

Market Makers in Financial Markets: Their Role, How They Function, Why They are Important, and the NYSE DMM Difference

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Abstract

In this article, we define market makers, and discuss their role in the financial markets, with a particular focus on the U.S. cash equity market. We review their recent evolution, where they function, and compare various market making obligations. We highlight the value of the NYSE Designated Market Maker (DMM) model as compared with other U.S. equity market making models.

Introduction

Through the first five months of 2021, average daily turnover in U.S. cash equities was nearly \$580 billion. The daily underlying notional value traded in global futures markets approaches \$6 trillion¹. According to the Securities Industry and Financial Markets Association (SIFMA), the U.S. Fixed Income Market trades more than \$1 trillion per day, with U.S. Treasuries accounting for nearly \$635 billion daily. The foreign exchange markets dwarf both U.S. equities and fixed income, with daily turnover estimated at approximately \$6 trillion per day. High volume does not necessarily mean that markets always trade efficiently; market makers play a critical role in providing liquidity and helping to maintain healthy, continuous and robust markets across all major exchange-traded and over-the-counter asset classes in the U.S. and across the globe.

The Securities and Exchange Commission (SEC) defines a market maker as “a firm that stands ready to buy or sell a stock at public quoted prices”². At first glance, one might think that a market like U.S. equities that trades \$580 billion per day, or the U.S. Treasury bond market, which is often characterized as one of the most liquid markets in the world, has no need for intermediaries. But some securities are less liquid than others: Many bonds rarely trade, for example, and roughly 30% of U.S. cash equity securities trade less than \$500,000 per day. Market makers provide a valuable service, providing investors with the ability to trade with immediacy and transparency,³ even for less liquid products.

Market makers may interact and function differently in these distinct markets. U.S. cash equities markets are largely electronic and trading occurs on both registered exchanges and on Alternative Trading Systems (ATS), commonly known as “dark pools,” and bilateral venues. Regardless of the trading venue, market makers may interact electronically with public order flow, but may also provide liquidity via high-touch operations. Market makers registered on the U.S. cash equity securities exchanges have varying obligations. But the trading venue makes a difference for transparency; U.S. cash equities trading on registered exchanges has significant public pre-trade and post-trade

¹ Data for H1 2021 reported to the World Federation of Exchanges.

² <https://www.sec.gov/fast-answers/answersmarkethtm.html>

³ Not all markets have the same transparency. For example, market makers in non-exchange markets, such as the foreign exchange markets and Treasury bond market, may not publicly display their quotes, but they do provide consistent liquidity to the market.

transparency⁴. However, the more than 40% of executed volume in the U.S. cash equity market that occurs off of exchanges has little or no pre-trade transparency.

Fixed income markets remain dealer driven and over the counter, in many cases still trading via person-to-person telephone interactions, although electronic trading is growing rapidly. Pre-trade transparency is limited, and many segments of this market have limited or no trade reporting. U.S. Treasury bond Primary Dealers are expected to make markets for the New York Fed on behalf of its account holders and are trading counterparties to the New York Fed in its implementation of monetary policy.⁵ Other governments also maintain similar market makers.

U.S. equity options exchanges utilize market makers to provide liquidity to their clients. Some options markets still combine floor and electronic trading. Futures markets are now almost solely electronic; futures exchanges also have market makers on their platforms.

Foreign Exchange markets are dominated by the world's largest banks and large market making firms, who generally stand ready to provide two-sided markets, and may provide liquidity when Central Banks intervene during periods of market volatility. Many quote bid and ask prices, albeit without size, electronically, but also interact with clients on a negotiated basis over the phone. Smaller electronic platforms focused on retail traders also employ market makers.

What is a market maker?

While regulations differ across different markets and asset classes, generally *registered* market makers provide transparent two-sided markets at all times that a market is open. This means the market maker must publish a price and amount that they are willing to buy or sell throughout the trading day. Regulators surveil market makers to ensure that they comply with these obligations.

Note the italicized "registered" above. Many participants may regularly provide liquidity to a market, but in the U.S. cash equities market, only registered market makers *must* provide displayed liquidity on both sides of the market on registered exchanges when the market is open⁶. The act of providing two-sided liquidity is not necessarily all that onerous. The regulatory requirement is that at all times the market maker must be willing to buy or sell one round lot (usually 100 shares) within a specified percentage of the national best bid or offer, which percentage ranges from 8 to 30% away. There are additional nuances for re-entry after an execution, for low-priced stocks, and for trading near the open and close.

⁴ Pre-trade transparency includes the two Security Information Processors (SIP), which post each exchange's best buy price and sell price. The SIPs also offer post-trade transparency by sending information on each executed trade. Individual participants may also offer more detailed information sources.

