[XTX]
MARKETS

HOW FAST CAN YOU TRADE FX?

JUNE 2021

HOW FAST CAN YOU TRADE FX?

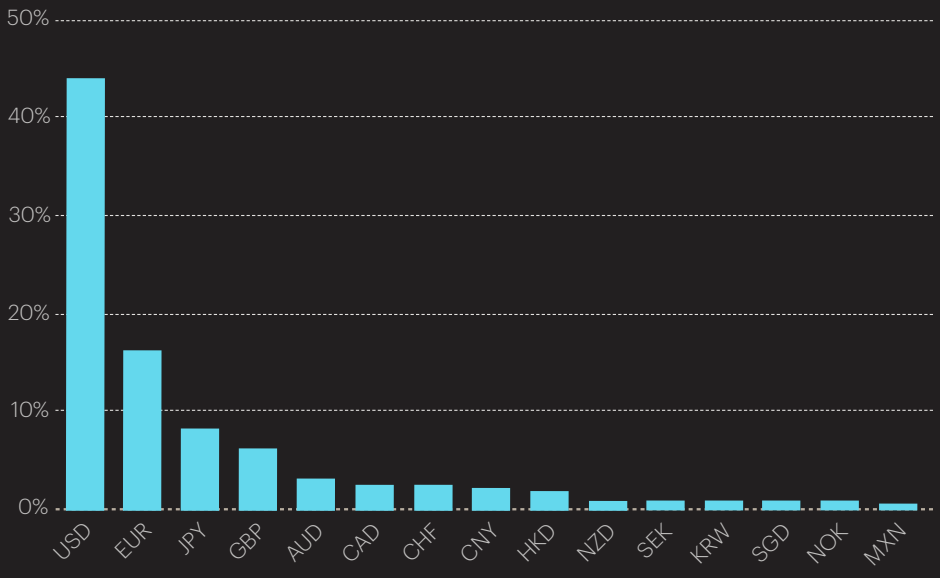
Experienced execution traders generally have an intuition as to when, and how, to trade a currency pair without unduly causing market stress.

However, less experienced traders – typically those who predominately trade, or have a background in, other asset classes – may overestimate the available liquidity in the FX market based on the daily notional volumes traded. This is because on streaming or RFQ protocols they are filled immediately and do not know how long the liquidity provider holds the risk.

TOTAL VOLUME BY PAIR

So how fast can you trade FX? Let's look at some data.

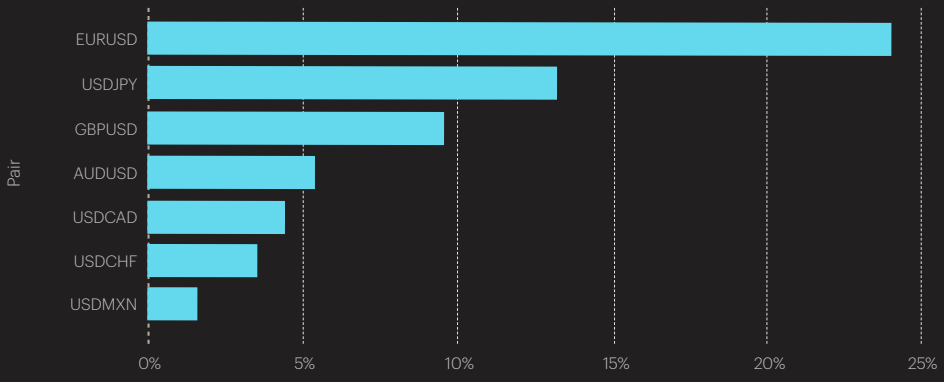
Every three years, the Bank for International Settlements ("BIS") publishes a survey on global FX market turnover[1]. Looking at the 2019 survey, we can determine from the below chart that USD is the largest currency traded by volume by some distance.



Note: Chart produced by XTX using values from the BIS triennial survey 2019, from the BIS triennial survey 2019. See link at bottom of this page.

