at the open and those are the most aggressive bids. The next 5,300 shares are at \$20.21, i.e. someone is willing to bid up to .11¢ higher than yesterday’s close. If this order does not get filled/matched on the open, the order will simply stay at that price during the trading day if sent as Limit Order (DAY/GTC) or get cancelled off, if it was submitted as a Limit-On-Open order. Below that order, there is a bid for 7,600 shares at \$20.15 and another participant willing to buy 15,000 shares if the stock trades flat, i.e. at yesterday’s close.

On the other side, I see the first selling interest with someone asking \$20.15 for 2,000 shares, \$20.17 for 3,200 and a larger block order of 20,000 shares .10¢ above the close at \$20.20. Note that in this state the market is “locked”, i.e. there are orders which so far have not been matched (since the NYSE market is not trading yet). Once the market opens, this state will not even be allowed among different venues as they will have to be rerouted in order to be executed at the best possible price that is available at that time in the National Market System.

Stock XYZ						
Last: 20.10 (1)		Prev Close: 20.10				
Chng: 0.00		Vol: 0				
Open: 0.00		High/Low: 0.00 / 0.00				
VWAP: 0.00		Exch: NEW YORK STOCK				
08:00:10 Buy Opening						
Imbalance Shares: 17,100		Near Ind. Clear Price: 20.20				
Matched Shares: 0		Ind. Change: 0.10				
DQOP SELL		DQOP BUY		CLOSEPOS Sell RAVN Buy RAVN		
100 300 500 700 1k 1.5k 2k 2.5k 3k x2						
Limit		L M D S P		Day		
100		0		-None-		
SELL		CXL ALL		BUY		
MM ID	Volume	Bid Price	Ask Price	Volume	MM ID	
MOO	4,200		20.15	2,000	NYSE	
NYSE	5,300	20.21	20.17	3,200	NYSE	
NYSE	7,600	20.15	20.20	20,000	NYSE	
NYSE	3,600	20.09	20.22	7,000	NYSE	
			20.25	1,300	NYSE	

Example 1. Imbalance window from HAMMER trading platform



In this example, there is more buying interest than there is selling interest; a buying imbalance is created and the bids will have to be matched against the offers. The 4,200 and 5,300 bids are aggressively priced and they can be matched against the 20,000 block order at \$20.20. Since there are only 5,200 shares offered at a price below \$20.20 and they are insufficient to fill the two most aggressive bids (that comes up to 9,500 shares), the order imbalance will be pooled together and filled at \$20.20.

The opening print will read 9,500 shares at \$20.20. Which orders got executed? The two most aggressive bids, the two most aggressive offers and 4,300 shares of the block offer at \$20.20 of which the remaining balance stands at 15,700. It's worth noting that the two offers at \$20.17 and \$20.15 received a price improvement because the orders in the auction were pooled at a price that was higher than their limit price. In this scenario their order prices did not matter, whether their orders were MOO or \$15.15 or \$20.15 or \$20.19, their orders would have been filled at the same price – the price at which the buying interest was matched and the imbalance was executed at \$20.20. The bid at \$20.21 also received a price-improvement as it was more aggressively priced (i.e. willing to pay more) than the price of the actual open. On the other hand, the bid at \$20.15 was not priced aggressively enough and did not participate in the opening cross. This limit bid will remain on the books until it is filled or cancelled.

From the example above, it is evident that the price will be influenced mostly by the market participants with larger trading sizes at the auction. Since they wish to sell off a large portion of their block and have to compete with other sellers, they will try to distribute as much of their volume as possible at the open without greatly influencing the price. Going back to the example above, since the two most aggressive offers did not have enough shares to match the aggressively priced bids, the stock opened above their limit prices. If the offer at \$20.17 was for 7,500 shares or more, the aggressive buying interest would have been matched by it and the stock would have opened at that price. On the other hand, if the block order offering 20,000 shares was priced at \$20.15, the stock would have opened at that price and the 7,600 limit bid at \$20.15 would have also been aggressive enough to participate at the open. As a result, the stock would have opened at \$20.15 with an opening print of 17,100 shares.

