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# New Trading Patterns Around the WM/R Fix

Introduction

On February 15, 2015, WM/Reuters adopted a five-minute window to calculate its 4 p.m. currency benchmark rates, also known as the Fix. In this research note, we show that this change, in conjunction with the industry's reported shift toward automated handling of Fix orders, has created **new patterns in currency trading around the Fix**. Anecdotal reports suggest that banks are shifting away from handling Fix orders as principal trades on the spot desk toward agency-style execution, specifically time weighted average price (TWAP) algorithms that trade steadily during the five-minute Fix window. The systematic concentration of demand imbalances during this five-minute interval has created **strong momentum in rate changes throughout the Fix window, followed by a marked reversion**. This pattern allows firms to improve trading performance relative to the Fix *without private information*.

Background

Until February 15, trading during a one-minute window around 4 p.m. London time determined the Fix for the most liquid currency pairs.[1] Typically clients would submit orders before the 4 p.m. window, and banks' spot desks would guarantee their clients the yet-to-be-determined benchmark rate. To manage the risk they assumed, banks typically traded before and during the one-minute Fix window. Though this trading was a standard industry practice, in 2013 reports surfaced that traders on some of the largest foreign exchange desks colluded to manipulate the Fix in order to generate profits from their principal trading.

In the wake of those revelations, the Financial Stability Board (FSB) formed a working group to examine the

FIGURE 1 Trade count around 4 p.m.
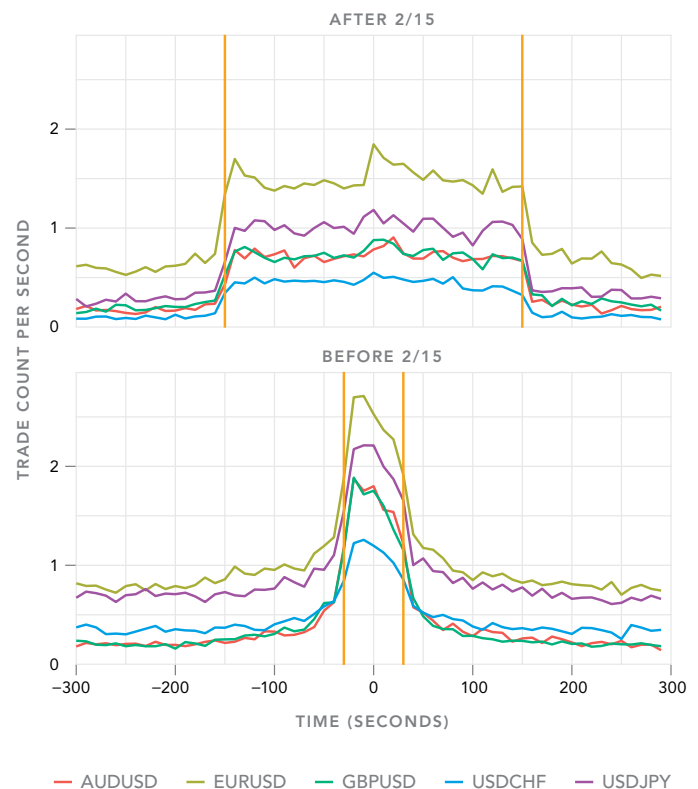
1   Details of the WM/Reuters methodology are available at http://www.wmcompany.com/pdfs/WMReutersMethodology.pdf.
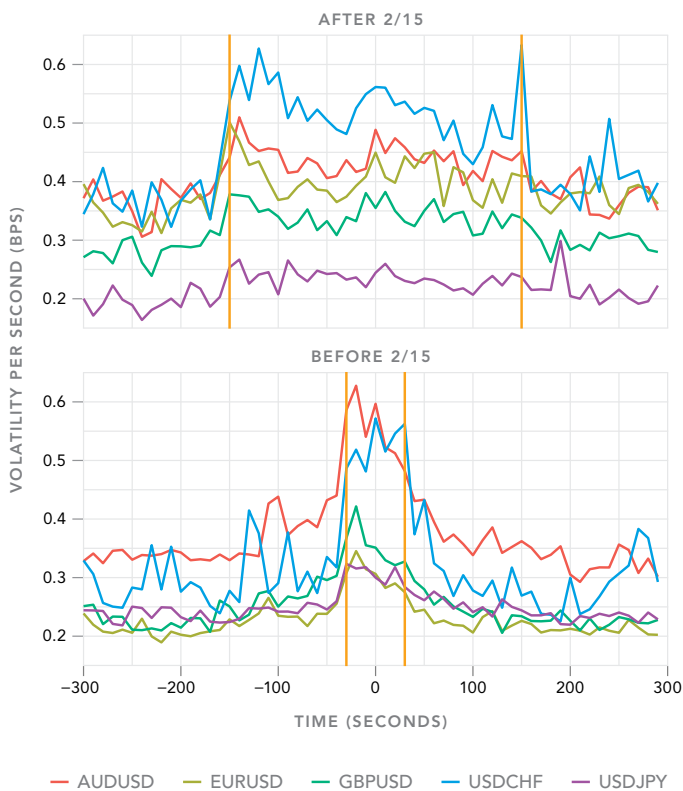
conditions that led to the scandal. The working group concluded that "it is the incentive and opportunity for improper trading behaviour of market participants around the Fix, more than the methodology for computing the Fix (although the two interact), which could lead to potential adverse outcomes for clients." In addition to expanding the Fix window, the group recommended that banks amend and clarify their practices to better manage their conflicts of interest when handling client Fix orders.[2]