⁵ <https://www.newyorkfed.org/markets/primarydealers>. Primary dealers also buy U.S. Treasuries at the Fed's periodic auctions.

⁶ Market making obligations are only active during regular trading hours - 9:30AM - 4:00PM on most days. Several participants offer extended trading from 4:00AM - 9:30AM and from 4:00PM - 8:00PM, but market makers are not required to quote during these time periods.

History

Although U.S. cash equity market makers now interact electronically, this was not always the case. NYSE Specialists used to execute auctions manually, matching buyers and sellers. As recently as the early 2000s, it could take more than 10 seconds to fill a market order. Off-exchange, market makers were at some points able to quote or indicate electronically, but voice or other direct communication was required to actually trade; several markets still operate in a similar manner.

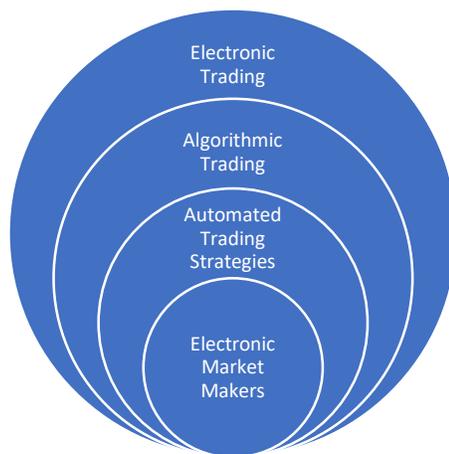
Under Regulation National Market System (Reg NMS), markets are required to provide firm quotes that are available and immediately accessible to trade against incoming orders.⁷ This means that if you enter a limit order to buy it will execute as soon as an eligible sell order with a limit price at or below your limit price to buy arrives, until you cancel your order.

Regulators can impose both positive and negative obligations on market makers. A positive obligation requires the market maker to provide liquidity to the market. Negative obligations prevent the market maker from executing a trade if a non-market maker order, such as a customer order, could execute instead of it.

Reg NMS, and Regulation Alternate Trading Systems (Reg ATS) before it, altered the landscape of the U.S. equity market. The proliferation of exchanges, ATSs and wholesalers has resulted in fragmentation and increased the need for efficient tools to search for and provide liquidity across multiple destinations. The ability to process information quickly became important for successful market making operations. At the same time, the increasing interconnectedness of global markets and assets requires market makers to evaluate myriad data points as quickly as possible to perform their market making obligations.

Algorithms, Automated Trading and Market Makers

An algorithm is “a procedure for solving a mathematical problem (as of finding the greatest common divisor) in a finite number of steps that frequently involves repetition of an operation”⁸. This definition does not require that algorithms be executed by computers. Technical analysis-based investors would often look at their charts at the end of the day and identify a moving average crossover and enter an order to buy or sell at the next morning’s open. In the modern trading world, “algorithmic trading” is



⁷ Usually 9:30AM Eastern Time until 4:00PM Eastern Time, except for the day before or after certain holidays when regular hours end at 1:00PM.

⁸ Merriam Webster

commonly understood to require the use of a computer to make certain types of trading decisions.

The nearby diagram details the application of technology to different trading strategies and use cases. Buy side, sell side, and even some retail traders may have electronic tools available to help them trade. Trading algorithms are one set of such tools used for order execution. Algorithms can employ a multitude of strategies, such as to limit the price impact of a large trade. Some of the strategies that are employed by market participants of all types include volume-weighted average price (VWAP) strategies, time-weighted average price (TWAP) strategies, percent of volume (POV) strategies, momentum/trend following strategies, and arbitrage strategies. Strategies like VWAP may initially attempt to provide liquidity passively, but if they are not trading enough, or their average price diverges too much from the VWAP, will begin to trade more aggressively. These strategies may mimic elements of automated trading strategies regardless of the underlying client’s investment strategy.

Automated trading strategies use algorithmic logic to not only execute orders, but also to create orders and/or enact an investment strategy. Automated trading strategies are used by both asset management and proprietary trading firms. Examples of such strategies can include market making, statistical arbitrage, and cross-asset arbitrage. To design and implement these strategies, firms need personnel skilled in computer science, network engineering, quantitative finance, and other similar disciplines.

Electronic market making is a distinct automated trading strategy, focused on standing ready to both buy and sell an asset in hopes of earning the difference between the market’s bid price and ask price. In some markets, including many U.S. cash equities trading venues, further income may come from rebates offered as incentives for displaying orders on the venue. Liquidity providers may also aggressively take liquidity in some circumstances, such as to manage their inventory.