Note that the example above is theoretical and shows how a double auction<sup>7</sup> works. Most of the critical information illustrated in it is not available to the market participants at the time of the auction. In order for a trader to apply this in practice, he/she must fully understand the underlying concepts before being able to apply to real-time market trading.

In reality, the exchange is the only party that has access to all of the information above. Traders operate under uncertainty and have to weigh the odds. Most importantly, traders do not see the full order size, as part of it might not be displayed. The orders in the example above might be displayed as 100 share orders on the book, however, the end result of the auction process would be exactly the same. Traders also do not see Market/MOO orders, so they have to guess or look for other indicators.

That's where Imbalance indication comes into play.



# Imbalances

If a stock is about to open higher or lower than the previous day's close, the New York Stock Exchange disseminates the information of the size of the imbalance before the open. The initial imbalance is calculated and published at 8:30 a.m., i.e. one hour before the open. Between 8:30 a.m. and 9:00 a.m. the imbalance feed and matched size are updated every 5 minutes; then from 9:00 a.m. to 9:20 a.m. every minute; and as the open approaches, the feed will update every 15 seconds for each security.

The information feed is designed to attract matching interest so that divergences in the opening prices do not happen arbitrarily. For example, if a large MOO order is submitted a few seconds before the DMM opens the stock, the security might gap higher for no other reason than the interested parties' inability to submit their orders. If the order was submitted earlier, a matching seller might read the imbalance, submit their order and get it filled at the opening auction.

Since the imbalance feed is not available in every market data subscription, it is safe to assume that not all market participants have access to it and even fewer understand the intricacies of trading the imbalances. This opens the market to inefficiencies.

In the theoretical setup above, [Example 1](#), the indicated imbalance before the actual open would be on the buy-side, i.e. +17,100 shares (the sum of the three bids placed above yesterday's close = 4,200 + 5,300 + 7,600). That same setup would look rather different in a real trading environment with reserve orders. Since large traders do not wish to give themselves away, they will hide their actual orders sizes by reducing their display size.



MM ID	Volume	Bid Price	Ask Price	Volume	MM ID
NYSE	100	20.21	20.15	300	NYSE
NYSE	100	20.15	20.17	1,000	NYSE
NYSE	15,000	20.10	20.20	20,000	NYSE
NYSE	3,600	20.09	20.22	7,000	NYSE

**Example 2.** Theoretical Imbalance with reserve orders (window from [HAMMER trading platform](#))





The actual order structure in [Example 2](#) is the same as before in [Example 1](#). However, since MOO orders do not get displayed in the Level 2<sup>8</sup> and LOO and DAY orders can be displayed as 100 share bids (depending on the order display instruction<sup>8</sup>), the same theoretical situation from Example 1 now looks somewhat different in a live trading platform. Therefore, the two most aggressive bids from Example 1 only display 100 shares through reserve orders; the two most aggressive offers also display less than their actual size. In other words, in the real world trading is done with less information. However, there are additional clues, coming from the imbalance feed which is now on display, 'disclosing' that 17,100 shares are priced above yesterday's close. This means that some combination of Limit and On-Open orders add up to that amount, yet only 200 can be seen as limit bids. This is where the art of reading the imbalance comes into play – one has to guess the actual order sizes and the orders that are On-Open. There are plenty of variations that yield this result, but they are limited by the following ideal scenarios:

A) Scenario A: The two 100 share bids at \$20.15 and .21¢ are fully displayed and the rest of the imbalance (a full 16,900) are MOO: The stock would open at \$20.20 with a 17,000 share print.

B) Scenario B: The 100 shares at .21¢ are fully displayed and the 100 shares at \$20.15 are actually 17,000 revolving. The stock would open at .15¢ with a 2,100 share print.

C) Scenario C: Any other combination of orders will lead to the stock opening between \$20.15 and \$20.20 with various print sizes.

