One-Click trading and the global liquidity structure

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What drives the global FX industry? Is it dominated by large liquidity providers and institutions, or by traders in the market? To understand the relationship between participants in the FX market it is essential to investigate certain factors that impact the market – spread, liquidity, as well as human and technological limitations. One-click trading is the key tool in FX trading today. Billions of one-click trades around the globe affect the fine structure of FX global liquidity, simultaneously creating liquidity and testing its limits. These restrictions and corresponding challenges facing the FX industry in general, and marketplaces in particular, are subject of this article. Some important statistics regarding current FX global industry spreads, frequency of price update, human trader reaction and internet connection delays will be presented. In response to these factors, a few practical recommendations are proposed for traders who seek maximum trading effectiveness in the execution process. Specifically, how to deal with the high frequency of price updates and how to benefit from tighter spreads are examined. Possible future changes in FX market structure will also be discussed.

Industry spreads and quote update frequency

To reliably estimate current FX spreads industry-wide is not a simple task. There are many liquidity providers offering their services to both professional and retail traders. Whilst the global FX industry is a network of tightly connected institutions and liquidity providers, they are not synchronized. For a number of reasons, price quotes (bid and ask) at any given moment can differ between providers, sometimes even by a few pips. It follows that, in order to deliver clients the best available liquidity and spreads one should combine as many liquidity sources as possible. This aggregation function is currently performed by FX marketplaces. In order to simulate the "best of" performance available industry-wide, and specifically to obtain statistics on current industry spreads, we put together the best prices from four FX marketplaces (Lava, HotSpot, Currenex, Dukascopy) and prices from a selection of leading single-bank liquidity providers. It was an attempt to imitate a sort of "ideal" global FX marketplace.

Statistics on average spreads and Bid lifespan (the time between two sequential price updates) in this "ideal" marketplace are shown in Table 1. (Note for this table, that total frequency of update is shown for Bid. For Ask it is the same).

Figure 1 shows the resulting range of spreads from the "ideal" data feed for EURUSD. About 21% of time spread is 0.5 pip, 65 % - 1 pip, 10 % - 1.5 pip, and 4% - 2 pip. In this example, and in following examples, measurement is limited to the minimum price movement of 0.5 pip and will continue to use currency pair EURUSD.

Change in price (or price volatility) as a function of time interval is shown in Table 2. The relevance of this table is the correlation between spread size and the frequency of price update. Expected spread size figures indicate that, to follow market prices with a particular spread, the average update time should be as shown in column Time Interval (secs).

We can see that for EURUSD with 3 sec average price update time a reasonable spread value is about 1.09 pip (bid + ask price volatility). Further, we may estimate that expected average update time for a "standard" 2 pip spread should be about 8 to 10 seconds. Also, where the average spread could be 0.5 pip, the price should update each 1 sec.

Keeping in mind that currently the average duration of a bid in the "ideal" market for EURUSD is 3 sec – quite brief – it is important to know deviation around this average price lifespan. In Figure 2 the probability to meet a bid with particular lifespan is shown as price (bid) lifespan distribution.

Two remarkable properties of this distribution must be considered. First – whilst the average time it takes to update a bid or ask quote is 3 seconds, the most likely (probable) lifespan of a particular quote is only 0.4 sec. It means that from the moment one sees a new changed price, it is most likely that the next price change will arrive in just 0.4 sec! Of course there are many instances when price is not updated for a longer time, when price seems to become stable. This is the nature of price updates in the market. All the same, this high probability of fast price update must be analyzed as a factor responsible for a situation when human trader is not able to react to price update.

Average spreads & BID lifespan
Experiment time: 18.10.2006 14:10:14 - 15:10:14 GMT

Currency Pair	Spread (pips)	Avg BID lifespan (sec)
EUR/USD	0.903	3.01
GBP/USD	1.52	2.76
USD/JPY	1.05	4.77
USD/CHF	1.20	3.30
USD/CAD	2.20	5.17
AUD/USD	1.38	5.92
EUR/GBP	0.818	4.50
EUR/CHF	0.921	4.77
EUR/JPY	1.42	3.56
GBP/JPY	4.60	2.29
CAD/JPY	4.07	4.56
CHF/JPY	3.37	4.87
AUD/JPY	3.32	4.45
GBP/CHF	4.31	2.16