Earning the Spread

Order Book

Order #	Shares	Buy Price	Sell Price	Shares	Order #
			\$100.10	100	2
			\$100.05	200	3
			\$100.02	350	4
1	200	\$100.00			
5	300	\$100.00			
6	100	\$99.98			

How do electronic market makers (EMMs) “earn the spread”? In general, EMMs provide liquidity to the market. That means they display quotes to buy and sell, which other traders execute against. Consider the sample order book shown above. Assume that the market maker is represented by orders #3 and #5. That means they are ready and willing to buy 300 shares at \$100.00 and sell 200 shares at \$100.05 (in most cases, the market maker identity is not shown in an order book). If a 400 share order to sell at

\$99.98 or better comes in, Order #1 would execute in its entirety and the market maker would buy 200 shares at \$100.00, supplying the liquidity necessary to allow that order to execute in full immediately.

Assuming the market price does not immediately rise to \$100.05 (in which case the EMM's order at \$100.05 would execute next), the EMM might not immediately seek to sell out of their position if it believes the price will move higher. If the purchase of 200 shares at \$100.00 put the EMM in a long position, the firm might add an order to sell those 200 shares at \$100.02. If the firm wanted to be more aggressive, it could also post an order to sell at \$100.01. If an order comes in to buy and trades with their new sell order, the EMM "earns the spread" of \$0.02, or \$0.01 if the firm tightened the quote. All of these possibilities are consistent with rules of cash equity exchanges.

But instead of a 400 share sell order, there might have been a 1,000 share order to sell, which would have resulted in the EMM being long 300 shares at \$100.00, while the order book would now have 400 shares to SELL at \$99.98 in addition to the orders at \$100.02, \$100.05, and \$100.10, since the original order to sell did not get completely filled. The EMM at that time could decide to hold its position if it believes prices will reverse higher, post an order to sell at \$99.98 or even choose to simply trade out of the position by selling to the prevailing highest priced buy order, locking in a trading loss.

EMMs need to weigh their obligations and risk carefully. Posting orders helps to dampen volatility in a stock's trading. However, when their positions move against them, EMMs may have to take liquidity. Even while providing liquidity, they may consider how that impacts liquidity on the book.

Not all firms that use an electronic market making strategy operate as registered market makers, which means they are not required to be in the market with buy and sell interest at all times. These firms have no obligation to provide liquidity throughout the day and may halt liquidity provision when market conditions make it disadvantageous.

Studies have shown that during periods of extreme market stress, automated traders reduce their liquidity provision, reduce their aggressiveness, and increase the price at which they provide liquidity⁹. Another study found that the elasticity of prices to liquidity demand increases in high uncertainty regimes (wider spreads, less frequent provision of liquidity)¹⁰. To encourage more consistent liquidity provision, many exchanges offer enhanced rebates for more frequent executions, especially when accompanied by substantial time and size quoting at the national best bid or offer (NBBO).

⁹ **Man vs. Machine: Liquidity Provision and Market Fragility (2021)**, Vikas Raman (Univ. of Warwick, England), Michel Robe (Univ. of Illinois - Urbana), Pradeep Yadav (Univ. of Oklahoma). Note that "price" in this context is not an order's limit price, but how the market maker provides liquidity. If they increase the price of liquidity, they are essentially providing liquidity at a wider spread or decreasing shares available at a given price level.

¹⁰ **Liquidity Provision and Market Making in Different Uncertainty Regimes: Evidence from the Covid-19 Market Crash (2021)**, Marie Briere (University Paris-Dauphine / PSL Research University), Charles-Albert Lehalle (Imperial College London), Amine Raboun (University Paris-Dauphine / PSL Research University).

The NYSE DMM Difference

Some U.S. cash equity exchanges point to the fact that they have market makers registered on their exchanges, sometimes noting that multiple market makers may be registered in each stock, as evidence of that exchange being a venue that provides liquidity. But being registered as a market maker in an exchange does not necessarily mean that those market makers are making a tight market. For example, some liquidity providers choose to register as a market maker to obtain regulatory relief and operational flexibility.¹¹ In addition, the minimum requirement on all U.S. cash equity exchanges is that registered market makers are required to maintain two-sided quotes only within 8-30% of the NBBO throughout regular hours, and for only 100 shares.¹²

NYSE DMMs are different in many ways:

- In addition to meeting the minimum quoting requirements required of registered market makers on all exchanges, DMMs must also maintain a bid or offer at the NBBO a specified percentage of the day. In other words - they must be a leader in the prices at which they quote their assigned securities.
- DMMs are required to maintain price continuity with reasonable depth, which they achieve by quoting not only at top of book, but also providing liquidity at multiple price levels to help dampen volatility.
- As the market maker dedicated to a security, DMMs can provide real-time market insight to issuers.
- DMMs facilitate the opening and closing auctions and have an obligation to supply liquidity as needed. As a result, DMMs use their expertise to determine a price that ensures that all marketable interest participates in the closing auction. In special situations, they can delay the close and go back out to the Street to seek additional imbalance-offsetting liquidity.