The trader has to speculate where the stock will open and which order was crossed at the open.

Reading the order book<sup>9</sup> and tape will offer a good idea of what has happened with the stock so far. For instance, Scenario A is an extreme case where one of the buyers is excessively aggressive and might represent a good setup for a trade on the short side, if there is no follow through in intraday price action. Scenario B could mean that the buyer at .15¢ still has 15,000 shares left to buy and might continue to act as support at that level; later on, he might step in to take the block offer at \$20.20, if no intraday seller shows up. The seller at .20¢ might end up losing their patience and selling the block aggressively at .15¢, opening the way for higher prices.

If the odds are weighed as shown, the trader might go ahead and send an On-Open order at \$20.19 to participate in the auction and short the stock if it opens at .19¢ or higher. If they do not get filled and the stock opens lower, then the risk outweighs the reward, the wait for an opportunity continues, perhaps another stock or another day.

In the example above, the range of scenarios all indicate a price between \$20.15 and .20¢. But what if during the last minutes before the open more buy orders come in? Or the block order at \$20.20 decides to cancel or go higher? Then the stock will most likely gap higher and catch many traders by surprise.



# Trading the Open

Trading the open successfully largely depends on accurately gauging the direction and risk of the execution. If a stock has a large imbalance indicated, the trader has to estimate where it will open and if there is an explicit reason for that. As a general rule, for the mispricing to be technical, the execution would be a reversion-to-the-mean type of strategy. If an imbalance appears to be the consequence of changes in the fundamentals of the stock, it might offer information leading to consider trading in the same direction.

A) Trading the range - If a stock has been largely range-bound and there is no significant news for the stock, then a buy-imbalance might be the opportunity to sell or short the stock at or above the upper bound of the range. If for any reason the stock continues to climb, the trader can cover the short position intraday with minimal loss. An excessive opening price might occur for a wide range of technical reasons. For instance, a broker executing a position recklessly at the open or a large short position being covered in a rush because of a streetwide lack of borrows;

B) Shorting into an uptrend - If a stock has been in a prolonged uptrend and opens with a buy-imbalance, it might be a bad idea to short it, given that sellers have not yet had a good reason to bring the price down. Stocks that trade at all-time highs or between levels, rarely have many offers in the book and can make wild swings on little volume;

C) Fundamental news - If a stock has a significant news event, such as earnings or a merger coming up, it might make more sense to go with the imbalance, i.e. to add limit bids to the open. Let's say a company publishes an agreement to get acquired by another company for \$50/share. It might be that large GTC orders by slow participants have been resting at lower prices and might cause the open to price at \$48, before the stock races to \$50 intraday. Joining the trade into the open at a good price might end up moneymaking;

D) IPOs - If an IPO has been hyped and very well marketed to the public, it might prove profitable to buy at the very first trade of the stock and offer it out higher a few moments later. A lot of market participants will not participate in the initial auction, but wait for the stock to open before buying, when the stock starts trading. If a lot of buying interest has been generated, retail traders will come in with market orders after the initial print. As an example, before BABA (Alibaba Group Holdings Ltd.) started trading on 9/19/2014, it was very well advertised and anticipated for weeks on CNBC and in various news outlets. Although it was expected to trade in the \$60 range, it actually opened at \$92.70 and raced to \$99.70 in the following two hours as retail interest flooded the market in fear of missing out the new hot stock. For the next month, in the following five months there was no more buying interest as the stock retraced to \$82.81, before it started its next bull swing into the \$120 range.

A similar example was FB (Facebook Inc.), which again was very well anticipated. It opened for trading at \$42.05, before rallying to \$45.00 as traders rushed into the market in fear of missing out. In the following five months, the stock collapsed to \$17.50 before stabilizing, preparing for a new bull campaign. It regained the \$40 range a full 15 months after its initial IPO. The trader who came in to make a quick opening scalp made a quick couple of points and could have waited patiently to see where the stock would find its true value and support. That trader was not left holding the bag, hoping for the stock to come back to its IPO price... eventually;



E) Venue arbitrage – Sometimes a stock is trading quite actively pre-market on electronic venues before the actual open on the primary exchange. For instance, a stock is trading at \$99.20 a few minutes before the open as it looks like it will open around those levels. As the open moves closer, a large institutional limit bid appears at \$100. This new information makes it more likely that the stock will open around or at that price (provided no new sellers come on the market). A trader that is alert and is observing both the ECN Level 2 books and the NYSE Open book can start participating in the pre-market session to take any offers below the price that they believe the stock will open on the primary exchange.

