The Spread

In continuous trading markets, there is always a positive difference between the *ask* and *bid* offers, which is called the ***spread***. The spread is a dynamic data point that many trader's monitor to infer roughly the amount of buying and selling interest in a market. Later, we will refer to the cumulative distribution of *orders* (imagine a histogram consisting of stacked bars with price on the x-axis and order size on the y-axis) as the market's *liquidity*. The spread is less informative to a trader than a liquidity distribution. It lacks the quality of depth that a liquidity distribution provides. As information, the spread is useful because some brokers choose to obfuscate liquidity information from clients. There are many reasons for a broker to be less than transparent. For one, streaming an entire *order book* is far more data intensive than streaming the top-of-book *bid* and *ask* offers, and therefore would represent a real cost for information that most clients do not find important. To make matters worse, much of the order book data streamed is highly redundant. To service clients who would like to view the market's liquidity, some brokers will provide these '*level 2 quotes'* for a fee. Other brokers do not provide view access to their order book because the markets they operate are not natural markets.

If a broker offers *'commission-free'* trades it is because they have chosen to implant their commission fees within an artificially inflated spread cost which they pass on to their clients. Spread costs are dynamic, and therefore less calculable, as opposed to standard commission structures, where a trader can easily calculate the cost either as a fixed value ($10 per trade, for instance), or as a fixed proportion of their trade size (1% of a $1,000 trade, or $10). Compare this to a spread commission where the broker has inflated the spread by 12 cents per share from 3 cents to 15 cents. Will the client who is looking to purchase 1,000 shares prefer the 3 cent spread and a $10 commission added to their basis? Or will they prefer the 15 cent spread with no commission, with

the conviction that the price of their selection will cover the spread? In the second case, the broker is able to increase their fee by 20%, and still collects immediately from the sale. Yet many clients would choose the second option. These clients are victims of their own conviction, having chosen to pay a premium for risk over a known commission rate when the risk is masked within the spread.

Another reason a broker may be less than transparent about their liquidity situation is that they are partnered with a large *market maker*, or perhaps they take on the role of market maker themselves. The role of the market maker is to meet the liquidity demands of the market. The broker sells the market maker their client's *'order flow'* for a fee, and the market maker takes on the risk of performing statistical arbitrage. The bid and ask prices the broker advertises to its clients are their partner market maker's current bid and ask offers. They are not the result of multiple autonomous market-making traders, as in a natural continuous market, but of one large trader executing lots of trade volume for thin profit margins. By accepting payment for order flow, the broker may advertise their services as 'commission-free'. In reality, this is another scenario where the client has exchanged the certainty of a commission cost for the uncertainty of an artificial spread. There is no such thing as a free lunch when it comes to executing orders.

A trader who is familiar with their market will have a sense for the typical market spread in normal trading situations. Generally, if a spread is large, a trader can infer that the market is not very liquid. One quality of highly liquid markets is that spreads are usually small. Although a trader might have a sense for the average spread, it is important to remember that the average is not always the case. There are situations in which higher spreads are to be expected. Trading after normal trading hours or in holiday trading sessions, where less traders are participating in the market, comes with additional cost—an inflated spread. Traders should also expect inflated spreads in the wake of scheduled news releases. If a news release is relevant to a market, and the news changes trader's future price trajectories, it will cause significant *volatility* as the market

adjusts to a new set of liquidity thresholds. In this scenario, trader's can witness higher spreads than they are used to seeing. It is desirable to avoid trading while spreads are high, but at times it is a cost that must be paid if the risk adjustment is large enough to offset it.

Scenario X.x

I have developed a high frequency trading strategy which involves trading Moderna (MRNA) stock on news events. In a backtest using historical data, the strategy is profitable; however, my backtest does not take into account spread—an aspect which I know from experience could make or break my strategy. I would like to analyze the spread on average, but particularly during key news events, such as the FDA approval of the company's mRNA COVID-19 vaccine. My thesis is that these rumors will cause significant volatility, inflating the spread well above its typical range.

I accumulate data points over multiple days and conclude that the median MRNA spread is 10 cents. My strategy maintains profitability with the 10 cent spread and I am encouraged to move forward with my experiment. I collect spread data directly following key news events. My conclusion is that the median spread in the interval following the rumor is $0.70, 7 times the average spread! When I incorporate a $0.70 spread into my backtest, the strategy is no longer profitable. I walk away from the strategy knowing I have saved myself from a frustrating lesson had I attempted to implement a "profitable" trading strategy without discounting the spread costs.