These obligations mean NYSE DMMs provide consistent liquidity throughout the trading day, helping to dampen volatility. They post at least 1,000 shares in S&P 500 stocks within 2% of the NBBO 43% of the trading day and have displayed liquidity more than 66% of the time within 10 basis points of the NBBO in these stocks.

In the less liquid securities of the S&P 600 Smallcap Index, the DMMs post at least 1,000 shares within 2% of the inside 22% of the time and provide liquidity within 10 basis points of the NBBO in these stocks for 63% of the trading day.

¹¹ Registered market makers are not required to locate a stock (i.e., obtain a promise that they can borrow a stock) before selling short, have an extra 2 days to close out fail-to-deliver positions, can avoid regulatory fees for some trading activity, and may have access to additional financing arrangements.

¹² E.g., <https://listingcenter.nasdaq.com/rulebook/nasdaq/rules/Nasdaq%20Equity%202020>; https://cdn.cboe.com/resources/regulation/rule_book/BATS_Exchange_Rulebook.pdf.

DMMs compete with each other when securities list on the NYSE, whether by IPO, transfer or SPAC business combination. They may present NYSE-reviewed statistics that show how they perform. DMMs also make themselves available to issuers to analyze market developments and discuss how they work to maintain fair and orderly markets.

In the below example, we provide a theoretical example, which shows the value of the DMM layering the book at multiple price points.

**Customer Order - Buy 500 Shares
Company XYZ up to \$50.50**



Bid Order	Bid Shares	Bid Price	Offer Price	Offer Shares	Offer Order
DMM 1	400	\$50.45			
DMM 2	200	\$50.46			
Cust 1	300	\$50.47			
			\$50.48	200	DMM 1
			\$50.49	300	Cust 1
			\$50.50	100	Cust 2
			\$50.51	200	Cust 3

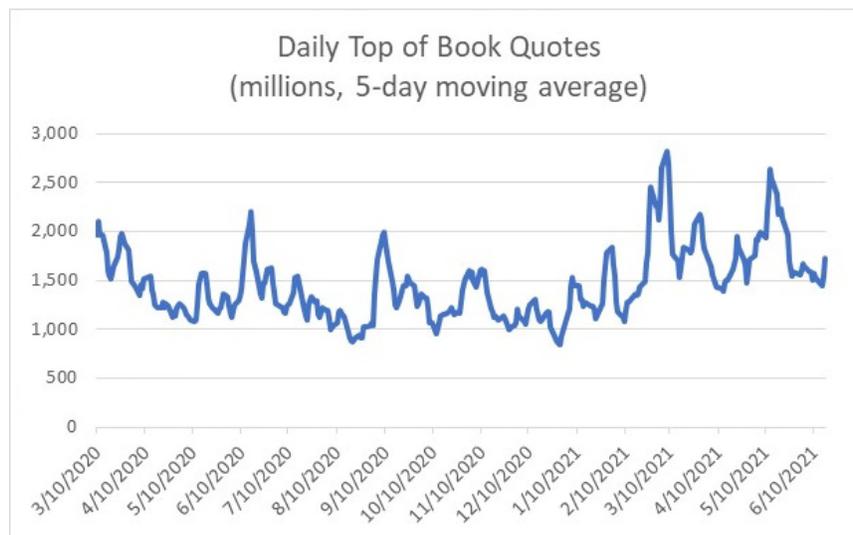
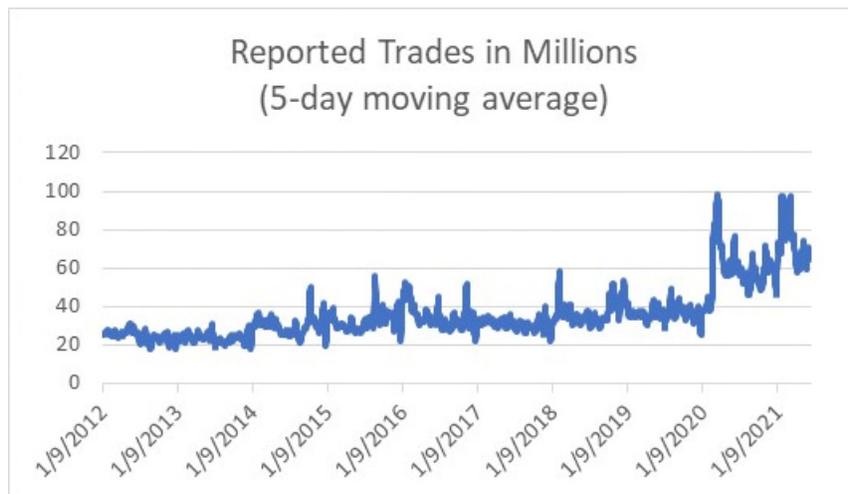
Although the DMM is not bidding at the highest price, a large sell order would have less price impact due to the 600 shares the DMM was willing to buy at the next two price levels.