Although many participants might be watching the market, not all of them have orders in the book. This means that once an inefficiency appears to be in the making, traders are likely to compete with orders from other traders. The information available to any participant in the market is in a constant state of change. That being said, with enough experience, a trader will be able to distinguish a good set-up from a bad one.

## Executing an Opening Imbalance Trade

Drawing from what was discussed so far, below I take a look at how a trade execution would be carried out. Say, I own 20,000 shares DHY that I bought around yesterday's close, priced at \$2.35. The stock ticker represents Credit Suisse's High Yield Bond Fund, which has an average daily volume of 300,000 shares and an Average Daily True Range of \$0.03-\$0.05 (i.e the stock does not usually move more than 5 cents a day). Here's what I see:

- 15 minutes before the open an unusually large 100,000 Buy Imbalance appears (representing around 1/3 of the average daily volume). There is no corporate or news event published;
- At the time the imbalance was published, there was no displayed bid above yesterday's close, so the Imbalance must be a large MOO order. I suspect that strategy A covered before might be a good fit;
- Bids start coming in, making the imbalance harder to read. 20,000 shares get matched. 1 minute before the open it still shows **+84,300**, but no significant sell orders are on sight. It seems the stock will gap higher for no fundamental reason;
- I own 20% of the potential MOO imbalance, so I have to distribute my orders in such way to avoid matching the imbalance and skewing the opening price down;
- I place my NYSE DAY or LOO orders the following way:
  - o 10,000 shares at \$2.39 (this would represent a fairly "large" move for the stock with regards to ATR);
  - o 5,000 shares at \$2.49;
  - o 5,000 at \$2.55;

All orders display 100 shares, so that I do not show my interest in selling - other traders have to guess the size I am willing to sell at those price levels. I have to weigh the odds of the imbalance opening above my orders, so I distribute my volume and price it differently. The goal is not to offer too much size too cheap, skewing the opening price lower. Since I am uncertain where the stock will open precisely, I send various orders at different prices.



DHY opens at \$2.72, taking the full 20,000 of my shares.

My profit is \$7,400 ( $20,000 \times 0.37 = \$7,400$ ). If I was proven right in thinking the opening print was in fact, a misprint, potential sellers who did not see the imbalance indication will start rushing in to sell at that price. Since the buyer came in with a single burst of orders, the stock should start retracing down again and trade back to flat. If I like the position long-term I can start accumulating at yesterday's levels again.

In a less ideal scenario, the stock might open at \$2.52, leaving me with 5,000 shares. In this case, I was too optimistic and overestimated the aggressiveness of the buyers. In a third scenario, the stock might also open at \$2.40, which is about the most it usually moves in a day. In this case, I let half of my shares go as I assume it will be unlikely that the stock will trade higher that day.

## Mechanics of the closing

Although the mechanics of the closing print are similar to the open, there are some differences that need pointing out. Limit-On-Close and Market-On-Close order types for the close can be entered throughout the entire trading day. Their cut-off time is 3:45 p.m., when the initial imbalance for the close is published – no MOC/LOC orders can be cancelled afterwards. At this time, a distinction must be made between a Regulatory imbalance<sup>10</sup> and an informational imbalance<sup>11</sup>. A Regulatory imbalance is defined as a published imbalance at 3:45 p.m. above 50,000 shares in either direction. In such cases, traders can only trade in the opposite direction of the imbalance with a CLO (Closing-Offset-Order<sup>12</sup>), until the end of the day. Besides that, one can send DAY or EXTENDED orders, but the order might also be filled intraday if the stock trades at that price prior to the close at the limit price. If no Regulatory Imbalance is in effect, no direct NYSE order can be sent that is not executable intraday, but is solely to be included in the market closing auction. This makes the execution at the close trickier for a participating trader.