Table 1

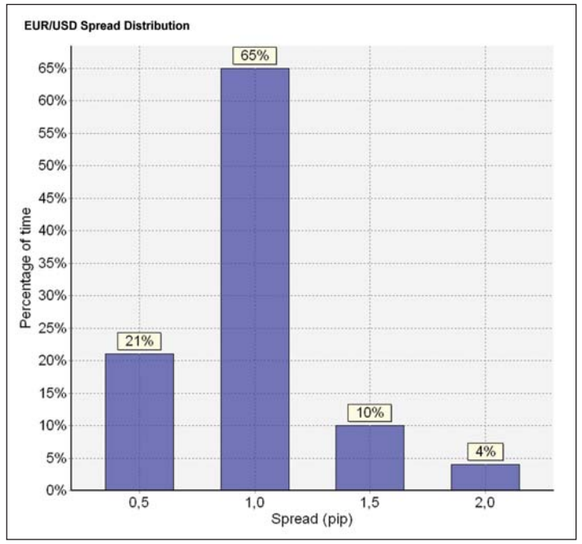

Figure 1

EUR/USD BID Volatility over Time Interval, with expected spread sizes

Time interval (secs)	Average BID Volatility (pip)	Expected spread size (pip)
1	0.254	0.51
2	0.409	0.82
3	0.547	1.09
4	0.633	1.27
5	0.737	1.47
6	0.834	1.67
7	0.922	1.84
8	0.979	1.96
9	1.053	2.11
10	1.134	2.27

Table 2

One-Click trading and the global liquidity structure

The second important observation is that price lifespan values accumulate around increments of 0.4 seconds. Simply, the first highly probable zone of price lifespan is located around 0.4 second, next increase of probability market faces about 0.8 sec, then close to 1.2 sec and so on. After 2.0 sec lifespan, this periodical structure of probability practically disappears. It must be said that after stringent control of Dukascopy hardware/software system, the authors can reject any reason for this periodical structure to be linked to internal Dukascopy electronic system. Also, such price behavior cannot be explained by assuming that there is a huge bank dictating to the market its own data feed based on 0.4 sec periodic updates. Firstly, because a large number of banks (at least 50) participate in constructing this "ideal" global data feed, and secondly, is the competition for best price. If another bank offers a better price, it would immediately update.

So, price lifespan does not depend on one bank cycle, it depends as well on the moments when another bank proposes a better price. Also, if there is a bank with such an inefficient data feed, it would be attacked by arbitrage, and punished for this tardiness. So this "strange" price lifespan structure must be explained another way.

Human trader reaction and Internet delays

As price updates in current FX markets are very fast, the ability of a human trader to react to this data feed should be considered. As shown in Figure 3, there are two factors which contribute to delay: one is linked to internet connection and another to human reaction itself. Let us start with the second one. To study this question, Dukascopy created a simple tool measuring human reaction on recognition of a price and corresponding delay to click on it. This tool imitates the process of one-click trading.

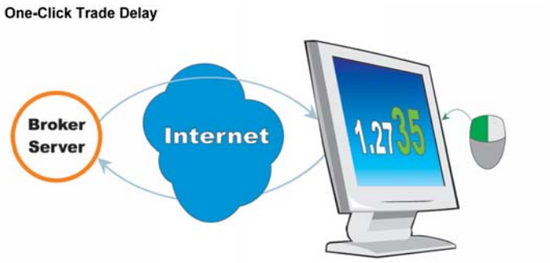

Figure 3

Anyone interested in testing their own reaction time are welcome to participate at www.dukascopy.com/public/reaction_test . The test lasts just a few seconds. Figure 4 shows cumulative results of test participants, presented as a probability distribution.

We can see that average reaction time of human trader in "one-click" trading activity is about 0.4 sec. The shape of distribution in fact practically reproduces the first pick of distribution in Figure 2 (Price (Bid) Lifespan distribution).

This coincidence suggests the following explanation for the previously discussed "strange" global data feed structure. Such a form of distribution is constructed by a chain of reactions by human traders, to price change. They react by their trades and in this way participate in the next price change and so on and so forth. Traders react to a price update, a reaction to previous reaction, then next reaction, next reaction…

So, what drives global FX prices – program (algorithmic) or human traders? Currently, it seems that human traders dominate.

Maybe less significant but still an important part of total delay in trader reaction to price change is the question of internet connection speed to their broker. To study this factor, standard ping round-trip delay results between trader and broker should be measured. Table 3 presents an example of average ping delay results between Dukascopy servers (Geneva, Switzerland) and a number of servers located in different parts of the world.

Clearly, total time delay is seriously impacted where the broker and trader are not located in the same local geographic area.

