READING THE ELECTRONIC TAPE: BLOCK TRADING IN TODAY'S ELECTRONIC MARKETS

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INTRODUCTION

Block trading, or trades with sizes much larger than average, has been a feature of equity markets for a long time. Electronic markets have made information about such trades more readily available. Additionally, block trade analytics, like MBTR <GO> on the Bloomberg Professional service®, can monitor and analyze the information. Our goal in this series of papers is to analyze otherwise hard-to-read information based on publicly available datasets and find nuggets of information that might prove useful to the participants in today's "big data"–driven markets. In this paper, we look at block trading, however ambiguously defined, to highlight characteristics of how markets publish and digest information regarding blocks being printed on the tape.

CAN WE IDENTIFY ALL BLOCK TRADES ON THE TAPE?

We looked at stocks listed on the U.S. exchanges (NYSE EURONEXT and NASDAQ OMX listed) and the London Stock Exchange for this study. U.S. equity markets are some of the most transparent markets in the world. They feature a consolidated tape, which shows all trades done in a given security in a publicly available data feed. Regulation dictates that all off-exchange or ATS-executed trades be reported to one of two trade reporting facilities at NYSE or NASDAQ. Regulation ATS rules[1] govern all off-exchange activity in all publicly traded securities. Block trading desks are subject to similar reporting requirements, hence, all block trades can be seen on the tape within a limited amount of time.

NYSE Rule 72[2] defines a "Block" as at least 10,000 shares or $200,000 USD, whichever is less. Thus, for stocks priced at less than $20, a 10,000 share trade can be a block, but in higher-priced stocks even a 1,000 share trade could constitute a block. Large trade sizes are extremely valuable to institutional investors to access liquidity. As markets have moved to higher levels of fragmentation and electronic access, larger-size trades have been on the decline. NYSE's "Facts and Figures"[3] provides data for blocks going back to 2004. Figure 1 shows the block volume as a percent of total NYSE volume and average block trade size in listed stocks. Contrary to intuition, block trading on NYSE has been inching higher since Regulation NMS and the financial crisis of 2008. The most recent data point suggests around 25% of NYSE volume is blocks. Moreover, average block size has gone up steadily over the years. One thing to note is that NYSE's market share, and hence volume, has gone down steadily over a similar time frame. This could explain the high block market share in recent years. It's unclear if the NYSE dataset filters the open and closing auction prints, as the open and closing prints are frequently large prints and can be considered a block by that definition.

[1] https://www.sec.gov/rules/final/34-40760.txt
[2] http://rules.nyse.com/NYSETools/PlatformViewer.asp?selectednode=chp_1_3_4_10&manual=%2Fnyse%2Frules%2Fnyse-rules%2F
[3] http://www.nyxdata.com/Data-Products/Facts-and-Figures