Anecdotal reports suggest that, in response to the FSB working group's recommendation, many banks have moved Fix trading away from the spot desk and over to the e-commerce group, and are using a TWAP algorithm to trade during the new five-minute Fix window.[3] The TWAP algorithm, also known as time-slicing, breaks an order into smaller trades that are executed at evenly spaced intervals, providing execution prices that are likely to be closer to the average rate during the trading period—and thus closer to the Fix. This straightforward, automated approach to client Fix orders helps even the appearance of banks putting their interests ahead of their clients'. Some buy-side institutions are reportedly using TWAP algorithms themselves, and some banks that lack that capability are withdrawing from handling client Fix orders altogether.

While trading around the Fix has undergone a dramatic shift, the fundamental demands of institutional firms have not changed. They still trade the Fix to offset risk and minimize their tracking error against MSCI indices and other benchmarks. And as the FSB working group observed, these demands create significant imbalances around the Fix, especially at month-end and quarter end. In this research note, we highlight the new trading patterns that have emerged around the Fix in volume, volatility, spreads, and rate movements.

Analysis

VOLUME AND VOLATILITY

Figure 1 shows the average trading intensity around the Fix window (the interval between the orange bars) in the year preceding the February 15 change and in the four months afterward. The X-axis shows seconds relative to 4 p.m. London time, and the Y-axis represents the trade intensity, a proxy for volume calculated as the number of trades reported per second on several ECNs, for five liquid currency pairs. Figure 2 shows the volatility around the Fix windows.

These charts show that volume and volatility increase during the Fix window. Before February 15 the increase started gradually in the minute or so before the Fix window, and tapered in the minute or so after. This pattern is consistent with a diverse range of trading strategies aiming to come close to the Fix while avoiding the excessive market impact that might come from trading strictly within the one-minute window. In contrast, after February 15, volume and volatility seem to rise and fall more abruptly, and volume remains flat during the Fix window. These observations are consistent with a broad shift to TWAP algorithms since February 15. Additionally, volume appears to spike in the seconds around 4 p.m.—possibly reflecting a population of market participants still using a point-in-time approach to trading the Fix.

FIGURE 2   Volatility around 4 p.m.

AFTER 2/15

BEFORE 2/15

VOLATILITY PER SECOND (BPS)

TIME (SECONDS)

— AUDUSD   — EURUSD   — GBPUSD   — USDCHF   — USDJPY

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2   See the FSB's final report, http://www.financialstabilityboard.org/wp-content/uploads/r_140930.pdf, and clarifying comments from Guy Debelle: http://www.rba.gov.au/speeches/2015/sp-ag-2015-02-12.html.

3   See, for example, Profit & Loss Squawkbox, 15 June 2015, http://www.profit-loss.com/node/28896.

BID-OFFER SPREADS

Figure 3 shows the average bid-offer spread of the primary market in basis points over the Fix windows before and after February 15.

