

The WM/R Fix One Year Later

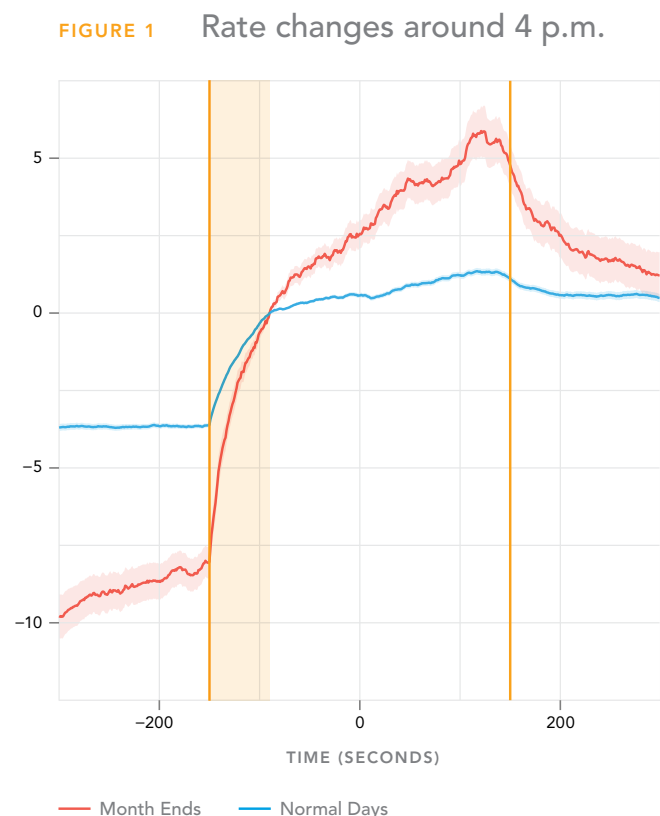
A TRADING PATTERN AND AN ALGORITHM

Overview

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 the summer of 2015, Pragma published research showing that this change, in conjunction with the industry’s reported shift toward automated handling of Fix orders, created **predictable patterns in currency trading around the Fix**. Banks shifted 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 created strong momentum in rate changes throughout the Fix window, followed by a marked reversion. This pattern is especially strong on month and quarter ends, and allows firms to improve trading performance relative to the Fix without private information. **Pragma has announced SmartFix, an execution algorithm that takes advantage of the pattern to achieve better execution for firms targeting the WM/Reuters benchmark.**

Background

Prior to February 15 of 2015, trading during a one minute window around 4 p.m. London time determined the Fix for the most liquid currency pairs. 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 that principal risk, 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, spurred in part

by recommendations from the Financial Stability Board (FSB), banks clarified their practices to better manage their conflicts of interest when handling client Fix orders, with many banks—especially larger ones—shifting execution of Fix orders from the spot desk to the electronic trading desk utilizing algorithmic execution. Anecdotal reports suggest that most such desks utilize a TWAP algorithm to trade during the new five minute Fix window. 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.

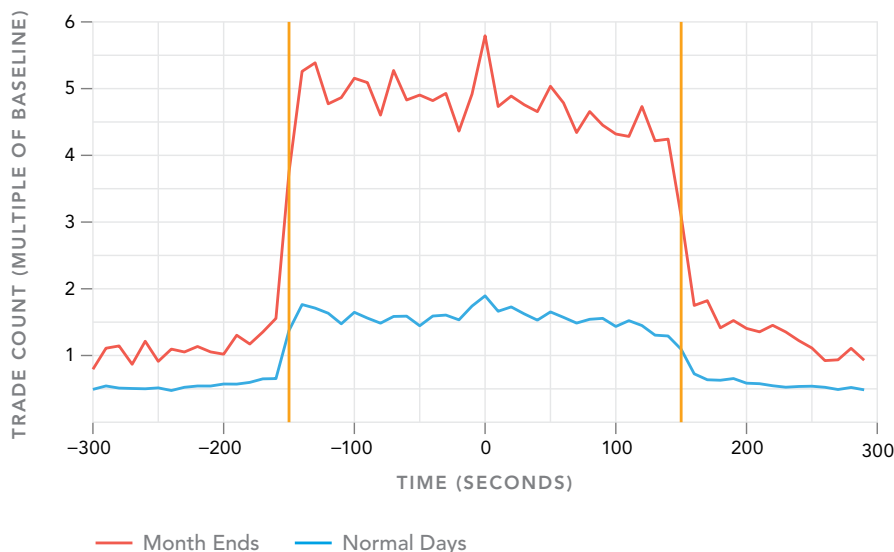
This straightforward, automated approach to client Fix orders helps even the appearance of banks putting their interests ahead of their clients'. In this research note, we review the new trading patterns that have emerged around the Fix in volume, spreads, and rate movements since the Fix methodology change, and discuss an algorithm Pragma has introduced to take advantage of these patterns to achieve better execution quality around the Fix.

