

MiFID II Order-to-Trade Ratio

Update on Regulatory Requirements

January 2019



Key facts at a glance

Reason

- With the introduction of the German HFT Law, Eurex introduced the current volume based Order to Trade Ratio (OTR)
- With the introduction of MiFID II, Eurex is required to adapt the current OTR framework, by
 - Calculating a volume and transaction based OTR
 - A reduced observation period from monthly to daily

Objective

- Provide information on regulatory framework
- Provide model and parameters for the MiFID II compliant OTR

Agenda

- 1) Introduction
- 2) Definition of the Order to Trade Ratio
- 3) Definition of the Maximum Allowed Order to Trade Ratios
- 4) Parameter
- 5) Reports

Introduction

- The Order-to-Trade Ratio (OTR) has been introduced as a consequence of the German HFT Law in 2013. The rationale is to disincentive the submission and deletion of a large number of orders with low trading volume.
- With the introduction of MiFID II in January 2018 the methodology, the maximum OTR and the calculation period has to be changed. Furthermore Eurex is required to not only calculate a volume based OTR, but also a transaction based OTR

Definition of the OTR

Inline with the upcoming MiFID II regime Eurex introduces a new OTR regime. First an OTR based on volume,

$$OTR_{vol} = \begin{cases} \frac{OV}{F_{vol}} - 1, & \text{if } TV < F_{vol} \\ \frac{OV}{TV} - 1, & \text{if } TV \geq F_{vol} \end{cases},$$

and second, an OTR based on transactions,

$$OTR_{no} = \begin{cases} \frac{\#O}{F_{no}} - 1, & \text{if } \#T < F_{no} \\ \frac{\#O}{\#T} - 1, & \text{if } \#T \geq F_{no} \end{cases},$$

while OV is the ordered volume, TV is the traded volume, $\#O$ is the number of orders, and $\#T$ is the number of trades. All of the above are calculated on a daily basis per member and product. In case the trading volume (number of trades) is too small, we replace these with a minimum denominator F_{vol} (F_{no}). The minimum denominator is set to 10,000.

Definition of the Maximum Allowed OTR's

Volume based OTR

The threshold for the volume based OTR is defined as follows,

$$Limit_{OTR_{vol}} = Base_{vol} \cdot PF_{vol} \cdot f_{vol}(SQ, QSQ, QP, SMC),$$

where $Base_{vol}$ is a threshold per product group capturing different behaviour across product groups. $PF_{vol} \geq 1$ is a factor per product, it captures products with different behaviour in a product group. And $f_{vol}(SQ, QSQ, QP, SMC)$ is a function which accounts for the higher ordered volume of market makers, which is defined as follows,

$$f_{vol}(SQ, QSQ, QP, SMC) := \begin{cases} \max\{g^{vol}(SQ) \cdot QSQ \cdot QP \cdot ((1 - SMC) + SMC_{vol} \cdot SMC), 1\}, & \text{if } QP > MMR \cdot GF^{vol} \\ 1, & \text{else} \end{cases}$$

while MMR is the requirement from the market making program (e.g. 85%), GF^{vol} is a grace factor, QP is the quote performance, QSQ is the time-weighted average quote size. SMC is an indicator function (0 or 1) whether a member fulfilled quotation requirements during stressed market conditions and $SMC_{vol} > 1$ is the corresponding incentive. $g^{vol}(SQ)$ accounts for higher ordered volume for quoting tighter spreads,

$$g^{vol}(SQ) = \begin{cases} a_1^v, & \text{if } 0 < SQ \leq l_1^v \\ a_2^v, & \text{if } l_1^v < SQ \leq l_2^v \\ \vdots & \\ a_{n-1}^v, & \text{if } l_{n-2}^v < SQ \leq l_{n-1}^v \\ a_n^v, & \text{if } l_{n-1}^v < SQ \leq l_n^v \end{cases},$$

with $0 < a_1^v < a_2^v < \dots < a_{n-1}^v < a_n^v < \infty$ and $0 < l_1^v < l_2^v < \dots < l_{n-2}^v < l_{n-1}^v < l_n^v$. Apart for the SMC incentive the higher thresholds are granted to all market participants fulfilling the performance requirements.

Definition of the Maximum Allowed OTR's

Transaction based OTR

The threshold for the transaction based OTR is defined as follows,

$$Limit_{OTR_{no}} = Base_{no} \cdot PF_{no} \cdot f^{no}(SQ, QP, SMC),$$

where $Base_{no}$ is a threshold per product group capturing different behaviour across product groups. $PF_{no} \geq 1$ is a factor per product, it captures products with different behaviour in a product group. And $f^{no}(SQ, QP, SMC)$ is a function which accounts for the higher ordered volume of market makers, which is defined as follows,

$$f^{no}(SQ, QP, SMC) := \begin{cases} \max\{g^{no}(SQ) \cdot QP \cdot ((1 - SMC) + SMC_{no} \cdot SMC), 1\}, & \text{if } QP > MMR \cdot GF^{no} \\ 1, & \text{else} \end{cases},$$