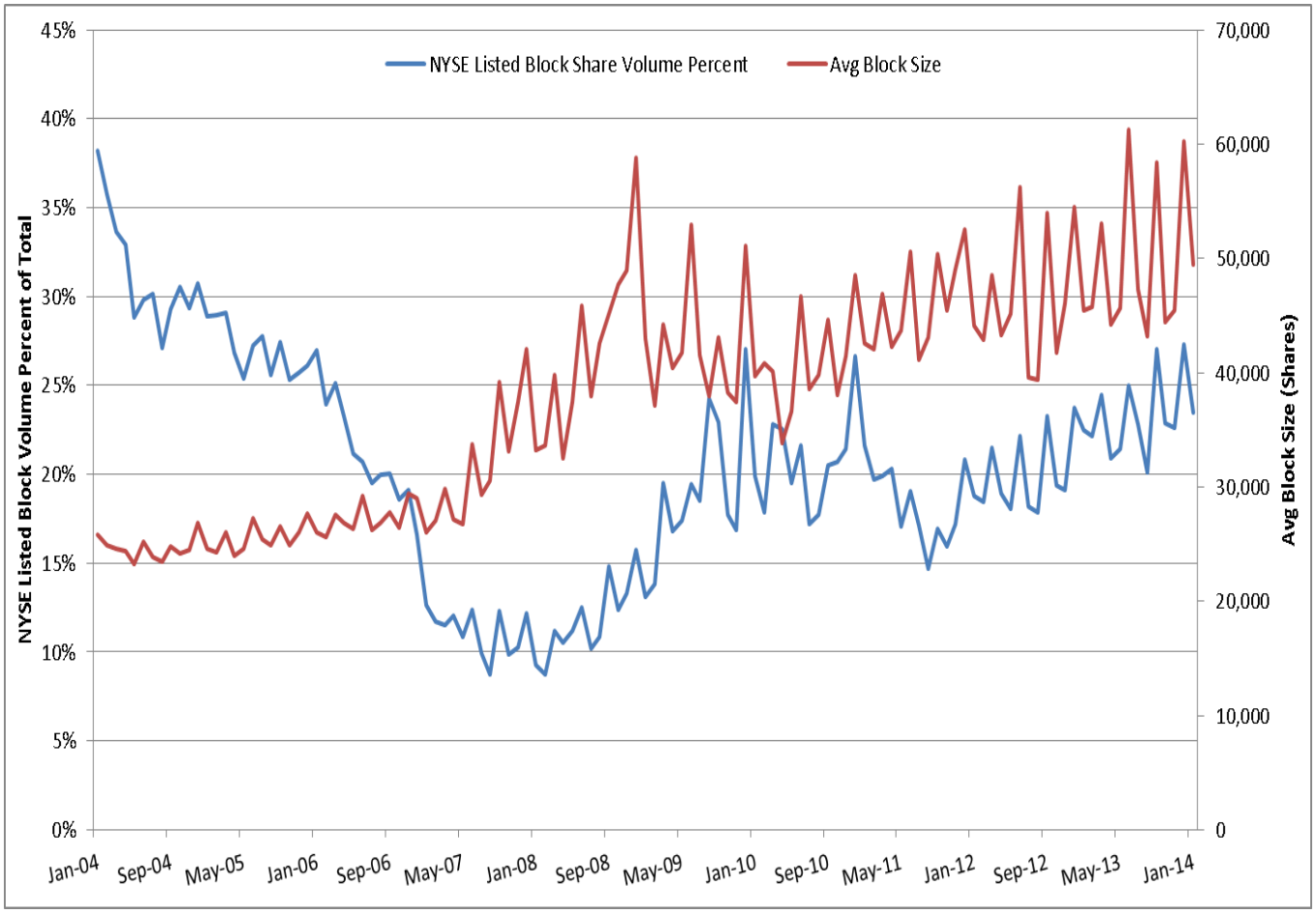

Figure 1. NYSE block volume percent and average trade size from Jan 2004 to Jan 2014

BLOCK STATISTICS THAT HELP TRADING STRATEGIES

We performed a study on a profile of blocks across stocks based on groups of average daily volume of shares traded and time of day. We used 10,000 shares or more as a definition for the rest of the study. In a later study, we will discuss the effect of determining the size that constitutes a block and how to do so on an individual-stock basis. The results are shown in Table 1. Our dataset allows us to compute block-based statistics for different sizes of blocks and specifically exclude trades that we believe are not blocks, such as auction prints, from our analysis.

Interestingly, Table 1 shows block volume as a percent of total continuous trading volume declining with average daily volume. This is a bit surprising at first, since one might think that the less liquid stocks are more likely to have blocks than are the more liquid ones. One explanation for this trend is that more institutional interest exists for liquid stocks given that they tend to have a larger market cap or cheaper price. This attracts larger portfolio positions, hence, the larger trade sizes. These numbers

might also have seasonality within the year or the investment cycle, which is why we need to monitor these numbers regularly. Tradebook's STAZ <GO> analytic on the Bloomberg terminal enables traders to monitor block percentage on their stocks. This further enables traders to appropriately allocate liquidity for block opportunities. Additional analysis shows that average block size increases as average daily volume increases—confirming a widely held belief that traders are trading larger trade sizes in the more liquid stocks.