The Informational Imbalance is disseminated every 5 seconds until the close, which includes the Paired-off quantity. 3:58 p.m. is also the cut-off time for CLO orders, so that they can no longer be cancelled past that point. The closing auction begins at 4:00 p.m. and if the volume is substantial it might take a few minutes for a stock to close.



# Executing a closing auction trade

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Since the initial imbalance information is disseminated 15 minutes before the close and the market is still trading actively at the time, it is harder to judge where a stock will close. The continuous book is moving and adjusting in accordance to the ebb and flow during the last 15 minutes of the regular trading day. The definitive indication of where the stock will close would be the imbalance feed, which in this case hints to the structure of the closing book<sup>13</sup>. If an unusually large imbalance is to be traded at the close, the market price will adjust immediately, as traders try to take advantage of the information that a large participant wants to trade at the close. However, since the imbalance feed is meant to draw liquidity to the market, the orders that will be coming in during the last minutes of the trading day might reduce the size or even reverse (“flip”) the direction of the initially published imbalance.

Floor broker’s<sup>14</sup> interest and pegged e-quotes will be included only at 3:55 p.m.; this update will give additional information and reassurance of what will take place at the close and if a large move or mispricing is in the works. As the closing cross approaches and the time for additional orders is running out, traders will have more confidence in their prediction of where the stock will close. Unfortunately, the more confidence they have, the more the market will already have adjusted the price to reflect the new information as trading progresses. Therefore, trading the close is an intricate game and provides opportunities to good trades only occasionally.



# Avoiding pitfalls while trading the close

The Imbalance published at 3:45 p.m. is composed of a large LOC order.

If an Imbalance that is a large percentage of the trading volume is initially published 15 minutes before the close, traders might start accumulating the stock in order to sell it into the close. However, if the Imbalance is composed of a large Limit-On-Close order the stock has no potential to gap higher. Once the stock starts trading above the limit price of the LOC order, the imbalance will disappear, effectively making it clear that the order is not marketable.

- The Informational Imbalance might flip before the close.

If too many participants decide to match the Imbalance at the close, the Informational Imbalance might flip into the opposite direction of the Regulatory Imbalance. However, regulation dictates that the Regulatory Imbalance can only be offset by a CLO order type and those orders can only be sent against the initial direction of the Regulatory Imbalance. If the imbalance flips, traders will have hard time matching it and this might lead to unexpected outcomes.

- No cancels after 3:58 p.m.

If one decides to participate with a LOC/MOC/CLO order, they have to keep in mind that those orders cannot be cancelled after 3:58 p.m. Although the stock might initially trade in one's favour, a last minute imbalance flip might cause one's order to execute at a bad price or not be filled at all. If the trader got in with a quick scalping trade in mind, they might be left holding the bag with a stock that they did not intend to hold overnight.

- Floor brokers and DMM's receive a "Sneak Peek" of the closing book starting 2:00 p.m.

Since Floor brokers and DMM's have an advantage over other market participants, they might start participating in the market before the Imbalance is actually disseminated throughout the feed. Therefore, a large move might occur an hour before the Imbalance, leaving traders that do not see the closing book wondering why that movement is happening. Once the imbalance is published, short term traders and algos (algorithmic-traders) might create a final rally in the price. But since the floor brokers will offset the amount of stock they already bought an hour earlier, the stock has little potential for further rally or gap.

- Bottom line, a trader who wants to make money in a closing auction gap, should watch out for potential surprises and imbalance flips in the market place. Such flips will result in some participants being stuck with their non-cancellable MOC orders. During slow market days, such an occurrence would be an exception. However, there are days when such inefficiencies might occur in multiple stocks. Below is a list of significant market events that give rise to significant imbalance formation.