NYSE DMMs are also responsible for managing the opening, closing and reopening auctions. This is a critical difference compared to other U.S. cash equity markets, as only NYSE auctions guarantee that all market orders entered into the auction are filled.

NYSE Group operates other market making programs to improve market quality. NYSE Arca Lead Market Makers (LMMs) must meet average spread requirements and provide liquidity at the auctions for listed Exchange Traded Products in order to remain in good standing as an LMM and receive associated incentives. Similarly, NYSE American Electronic DMMs (eDMMs) must meet per symbol and portfolio quoting levels to receive certain rebates. Most U.S. exchanges also offer incentives to other market makers and other liquidity providers to quote throughout the day at the NBBO. Note, however, that these incentives do not require continuous two-sided quoting and are not always limited to registered market makers.

The Market Makers' Toolbox

Electronic market making in today's U.S. equity market requires substantial investment. Firms must continuously upgrade their hardware and tune their software to account for constant competition from other sophisticated market participants and increasing amounts of data. In 2012, there were less than 25 million trades per day. In 2021, the average is nearly 73 million. This is orders of magnitude less than the average daily number of quotes, which has averaged more than 1.7 billion top of book quotes sent to the SIPs per day in 2021.



Quoting Recipe¹³



$$S = f(I, V, M, N)$$



A buy or sell order, including price, number of shares, hidden or displayed, mid-point, pegged or not, time in force, and other possible variations.

In addition to reading standard market data consumed by most market participants, market makers must also account for fundamental and macroeconomic information. Digitized news feeds and other information are ingested and analyzed by market makers, who are looking for surprise news items, government statistical releases and quotes from corporate and world leaders that could move the markets. Related markets may also be tracked. An ETF market maker may hedge their inventory with the individual components of the fund, which could be a commodity, fixed income product, or foreign security. Changes in options volatilities and skews may also signal changes in stock prices and are closely tracked. Administrative messages are read from the exchanges and SIPs to allow firms to track if there is risk that a stock could be impacted by a volatility pause or other event. Finally, market makers must also track fundamental and lower-frequency data such as earnings announcement calendars and corporate actions including ticker symbol changes, dividends, stock splits and M&A activity.

All of these inputs go into sending an order to an exchange. This is a continuous feedback loop. The market maker must track every execution, estimate their likelihood of receiving an execution, and estimate what the likely future price path will look like.

¹³ This simplified equation states that the market maker will provide liquidity at a spread (S) subject to their current inventory position (I), Net supply and demand in the market (V), Price Momentum (M) and News (N).

These inputs are already complicated, but the market maker needs to consider much more. They must carefully track their inventory to ensure they are not taking undue risk or encroaching on capital limits. Market makers likely provide liquidity on multiple exchanges or ATSs, so they need to track their positions in each market. This of course means they need to consider processing and geographic latencies because an execution on one exchange may impact a market maker's quoting at an exchange in a different geographical location.

Understanding the Impact of a Security's Underlying Liquidity

Cash equity market makers will typically trade across a wide range of securities. Some commentators argue that you really do not need a market maker for the most active stocks. These issues typically have very deep books even without market makers, and the bid/ask spread is often the minimum \$0.01. This view does not account for what happens when the markets become volatile, as they did at the start of the Covid-19 pandemic in March 2020. Liquidity dropped and spreads widened, and the presence of a market maker with real obligations like NYSE's DMMs allowed its listed securities' market quality to exhibit less degradation than the competition¹⁴.

Additionally, the ability to trade in active stocks helps to diversify returns and mitigate potential losses in less liquid securities. Liquidity can shift suddenly and dramatically into and out of less widely-held securities, and a market maker may want to be active and ready to trade in a wide variety of securities. Diversification can also help offset challenges posed by segmentation¹⁵ and orders initially routing to off-exchange venues.

One occasionally advocated partial solution to the liquidity provision problem for less liquid securities would be to permit issuers to contract with market makers to meet certain market quality goals.¹⁶ This practice exists in several European markets but is prohibited by US regulators.