ADV Bucket	Block Pct	Avg Size
> 5MM	7.1%	31,087
1MM–5MM	6.8%	28,379
500K–1MM	5.5%	29,380
250–500K	3.9%	29,300
0–250K	2.1%	30,751

Table 1

Let's take look at intraday block profiles in Figure 2. For U.S. equities, the block volume (absolute number of shares as percent of daily volume) shows a profile similar to the VWAP profile observed in U.S. stocks. The profiles are also very similar across the different ADV buckets, indicating the time of day traders have the most success in trading blocks. Blocks tend to trade during the first and last half hour of the day. In fact, blocks are almost three times more likely to be executed during those times than in the middle of the day. This had led to the conclusion that if a trader has an order that is a large percent of the day's volume, a liquidity-seeking trading strategy must include a dark aggregator order with minimum fill sizes set to 10,000 for the first and last 30 minutes of the day. Tradebook's B-Dark Algorithm offers access to almost 95% of the block volume[4] in dark pools and can be set easily to include only block dark pools. B-Dark also provides easy options to have the strategy active during specific times, say 3:30 pm to 4:00pm.

[4] Tradebook connects to the dark pools that represent almost 95% of the executed volume of the Rosenblatt Securities universe.

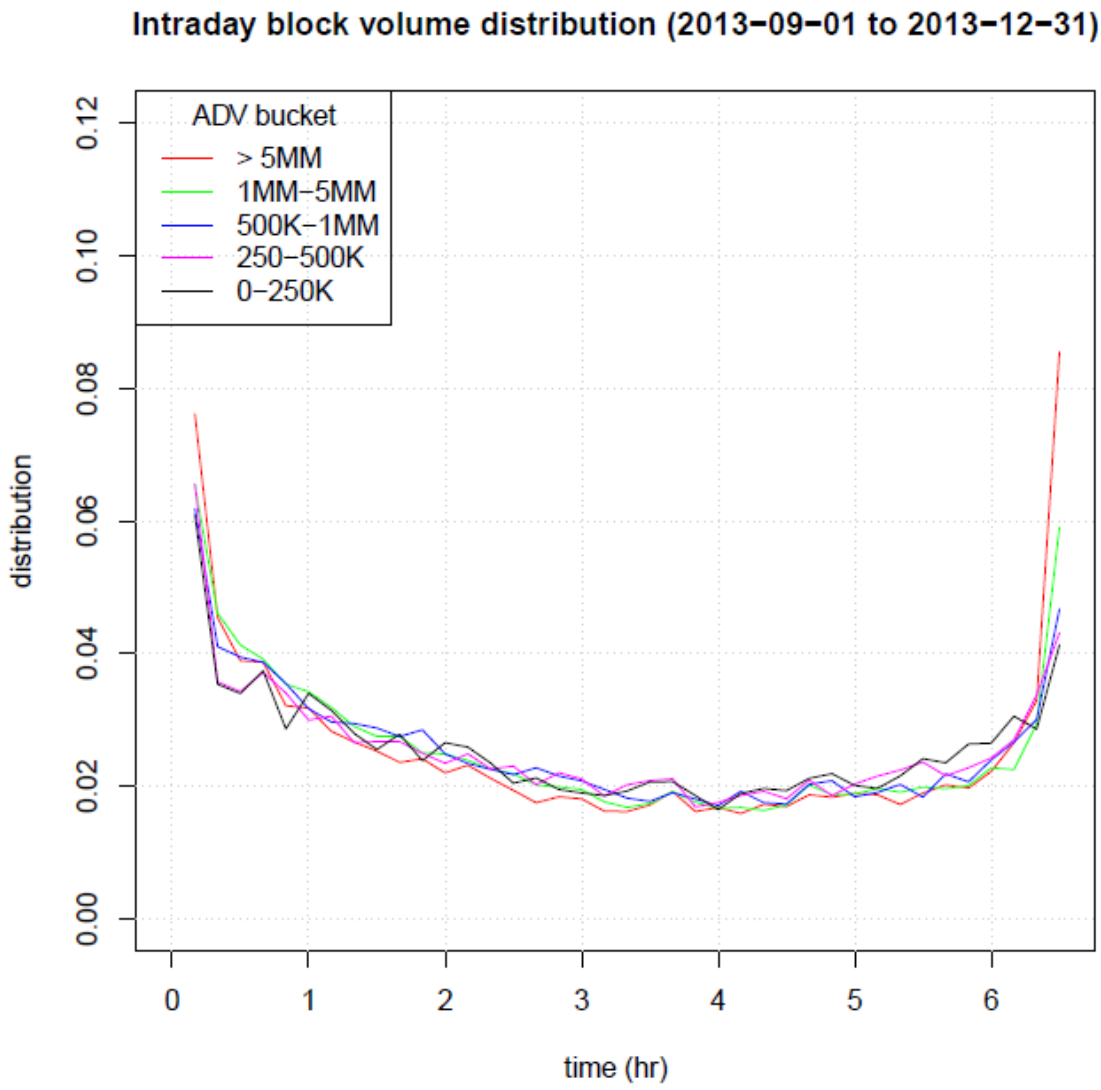

Figure 2. Intraday block volume distribution across the market NOT normalized by market volume

Figure 3 shows intraday block *percent* volume profiles across the different average daily volume groups. This is computed as a percent of the total volume for the individual stocks. Each data point shows the block volume as a percent of total volume at a given point in the trading day. This chart clearly shows how the block volume profile compares with the daily volume profile. The flatness across the day shows that these individual profiles are very similar to each other, i.e., as volume increases during the day, so does block volume; as volume goes down, block volume also decreases. It also shows a clear peak in the first 10 minutes of trading. This is consistent with anecdotal evidence that block traders find liquidity earlier in the day.

Another feature clearly indicated in this chart is the separation of the individual ADV group profiles. This separation follows from Table 1, but is shown to be prevalent across the entire day. Thus, our actionable conclusions for Table1 are applicable throughout the day.