We have already shown that volume and volatility increase during the Fix window. Higher volatility is generally accompanied by wider spreads, as liquidity providers require a larger premium to compensate for the increased risk of losses. Higher volume, meanwhile, is generally accompanied by tighter spreads when volatility remains constant. The volume effect seems to predominate, as spreads tighten significantly during the Fix window. One possible explanation is that competing algorithms that provide passive liquidity result in narrower spreads. Another possibility is that predictable patterns in rate movements allow market makers to trade more profitably despite higher volatility; a possibility that we explore next.
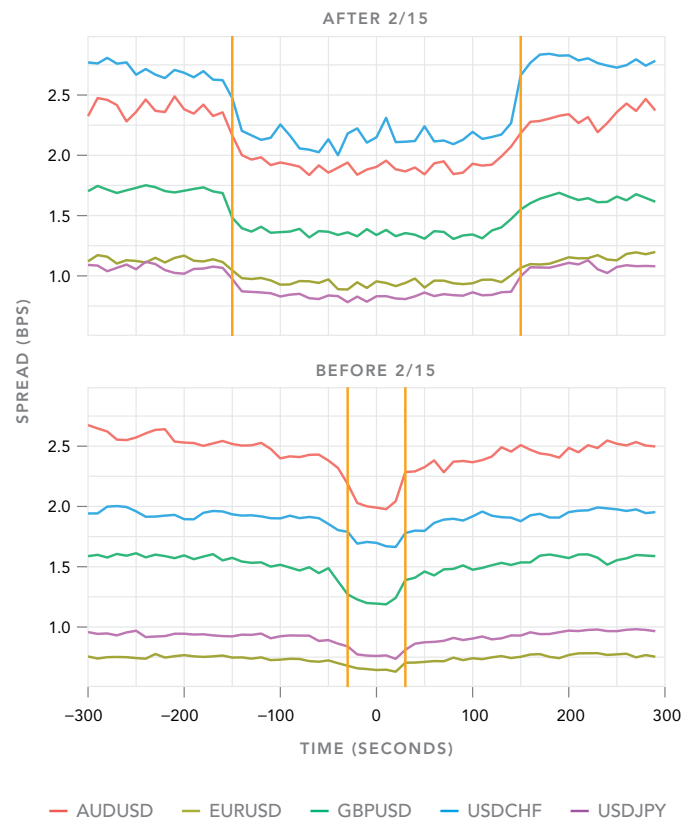
RATE CHANGES

The flat volume pattern shown in Figure 2 suggests a shift to extensive usage of TWAP algorithms since February 15, consistent with anecdotal reports of how banks have adjusted in order to manage potential conflicts of interest in handling client Fix orders. If this is the case, patterns in rate changes can be predicted. Why? Assume that, on a given day, some market participants need to buy 4 billion EUR/USD and others need to sell 3 billion. If these market participants all use a TWAP algorithm during the Fix window, then the net imbalance of those orders—1 billion to buy—will be traded evenly over the course of the Fix window. By observing the rate change over, say, the first 2½ minutes of the window, one can infer that this imbalance will persist through the last 2½ minutes, with a corresponding momentum in the rate change.

Figure 4 tests this hypothesis about the predictability of prices around the Fix window.

For each of the same five liquid pairs,[4] Figure 4 divides the days between February 15 and June 15 into two groups: days when rates increased during the first half of the Fix window (indicated by the tinted region), and days in which the rate dropped during those first 2½ minutes. The X-axis shows seconds relative to 4 p.m. London time, and the Y-axis shows the average rate for each currency pair relative to the rate at 4 p.m.

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4   The rate convention for representing AUDUSD, GBPUSD, and EURUSD was inverted to consistently separate up and down days with respect to the dollar.

FIGURE 3

Bid-offer spread around 4 p.m.

AFTER 2/15

BEFORE 2/15

SPREAD (BPS)

TIME (SECONDS)

— AUDUSD   — EURUSD   — GBPUSD   — USDCHF   — USDJPY

The data bear out our hypothesis, showing that on average the rate movement over the second half of the Fix window maintains the same direction as the rate movement in the first half, and the size of that predictable price move is material, on the order of two basis points. Also striking is the reversion of rates at the end of the window, presumably due to the decay of the temporary impact of the net imbalance during the Fix window. (Temporary impact is the short-term effect of excess liquidity demand on prices that figures in many academic and empirical trading models.) Such predictability is in stark contrast to the typical situation in FX, and is notable because predictable price movements are rare in huge, efficient markets.

