



Order to Trade Ratio

Version 4.0
Date December 2023

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Contents

1. List of abbreviations	5
2. Introduction	6
3. Methodology of the Order to Trade Ratio	7
3.1 <i>Calculation of the Order to Trade Ratio</i>	7
3.1.1 Ordered Volume and Number of Orders	8
3.1.2 Traded Volume and Number of Trades	9
3.1.3 Calculation per Member ID	9
3.1.4 General remarks	10
3.2 <i>Definition of the Maximum Order to Trade Ratios</i>	11
4. Limit Parameters	16
5. Sample Calculation of the Order to Trade Ratio	21
6. Customer Reports	23
6.1 <i>TR100 Order to Trade Ratio Report</i>	23
6.2 <i>CB069 Transaction Report</i>	24
6.3 <i>TR103 Eurex Daily OTR Parameter</i>	25
6.4 <i>TR105 Minimum Quotation Requirement</i>	26
6.5 <i>TR106 Order to Trade Ratio Detailed Transaction Report</i>	26

Table of figures

Figure 1 : Overview of factors affecting the limit used for the volume and transaction based Order to Trade Ratio	11
Figure 2 : Structure of the daily CB069 report	25

Table of tables

Table 1 : Abbreviations	5
Table 2 : Calculation of the ordered volume and number of orders	8
Table 3 : Volatility indicator and Volatility factor for volume based OTR for product type OINX	13
Table 4 : MQ base factor and spread quality for volume based OTR for product type OINX	14
Table 4 : Limit Parameters for the volume based OTR	17
Table 5 : Product Factors for the volume based OTR	18
Table 6 : Limit Parameters for the transaction based OTR	19
Table 7 : Product Factors for the transaction based OTR	20
Table 8 Parameters for calculating the volatility indicator and the corresponding volatility factors	20

Table of equations

Equation 1 : Calculation of the volume based Order to Trade Ratio 7

Equation 2 : Calculation of the transaction based Order to Trade Ratio..... 7

Equation 3 : Decision whether MQ limit is applicable 11

Equation 4 : Calculation of the minimum quotation limit for the volume based Order to Trade Ratio ... 12

Equation 5 : Calculation of the minimum quotation limit for the transaction based Order to Trade Ratio
..... 12

1. List of abbreviations

This section lists all the abbreviations used to describe the Order to Trade Ratio.

Abbreviation	Description
ALV	Allianz Option
CRE	Common Report Engine
FDAX	DAX® Futures
FESX	EURO STOXX 50® Index Futures
FGBL	Euro-Bund Futures
HFT	High-frequency trading
OESX	EURO STOXX 50® Index Options
OTR	Order to Trade Ratio
QP	Quote performance
QSQ	Quote size quality
SMC	Stressed market conditions
SQ	Spread quality
T7	Eurex Exchange's trading architecture
VI	Volatility Indicator

Table 1 : Abbreviations

2. Introduction

Eurex Exchange has recalibrated the parameters for the calculation of the Order to Trade Ratio (OTR) with effect from February 2023.

The limits for the volume based OTR are set on the ratio between volume of all order-entries (ordered volume) to the trading volume per product and per day generated by orders and quotes sent by the participants to T7. The limits for the transaction based OTR are set on the ratio between number of all order entries (number of orders) to the number of trades per product and per day generated by orders and quotes sent by the participants to T7. For the calculation of the ordered volume (respectively the number of orders), all types of orders and/or quotes are considered. This includes any/all of the following: add, modify and delete. For the calculation of the traded volume (number of trades), all executions are taken into account. Please note, the aforementioned metrics are calculated per trading day, per product and per participant.

The limits are defined based on the product type. For some products with a different behaviour, the limits are modified by a product specific factor. In case a participant fulfilled the Minimum Quotation Requirements¹, the limits will be increased considering the quotation performance.

At the end of a day, if the value of an OTR for a particular product for a particular participant is greater than a pre-defined limit, such instance is considered a violation. A violation may trigger sanctions against the participant.