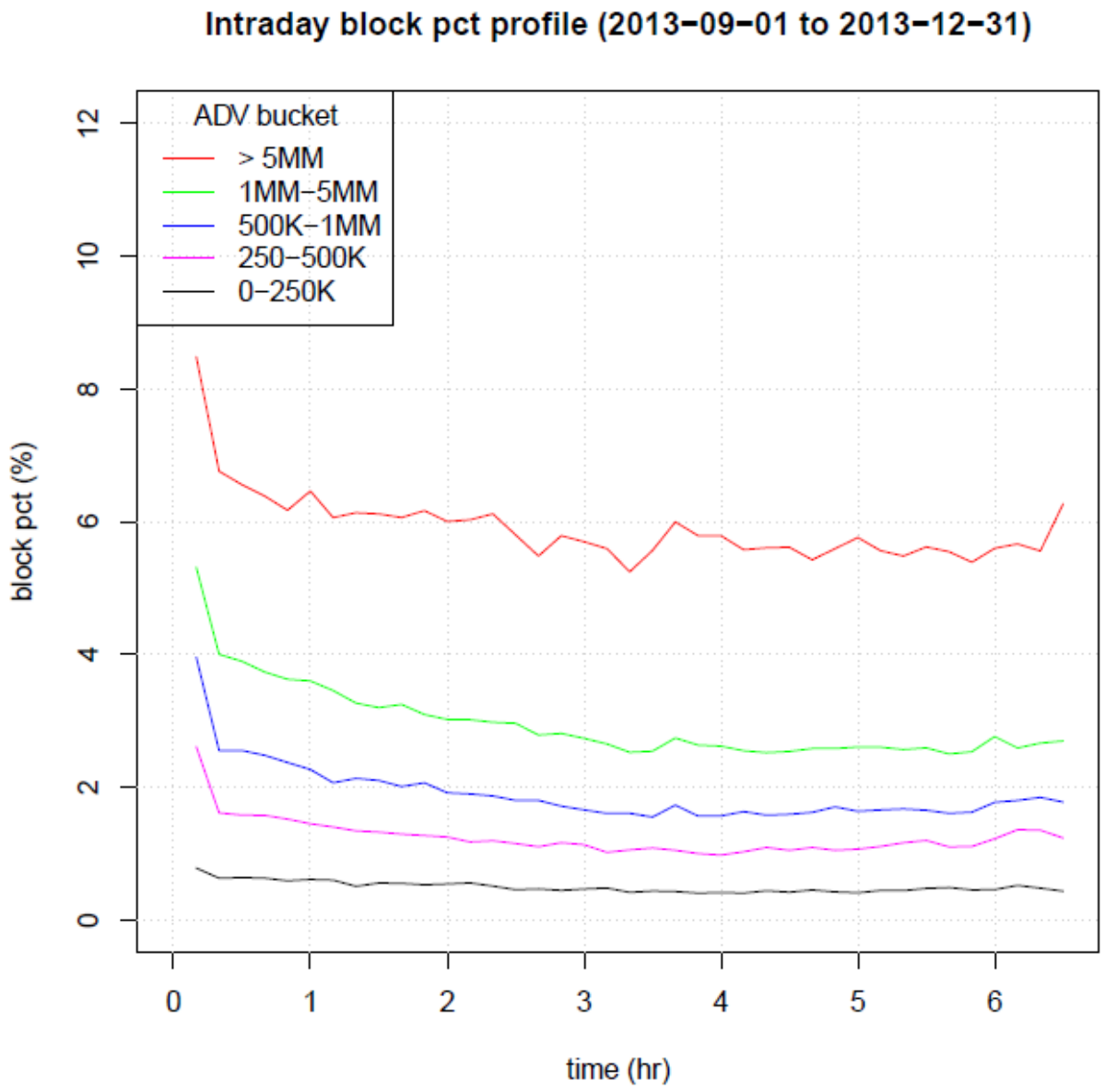

Figure 3. Intraday profile of block volume as a percent of total volume on the day

INTRADAY EFFECTS FOR EVEN MORE BLOCKS

One major driver of blocks is an urgency to execute large institutional orders, which leads to our first intraday effect in blocks: if the old adage is true that liquidity begets liquidity, then in the block world—how likely are blocks to be followed by more blocks in the same stock?. It appears that there is a time window.

Figure 4 shows the likelihood of blocks following other blocks by time. This plot, like others in our analysis, has a data point per every 10 minutes. Thus, every 6.5 hours is a trading day. Each effect around the 6.5-hour multiple is around the same time each day and multiple of it, for example, the first peak at 6.5-hour lag could indicate that if blocks are higher at 9:30 am today, they are higher close to end of day 4 pm and next day around 9:30 am. The spike at the beginning is the highest in the chart and potentially more interesting because it indicates that blocks at any time of the day are more likely to be followed by more blocks within an hour or so and the likelihood falls off very quickly in the ensuing hours. This is a clear indication that if you see blocks go off in a given stock (can be tracked by the STAZ <GO> analytic in real time), you should allocate volume to the strategies that pursue blocks in approximately the next hour.

