EUREX Architects of trusted markets

Order-to-Trade Ratio

Update on Regulatory Requirements

December 2023

Key facts at a glance

Reason

- With the introduction of the German HFT Law as well as the introduction of MiFID II, Eurex introduced the current volume and transaction based Order to Trade Ratio (OTR)
- As of December 2023, Eurex adapted the current OTR framework by
  - Introducing a volatility factor, making the limit regime more dynamic with respect to changing market conditions

Objective

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

Agenda

1 Introduction

2 Definition of Order to Trade Ratio

3 Definition of the Maximum Allowed Order to Trade Ratios

4 Parameter

5 Reports

1 Introduction

Introduction

MiFID II Order-to-Trade Ratio

OTR

- 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.

MiFID II

- With the introduction of MiFID II in January 2018 the methodology, the maximum OTR and the calculation period had to be changed. Furthermore, Eurex is required to not only calculate a volume based OTR, but also a transaction based OTR

New regime

- Due to increased volatility and participant behaviour, Eurex has decided to recalibrate the parameters used to calculate the OTR with effect from 1 February 2023

2 Definition of the OTR

Definition of the OTR

Inline with the **MiFID II** regime, Eurex introduced the OTR regime. First, an **OTR based on volume**,

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

and, second, an **OTR based on transactions**,

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

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 1,000.

3 Definition of the Maximum Allowed OTR‘s

Definition of the Thresholds Volume based OTR*

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

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

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,

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

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, and $h_{vol}(VI)$ accounts for higher ordered volume during periods with higher volatility,

$$g^{vol}(SQ) = \begin{cases} a_1^v, & if\ 0 < SQ \leq l_1^v \\ a_2^v, & if\ l_1^v < SQ \leq l_2^v \\ \vdots & \\ a_{n-1}^v, & if\ l_{n-2}^v < SQ \leq l_{n-1}^v \\ a_n^v, & if\ l_{n-1}^v < SQ \leq l_n^v \end{cases}, \qquad h_{vol}(VI) = \begin{cases} b_1^v, & if\ 0 < VI \leq k_1^v \\ b_2^v, & if\ k_1^v < VI \leq k_2^v \\ \vdots & \\ b_{n-1}^v, & if\ k_{n-2}^v < VI \leq k_{n-1}^v \\ b_n^v, & if\ k_{n-1}^v < VI \leq k_n^v \end{cases},$$

with $0 < a_1^v < a_2^v < \cdots < a_{n-1}^v < a_n^v < \infty$ and $0 < l_1^v < l_2^v < \cdots < l_{n-2}^v < l_{n-1}^v < l_n^v$, $0 < b_1^v < b_2^v < \cdots < b_{n-1}^v < b_n^v < \infty$ and $0 < k_1^v < k_2^v < \cdots < k_{n-2}^v < k_{n-1}^v < k_n^v$, and $b_1^v = 1$. Apart for the SMC incentive the higher thresholds are granted to all market participants fulfilling the performance requirements. The SMC incentive is only granted to regulatory market maker and liquidity provider.

Definition of the Thresholds Transaction based OTR*

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

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

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,

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

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, and $h_{vol}(VI)$ accounts for higher ordered volume during periods with higher volatility,

$$g^{no}(SQ) = \begin{cases} a_1^{no}, & if\ 0 < SQ \leq l_1^{no} \\ a_2^{no}, & if\ l_1^{no} < SQ \leq l_2^{no} \\ \vdots & \\ a_{n-1}^{no}, & if\ l_{n-2}^{no} < SQ \leq l_{n-1}^{no} \\ a_n^{no}, & if\ l_{n-1}^{no} < SQ \leq l_n^{no} \end{cases}, \qquad h_{no}(VI) = \begin{cases} b_1^{no}, & if\ 0 < VI \leq k_1^{no} \\ b_2^{no}, & if\ k_1^{no} < VI \leq k_2^{no} \\ \vdots & \\ b_{n-1}^{no}, & if\ k_{n-2}^{no} < VI \leq k_{n-1}^{no} \\ b_n^{no}, & if\ k_{n-1}^{no} < VI \leq \mathrm{k}_n^{no} \end{cases},$$

with $0 < a_1^{no} < a_2^{no} < \cdots < a_{n-1}^{no} < a_n^{no} < \infty$ and $0 < l_1^{no} < l_2^{no} < \cdots < l_{n-2}^{no} < l_{n-1}^{no} < l_n^{no}, 0 < b_1^{no} < b_2^{no} < \cdots < b_{n-1}^{no} < b_n^{no} < \infty \; and \; 0 < k_1^{no} < k_2^{no} < \cdots < k_{n-2}^{no} < k_{n-1}^{no} < k_n^{no}, and\ b_1^{no} = 1$. *Apart for the* SMC incentive the higher thresholds are granted to all market participants fulfilling the performance requirements. The SMC incentive is only granted to regulatory market maker and liquidity provider.