[1] https://www.bis.org/statistics/rpfx19.htm

The BIS helpfully decomposes the data into pairs. We can see a large gap between EURUSD and other G10 pairs like USDCAD or USDCHF. This highlights that even outside the traditional EM/G10 distinction, there is significant variation between pairs that might have been assumed to have similar profiles because they belong to the same G10 grouping.

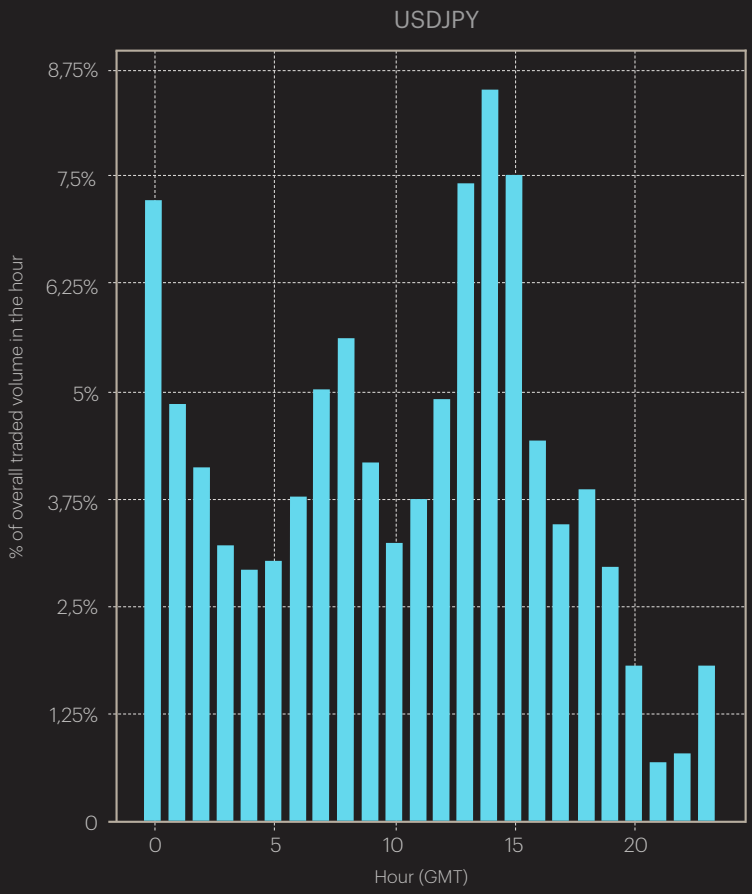


Note: Chart produced by XTX using values from the BIS triennial survey 2019, from the BIS triennial survey 2019. See page 3 for link.

TOTAL VOLUME BY HOUR

Volumes in each pair are not static throughout the day and the hourly profile will vary according to each currency pair. We can look at trade prints on primary markets and compute some hourly buckets.

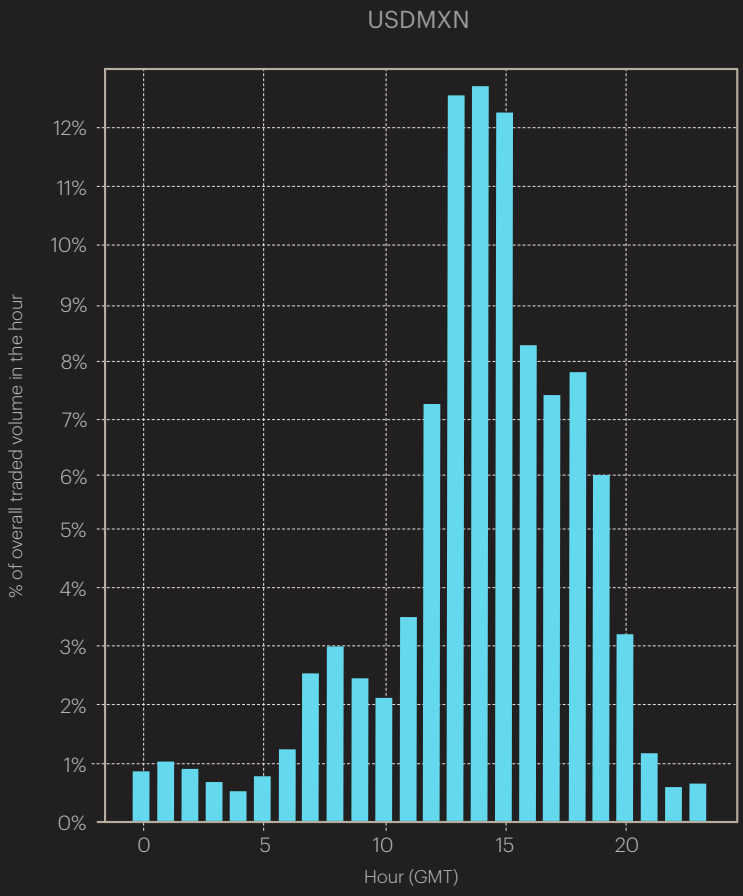
USDJPY looks like below.