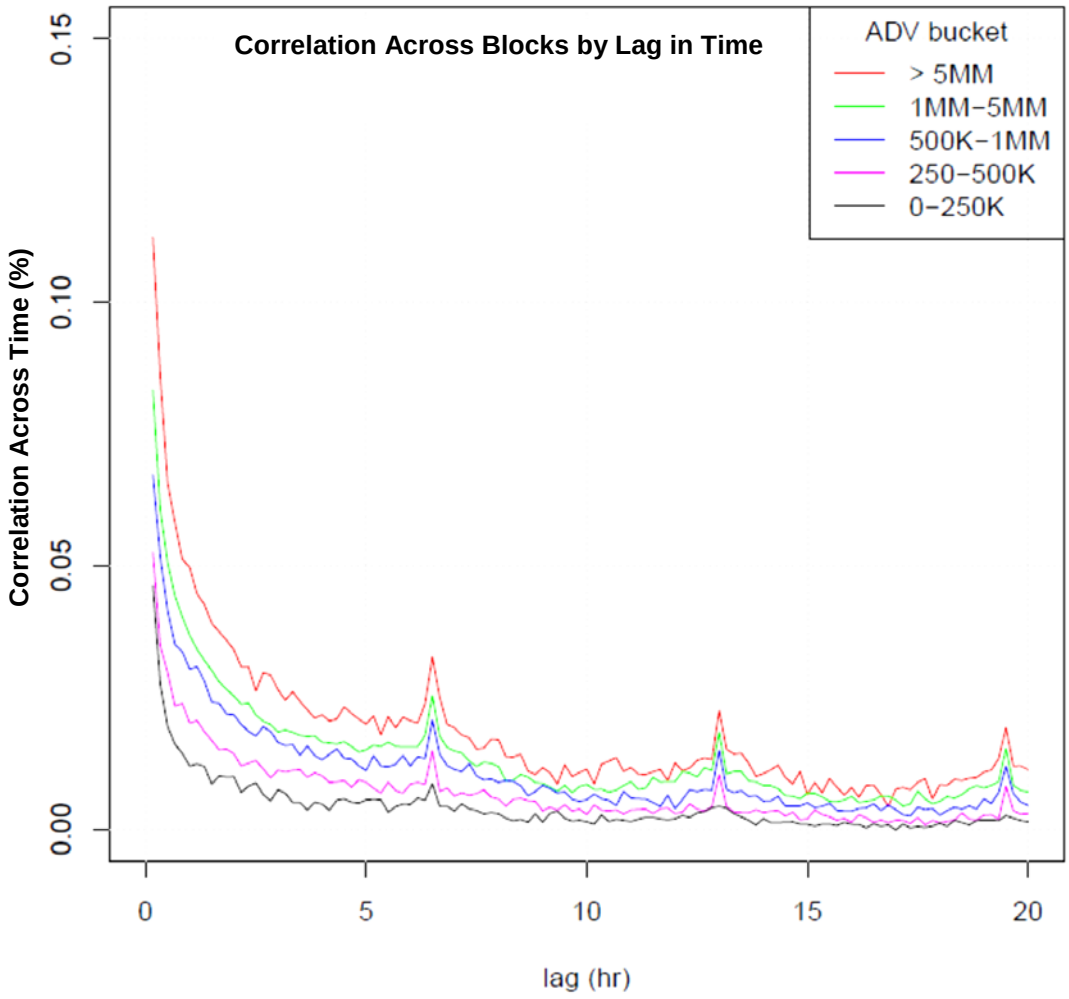

Figure 4. Autocorrelation across block volume percent shows distinctive peaks at short range and daily overlapping intervals

DO BLOCKS TRADES HAVE LASTING IMPACT? (SPOILER ALERT: NO)

Finally, we looked at price movement before and after a block is traded to understand the effect of a block trade on the price of stocks. Figure 5 shows the average return in the price of individual stocks 100 seconds before and 100 seconds after the print-by-venue type in 10-second intervals. Like the other charts in the study, we ran this analysis with 10,000 shares or more as the block size. The X-axis shows time in milliseconds before (negative) and after (positive) the block was executed. The Y-axis shows the mid-quote move (Toxicity) in basis points from the mid-quote at the time the block was traded. The black vertical line indicates the time the block went off and corresponds to a zero-basis-point move from itself. Each data point indicates the change in the mid-quote between the block trade and the reference time. We assigned all block trades a side based on an algorithm that examines the trade price versus the best bid and ask price just before the trade was executed. The change in mid-quote is then adjusted for side for each block. All timestamps used were exchange-level timestamps with millisecond accuracy. Thus, for a “Buy”-classified block, a price move from $8 before the block was executed to $10 after the block was executed, with the trade going off at $9, will show a positive 12.5% move before and 11.1% move after the block was printed. Similarly, a “Buy” block showing a move down indicates that the price has gone down since the block executed.