One additional feature merits comment: the rates before the beginning of the window are flat. This indicates no information leakage about the net imbalance before the Fix window starts, consistent with the reports that banks on the whole have shifted to agency-style execution and are not pre-hedging client Fix orders.
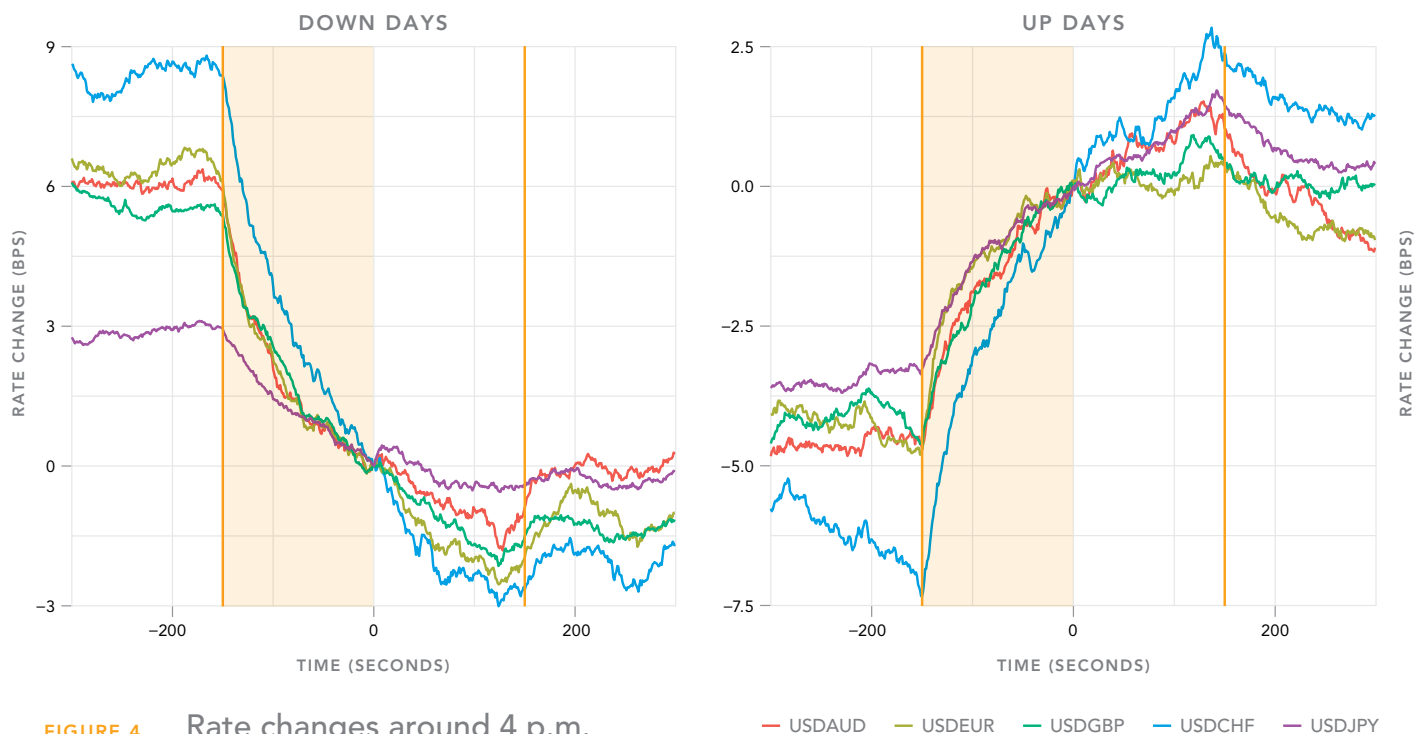
DOWN DAYS

UP DAYS

Rate changes around 4 p.m.

— USDAUD   — USDEUR   — USDGBP   — USDCHF   — USDJPY

Conclusion

Behavioral changes in how banks handle client Fix orders, combined with the new five-minute Fix calculation window, have created a distinctive new trading pattern around the Fix. Before February 15, volume and volatility rose during the one-minute Fix window, but there was little predictive information of rate movement within the Fix window. Since February 15, volume steps up to a steady level throughout the five-minute Fix window, then reverts to the previous level, consistent with the anecdotal reports of a broad shift by banks to using TWAP to handle Fix orders. A strong momentum in rate changes persists throughout the Fix window, followed by reversion. This pattern looks like a textbook illustration of market impact, and will allow firms with the capability to track and exploit such patterns to improve performance of orders benchmarked to the Fix.

Banks are now caught between a challenging pair of constraints. On one side, clients continue to demand orders benchmarked to the Fix despite the general understanding that this demand exposes them to risk of adverse trading results. On the other side, regulators have given banks clear instructions that they must

handle these orders systematically and transparently. For now, banks and their clients must carefully weigh the tradeoffs between tracking error relative to the Fix and execution quality. Participating before or after the Fix window and exploiting trading patterns such as the one described in this note can benefit execution quality, but may not be consistent with the banks' conduct policies. If banks are not in a position to provide more flexible trading tools in a principal model, it may drive Fix orders toward a true agency model.

Longer term, the industry will no doubt review whether the five-minute window selected by WM/Reuters is long enough to properly accommodate the demand imbalance from buy-side institutions. And in the words of the FSB, "index providers in other markets should review whether the foreign exchange fixes used in their calculation of indexes are fit for purpose."

Some of the underlying causes of these patterns—regulation, bank policies, and buy-side trading habits and mandates—may be slow to change. Meanwhile, we expect that market participants will exploit the patterns described here, causing the patterns to change over time. Achieving best execution will require firms to track and respond to this evolution.