4 Parameter

Parameters (1/3)

Volume based OTR

Product group	Product type	Grace factor	Volume based Minimum value	Volume based base limit	Spread quality	Volume based MQ base factor	Volume based SMC factor
Single Stock Futures	FSTK	0.10	1,000	10,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Index Futures	FINX	0.10	1,000	20,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Volatility Index Futures	FVOL	0.10	1,000	10,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Index Options	OINX	0.10	1,000	2,000,000	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	1,000	200,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
FX Options	OCUR	0.10	1,000	1,000,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
FX Futures	FCUR	0.10	1,000	20,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Options	OSTK	0.10	1,000	1,000,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Fixed Income Futures	FBND	0.10	1,000	20,000	0.00	2.00	1.20
					0.20	4.00	
Money Market Futures	FINT				0.40	6.00	
					0.60	8.00	
Options on Fixed Income Futures	OFBD	0.10	1,000	200,000	0.00	2.00	1.20
					0.20	4.00	
Options on Money Market Futures	OFIT				0.40	6.00	
					0.60	8.00	
New asset classes	New asset classes	0.10	1,000	2,000,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	

Product type	Product name	Product ID	Volume based product factor
FINX	EURO STOXX 50® Variance Futures	EVAR	1,500.00
OFIX	Options on VSTOXX® Futures	OVS2	20.00
OINX	EURO STOXX 50® Index Options	OESX	0.80
FINX	EURO STOXX 50® Index Futures	FESX	0.80
FBND	Euro-Bobl Futures	FGBM	0.80
FBND	CONF Futures	CONF	0.50

Parameters (2/3)

Transaction based OTR

Product group	Product type	Grace factor	Transaction based minimum value	Transaction based base limit	Spread quality	Transaction based MQ base factor	Transaction based SMC factor
Single Stock Futures	FSTK	0.10	1,000	500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Index Futures	FINX	0.10	1,000	1,500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Volatility Index Futures	FVOL	0.10	1,000	1,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Index Options	OINX	0.10	1,000	100,000	0.00	2.00	1.20
					0.20	5.00	
					0.40	10.00	
					0.60	20.00	
Equity Index Dividend Options	OFIX	0.10	1,000	5,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
FX Options	OCUR	0.10	1,000	100,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
FX Futures	FCUR	0.10	1,000	2,500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Equity Options	OSTK	0.10	1,000	50,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Fixed Income Futures	FBND	0.10	1,000	1,500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Money Market Futures	FINT						
Options on Fixed Income Futures	OFBD	0.10	1,000	10,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
Options on Money Market Futures	OFIT						
New asset classes	New asset classes	0.10	1,000	50,000	0.00	2.00	1.20
					0.20	4.00	

Product type	Product name	Product ID	Transaction based product factor
OFIX	Options on VSTOXX® Futures	OVS2	5.00
OINX	EURO STOXX 50® Index Options	OESX	0.80
FINX	EURO STOXX 50® Index Futures	FESX	0.70
FBND	Euro-Bund Futures	FGBL	0.80
FBND	Euro-Bobl Futures	FGBM	0.50
FBND	Euro-Schatz Futures	FGBS	0.50
FBND	CONF Futures	CONF	0.50
FBND	Euro-OAT Futures	FOAT	0.80

Parameters (3/3)

Volatility indicator

	Volatility Indicator				Volume Based OTR		Transaction Based OTR	
Product group*	**Product Type**	**Reference Product**	**Rollover Window**	**Averaging Window**	**Volatility Indicator**	**Volatility Factor**	**Volatility Indicator**	**Volatility Factor**
Equity Options Single Stock Futures Equity Index Futures Volatility Index Futures Equity Index Options Equity Index Dividend Options	OSTK FSTK FINX FVOL OINX OFIX	FESX	1	10	0.0 8.0 12.0 20.0	1.0 1.5 2.0 4.0	0.0 8.0 12.0 20.0	1.0 1.5 2.0 4.0
Foreign Exchange Futures Foreign Exchange Options	FCUR OCUR	FCEU	2	10	0.0 3.0 4.0 6.0	1.0 1.5 2.0 4.0	0.0 3.0 4.0 6.0	1.0 1.5 2.0 4.0
Fixed Income Futures Options on Fixed Income Futures	FBND OFBD	FGBL	2	10	0.0 3.0 5.0 10.0	1.0 1.5 2.0 4.0	0.0 3.0 5.0 10.0	1.0 1.5 2.0 4.0
Money Market Futures Options on Money Market Futures	FINT OFIT	FGBS	2	10	0.0 0.5 1.0 2.0	1.0 1.5 2.0 4.0	0.0 0.5 1.0 2.0	1.0 1.5 2.0 4.0
New asset classes	New asset classes	FESX	1	10	0.0 8.0 12.0 20.0	1.0 1.5 2.0 4.0	0.0 8.0 12.0 20.0	1.0 1.5 2.0 4.0

5 Reports

Reports

- The OTR is reported in the **TR100** report. The report is available daily. Intraday versions of the report are published as well, however, the conclusion whether there was a violation can only be drawn at the end of the day.
- The **CB069** report (daily + intraday) allows participants to calculate their own OTR, and to identify the drivers for increasing OTRs.
- The **TR103** report shows the current parameters used for the Eurex OTR calculation and is generated on a daily basis.
- The **TR105** report shows the minimum quotation requirements per product and is generated on a daily basis.
- The **TR106** report combines the information from the TR100 and the CB069 for cases close to an OTR violation.

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Thank you!

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