The Pattern

Figure 1 shows the trading pattern of momentum during the Fix window and reversion afterward first described by Pragma in the summer of 2015.¹ The figure shows that the rate change during the first minute of the window predicts a continuing rate change in the same direction over the subsequent minutes of the window, and a reversal or reversion starting shortly before the end of the window. Figure 1 shows the pattern separately for month-end days (including

1 "New Trading Patterns around the WM/R Fix," No. 9, July 2015, Pragma Securities. The returns in Figure 1 are the average of ten relatively liquid currency pairs: EUR, GBP, CHF, JPY, CAD, AUD, NZD, MXN, SGD, and ZAR, and cover all trading days from February 15, 2015 through March 31, 2016.

FIGURE 2 Trade count around 4 p.m.



The step up in volume during the Fix window is consistent with widespread use of TWAP.

quarter-ends), and for ordinary days. The X axis shows the time relative to 4 p.m. London time, and the Y axis shows the rate change in basis points relative to the "observation time" of one minute after the start of the Fix window.

The magnitude of the pattern is significant—particularly for month-end and quarter-end, when many buy-side firms concentrate their Fix trading. The magnitude of the predictable portion is about 6 basis points on month-end, and over 1 basis points on other ("normal") days.

Demand Imbalances

Figure 2 shows that trade intensity² steps up suddenly at the start of the Fix window, and stays more or less steady throughout the window, trailing off somewhat at the end, and ultimately reverting to the pre-window level. This step-like pattern is consistent with the FSB's report of the market's shift to algorithmic trading during the Fix window—and with TWAP or time slicing starting in particular.

The rate momentum pattern of Figure 1 is broadly consistent with broad TWAP usage as well. On any

2 The number of trades or volume of trading reported by several major ECNs.

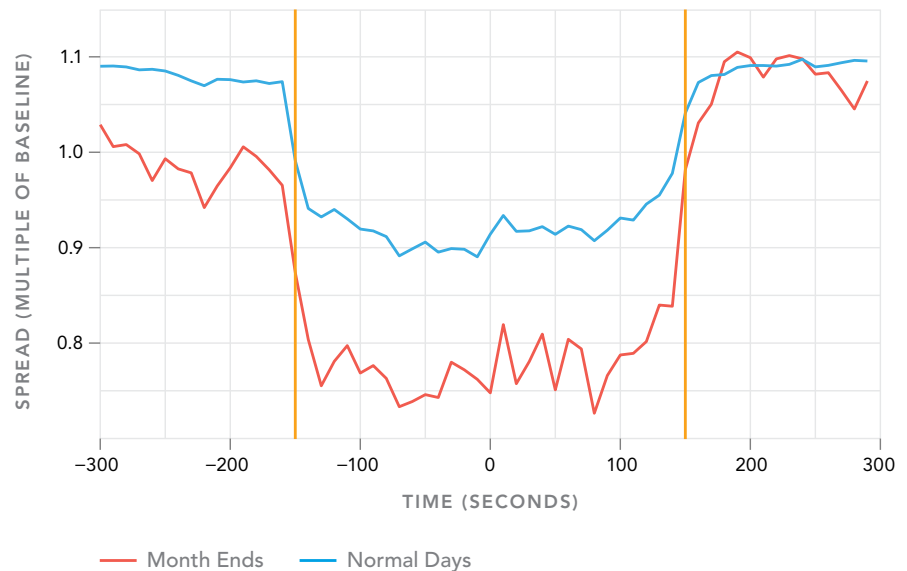
given day, the market as a whole will have a net demand imbalance in each currency—for example on a given day, one set of market participants need to buy a total of 4 billion EUR/USD and another set need to sell 3 billion. The size of these imbalances may be more extreme on month and quarter end, as participants with pent-up demand adjust their hedges. But in general, if most of these traders are using a TWAP (directly or indirectly), then the net liquidity demand will also be pushed into the market evenly over that five minute window, and will lead to a steady rate run-up during the window, followed by a reversion of the temporary market impact afterward. The reversion occurs because the net demand imbalance during the window is more than the market can absorb in such a short period, and short-term liquidity providers step in to sell at the elevated prices, unwinding the trade at the end of the window.