Note: Chart produced by XTX using trading activity on primary venues from (1st Feb - 1st May) for USDJPY

Clearly the volumes peak in the London – New York crossover hours but throughout the entire day there is a reasonably consistent volume profile.

Comparing this to a 'regional' pair like USDMXN we can see a difference.



Note: Chart produced by XTX using trading activity on primary venues from (1st Feb - 1st May) for USDMXN

USDMXN barely trades outside New York business hours. The volume distribution here is much more skewed.

TOTAL VOLUME BY INSTITUTION

Now we will consider how much volume a typical algo provider may trade throughout the day.

Absolute values are hard to find – they are not officially reported – but industry benchmarking surveys would suggest that the average Top 10 liquidity provider is trading around $40 billion notional volume per day in spot FX.

This is only an estimate but it seems reasonable: a leading ECN like CBOE FX trades about $30-$40 billion of spot FX each day and we know this because they publish official volumes online.

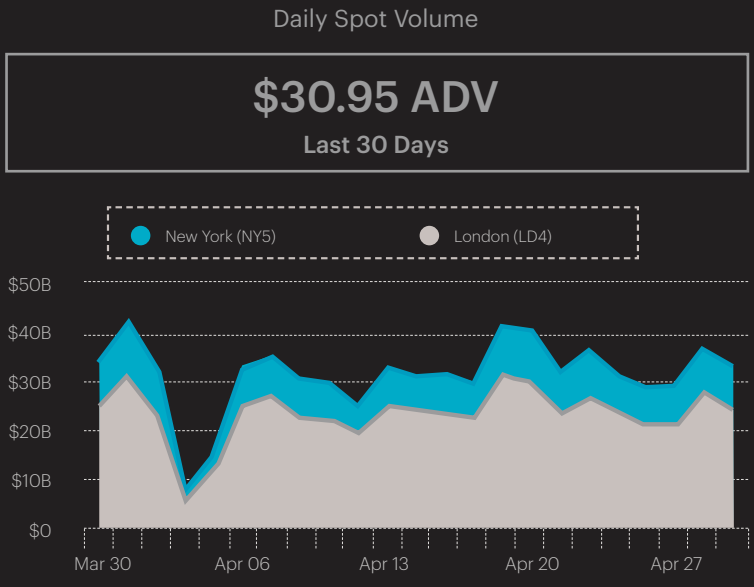


Chart reproduced from https://fx.cboe.com/

NATURAL FLOW RATE TABLE

We now have several components:

- $40 billion notional volume at institution level;
- Divide by two for buys/sells (algo only wants fills on one side);
- BIS market share per currency pair;
- Hourly distribution per currency pair.

