Comment on Mahmoodzadeh's Tick Size Change in the Wholesale Foreign Exchange Market

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Comment on *Tick Size Change in the Wholesale Foreign Exchange Market*

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Comment on *Tick Size Change in the Wholesale Foreign Exchange Market*.

I had the pleasure to hear Dr. Soheil Mahmoodzadeh discuss his job market paper (Mahmoodzadeh & Gençay, 2015) recently at the University of Victoria Department of Economics seminar. The paper studies the effect of changes to tick size from pip to decimal pip for major currency pairs by the Electronic Broking Services (EBS) in 2011. EBS implemented the change in a way that provides a natural or quasi-experiment with observations on both treatment and control groups, before and after the change. The change to decimal pip added an extra decimal point to all orders, which created new opportunities for high frequency traders (HFT) that may benefit or hurt the market. Mahmoodzadeh and Gençay establish stylized facts about the market and address how the change in tick size effects measures of market quality.

I offer three comments in order to encourage constructive discussion about methodology and concepts for this high-profile topic area. I apologize if the concepts are already under consideration by Mahmoodzadeh and Gençay or the literature on HFT more broadly. First, I suggest that quantile regression is a useful technique to explore changes in the distribution of spread beyond changes in the average spread captured by the difference in difference regression model used by Mahmoodzadeh and Gençay (2015). Second, I suggest that the difference in spreads faced by HFT and manual traders can be used to measure the gains captured by HFT on an intraday timescale. Third, I discuss concerns over the equilibrium effects of HFT penny jumping strategies. All figures reproduced with permission from author.

1. Difference in Difference Analysis

The change to decimal pip offers a quasi-experiment to test the hypothesis that lower tick size allows tighter spread (Mahmoodzadeh & Gençay, 2015, p. 15). Major pairs such as EUR-

USD changed to decimal pip pricing in March 2011, whereas less heavily traded pairs such as

EUR-GBP changed to decimal pip in October 2010. Thus, Mahmoodzadeh and Gençay use the

EUR-USD pair as treatment and EUR-GBP as control. They find that spreads narrowed in EUR-

USD after the change to decimal pip with statistical and economic significance. I reproduce

Figure 15 and 16 from Mahmoodzadeh and Gençay to show that spreads decreased in EUR-USD

after March 2011, but not in EUR-GBP.

Figure 15: EUR-USD Spread   **Figure 16:** EUR-GBP Spread
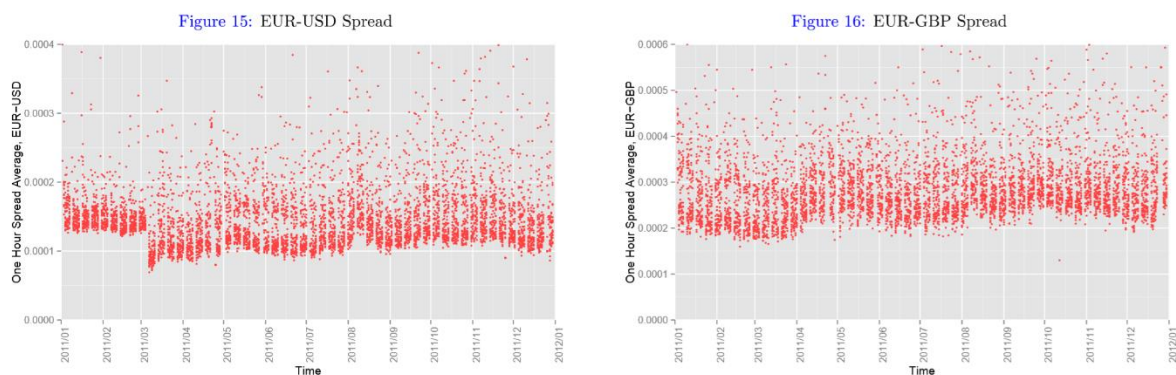
Notes: Figures 15 and 16 illustrate the one-hour frequency EUR/USD and EUR/GBP spread averages respectively, for 2011. In the graphs, each dot is the one-hour average spread and there are 24 observations in each day. We have excluded weekends and holidays.
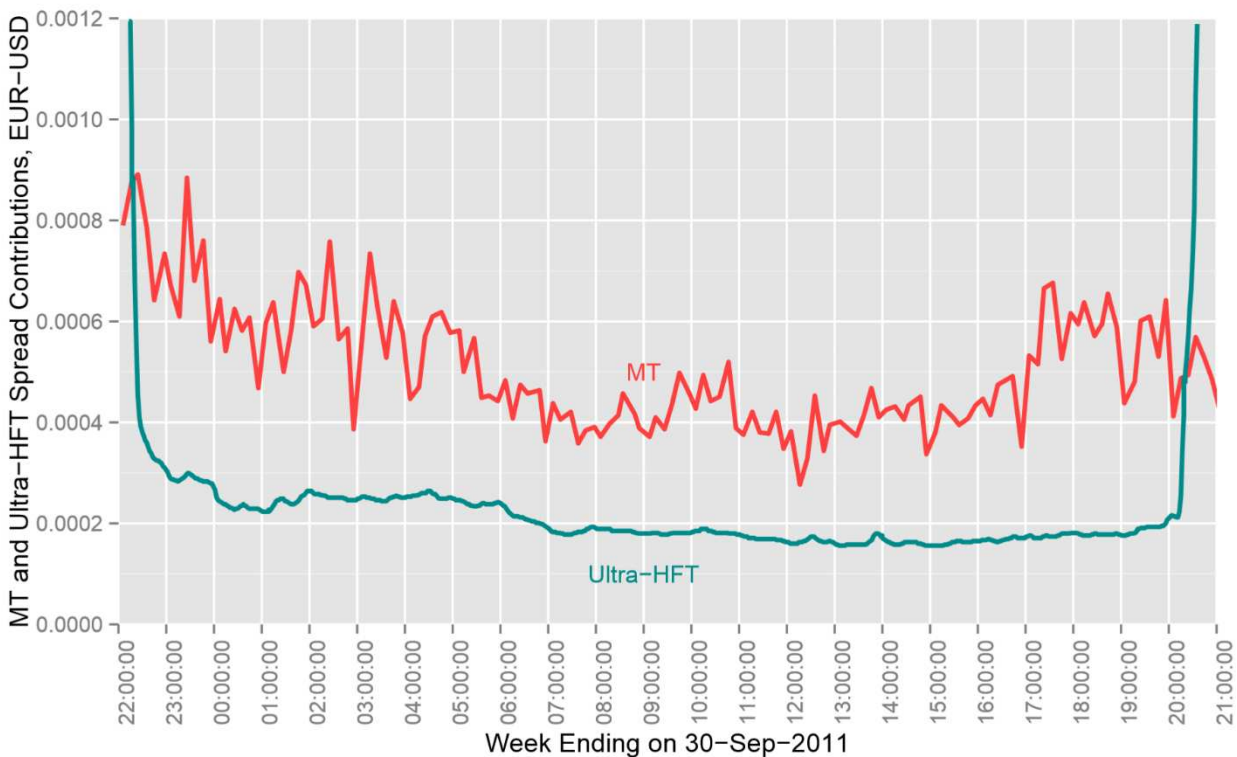
The variability of the spread in EUR-USD in Figure 15 leads me to wonder if the change

