

Was Amazon too expensive?

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What recent S&P 500 stock splits teach us about the need to reform the round lot

Introduction

Amazon has been known to investors for its high stock price as much as for its low product prices. However, its recent 20-for-1 stock split can also teach us an important lesson about the need to reform the round lot.

In June 2021, we published a white paper that examined the need to expedite round lot reform under the market data infrastructure rule (“infrastructure rule”).¹ While the primary listing exchanges have continued to be resistant to expediting these critical reforms, the timing of round lot reform remains an important issue for market participants.

At the same time, U.S. Securities and Exchange Commission (“SEC”) Chair, Gary Gensler, has indicated that the SEC is considering expediting round lot reform itself—which MEMX recommended in a letter to the Commissioners earlier this year.²

In support of that effort, we continue to evaluate the impact of a one-size-fits-all round lot regime on the U.S. equity market. This supplemental white paper examines recent stock splits effectuated by Amazon, Alphabet, and Tesla, which illustrate how changing the round lot in high-priced stocks could benefit investors by narrowing spreads and reducing related transaction costs.

¹ https://memx.com/wp-content/uploads/MEMX_Round-Lots_white-paper.pdf

² <https://memx.com/wp-content/uploads/Market-Structure-Proposal.pdf>

Background

As discussed in our prior white paper, under the current market convention, where a round lot is almost always for 100 shares, the price of a given security has an important impact on quoted prices in the market. That's because different prices equate to different notional requirements for how much a buyer or seller must be willing to purchase or sell in order to set the national best bid and offer ("NBBO").

For a stock like Apple (AAPL), which is currently trading around \$140 per share, a 100-share round lot translates into a buyer or seller needing to put up \$14,000 of notional value in order to set the NBBO. However, a trader would instead need to put up nearly \$190,000 to set the NBBO in Booking Holdings, Inc. (BKNG) at current prices. And, even though high-priced securities see a larger proportion of trading at odd lot prices within the spread, wider quoted spreads are nevertheless accompanied by wider effective spreads, meaning that investors are actually paying higher transaction costs when trading high-priced securities.

Our last white paper estimated the potential transaction cost savings from expediting round lot reform under the infrastructure rule. To do so, we reviewed quoted and effective spreads in high-priced securities that would qualify for a round lot of less than 100 shares under the infrastructure rule, and compared spreads in those securities with spreads in lower-priced securities with similar trading characteristics. The results of that review showed that it costs significantly more for investors to trade high-priced stocks under today's round lot regime.

Indeed, based on that review, we estimated that round lot reform could save investors as much as \$2.5 billion per year in reduced transaction costs, or up to \$7.5 billion total if these critical market reforms were expedited by just three years. Since then, stock splits have made a bit of a comeback, with big technology companies like Amazon, Alphabet, and Tesla effectuating stock splits this summer. This lets us ask a more direct question: What actually happens when lot constraints are eliminated?

I. Taking Stock of Stock Splits:

How eliminating artificial round lot constraints reduces spreads and saves investors money

Reviewing trading data before and after stock splits in high-priced securities allows us to examine the potential impact that eliminating artificial round lot constraints could have in those securities. Similar to changing round lot sizes, stock splits lower the notional value required to set the NBBO, in this case by lowering the price of the security rather than the number of shares of the security that would be considered a round lot. As discussed in our previous white paper, we would expect that such stock splits would reduce spreads. The data confirms our expectations.

Take the example of Amazon (AMZN), which began trading on a split-adjusted basis on June 6, 2022. On June 3, 2022, the last trading day prior to the stock split, AMZN closed at a price of \$2,447. At that price, almost \$250,000 in notional value is required to set the NBBO, despite the fact that the average trade size was for 15 shares, or a little less than \$37,000. How does this impact spreads? On any given day, AMZN is one of the most active securities in terms of notional value traded. June 3, 2022 was no different, with AMZN trading nearly \$12 billion in notional value (\$11,968,818,999), making it the second most actively traded corporate stock for that day. Yet, with an average quoted spread of 8.6 bps and average effective spread of 4.8 bps, it was much more expensive to trade AMZN on that day than other similarly active names. Three other corporate securities traded more than \$10 billion of notional value on June 3, 2022: Apple (AAPL), Advanced Micro Devices (AMD), and Nvidia (NVDA). However, as shown in Figure 1 (see next page), each of these securities traded with significantly tighter quoted and effective spreads.

Taking Stock of Stock Splits (continued)

Figure 1: Spreads in Corporate Stocks > \$10 Billion Notional Traded (June 3, 2022)

Security	Closing Price	Notional Value Traded	Average Quoted Spread (bps)	Average Effective Spread (bps)
AAPL	\$145.38	\$12,915,168,065	0.8	0.9
AMZN	\$2,447.00	\$11,968,818,999	8.6	4.8
AMD	\$106.30	\$11,814,978,899	1.5	1.2
NVDA	\$187.20	\$11,296,393,116	2.1	1.6

What does this have to do with round lot reform? To answer that question, we only need to examine spreads on the next trading day. As shown in Figure 2, while spreads in AAPL, AMD, and NVDA remained relatively consistent with the prior day, spreads in AMZN were significantly tighter once it began trading on a split-adjusted basis on June 6, 2022. Indeed, with more reasonable notional value requirements to set the NBBO, quoted spreads fell 57% to 3.7 bps and effective spreads fell 40% to 2.9 bps.