The exchanges with majority market share have a similar trend—a small uptrend in the time frame before the block is executed; this is consistent with institutions with large “Buy” positions having price impact on the market before they find a larger counterparty to trade with. There is immediate price impact (10 seconds) on the mid-quote after the block execution. One might think this is temporary impact, but the major exchanges do not show any signs of reversions within the next 100 seconds. This might be an indication that the major exchange liquidity-providing participants anticipate larger orders and react adversely immediately after the trade. This phenomenon is not visible in the smaller exchanges, and there is an absence of any pattern in the “dark” venues. We surmise that liquidity providers are reading the major exchange trades very closely to glean information about large orders. The exchanges with smaller market share are also inverted rebate venues, but the trend across these is not obvious. “Dark” block trades are the most interesting—attesting to our earlier claim that impact in dark is much more muted and advantageous to institutions trading large orders. This is consistent with “dark” block market share being much higher—almost 70% of all blocks traded.
The exchange termed as CINN is NSX, and has a distinctively different profile than all other exchanges in figure 5.The after-price impact in this exchange is similar to the major exchanges. It is not clear to the author why this is the case. Another exchange that has a different profile is the AMEX, also known as NYSE MKT LLC, which trades small-capitalization companies. If you look at the trading fees, DMMs and SLPs have large incentives to provide liquidity on this venue. These factors could affect the profile of blocks traded there and, consequently, the price impact around the trade.