Best Execution

The concentration of trading the Fix window is one of the most liquid times of the day, and bid-offer spreads contract by about 20% relative to the period just before the Fix window, as shown in Figure 3.

Other things equal, this would make the Fix window a good time to trade. However, to the extent that a firm is on the wrong side of the imbalance (which, on average, most can be inferred to be) it may actually be a very poor time to trade. Firms able to tolerate deviation from the Fix benchmark can do significantly better on average for their investors by trading their orders in the hours before the Fix window. Trading outside the Fix window would allow them to avoid having to pay the price concession to complete their trade during the crowded five minute window alongside many other traders going in the same direction. Individual firms may be able to evaluate this strategy by analyzing their trading history and determining how often they are on the wrong side of the imbalance.

FIGURE 3 Bid-offer spread around 4 p.m.



Spreads tighten during the Fix window – but for firms on the wrong side of the imbalance this doesn't compensate for the market impact.

Leveraging the Pattern With an Execution Algorithm

However, for the foreseeable future many market participants will continue to concentrate their trading during the Fix window. Some asset managers are constrained to meet trading mandates imposed by their customers, or have determined that the risk of incurring tracking error outweighs the potential benefit of improved execution. And the banks that service such customers in a principal capacity may similarly be constrained by risk appetite or by regulatory directive to use a systematic approach that avoids trading prior to the start of the Fix window even if doing so would be better.

For such traders, Pragma has developed an execution algorithm that takes the patterns described in this research note into consideration. The algorithm observes only publicly available information, and adjusts its trading rate in a systematic way based on those observations to achieve better execution on average for traders benchmarked to the Fix. In addition, these dynamic adjustments are layered on top of a proprietary trading schedule that achieves lower tracking error against the benchmark than a simple TWAP.

Conclusion

While the WM/Reuters 4 p.m. Fix was initially intended to be descriptive, its incorporation into indices and adoption as a standard when valuing portfolios with foreign holdings has led many firms to adopt it as a trading benchmark. This in turn has driven many market participants to crowd their trading into the Fix window in an attempt to minimize risk against that benchmark. For most market participants—those on the wrong side of the imbalance—this crowding creates market impact that systematically degrades execution quality in order to avoid risk against what's fundamentally an arbitrary price. While some firms are reconsidering the merits of this tradeoff, there are many layers of stakeholders, and change comes slowly. It appears that as long as trading continues to be disproportionately concentrated into the Fix window, there will be opportunities for improved performance against the Fix.

Algorithmic trading is essentially the automation of best trading practices. Execution algorithms can perform rapid calculations and trade in a systematic fashion that allows for more consistent results, as well as providing opportunities to reduce execution shortfall and control execution risk in a more granular way. The Fix is a case in point. Pragma has released an algorithm where the trading patterns described above can be leveraged to achieve better average performance against the Fix benchmark.

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