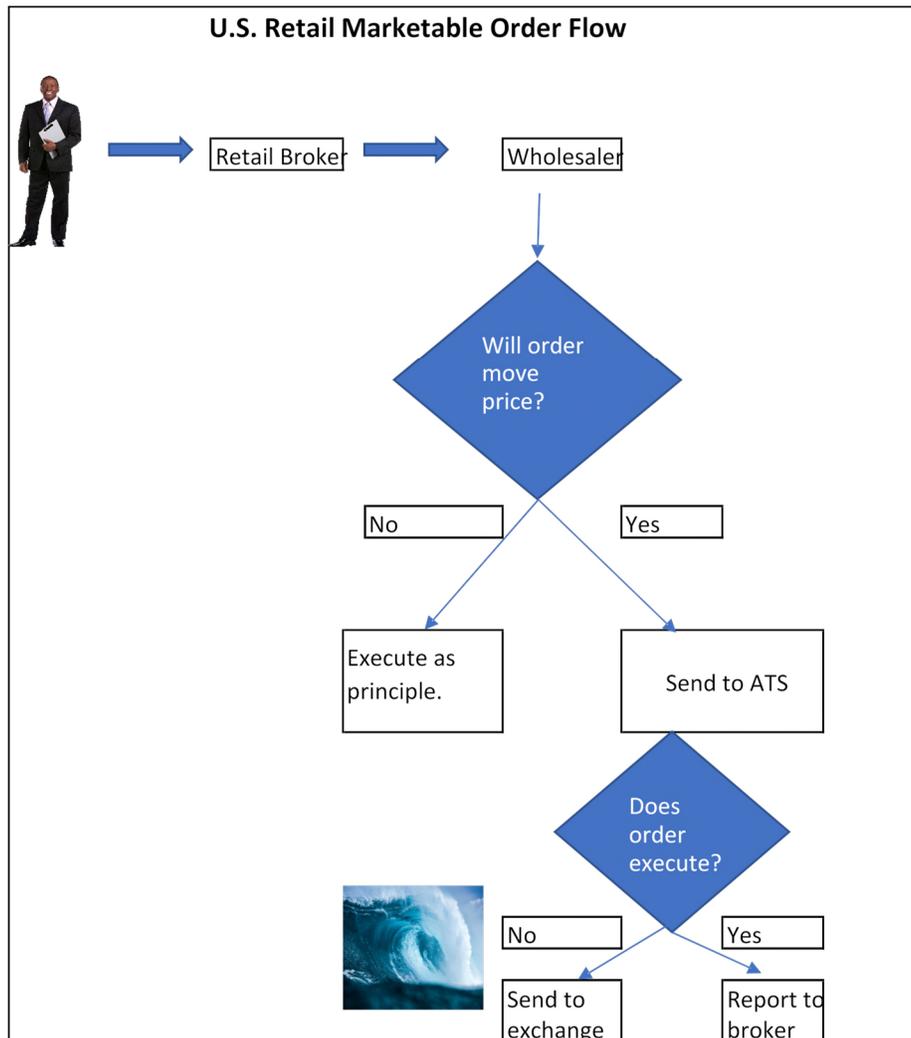
Another recommendation that has been periodically floated to aid liquidity provision in less liquid stocks is to keep trading in these securities on a single exchange. However, most of these proposals still allow for off-exchange trading and ignore the fact that less liquid stocks already tend to see less fragmented trading as highlighted in our article, "Can you 'de-fragment' small cap trading?", likely limiting the impact of any such change.¹⁷

¹⁴ See <https://www.nyse.com/article/stocks-trade-better-on-nyse>.

¹⁵ By segmentation, we mean that many orders never reach exchanges. Most retail order flow is handled on bilateral venues (sometimes called "internalizers"), and some ATS's control who participates on their platforms.

¹⁶ **Why do listed firms pay for market making in their own stock? (2012)**, Skjeltorp (Norges Bank) & Ødegaard (University of Stavanger)