while MMR is the requirement from the market making program (e.g. 85%), GF^{no} is a grace factor, QP is the quote performance. SMC is an indicator function (0 or 1) whether a member fulfilled quotation requirements during stressed market conditions and $SMC_{no} > 1$ is the corresponding incentive. $g^{no}(SQ)$ accounts for higher ordered volume for quoting tighter spreads,

$$g^{no}(SQ) = \begin{cases} a_1^{no}, & \text{if } 0 < SQ \leq l_1^{no} \\ a_2^{no}, & \text{if } l_1^{no} < SQ \leq l_2^{no} \\ \vdots & \\ a_{n-1}^{no}, & \text{if } l_{n-2}^{no} < SQ \leq l_{n-1}^{no} \\ a_n^{no}, & \text{if } l_{n-1}^{no} < SQ \leq l_n^{no} \end{cases},$$

with $0 < a_1^{no} < a_2^{no} < \dots < a_{n-1}^{no} < a_n^{no} < \infty$ and $0 < l_1^{no} < l_2^{no} < \dots < l_{n-2}^{no} < l_{n-1}^{no} < l_n^{no}$. Apart for the SMC incentive the higher thresholds are granted to all market participants fulfilling the performance requirements.

Parameters (1/2)

Volume Based OTR

Product group	Product type	Grace factor	Minimum Denominator	Base Limit	Spread Quality	MM Factor	SMC Factor
Single Stock Futures	FSTK	0.10	10,000	250	0.00	1.00	1.20
					0.20	1.25	
					0.40	1.50	
					0.60	1.75	
Equity Index Futures	FINX	0.10	10,000	1,000	0.00	1.00	1.20
					0.20	1.25	
					0.40	1.50	
					0.60	1.75	
Volatility Index Futures	FVOL	0.10	10,000	1,000	0.00	1.00	1.20
					0.20	3.00	
					0.40	3.50	
					0.60	4.00	
Equity Index Options	OINX	0.10	10,000	12,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Index Dividend Options	OFIX	0.10	10,000	1,200	0.00	1.00	1.20
					0.20	1.25	
					0.40	1.75	
					0.60	2.00	
FX Options	OCUR	0.10	10,000	12,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
FX Futures	FCUR	0.10	10,000	1,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Options	OSTK	0.10	10,000	5,500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Fixed Income Futures Money Market Futures	FBND FINT	0.10	10,000	1,000	0.00	1.00	1.20
					0.20	1.25	
					0.40	1.50	
					0.60	1.75	
Options on Fixed Income Futures Options on Money Market Futures	OFBD OFIT	0.10	10,000	1,200	0.00	1.00	1.20
					0.20	1.25	
					0.40	1.50	
					0.60	1.75	
New asset classes	New asset classes	0.10	10,000	12,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	

Product type	Product Name	Product ID	Threshold
OSTK	OPT ON BCO BILBAO VIZC.ARGENT.	BBVD	1.50
OSTK	OPT E ON NOKIA CORP. A FM 5	NOAE	2.00
OSTK	Commerzbank 1st Friday Weekly Options	CBK1	1.75
OINX	1ST FRIDAY OPT ON DAX	ODX1	2.00
OINX	2ND FRIDAY OPT ON DAX	ODX2	1.50
OINX	4TH FRIDAY OPT ON DAX	ODX4	2.50
OINX	5TH FRIDAY OPT ON DAX	ODX5	1.25
OINX	OPT ON EURO STOXX50 1ST FRI	OES1	1.25
OFBD	2nd Friday Weekly Options on Euro-Bund Futures	OGB2	1.25
OFBD	4th Friday Weekly Options on Euro-Bund Futures	OGB4	1.25
OFBD	5th Friday Weekly Options on Euro-Bund Futures	OGB5	1.25
OSTK	OPT ON UNICREDIT SPA	CR15	1.50
OSTK	Credit Suisse 1st Friday Weekly Options	CSG1	1.25
OSTK	Credit Suisse 2nd Friday Weekly Options	CSG2	1.50
OSTK	Credit Suisse 4th Friday Weekly Options	CSG4	1.50
OSTK	1ST FRI. OPT ON DEUTSCHE BANK	DBW1	1.25
OSTK	2NDFRI OPT ON DEUTSCHE BANK	DBW2	1.50
OSTK	4TH FRI OPT ON DEUTSCHE BANK	DBW4	1.25
OSTK	5TH FRI OPT ON DEUTSCHE BANK	DBW5	2.00
OFBD	Options on Euro-OAT Futures	OOAT	2.25
#N/A	Options on VSTOXX® Futures	OVS2	1.50
OSTK	E.ON Options	EOA	1.50
FSTK	FUT ON E.ON AG	EOAH	2.50
OSTK	OPT ON ISHARES DAX (DE)	EXS1	4.25
OSTK	Royal Dutch Shell 4th Friday Weekly Options	ROY4	1.25
FINX	FUT ON DJ-UBS COMMODITY INDEX	FCCO	3.00
FINX	FUT ON DIVDAX	FDIV	1.75
FINX	FUT ON EURO STOXX SEL.DIV 30	FEDV	1.25
FINX	FUT ON EURO STOXX BANKS	FESB	1.25
FINX	FUT ON EURO STOXX 50	FESX	1.25
OSTK	UBS 4th Friday Weekly Options	UBS4	1.50
OSTK	Unilever NV 1st Friday Weekly Options	UNI1	1.25
OSTK	Unilever NV 2nd Friday Weekly Options	UNI4	1.50
OSTK	Unilever NV 4th Friday Weekly Options	UNI5	1.50
FBND	FUT 1 3/4-2 1/4 Y.GOV.BONDS 6%	FGBS	1.25
FINX	FUTURE ON STXE MID 200 (50 EUR	FMCP	1.25
FINX	MSCI Europe Index Futures	FMEU	2.00
OSTK	Arcelor Mittal Options	ISPH	2.00
OSTK	Lenzing Options	LEN	1.25