This provides hourly USD figures and we've translated those into a table of the 'natural flow rate' per minute in each pair.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
EURUSD	1.4	1.5	1.4	1.1	0.8	1.1	2.2	4.7	6.1	5.0	4.3	4.0	5.4	7.7	8.4	7.7	4.8	3.6	3.5	2.4	1.6	0.5	0.3	0.6
USDJPY	3.2	2.2	1.8	1.4	1.3	1.3	1.7	2.2	2.5	1.9	1.4	1.7	2.2	3.3	3.8	3.3	2.0	1.5	1.7	1.3	0.8	0.3	0.4	0.8
GBPUSD	0.5	0.6	0.5	0.4	0.4	0.5	1.0	1.8	2.3	1.8	1.6	1.7	2.2	2.9	3.3	3.4	2.0	1.3	1.3	1.1	0.7	0.3	0.1	0.3
AUDUSD	0.8	0.9	0.6	0.6	0.5	0.6	0.7	0.9	0.9	0.8	0.6	0.7	0.9	1.2	1.7	1.6	0.9	0.7	0.8	0.6	0.4	0.1	0.1	0.4
USDCAD	0.3	0.3	0.2	0.2	0.1	0.2	0.3	0.6	0.6	0.5	0.4	0.5	0.9	1.4	1.8	1.7	1.1	0.9	0.9	0.7	0.5	0.2	0.1	0.2
USDCHF	0.2	0.2	0.2	0.1	0.1	0.1	0.3	0.7	0.9	0.7	0.6	0.5	0.6	1.0	1.2	1.2	0.7	0.5	0.6	0.6	0.3	0.2	0.1	0.1
USDMXN	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.7	0.7	0.7	0.4	0.4	0.4	0.3	0.2	0.1	0.0	0.0

Note: Chart produced by XTX using trading activity on primary venues (1st Feb - 1st May).

For example, let's say 13.00-14.00 GMT accounts for 7.5% of all USDJPY flow across the day. Our calculation is therefore: ($40 billion / 2) * 13.2% * 7.5% / 60. This gives us a rate of 3.3 million notional volume of USDJPY traded per minute.

OBSERVATIONS

The table gives rates of trading expressed as $mio per minute. For example, at 8:00am GMT in USDJPY, the rate is $2.5mio per minute, implying a duration of 4 minutes to trade 10 million. At 8:00am GMT in EURUSD the value is $6.1mio per minute; at the current EURUSD rate of 1.20 this translates as €5mio per minute. Trading 10mio EURUSD would therefore imply a duration of two minutes.

We can clearly identify regional pairs like USDMXN. Their profile is visibly different to global pairs such as EURUSD or USDJPY. The implication of this is that it is important – where possible – to trade each pair in the appropriate time zone. If an order is generated in USDMXN in Asian hours this data might suggest a trader should wait several hours before starting to execute the order.

We can also see a huge difference between the most liquid pair (EURUSD) and every other currency pair. Outside London hours, even GBPUSD has a natural flow rate of less than $1mio per minute at times.

IMPORTANT CONSIDERATIONS

It is worth noting that these values are only averages. Individual executions will vary and may be significantly faster or slower, based on prevailing conditions. However, the average is a useful rule of thumb.

It is also worth noting that triangulations are not included in the BIS survey methodology, so volumes are understated. For example a USDJPY algo may attract fills via a combination of EURJPY and EURUSD. However this effect is not so large – e.g. EURJPY market share is 1.7% whilst the main pair, USDJPY, is 13.2% per the BIS data – so it does not meaningfully change the picture.

Yet the rate above is too optimistic in some senses. It assumes an algo order can take 100% of all the natural flow on its chosen side of an institution whilst it is operational. This is unrealistic for at least two reasons.

For one thing there might be two competing client algo orders and thus they may have to share the incoming flow between them.

For another, it is common for institutions to run segregated market-making desks and algo desks. This means the market-making desks operate without any knowledge of the algo desks. Therefore the market-making desk will continue going about its business and trading in both directions, whilst client algorithms are in operation; it will not simply stop trading as it doesn't even know an order exists.

Consider an example of a buy EURUSD order. If all the buys that came into Bank A were given to the order but Bank A's market-making desk kept all the sells it would soon accumulate a big short position and need to buy to hedge. This means some of the buying volume at institution-level will go to the market-making desk and some to the algo. Not 100% to the algo.