# Market Events

## 1) Expiration Days & Quadruple Witching

Expiration dates in derivatives are the last day options or futures contract is valid. Since the Options Clearing Corporation automatically exercises a call or put option that is at least 1 cent in-the-money before it expires, this might create a lot of interest at the close of trading on the expiration date. Stock Options and Futures usually expire every third Friday of the month, provided it is not a day off for the markets (on bank holidays, they expire the day before). Furthermore, every third Friday in March, June, September and December Market Index Futures and Market Index Options expire the same day – this event is known as Quadruple Witching. During those days investors attempt to unwind their futures and options positions before the derivatives expire. Quite often, huge blocks of stock will be executed in thousands of symbols during the close. A trader, who is mindful of the market, could track several stocks, that might not find offsetting interest and end up “making a killing” on the close.

A good setup for a hedged trade at Expiration day is to enter a class A and class B shares of the same stock long/short. As an example, HEI (HEICO Corporation common stock) might have a huge sell imbalance and close at the low that day, while HEI.A (HEICO class A shares) might have a moderate buy imbalance and gap higher. Executing both trades at the close, produces a delta-neutral position that attempts to yield a return only out of the technical inefficiency.

## 2) Window Dressing

Window Dressing is quite often discussed in academic literature with regards to the Efficient Market Hypothesis. However, active traders are aware that when it comes to illiquid stocks, window dressing has a significant impact on the close of trading at quarters and year ends. If a fund that holds a basket of stocks wants to make its NAV quarterly statements look better, they could simply buy blocks of stock at the close of business during the last trading day. This will affect its accounting and quarterly report. The simplest way to achieve this, would be via a basket of MOC trades at specific dates. A trader who knows what dates are important for a fund's quarterly reporting could be on the lookout for Imbalance trades.

## 3) Index Change

If the market capitalization of a company drops below the market capitalization of another company, big indexes such as the S&P 500, might have to change their constituents. For example, on May 13, CUBI (Customers Bancorp Inc.) replaced CKP (Checkpoint Systems) in the S&P Small-Cap 600. This information was [published](#) several days earlier, on May 9th. A trader who caught wind of those changes would expect significant volatility at the close of business on May 9th. This is because ETFs tracking the S&P SmallCap 600 or asset managers, who trade only stocks in that index, need to rebalance their portfolios with respect to the changes of their underlying benchmark.

From experience, the initially published Regulatory Imbalance flips regularly into the close and catches many traders unprepared. More often it makes more sense to trade against the spike that occurs once the Regulatory Imbalance is disseminated.

## 4) Rebalancing Days

Many Market Indexes have rebalancing days that often create opportunities for imbalance trades. For instance, the Russell 2000 index reconstitutes its whole portfolio once a year. More information could be found on their [website](#).





## 5) Corporate Events

Corporate events such as stock spinoffs, mergers, expiration of when-issued stocks or convertible preferred stocks, symbol changes, stock exchange delistings and changes in a fund's prospectus, can also yield imbalances at the close of the market, since some holders prefer not to participate in a corporate reorganization event. If an abnormally large imbalance pops up before the close of the market, it is sensible to check if an announcement has been published. If a trader goes into trading an imbalance in a company stock that is undergoing restructuring, they would have to make sure to obtain that stock at a price that would make it likely to continue trading after-market. Thus, you can exit the position before settling the reorganization and capture the profit. In an adverse case you will have to carry the stock overnight and participate in the corporate reorganization, which might take days or even months to complete. If the stock gets delisted, it might continue trading OTC at a different price. In such case the trader would need access to OTCB markets to clear the position.

# Advanced NYSE Routing Strategies

As mentioned before, NYSE regulation poses strict limits on the order types qualified to participate in the opening and closing auctions. The regulation also dictates when those orders can be sent, if and when they can be cancelled and if they can be sent as non-displayed. These can make a trader's head hurt as they have their orders rejected for any of the reasons above during the last seconds before the auction. Inability to master the rules governing the order types will result in a lot of frustration, unsuccessful execution and ultimately, financial losses.