¹⁷ <https://www.nyse.com/data-insights/can-you-de-fragment-small-cap-trading>



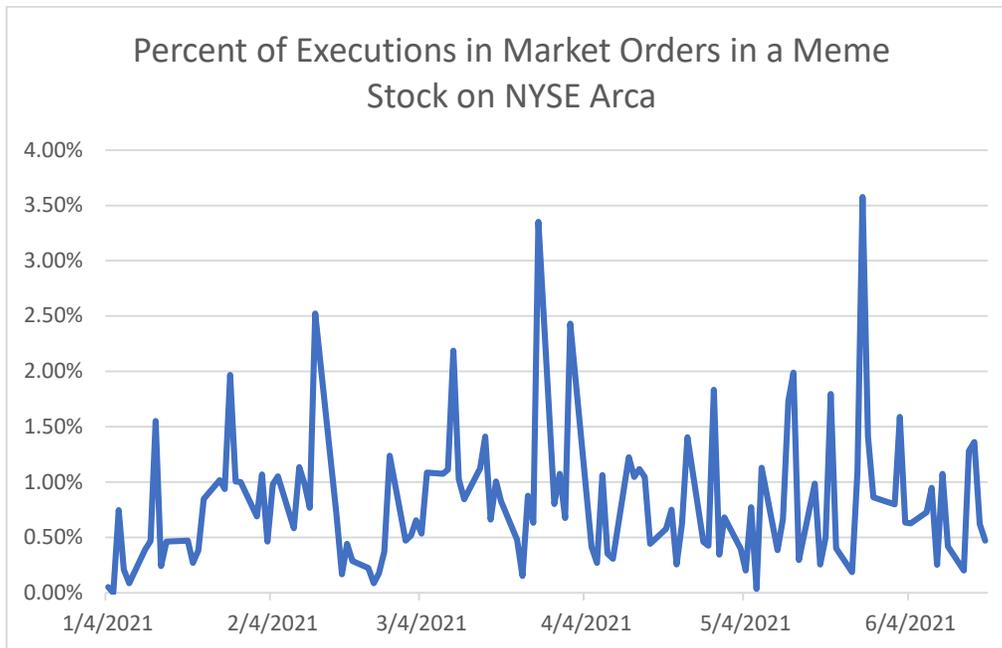
Impact of Counterparties and Segmentation

In the current US equity market structure, many orders first pass through ATSS and/or over-the-counter market makers before making their way to one of the 16 stock exchanges. This allows off-exchange participants to provide liquidity before these orders reach the broader public market. The order flow that then makes its way to the exchanges is more likely to be of the type that contributes to price discovery and can move a security's price (in large part because off-exchange transactions are not reported in the same way on-exchange transactions are reported).

For example, many orders from retail brokerages initially attempt to execute away from exchanges. But, a small percentage of this volume executes in a trio of Retail Liquidity Programs run by the three major exchange groups¹⁸. Some marketable retail flow executes on exchanges, most notably when wholesalers

¹⁸ For more information on NYSE's Retail Liquidity Provider program see <https://www.nyse.com/data-insights/a-deeper-dive-into-the-nyse-group-retail-liquidity-programs>

choose to send this flow on, rather than commit additional principal. We note that in one “meme stock”¹⁹, market orders, which are almost exclusively used by retail accounts, have often spiked, suggesting periods where wholesalers stepped away and sent orders on to the exchanges. Non-marketable retail orders are typically routed to exchanges, since they receive favorable rebates.²⁰



Market makers may trade in multiple environments. One firm may provide liquidity in the same security on multiple exchanges, in more than one ATS, provide liquidity to institutional counterparties, and act as a wholesaler to retail flow. Those that are active in multiple venue types may garner significant advantages, albeit at a cost in terms of IT infrastructure, regulation, and other intangibles. The costs may be outweighed by the ability to gather information and data on more securities at more times, in more environments. More efficient liquidity provision allows the market making firm to better allocate resources, meet obligations, and avoid risk (which can create systemic market risk if firms fail or leave), while also earning a profit.

U.S. Equity Market Microstructure Impact on Market Making

Modern electronic market making developed in response to regulatory changes, cash equity market product innovation and technology. The full implementation of Reg NMS in 2007 permanently altered

¹⁹ “Meme stocks” refer to securities whose trading activity are, for at least some duration of time, primarily driven by commentary on social media.

²⁰ To receive higher rebates brokers must attest that the orders are from “human” retail traders and not computer driven. Some programs limit the order count from an individual to 390 trades per day.

the U.S. market structure landscape. In this section we will briefly touch on some of these topics as it relates to market making.

Fragmentation, Segmentation and Trading Fees and Rebates

It is impossible to cover any one of these three topics without understanding its interaction with the other two. The combination of Reg NMS and Reg ATS created a multi-pronged U.S. equity market. Despite a primary goal of Reg NMS being to “increase displayed depth and liquidity in NMS and thereby reduce transaction costs for a wide spectrum of investors, particularly institutional investors that must trade in large sizes”,²¹ dark liquidity has continued to grow with the proliferation of ATSS, off-exchange market makers, and specialized SEC-approved non-displayed functionality on exchanges.

All members of the NMS universe - exchanges, wholesalers and ATSS - compete for order flow. On-exchange market makers may also offer liquidity off-exchange on a bilateral basis and via ATSS. On-exchange, they may deploy market making strategies across several exchanges simultaneously, whether or not they are specifically registered as a market maker on a given exchange. Trading on multiple venues improves a market maker’s understanding of buy and sell order flow pressure in the market.

Fragmentation adds to the cost of market making. To ensure the firm has the necessary information to effectively provide liquidity, they need to ingest as detailed information as possible from the venues they interact with. The cost of programming, market data, hardware, people - are all factors when determining how much risk to deploy. The ability to quickly adjust orders, and to pare or add to inventory is critical. Access to multiple venues makes it more likely for a market maker to find liquidity when they need it. Diverse liquidity sources also allow them to use both passive liquidity provision and aggressive liquidity seeking strategies in one or more venues.