The TR100 report is published on a daily basis. Intraday versions are available as well. With the intraday reports, participants have access to preliminary values of the OTRs as well as the respective limits during the day. The intraday versions of the report are published every 30 minutes (with a possible delay up to 5 minutes), starting at 1:30 CET and ending at 21:30 CET². **The final conclusion on whether the OTR is violated can be drawn only at the end of a day.**

¹ See definition in 3.1.3

² Intraday versions of OTR reports for T7 FX are published from 0:30 to 22:30 CET

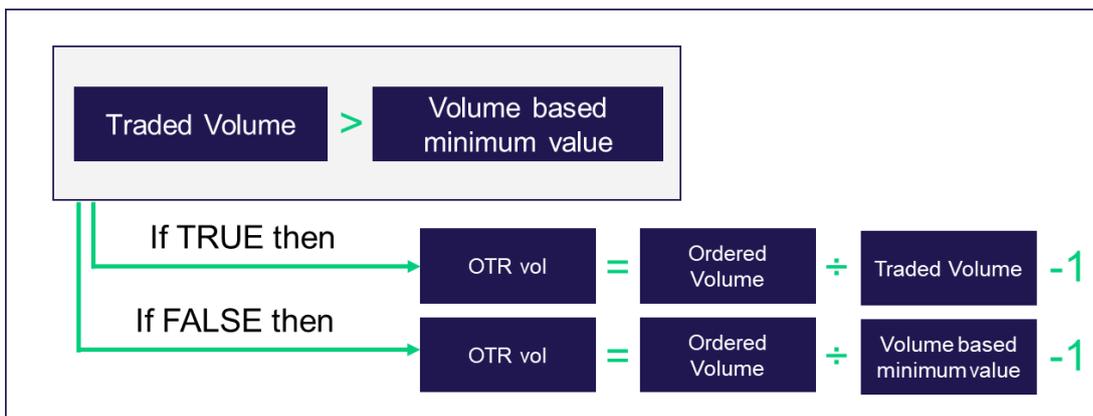
3. Methodology of the Order to Trade Ratio

The methodology of the Order to Trade Ratio regime at Eurex consists of two parts: first the volume based, and second the transaction based Order to Trade Ratio itself as described in section 3.1 and the corresponding limits (i.e. the maximum allowed Order to Trade Ratio) as defined in section 3.2. At the end of a day, if the value of at least one of the two OTR metrics for a particular product for a particular participant is greater than the limit, such instance is considered a violation. A violation may trigger sanctions against the participant.

Participants can monitor their OTRs with the intraday reports supplied by Eurex. However, the conclusion on whether the OTR is violated can be drawn only at the end of a day.

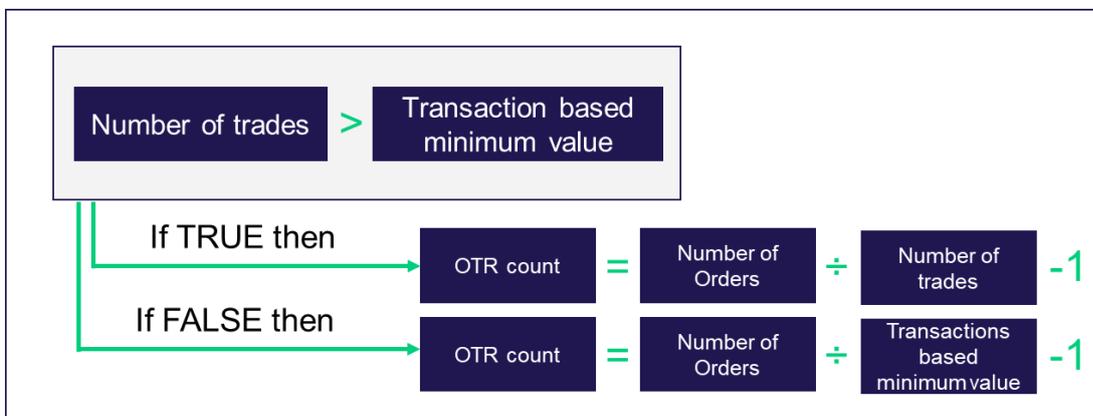
3.1 Calculation of the Order to Trade Ratio

The volume based Order to Trade Ratio is calculated using Equation 1 and the transaction based Order to Trade Ratio is calculated using Equation 2.