CAN IT GO FASTER?

Of course. It is possible to trade much faster than this natural flow rate.

By showing skew one can shift the flow imbalance. Indeed this is how market-making desks hedge. If they are long EURUSD and wish to sell, they skew prices slightly left of their view of fair value mid. This makes their buying price (bid) less attractive and their selling price (offer) more attractive. They may still only trade 10m EUR/USD but instead of 5m buys and 5m sells the skew may bias it to 2m buys and 8m sells.

If a liquidity provider implements a heavy skew, it can even induce latent demand and increase volumes. People who wouldn't otherwise have interest to trade will fill against this skew because the price appears extremely favourable to them.

The downside of this additional skew – used in order to trade faster – is that it will disrupt the supply/demand balance, result in wider spreads, and likely cause greater market impact.

Different participants may, of course, use different weights for these input assumptions and end up with somewhat different outputs[1]. Therefore this table should be understood as a useful rule of thumb (with assumptions clearly outlined) rather than a definitive answer. The table approximates how much flow you might trade per minute if you were able to take 100% of the flow on your chosen side that a top-tier liquidity provider receives. Of course, top-tier liquidity providers are connected not only to their franchise but to all the major ECN venues and are themselves using algos to trade.

[1] See http://eprints.lse.ac.uk/90485/1/Oomen_Internalisation%20by%20electronic%20FX_2018.pdf for a related exercise from the perspective of an internalising liquidity provider rather than an execution algorithm.

COMPARISON TO BUY-SIDE ALGORITHM USAGE

Certain clients wish to trade considerably faster than the 'natural flow rate' in this table.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
EURUSD	1.4	1.5	1.4	1.1	0.8	1.1	2.2	4.7	6.1	5.0	4.3	4.0	5.4	7.7	8.4	7.7	4.8	3.6	3.5	2.4	1.6	0.5	0.3	0.6
USDJPY	3.2	2.2	1.8	1.4	1.3	1.3	1.7	2.2	2.5	1.9	1.4	1.7	2.2	3.3	3.8	3.3	2.0	1.5	1.7	1.3	0.8	0.3	0.4	0.8
GBPUSD	0.5	0.6	0.5	0.4	0.4	0.5	1.0	1.8	2.3	1.8	1.6	1.7	2.2	2.9	3.3	3.4	2.0	1.3	1.3	1.1	0.7	0.3	0.1	0.3
AUDUSD	0.8	0.9	0.6	0.6	0.5	0.6	0.7	0.9	0.9	0.8	0.6	0.7	0.9	1.2	1.7	1.6	0.9	0.7	0.8	0.6	0.4	0.1	0.1	0.4
USDCAD	0.3	0.3	0.2	0.2	0.1	0.2	0.3	0.6	0.6	0.5	0.4	0.5	0.9	1.4	1.8	1.7	1.1	0.9	0.9	0.7	0.5	0.2	0.1	0.2
USDCHF	0.2	0.2	0.2	0.1	0.1	0.1	0.3	0.7	0.9	0.7	0.6	0.5	0.6	1.0	1.2	1.2	0.7	0.5	0.6	0.6	0.3	0.2	0.1	0.1
USDMXN	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.7	0.7	0.7	0.4	0.4	0.4	0.3	0.2	0.1	0.0	0.0

Note: Chart produced by XTX using trading activity on CME, Reuters from (1st Feb - 1st May) for USDJPY

One reason for this is incentives. A centralised execution desk, trading on behalf of 10 different portfolio managers, has a tricky optimisation problem.

Whilst it is logical to seek the best average outcome across all orders, the desk may instead find itself seeking to minimise the likelihood of extreme individual outcomes.

Note: This is a purely illustrative example, to highlight the difficulty in averaging results for certain centralised execution desks

Taken as a whole, this is an objectively wonderful result: it averages out to zero pips of slippage per order. However, for legal reasons the individual funds cannot pool performance and the manager of Fund D may be very unhappy – and rather vocal – about the slippage.

