

**Statement of Professor Terrence Hendershott
In the Matter of PJM Up-to Congestion Transactions
Federal Energy Regulatory Commission
Docket No. IN10-5-000**

Introduction

Powhatan Energy Fund LLC and its counsel, Drinker Biddle & Reath LLP, retained me to opine on whether the conclusions outlined by the Federal Energy Regulatory Commission (FERC) staff in its preliminary findings in the above-referenced investigation are well-founded. I am the Cheryl and Christian Valentine Chair and Associate Professor of Finance and Operations and Information Technology Management at the Haas School of Business, University of California at Berkeley. I have focused much of my academic research on the equity market structure and trading. Appendix A contains my curriculum vitae further describing my qualifications. Appendix B lists materials that I reviewed prior to writing this position statement.

My opinion will focus on the FERC staff's findings in its preliminary findings that Dr. Houlian "Alan" Chen and Powhatan engaged in market manipulation related to certain Up-to Congestion trades and their receipt of Marginal Loss Surplus Allocation (MLSA) payments between February 2010 and August 2010. My analysis assumes that the MLSA payments themselves are not directly at issue as they were approved by FERC. A regulatory policy punishing market participants retroactively for flaws in existing rules is preposterous when those rules were clearly approved.

Investors, traders, and other market participants do not and should not view payments for trading volume separately from the gross revenues associated with their trading activity. There is no economic support or support in academic literature that trading payments like the MLSA are relevant as to whether or not behavior constitutes "wash trades", "sham" transactions, or manipulation.

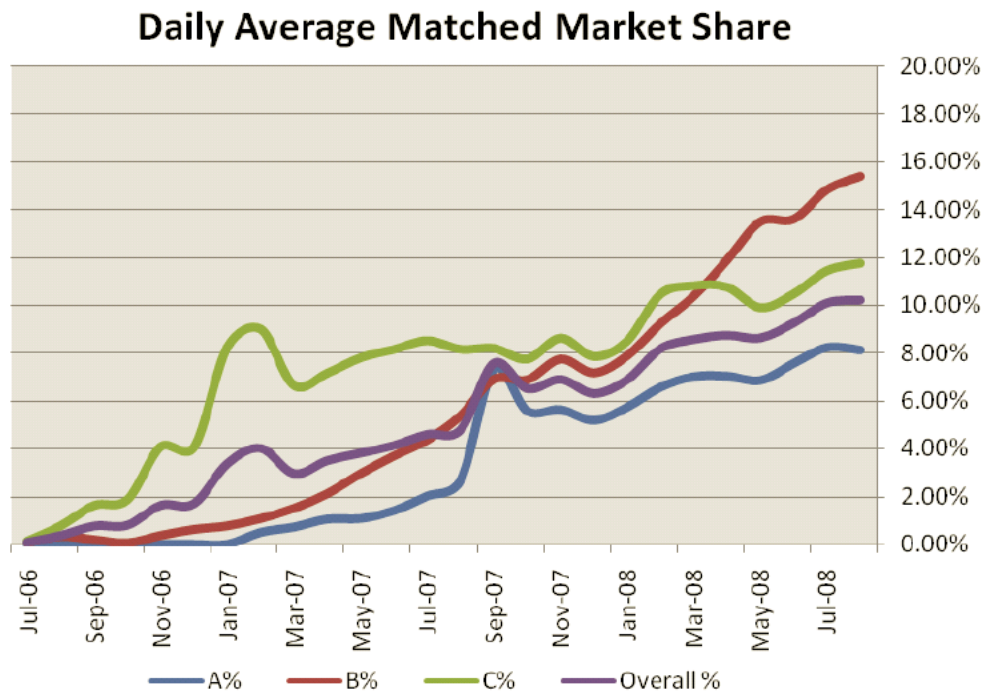
Below I will describe the basis for my conclusion using my knowledge of working with trading firms and the academic literature related to trading fees and rebates. The study and use of these payments is most common and best known in the equity markets. Therefore, while the economic principles are universal, my evidence will focus on the equity markets.

Trading Fees and Rebates

Trading fees and rebates in equities are commonly referred to as maker/taker pricing. The maker is the resting limit order and the taker is the incoming marketable order that initiates the transaction. Typically, the market center charges the taker a fee and provides a rebate to the maker. These fee/rebate payments are explicitly designed to affect traders' incentives and behavior in terms of how much they trade and where they trade.

The BATS stock exchange is well known for using its fee/rebate payment structure to change trader behavior. Examples of this are its pricing experiments in January 2007 and September 2007. In January 2007, BATS reduced its fees in Tape C securities (NASDAQ-listed). The below graph shows that its market-share in those securities immediately increased from 4% to almost 10% (see the green line). BATS market share in other securities did not change noticeably, demonstrating that the fee change was responsible for the change in trading behavior. This successful experiment was repeated in Tape A securities in September 2007 and its

market-share in those securities immediately increased from 2% to nearly 8% (see the blue line). Similar to the January 2007 event, the market-share effect was only present in securities affected by the temporary fee reduction. BATS repeated this experiment again by successfully increasing its market share in European equities by reducing fees in June 2009.