Figure 2: Spreads in AAPL, AMZN, AMD, NVDA (June 6, 2022)

Security	Closing Price	Notional Value Traded	Average Quoted Spread (bps)	Average Effective Spread (bps)
AAPL	\$146.14	\$10,497,394,940	0.8	0.8
AMZN	\$124.79	\$17,035,899,614	3.7	2.9
AMD	\$105.65	\$10,301,510,497	1.5	1.1
NVDA	\$187.86	\$7,988,952,811	2.6	2.4

Taking Stock of Stock Splits (continued)

What's more, spreads in AMZN continued to improve following the day of the split as quoting gradually improved on additional markets. Indeed, as shown in Figure 3, spreads in AMZN are now generally in line with those seen for other similarly active securities.

Figure 3: Quoted Spreads Pre- and Post-Split (AMZN)



Similar results were found when examining spreads in Alphabet Inc. (GOOG, GOOGL). Indeed, as illustrated in Figures 4 and 5, spreads in both of these securities narrowed significantly after their respective stock splits, showing how reducing the notional value required to set the NBBO in these securities can reduce investor costs.

Figure 4: Quoted Spreads Pre- and Post-Split (GOOG)

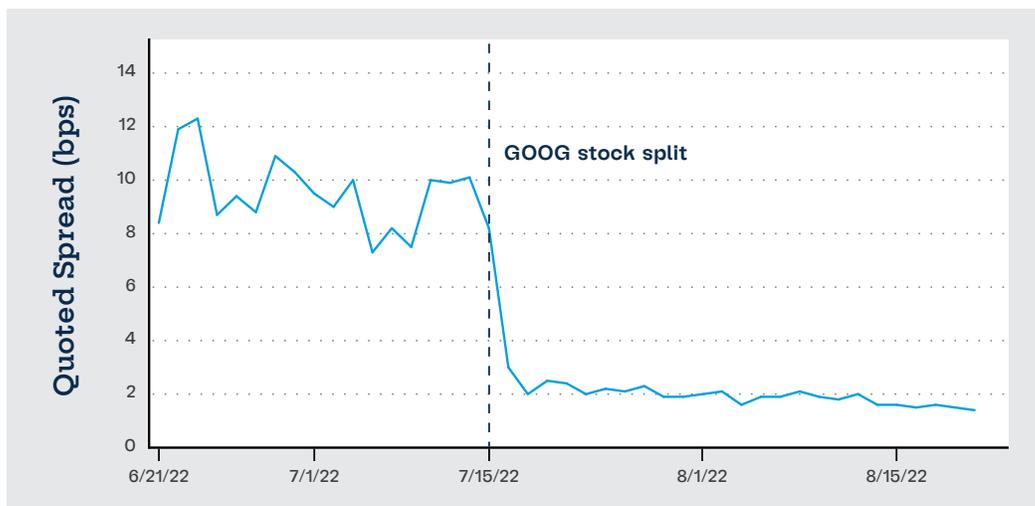
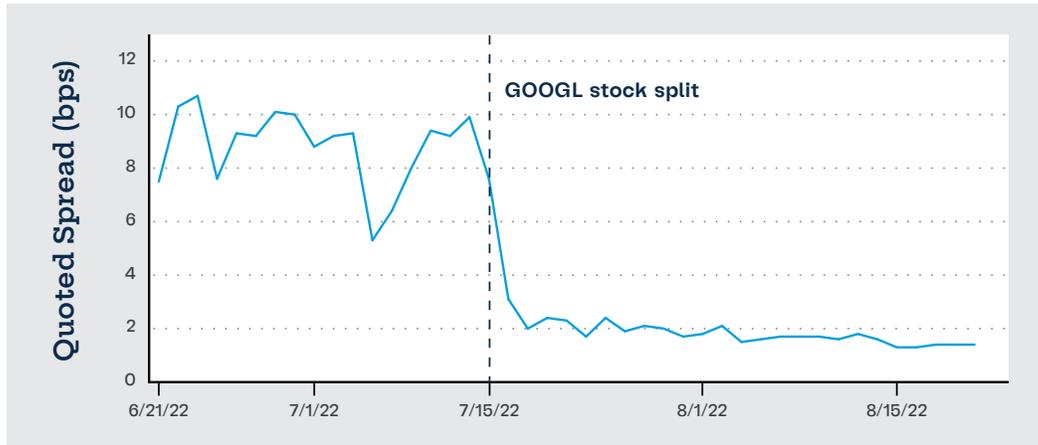


Figure 5: Quoted Spreads Pre- and Post-Split (GOOGL)



Finally, spreads in Tesla Inc. (TSLA) also narrowed, though the amount of narrowing observed for this stock was more subdued than observed in AMZN, GOOG, or GOOGL. This is likely due to the fact that TSLA only implemented a 3-for-1 stock split compared to 20-for-1 stock splits effectuated by the other securities examined in this white paper. With a 3-for-1 stock split, TSLA remained round lot constrained at its new price of \$303.75 as of the close on September 15, 2022. We would have expected greater savings if TSLA had implemented a more aggressive split.

