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PHANTOM INDEXES

Major Market Indexes Reflect Only 30% of All Trades Intraday

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Introduction

The investment world trusts and relies upon indexes such as Dow Jones Industrial Average, S&P 500, NASDAQ 100 and Russell 2000 for gauging market activity. In recent years, this emphasis has become even greater due to the explosion in popularity in tradable index-based products, such as ETFs, futures and options. In addition, the market has become increasingly dominated by trading volume from arbitrating index, ETF, and other derivative movements versus the underlying equities.

Surprisingly, we have found that on an intraday basis, these widely watched indexes and possibly others are based on less than 30% of all shares traded, therefore conveying incomplete trading data. We have confirmed in writing with representatives from Dow Jones Indexes, S&P, NASDAQ, and Russell that these indices are calculated using only primary market data. Nowadays, in a world of microsecond trading, these indexes have become phantoms – they reflect some trades involving their components, but not the majority of them.

This situation raises serious questions about the reliability of index-based trading products. The solution? Simple. Indexes should be calculated based on every trade involving a component that crosses the consolidated tape, which includes trades from non-primary exchanges such as BATS, DirectEdge and NYSE Arca.

Incomplete Trading Data

US stocks are traded today on more than 50 market centers. According to TABB Group, stock exchanges trade 67% of overall volume. The biggest exchanges are NASDAQ (26% of total US stock exchange share), NYSE (19%), NYSE Arca (19%), DirectEdge (14%) and BATS (12%).¹ The balance of shares traded (about 33%) occurs in dark pools, electronic communication networks (ECNs) and broker internalized alternative trading systems.

As a result, many stocks are traded on exchanges other than where they have their primary listing.² NYSE actually only trades 27% of the volume of NYSE-listed stocks³ and NASDAQ, 29% of the volume of NASDAQ-listed stocks.⁴ Most major indexes, however, are calculated intraday using sales from only the primary exchange where the component stock is listed. Thus, they do not incorporate the majority of shares traded. That means that these indexes are based on a little more than one out of every four shares traded.

Dow Jones Industrial Average Components⁵

| Ticker | Company | Primary Exchange | % Traded on Primary Exchange |
|--------|--------------------------------------|------------------|------------------------------|
| MMM | 3M Co | NYSE | 36.87% |
| AA | Alcoa Inc | NYSE | 15.52% |
| AXP | American Express Co | NYSE | 26.29% |
| T | AT&T Inc | NYSE | 22.02% |
| BAC | Bank of America Corp | NYSE | 15.26% |
| BA | Boeing Co/The | NYSE | 21.69% |
| CAT | Caterpillar Inc | NYSE | 19.80% |
| CVX | Chevron Corp | NYSE | 28.75% |
| CSCO | Cisco System s Inc | NDAQ | 26.52% |
| KO | Coca-Cola Co/The | NYSE | 33.71% |
| DD | EI du Pont de Nemours & Co | NYSE | 29.01% |
| XOM | Exxon Mobil Corp | NYSE | 34.24% |
| GE | General Electric Co | NYSE | 20.77% |
| HPQ | Hewlett-Packard Co | NYSE | 30.14% |
| HD | Home Depot Inc | NYSE | 25.05% |
| INTC | Intel Corp | NDAQ | 30.59% |
| IBM | International Business Machines Corp | NYSE | 26.91% |
| JNJ | Johnson & Johnson | NYSE | 28.52% |
| JPM | JPMorgan Chase & Co | NYSE | 27.30% |
| KFT | Kraft Foods Inc | NYSE | 28.07% |
| MCD | McDonald's Corp | NYSE | 29.26% |
| MRK | Merck & Co Inc | NYSE | 20.87% |
| MSFT | Microsoft Corp | NDAQ | 30.19% |
| PFE | Pfizer Inc | NYSE | 20.50% |
| PG | Procter & Gamble Co/The | NYSE | 30.22% |
| TRV | Travelers Cos Inc/The | NYSE | 50.29% |
| UTX | United Technologies Corp | NYSE | 28.15% |
| VZ | Verizon Communications Inc | NYSE | 20.66% |
| WMT | Wal-Mart Stores Inc | NYSE | 27.96% |
| DIS | Walt Disney Co/The | NYSE | 29.83% |
| | AVERAGE | | 27.17% |

¹ See http://mm.tabbforum.com/liquidity_matrices/66/documents/original_TABB_Group_LiquidityMatrix_April_2011.pdf?1305559304 – Tabb Group Liquidity Matrix April 2011

² “The exchange where a corporate stock issue is primarily listed is the primary listing market.”- Larry Harris, *Trading and Exchanges* (New York: Oxford University Press, 2003), 48.