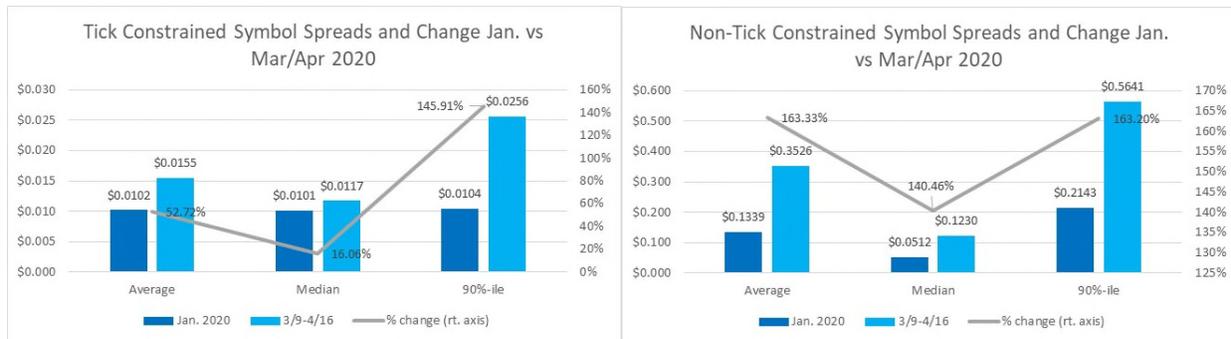
Exchanges and other trading venues offer differentiated pricing to address market participants’ various trading needs. For example, if a firm wants to avoid causing market impact by crossing the spread, but also has a higher urgency to trade, they can choose to pay a fee to quote on an inverted exchange²² in an attempt to get a faster passive fill. If their urgency is greater and impact isn’t a concern, they can choose to cross the spread on an exchange or ATS. On the opposite end of the spectrum, if they are being opportunistic, they may quote or rest passively on a larger exchange or ATS.

²¹ Reg NMS Final Adopting Release, <https://www.sec.gov/rules/final/34-51808.pdf>, page 140

²² Inverted exchanges charge to post liquidity and offer a rebate to take liquidity

Tick Size Impact on Profitability

U.S. markets essentially have a one-size-fits-all tick size²³ structure. With the exception of stocks that trade at less than \$1.00, all securities have a minimum \$0.01 tick size, whether the stock is priced at \$1.50 or \$1,000. Most stocks currently have a round lot size of 100 shares. The SIPs only show quotes of at least one round lot. For a \$5.00 stock, that means \$500 at risk. For a \$1,000 stock, that means \$100,000. The risk/reward equation is very different between the two.



We touched on tick size in some detail in our White Paper on inaccessible liquidity.²⁴ We showed in that paper how securities that are forced to trade at a \$0.01 minimum tick increment, but should trade with a smaller increment, become less transparent, forcing investors and market makers to seek liquidity away from displayed markets and to use dark order types to execute transactions without causing undue market impact. During the pandemic in Spring 2020, tick constrained securities' market quality degraded far more than stocks that were not constrained. The above two charts show that quoted spreads in tick constrained securities widened more than in stocks that were not constrained.

Narrower tick sizes may decrease some market maker profits as they attempt to earn the spread by passively providing liquidity. However, we would expect an offset with lower risk as shorter queues, with less depth at each price level may allow for more flexible inventory management.

²³ Tick size is the minimum difference between the highest buy price and the lowest sell price that can be displayed. In the U.S., for any stock at or above \$1.00, this is \$0.01.

²⁴ "The Impact of Tick Constrained Securities on the U.S. Equity Market": https://www.nyse.com/publicdocs/Tick_Constrained_Stocks.pdf

Conclusion

Market makers are a critical component of the U.S. Equity markets.

According to SIFMA,²⁵ as of the end of 2019, households directly held 37.7% of U.S. equities, but indirectly, through mutual funds, ETFs, and public and private pension funds, accounted for an additional 40.6% of holdings. When these other entities need to make changes to their portfolios, they need deep and liquid markets to protect their holdings and the individuals to whom they have a fiduciary responsibility. These institutions represent individual investors and should not be forgotten when considering the impact of regulatory changes. Working to ensure fair and liquid markets for all, enhancing the displayed markets and helping to improve the overall quality of liquidity reaching the displayed markets will pay dividends for all investors.

²⁵ <https://www.sifma.org/wp-content/uploads/2021/02/SIFMA-Insights-Who-Owns-Stocks-An-Update-FOR-WEB.pdf>