affected the distribution spread in non-homogeneous ways. For example, there could be a

decrease in the average spread but an increase in extreme spreads. Such an increase at extremes

may suggest a decrease in market quality at times of stress. This observation leads me to suggest

that quantile regression could be a useful way to investigate how the entire distribution of

spreads change with decimal pip pricing.

2. Spread different for HFT and MT

In his presentation at the University of Victoria Department of Economics seminar, Dr.

Mahmoodzadeh included a figure titled 'Who Benefited from Smaller Spreads' that I reproduce

below. The figure shows the effective spread for HFT and manual traders throughout the trading

day. In particular, HFT generally face a lower spread than manual traders. This difference may

be not surprising given HFT generally trade smaller orders and may have less market impact, but

it led me to wonder if the difference between spreads for HFT and manual trader represents a

source of profit to HFT. Could we think of the difference in spreads as an economic rent

captured by HFT?

I would like to suggest a possible measure for the gains earned by HFT based on the figure

above: an integral of the difference in spreads weighted by manual traders' total volume

throughout the trading day. Such a measure could provide insight into the size of profits earned

by HFT *en masse* and may motivate interesting theoretical questions for microstructure.

3.   Equilibrium effects of HFT

Mahmoodzadeh & Gençay (2015) report that decimal pip pricing increases the expected returns for a sub-penny jumping trading strategy by HFT. This led to an interesting question from Dr. Pascal Courty: how can the market function if there is always an incentive for HFT to jump in front of manual traders? Evidence from Mahmoodzadeh & Gençay suggest that this puzzle is indeed in play. Manual traders appear further back in the limit order book (2015, pg. 26) and report anecdotally that it takes longer to execute trades under decimal pip pricing. This increased waiting time for manual traders can be seen as a breakdown in market function that occurs because HFT are crowding in front of manual traders.

However, the market does not breakdown completely for manual traders under decimal pip pricing. For example, if a manual trader posts an order near the top of the order book and other prices change for other currency pairs, then the manual trader's order may be in the way of the new arbitrage-free price. In such a case, HFT may have an incentive to trade against the manual trader's order and actually have a negative expected return for penny jumping. This observation suggests a testable prediction: are triangle arbitrage opportunities associated with large, stale orders from manual traders resting at the front of the order book? This example highlights the need to consider HFT behavior in a dynamic setting with some complex interactions, rather than a static setting dominated by equilibrium behaviour.

References

Mahmoodzadeh, S. & Gençay, R. (2015). *Tick Size Change in the Wholesale Foreign Exchange Market*. Unpublished manuscript.