³ See https://batstrading.com/market_summary/ - 5 Day Average Chart

⁴ See <http://www.nasdaqomxtrader.com/Trader.aspx?id=MarketShare> - Market Share Statistics – May 2011

⁵ See <http://fragmentation.fidessa.com/fragulator/> - % traded on primary exchange from May 01- May 31, 2011

This index incompleteness is compounded by the number of respective components. There are 30 stocks in the DJIA, 100 in the NASDAQ 100, 500 in the S&P 500, and 2,000 in the Russell 2000. The problem is compounded further by the trading liquidity of each component. In general, the smaller the market cap, the less liquid the trading, and the larger the variances that could occur from one trade on one market center, to the next trade on another market center.

Unintended Consequence of Reg NMS

The Phantom index problem appears to be another unintended consequence of the SEC's Reg NMS. Prior to 2007, approximately 80% of NYSE listed stocks traded on the NYSE and the majority of stocks in the S&P 500 and the DJIA (the two most watched indexes) were NYSE listed stocks. In 2007, Reg NMS resulted in the equity markets becoming extremely fragmented, spreading trades amongst a variety of competing market centers.

Almost overnight, NYSE's market share of trading dropped from 80% to less than 30% as faster, cheaper competitors captured share. Indexes, which were being calculated intraday based on 80% of all trades, began being calculated based on less than 30% of all trades. Owners of the major indexes, however, have not changed what data they capture to reflect this new paradigm.

NYSE LRPs: Another Source of Index Inaccuracy?

We also believe that during times of market stress, when the whole world is watching, key indexes might reflect an even greater degree of inaccuracy. The conventional belief is that on May 6, 2010, the DJIA, under selling pressure due to a plethora of reasons, plunged nearly 1,000 points, and then recovered much of that loss within 20 or so minutes. Some speculate, however, that the DJIA actually fell 25% lower.⁶

One reason could be NYSE's Liquidity Replenishment Points (LRPs). According to the NYSE, an LRP is: *"A volatility control built into the Display Book to curb wide price movements resulting from automatic executions and sweeps over a short period of time. When triggered, LRPs automatically convert the market temporarily to slow or Auction Market only mode, allowing specialists, floor brokers and customers to supplement liquidity and respond to the stock's volatility."*⁷

⁶ Melloy, John. *Did Dow Actually Drop 1250 in 'Flash Crash'* Retrieved May 31, 2011 from http://www.cnbc.com/id/37109515/Did_Dow_Actually_Drop_1250_in_Flash_Crash

⁷ See <http://www.nyse.com/glossary/1127471914646.html>

During the May 6th Flash Crash, many LRPs were activated. Most trades that were executed at extreme prices, such as \$0.01 per share did not occur on the NYSE. For example, NYSE-listed Proctor & Gamble (PG) – a DJIA component – traded as low as \$39.37 on non-primary exchanges.⁸ However, because LRPs were activated, the low of the day on the NYSE was only \$56, or 42% higher. Any trades below \$56 were not included in index calculations because they were traded off the primary exchange.

In times of extreme volatility, NYSE LRPs will likely be activated, but non-primary exchanges may continue trading NYSE stocks. However, intraday trades from these non-primary exchanges will not be reflected in the indexes. Thus, investors who rely on index values in times of market stress could be relying on data that varies widely from reality.

Conclusion

Would you bet on the Kentucky Derby (legally, of course) if the results reflected only some of the horses in the race? Would you have confidence in a publicly traded company that reported results from only some of its subsidiaries? This is currently the case with the major stock indexes in the US. The indexes that everyday retail and institutional investors rely upon are being calculated on an intraday basis without a full deck, so to speak.

In a post Reg NMS world, fragmentation amongst market centers has reduced the amount of trades that occur on the primary exchanges. The primary market alone is no longer a complete enough source of data when calculating an index value since it represents only about one in four trades. Index suppliers must adjust their methodology to accurately reflect all trades intraday in a timely manner. If they don't, they risk regulators or Congress doing it for them.

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⁸ Goldman, David. *P&G Stock Drops 37% -- Not Really* from http://money.cnn.com/2010/05/06/markets/procter_and_gamble_stock/index.htm?postversion=2010050619