Parameters (2/2)

Transaction Based OTR

Product group	Product type	Grace factor	Minimum Denominator	Base Limit	Spread Quality	MM Factor	SMC Factor
Single Stock Futures	FSTK	0.10	10,000	75	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
Equity Index Futures	FINX	0.10	10,000	150	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
Volatility Index Futures	FVOL	0.10	10,000	150	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
Equity Index Options	OINX	0.10	10,000	225	0.00	50	1.20
					0.20	100	
					0.40	250	
					0.60	500	
Equity Index Dividend Options	OFIX	0.10	10,000	75	0.00	3	1.20
					0.20	20	
					0.40	30	
					0.60	50	
FX Options	OCUR	0.10	10,000	225	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
FX Futures	FCUR	0.10	10,000	150	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
Equity Options	OSTK	0.10	10,000	150	0.00	15	1.20
					0.20	30	
					0.40	45	
					0.60	60	
Fixed Income Futures Money Market Futures	FBND FINT	0.10	10,000	150	0.00	3	1.20
					0.20	5	
					0.40	7.5	
					0.60	20	
Options on Fixed Income Futures Options on Money Market Futures	OFBD OFIT	0.10	10,000	225	0.00	4.5	1.20
					0.20	20	
					0.40	30	
					0.60	40	
New asset classes	New asset classes	0.10	10,000	225	0.00	20	1.20
					0.20	80	
					0.40	150	
					0.60	225	

Product type	Product Name	Product ID	Threshold
OSTK	Iliad Options	ILD	1.75
OSTK	Anheuser-Busch InBev Options	ITK	1.50
OSTK	Lenzing Options	LEN	1.25
OSTK	OPT ON LINDT & SPRUENGLI	LISN	1.25
OSTK	ASML Holding Options	ASM	1.50
OSTK	OPT E ON COMMERZBANK	CBKE	1.25
OSTK	OPTION ON NORILSK NICKEL	NNIA	1.50
FBND	FUT 8 1/2-10 1/2 Y.GOV.BOND 6%	FGBL	1.25

Reports

- The OTR is reported in the TR100 report. The report is available daily, intraday versions are planned.
- The CB069 report (daily + intraday) allow participants to calculate their own OTR, and to identify the drivers for increasing OTRs.

Appendix

Market Making Performance Measurement

- Quote Performance (QP) represents the time of active quotes per instrument in relation to the requirements from the corresponding minimum quotation requirements. QP is defined as follows,

$$QP = \frac{\sum_{i=1}^n t_i}{m \cdot T},$$

with n is the number of instruments in the respective product, $t_i \geq 0$ is the time with active quotes fulfilling the requirements in the i -th instrument in hours. m is the required number of instruments to quote from the minimum quotation requirements (e.g. 50 strikes), and T is the required time from the minimum quotation requirements (e.g. 8 hours per day)

- Spread quality (SQ) measures the quoted spread in relation to the spread requirements from the respective MM program. It is ranging between 0 (participant quotes maximum allowed spread) and 1 (participant quotes a spread of one tick),

$$SQ = \begin{cases} \frac{Max\ Spread\ Allowed - Quoted\ Spread}{Max\ Spread\ Allowed - Tick\ Size}, & \text{if } Max\ Spread\ Allowed > Tick\ Size \\ 1, & \text{if } Max\ Spread\ Allowed = Tick\ Size \end{cases}$$

Spread quality ranges from 0 (quoting maximum required spreads) to 1 (quoting spreads of one tick).

- Quote Size Quality (QSQ) is the minimum of the bid and ask quantity, which is above the size requirements.
- Spread Quality and Quote Size Quality is calculated on a tick by tick basis and aggregated using time-weighted averages.
- If there are multiple Minimum quotation parameter sets available, for each factor we use the most relaxed parameter