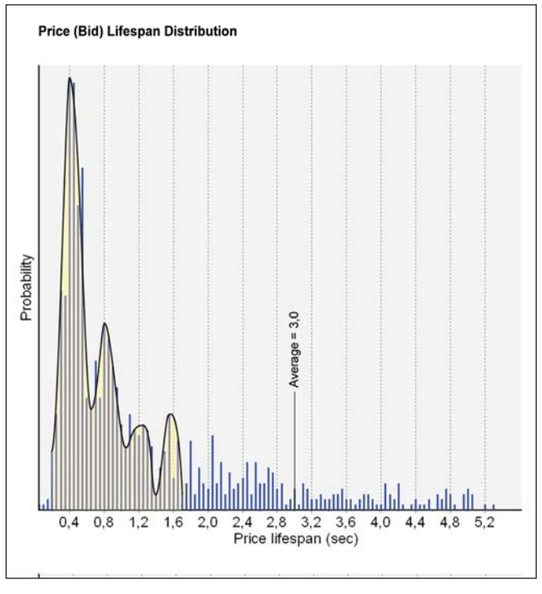

Figure 2

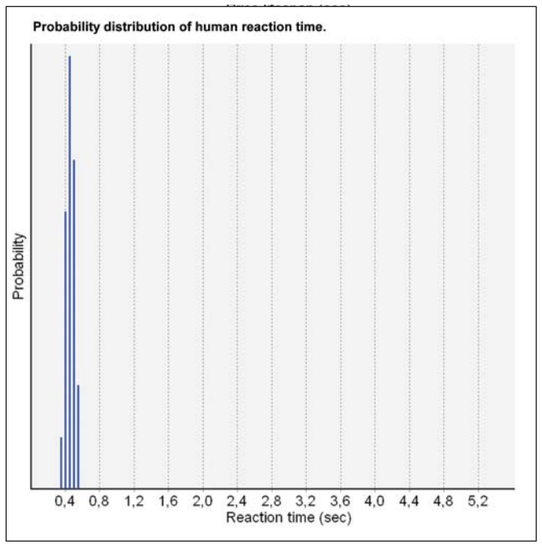

Figure 4

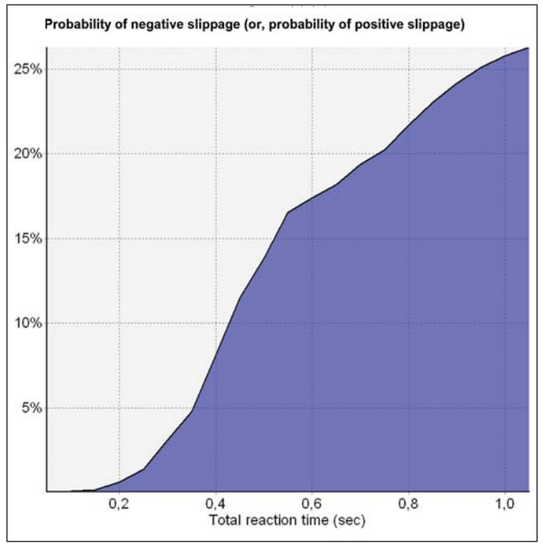

Figure 5

Trade execution slippage probability

Keeping in mind the factors of one-click trading delay and price lifespan distribution (Figure 2), we are now able to analyze their impact on execution slippage. It is clear that by having the most frequent price update time combined with an average trader reaction, it would be possible to click on a price that is no longer available. The longer the total reaction, the greater the probability that this may occur.

When discussing slippage, it must be noted that there is equal probability of positive slippage, as there is of negative slippage. Positive slippage is not a concern for the trader – they don't mind! Let us therefore focus on negative slippage. Using the current "ideal" data feed with 0.9 pip average spread on EURUSD, Figure 5 presents the probability of getting a worse price. For the total delay of 0.4 secs one has about 8% probability of experiencing negative price slippage. At the same time a trader with good reaction (0.35 secs) using a local broker may experience only 4% chance of slippage. Slow reaction and bad internet connection can increase this probability to 20-25%.

Ping round-trip delay with Switzerland

Region	Country	Round-trip time (Sec) Avg
Europe		
	Switzerland	0.016
	U.K.	0.030
	Germany	0.040
North America		
	U.S.A.	0.095
	Canada	0.120
South America		
	Argentina	0.236
	Brazil	0.280
Asia & Middle East		
	Japan	0.310
	China	0.450
	India	0.150
	U.A.E.	0.380
Oceania		
	Australia	0.330
Africa		
	South Africa	0.267
	Morocco	0.103

Table 3

So, we offer the reader this simple exercise:

1. Test your own reaction delay.
2. Measure ping delay of your internet connection to the broker.
3. Add both delay factors together to realize total personal delay, and refer to Figure 5 to find the probability you may experience slippage in the current FX industry.

Here are some practical suggestions: Firstly, choose a broker able to provide you with the necessary tool set to control slippage of one-click trade execution at market. Secondly, use "place bid / place offer" with FX marketplaces. This will guarantee you instant execution and the absence of slippage.

Conclusions

- The FX industry will provide traders with tighter and tighter spreads, with faster and faster price updates.
- The FX industry will provide more and more tools to protect the trader against slippage for one-click execution at market.
- The FX industry will increasingly adopt the FX marketplace business model (tighter spreads, greater liquidity).
- The FX industry will compete to be as close geographically to the trader as possible, creating local FX marketplaces.

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