There is a way to get around the hassle and make one's life simpler by delegating the task of executing the order in the auction to a Floor broker. Floor brokers occupy a special place in the world of NYSE trading, as the order flow between retail traders and floor brokers gets split up. Here's what that means:

- a) By sending his order to the floor broker the trader has a chance to receive a better fill at auctions if the stock closes at their limit price;
- b) The trader can cancel their order up until the very last moment before the auction, as they are not cancelling an actual trading order at the exchange, but in fact cancelling the instruction to the floor broker to fill the order at the auction. The floor broker would use their own technology to actually get the order filled;
- c) The trader can send with or against the Regulatory Imbalance (unlike CLO orders which can be sent only against it). One can also send On-Close Floor Broker routes if there is no Regulatory Imbalance in effect – the broker will still fill it;
- d) The trader is effectively participating in the discretionary trading interest during the auction, which means that their orders will not participate in the imbalance calculation until 3:55pm at the close.

The floor broker route usually has higher execution costs than a direct NYSE order, however given the advantages outlined above it often proves an indispensable 'tool' during imbalance executions. It leaves other traders who have no access to floor routes scratching their heads wondering how someone could get a hold of all that trading flow. If the trader's executing broker offers access to a NYSE floor broker, this routing strategy can be a serious money-maker for Imbalance traders.



# Advanced Nasdaq Routing Strategies

Since NASDAQ's marketplace is fully electronically operated, there are no floor brokers that can execute one's order. Therefore, the trader needs to make sure they understand all order intricacies in routing to NASDAQ's auctions. Most importantly, NASDAQ has two order types for auctions:

a) OnOpen & OnClose orders, that can be sent up to 9:28am for the Open and 3:50pm for the Close. Once sent, these orders cannot be cancelled after the cutoff time. If a trader sends such an order after the cutoff time it will be rejected by the exchange;

b) Imbalance-Only orders<sup>15</sup>, which are designed to offset imbalance liquidity. They can be sent only after the cutoff time and can go only against the imbalance at that time. It is interesting to note that the limit price of Imbalance-Only orders will be replaced by the nearest order in the book for the auction.

If for some reason a trader wants to participate in an opening auction two minutes before the open and does not want to have their limit price replaced due to an Imbalance-Only order, they will have to send an Extended order. However, since this order is eligible to be filled in the pre-market session, the trade could also get executed before the actual auction.

One might also wish check if their NSDQ DAY orders would fill pre-market. If they do not, then the trader is trading with NSDQ.CORE orders, which are treated as OPG orders before the close and then get replaced to normal core session DAY orders. This might create some confusion if one is trying to get a fill in an imbalance with such an order and they are not getting a fill. In such case, the trader should refer this issue to the executing broker.

Due to the fully electronic nature of NASDAQ's marketplace and the rise of high-frequency trading it is much harder for a human to catch an imbalance inefficiency, as flesh and blood traders are competing with algorithms that take split-second decisions. That being said, in many cases knowing the inner workings proves valuable to traders who are alert and understand how auctions work.



# Conclusion

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Traders are frequently caught by surprise with sudden “gaps” in price formation during the stock opening and closing. This is often the result of lack of understanding of the underlying auction principles, insufficient information on the topic, not enough market data and technological disadvantage. Professional equity trading software – an OEMS platform, combined with comprehensive market data subscription (inclusive of the imbalance data feed<sup>16</sup>) and an executing broker that can provide different DMA<sup>17</sup> order types and custom routing, gives professional traders the edge in a setting that is often overlooked and remains obscure to most participants on the market.