In order to reduce the chance of large variance on individual orders, traders will often trade fast. In 10 minutes there is less opportunity for the market to drift, relative to how far it may move in 100 minutes. This reduces the likelihood of outlier moves – in both directions – for, or against, the order.

However, this speed comes at a price. It is self-evidently the case that the faster one goes beyond the 'natural flow rate' the more (on average) the transaction costs will increase. The extreme example is risk transfer: here there is zero variance due to the immediate fill on the entire amount but a full spread is paid in return.

TAKEAWAYS

There are several practical next steps execution traders may take:

1. Review the 'natural flow rate' table and sense-check that you are trading in the right timezones for particular pairs.

2. Compare your algo execution speeds (independent vendors all calculate them per currency) against these numbers to get a sense of where you are in relation to the wider market.

3. Ask several of your liquidity providers if they are willing to share how fast on average they hedge their own risk in various pairs. They are execution experts and will have carefully optimised these values. If their speeds differ to your own, that is interesting in itself.

4. If you are trading significantly faster, consider sharing this data with portfolio managers and seeing if they would be willing to accept more variance on individual orders in return for an expectation of cheaper execution on average. Especially on higher turnover momentum-driven strategies, transaction costs can meaningfully affect performance; whilst on low turnover strategies it is generally not the case that the order needs to be executed quickly in any case as the investment horizon is long.

FX is often described as the "largest and most liquid market in the world"[1]. However, this data offers a more nuanced picture and provides tangible values for what 'patient' execution might look like in a particular pair at a particular time of day.

[1] https://www.investopedia.com/articles/forex/10/forex-market-history.asp#:~:text=Forex%20is%20the%20largest%20and,is%20a%20truly%20new%20market

IMPORTANT NOTICE

This Document is issued by XTX Markets Limited ("XTX"), which is authorised and regulated by the Financial Conduct Authority of the United Kingdom (the "FCA"), with FCA FRN: 711945. XTX is a private limited company incorporated in England & Wales, with company number 09415174. XTX's registered office and principal place of business is R7, 14-18 Handyside Street, London, N1C 4DN, United Kingdom.

This Document is issued by XTX only to and/or is directed only at persons who are eligible counterparties for the purposes of the FCA Rules. This Document must not be relied or acted upon by any other persons (including, without limitation, persons who are retail clients or professional clients for the purposes of the FCA Rules). The distribution of this Document may be further restricted by law. No action has been or will be taken by XTX to permit the possession or distribution of the Document in any jurisdiction where action for that purpose may be required. Accordingly, the Document may not be used in any jurisdiction except under circumstances that will result in compliance with any applicable laws and regulations. Persons to whom the Document is communicated should inform themselves about and observe any such restrictions.

This Document is for information purposes only. The Document does not constitute an offer to transact in, or the solicitation of an offer to transact in, securities, derivatives, FX transactions, or other financial instruments, in any jurisdiction.

Although the information in this Document is believed to be materially correct, no representation or warranty is given as to the accuracy of any of the information provided. Certain information included in this Document is based on information obtained from sources considered to be reliable. However, any projections or analysis provided to assist the recipient of this Document in evaluating the matters described herein may be based on subjective assessments and assumptions and may use one among alternative methodologies that produce different results. Accordingly, any projections or analysis should not be viewed as factual and should not be relied upon as an accurate prediction of future results. Furthermore, to the extent permitted by law, neither XTX nor its employees, directors, officers, shareholders or service providers assumes any liability or responsibility nor owes any duty of care for any consequences of any person acting or refraining to act in reliance on the information contained in this Document or for any decision based on it. Past performance cannot be relied on as a guide to future performance.

Any reference in this Document to a counterparty trading with XTX (or XTX trading with counterparties) is a reference to XTX providing liquidity quotes through certain specific platforms, and all trades will be settled or cleared with or through XTX's prime broker(s) or CCPs, and not with XTX directly.


[XTX]
MARKETS