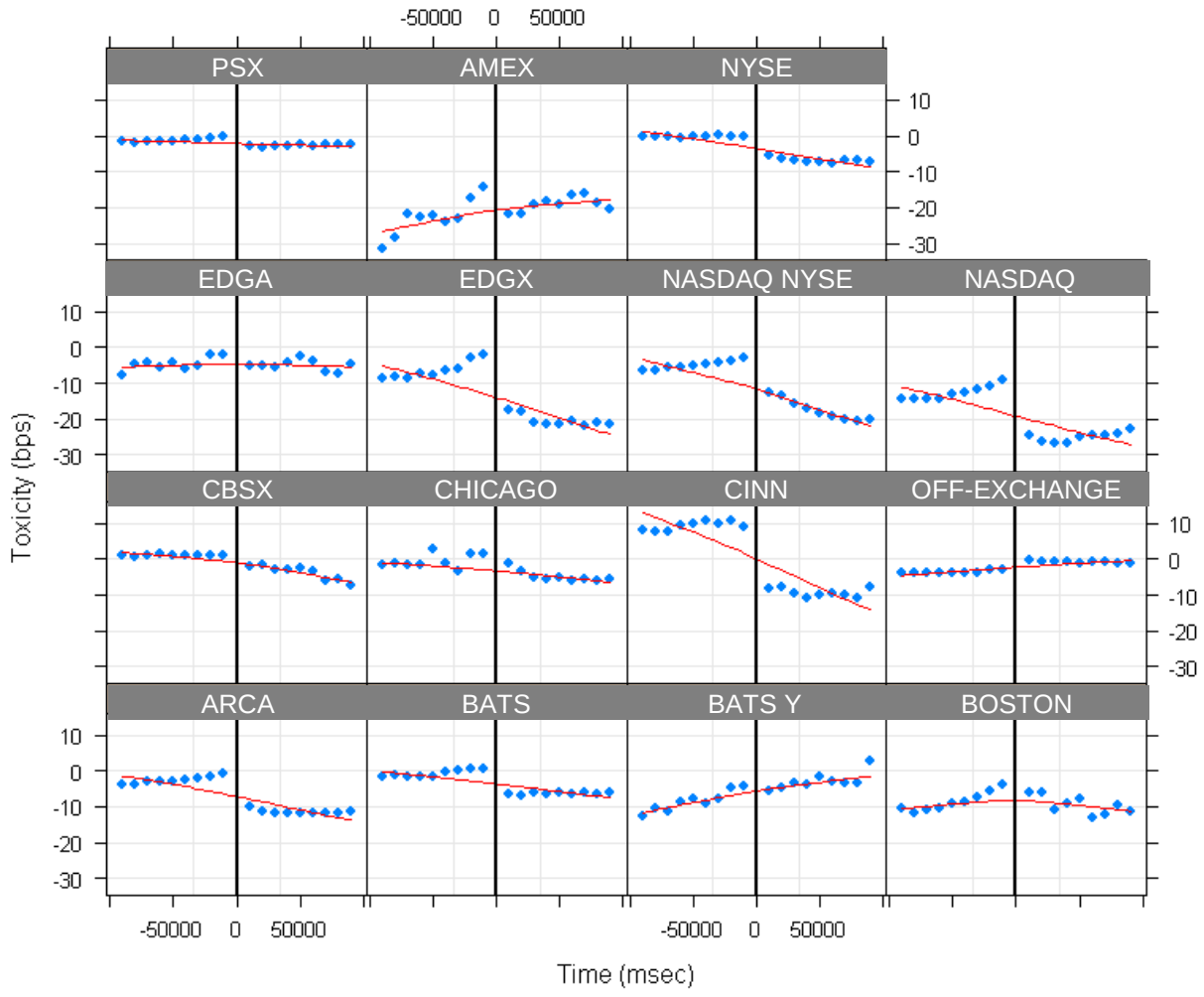

Figure 5. Block "Toxicity" or price movement in mid-quote before and after the block was printed on the tape

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