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# Additional Materials for Reading

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NYSE Open/Close FAQ:

[https://www.nyse.com/publicdocs/nyse/markets/nyse/NYSE\\_Opening\\_and\\_Closing\\_Auctions\\_Fact\\_Sheet.pdf](https://www.nyse.com/publicdocs/nyse/markets/nyse/NYSE_Opening_and_Closing_Auctions_Fact_Sheet.pdf)

Full NYSE Rules:

[http://nyserules.nyse.com/nyse/rules/nyse-rules/chp\\_1\\_3/chp\\_1\\_3\\_8/chp\\_1\\_3\\_8\\_12/default.asp](http://nyserules.nyse.com/nyse/rules/nyse-rules/chp_1_3/chp_1_3_8/chp_1_3_8_12/default.asp)

NSDQ Open/Close FAQ:

[http://www.nasdaqtrader.com/content/productservices/trading/crosses/openclose\\_faqs.pdf](http://www.nasdaqtrader.com/content/productservices/trading/crosses/openclose_faqs.pdf)

FTSE Russel Reconstitution:

<https://www.ftserussell.com/research-insights/russell-reconstitution>

SPICE Index Announcements:

<http://us.spindices.com/search/?ContentType=Announcement>



<sup>1</sup> A DMM (formerly called Specialist) is a NYSE market participant who is obligated to maintain a fair and orderly market for an assigned set of listed firms. He is also obliged to quote at the National Best Bid and Offer (NBBO) for a percentage of the time and can step in with his own or his firm's capital to eliminate liquidity risk.

<sup>2</sup> Regulation National Market Structure was established in 2005 to organize the trading flow among different market centers.

<sup>3</sup> An arbitraging strategy is a strategy, attempting to capture an (almost) instantaneous profit out of a mispricing among different marketplaces.

<sup>4</sup> Time-In-Force. The TIF of an order is the instruction for how long an order is eligible for execution. The usual order types are: DAY orders, Extended session orders, Immediate-Or-Cancel, Good-Till-Cancelled and OnOpen/Close orders for auctions.

<sup>5</sup> Limit orders are a type of orders that have an instruction to be filled at a specific price or better. Depending on the Time-In-Force they can produce Limit-On-Open and Limit-On-Close orders.

<sup>6</sup> Market orders do not have a pricing instruction and are the most aggressive participants, as the order has to be filled immediately at the prices prevailing in the market place.

<sup>7</sup> Double auction is a process in which both buyers and sellers can simultaneously submit their orders before they are cleared at one unified price at the end of the auction.

<sup>8</sup> Today's electronic markets allow trading participants to choose the display size of the order. They can be generalized as follows: a) non-displayed orders which are hidden in the book; b) revolving (iceberg) orders which display only part of the trading size and refresh when the displayed liquidity has been exhausted; c) fully-displayed orders which display the actual trading size. Exchanges prioritize order matching based on the display instruction.

<sup>9</sup> Level 2 order book is the list of buy & sell orders that are displayed in the market place.

<sup>10</sup> Regulatory Imbalance is an Imbalance that is published at 3:45pm EST and is above 50,000 shares. Once disseminated, specific rules for offsetting orders are in effect.

<sup>11</sup> Informational Imbalance is the information about order matching that is updated after the Regulatory Imbalance has been disseminated.

<sup>12</sup> A direct NYSE order, specifically designed to allow market participants to offset major Imbalance interest at the closing auction.

<sup>13</sup> The closing book consists of all orders that are sent to participate in the closing auction (i.e. CLO and DAY orders), while the continuous book consists of all DAY orders that are displayed in Level 2 intraday while the market is trading.

<sup>14</sup> Floor broker is an independent member of an exchange, who is authorized to execute trades on behalf of clients, whose primary objective is "best execution".

<sup>15</sup> Imbalance-Only Order is a NSDQ order type that is specifically designed to offset market imbalances after the cutoff time for OnOpen & OnClose orders.

<sup>16</sup> Imbalance Data Feed is the feed that carries the Imbalance information that is disseminated to the market place. It is included in most Level 2 data subscriptions, such as the NYSE Open Book feed and NSDQ TotalView.

<sup>17</sup> DMA (Direct Market Access) is a term in electronic trading that gives traders the technology to interact directly with the order book of an exchange, instead of handing the execution over to a broker-dealer or investment firm.