Graph of BATS market share in U.S. equities from July 2006 to August 2008:

http://www.batstrading.com/resources/press_releases/BATSAugust2008VolumeFINAL.pdf

The evidence from BATS demonstrates how payments are used by markets to influence traders' behavior and increase trading volume. BATS was one of many market centers, so focusing on its market share does not demonstrate that traders increased their total trading as it is possible they simply shifted their trading from another market to BATS. However, how fee/rebate payments affect overall trading volume is shown by Malinova and Park's (2013) examination of a fee change in July 2005 on the Toronto Stock Exchange (TSX). The TSX moved from per-dollar to per-share calculation, generating heterogeneity in the payment depending on the price of the stock: the net maker/taker payment declined for high-priced stocks and it increased for low-priced stocks. In stocks that were only traded on the TSX, trading volume decreased where net payments increased and trading volume increased where net payments decreased. The BATS and TSX fee/rebate changes demonstrate that payments affect where and how much traders trade.

Trading Fees and Prices

The FERC staff's preliminary findings seem to attach significance to the breakdown of the profitability of trading between the trading revenues based on transaction prices and trading fees/rebates. There is absolutely no economic basis for making such a distinction. All economic agents rationally view the total costs and total benefits of their actions and choose their behavior accordingly. A natural intuition is that in a competitive market, if traders are charged a fee (or given a rebate), they will adjust their pre-payment prices to exactly incorporate that payment. Colliard and Foucault (2012) provide an example of this with an economic model in

the context of financial market fees and rebates. In line with the above intuition, they find (Corollary 1) that traders adjust their prices to exactly incorporate the fee/rebate. This makes fees/rebates irrelevant to the prices (and profits) after accounting for the payments.

The preliminary findings appear to focus on the issue that trading revenues sometimes were negative before accounting for MLSA. Given the above economic principle that traders only care about prices after incorporating fees/rebates, negative trading revenues signify nothing. In my experience working with high frequency trading firms, there were often times when their trading revenues were negative before accounting for fees and rebates. They viewed this as irrelevant as their firms only cared about total net revenues, which is inclusive of fees and rebates. In fact, significant types of equity market trading have negative trading revenues before accounting for fees and rebates. My own research provides evidence of this (Brogaard, Hendershott, and Riordan (2013)). We examined high-frequency traders (HFTs) on NASDAQ in 2008 and 2009. We found that their liquidity supplying trades, which receive the above mentioned maker liquidity rebates, are unprofitable gross of fees, but profitable once liquidity rebates are included. For example, in Table 5 of Brogaard, Hendershott, and Riordan (2013), we find that in the large stocks, HFTs' liquidity supplying trades (which are 42% of trading volume) lost \$1,824.99 per stock per day on average. However, once the liquidity rebates were included, the HFTs had positive trading revenues of \$8,211.21 per stock per day. In other words, on average these equity traders were buying shares of stock at higher prices than which they were selling them. They were losing money on the trades when rebates were not taken into account. However, they more than made up from this loss on the rebates paid by the exchanges and market centers where the trades were being executed. As a result, their trades were profitable after accounting for all costs and benefits of their activity. In the peer review process at one of the most highly regarded academic finance journals, no reviewer found this surprising or evidence of manipulative behavior. Moreover, one of the reviewers commended us for including fees/rebates, as the analysis without them would be incomplete and possibly misleading. Brogaard, Hendershott, and Riordan's (2013) findings represent a large amount of trading activity and have been in the public domain for many years. I am unaware of any claims by the exchanges themselves, the Securities and Exchange Commission, or other regulators that these findings indicate manipulation.

Conclusion

Trading fees and rebates affect traders' incentives and behavior. A properly designed market takes this into account. There is no economic basis, academic literature, nor equity market industry practice supporting the notion that trading payments like the MLSA are relevant as to whether or not behavior constitutes "wash trades", "sham" transactions, or manipulation. Similarly, no economic basis exists for distinguishing the profitability of trading between the trading revenues based on transaction prices and trading fees/rebates. If lack of positive pre-payment trading revenues, but positive post-payment revenues, is evidence of possible market manipulation, then positive pre-payment trading revenues, but negative post-payment revenues, could be viewed as evidence against market manipulation. This illustrates how the FERC staff's preliminary findings in this area are lacking in any sound economic reasoning. In short, economic basis, academic literature, and equity market industry practices provide no support for the relevance of pre-approved trading fees and rebates in reaching a conclusion of manipulation.

References

Brogaard, J., T. Hendershott, and R. Riordan (2013) High Frequency Trading and Price Discovery. *Review of Financial Studies*, forthcoming.

Colliard, J.-E., and T. Foucault (2012) Trading fees and efficiency in limit order markets. *Review of Financial Studies* 25, 3389-3421.

Malinova, K., and A. Park (2013) Subsidizing Liquidity: The Impact of Make/Take Fees on Market Quality, *Journal of Finance*, forthcoming.

Appendix B: Materials Reviewed

FERC Preliminary Findings, August 9, 2013

Powhatan Written Submission to Commission Investigation Staff

Powhatan Final Submission to FERC on behalf of Alan Chen

August 24, 2012 Letter from William McSwain to Steven Tabackman, Supplemental Submission on Behalf of Powhatan

Glen Boshart, "Alleging \$19M in ill-gotten gains, PJM asks FERC to grant quick approval to rule changes," SNL Financial, August 24, 2010

Platts, Global Power Report, August 26, 2010