Figure 6: Quoted Spreads Pre- and Post-Split (TSLA)



II. Putting Stock Split Data Into Perspective: Effective spread data confirms that investors could save billions

Let's put this into perspective. While quoted spreads reflect the cost for an investor to buy or sell a security at displayed market prices, i.e., the NBBO, effective spreads show the costs incurred based on actual trade prices. Examining effective spreads in addition to quoted spreads is particularly important for lot constrained securities that are often traded at odd lot prices better than the NBBO. As discussed, AMZN is one of the most actively traded U.S. equity securities in terms of dollar value traded. In May 2022, the month before the Amazon stock split, transactions in AMZN totaled \$241 billion. With an average effective spread of 6.2 bps, spread costs for that month totaled \$77 million.³ In July, the month after the Amazon stock split, transactions in AMZN totaled \$158 billion. With a significantly lower average effective spread of 2.3 bps, spread costs for July were only \$19 million for the month. Even accounting for the difference in notional value traded each month, it would have cost \$49 million to trade an equivalent dollar volume of AMZN in May, meaning investor savings of \$30 million per month.

Similar savings can be seen with GOOG, GOOGL, and TSLA, as shown in Figure 7 (see next page). Over the course of an entire year, investors in these four securities alone could save just shy of a billion dollars in spread costs as a result of improved market quality.⁴

³ Spread costs are calculated each day by taking the average effective spread in the security and multiplying by notional value traded and dividing the result by two since the effective spread measures round trip transaction costs, i.e., both a buy and a sell transaction. Daily costs are summed for the month.

⁴ The \$76.5 million estimated monthly spread cost savings shown in Figure 7 is equivalent to an annualized estimated savings of \$918 million.

Putting Stock Split Data Into Perspective (continued)

Figure 7: Pre- and Post-Split Effective Spreads (AMZN, GOOG, GOOGL, TSLA)

	Split Effective Date	Notional Value Traded (July)	Effective Spread (bps) (Month Before Split)	Effective Spread (bps) (Month After Split)	Change	Estimated Spread Cost Savings (Monthly) ⁵
AMZN	June 6, 2022	\$158,152,181,532	6.2	0.9	63%	\$31,116,442
GOOG	July 18, 2022	\$72,094,869,897	5.9	4.8	66%	\$13,931,625
GOOGL	July 18, 2022	\$88,568,369,539	5.8	1.2	68%	\$17,670,582
TSLA	August 25, 2022	\$438,309,884,047	2.6	1.6	24%	\$13,770,236
Summary		\$757,125,305,015			55%	\$76,488,883

While investors are enjoying these savings today, there are still more than 150 NMS stocks priced over \$250 per share that would benefit immensely from round lot reform. In October, these securities collectively traded about \$116 billion each day and accounted for 20% of notional value traded in the U.S. equity market. And, without any immediate plans for issuers to split these stocks, investors will continue to experience higher transaction costs. AMZN, GOOG, GOOGL, and TSLA together accounted for 9% of the volume and 23% of the notional value traded in NMS stocks priced over \$250 as of May 2022, i.e., before any of their stock splits. Although this is clearly significant, the vast majority of high-priced securities continue to trade inefficiently.

Indeed, we find that spread costs for investors in NMS stocks still priced over \$250 totaled \$309 million in October.⁶ As shown in Figure 7, the average spread cost reduction following splits in AMZN, GOOG, GOOGL, and TSLA was 55%.

⁵ Savings are calculated by multiplying the notional value traded in each security by the difference in effective spread in the months before and after the split and dividing the result by two to account for the fact that effective spread measures round trip costs.

⁶ To mute impact of any outliers on this spread cost calculation, on any day where a security has a reported effective spread that is greater than its quoted spread, the amount of any savings is calculated by the narrower quoted spread in that security.

Putting Stock Split Data Into Perspective (continued)

The actual spread reduction in any particular security will depend on a number of factors, including where that security falls within the round lot tiers established under the infrastructure rule. However, if we assume similar spread cost reductions to the securities examined in this white paper, this would represent investor savings of \$171 million each month. Annualized, this represents investor savings just north of \$2 billion a year in stocks that are still round lot constrained. It's therefore not enough to simply wait and rely on issuers to split their stocks to address the inefficiencies in trading high-priced NMS stocks.

As a national securities exchange built to respect the needs of all market constituents, MEMX believes that it's important that we work towards proactively solving these issues so that investors can enjoy the benefits of a fair, orderly, and efficient market. Unfortunately, since the primary listing exchanges have been reluctant to address these issues—and in fact have sought to delay the overall implementation of these rules—the SEC must act to protect the needs of the investing public. As illustrated by these recent S&P 500 stock splits, the cost of inaction is simply too high.