Equation 1 : Calculation of the volume based Order to Trade Ratio

The ordered volume is the sum of all order entries, modifications and deletions. The traded volume is the sum of all executions. The volume based minimum value is a fixed number and is used if the trading volume is too small to create a reasonable Order to Trade Ratio. The rationale is to have only a small impact on the overall Order to Trade Ratio in case of a small increase in the trading volume.



Equation 2 : Calculation of the transaction based Order to Trade Ratio

The number of orders is the number of all order entries, modifications and deletions. The number of trades is the sum of all executions. The transaction based minimum value is a fixed number and is used if the number of trades is too small to create a reasonable Order to Trade Ratio. The rationale is to have only a small impact on the overall Order to Trade Ratio in case of a small increase in the number of trades.

The following two subsections describe the calculation process of the input factors for both volume and transaction based Order to Trade Ratio.

3.1.1 Ordered Volume and Number of Orders

In this section, the ordered volume and the number of orders is described in the context of the Eurex Order to Trade Ratio regime. The Eurex Order to Trade Ratio regime applies to the Eurex Exchange and its order books only (off book business, etc. is disregarded). The ordered volume and number of orders is aggregated per product and per day for each participant.

The ordered volume is the sum of:

- The number of contracts generated by the orders and quotes that are accepted by the matcher and are added to the order book and
- The number of contracts that the participant deletes from the matching engine and thus has not been executed.

The number of orders is the sum of:

- The number of orders and quotes that are accepted by the matcher and are added to the order book and
- The number of orders that the participant deletes from the matching engine and thus has not been executed.

The order executions are neither counted towards the ordered volume nor the number of orders. A modify of an order or quote is treated as a "delete" followed by an "add". Thus, the original order and the new order will both be counted towards the ordered volume total and the number of orders. This process applies regardless of which attribute of the order is changed. Table 2 shows a sample calculation of ordered volume and the number of orders for a particular sequence of orders sent by the participant.

Transaction	Order Size	Volume in order book	Counted ordered volume	Ordered volume (cumulative)	Number of Orders	Number of orders (cumulative)
Order entry	100	100	100	100	1	1
Order delete	100	0	100	200	1	2
Order entry	100	100	100	300	1	3
Partial execution	50	50	0	300	0	3
Order modify	100	100	150 [50 (deleted) + 100 (added)]	450	2	5
Order modify	150	150	250 [100 (deleted) + 150 (added)]	700	2	7

Table 2 : Calculation of the ordered volume and number of orders

The calculation method explained in Table 2 is applied to quotes in the same way. A double-sided quote is treated like two orders, mass quotes are treated like multiple quotes. Quotes can be modified by sending a quote 'add' instead of a quote 'change'. This 'quote add' is treated like an 'order modify'. The inactive flag describing whether quotes are active and visible to the market is disregarded.

On the similar lines, an 'immediate or cancel' order is considered as an 'add' order followed by a 'delete' order. Matched quantity is deducted from the 'delete' count. Similarly, a 'fill or kill' order is treated as an 'add' order followed by a 'delete' order and corresponding quantities are counted towards ordered volume. If the order is filled instead, no contracts are deleted and only the added contracts are counted towards the ordered volume.

If an order or a quote is fully or partially deleted by the Self-Match Prevention (SMP) functionality then the ordered volume increases both on the buy and the sell side only by the number of deleted contracts.

Special handling is required for orders and quotes that combine several legs, such as strategies. A strategy-order or strategy-quote is split into its components and the corresponding volumes are incorporated into the overall ordered volume as well as the number of orders of the primary product. For example, if a strategy involves a spread between DAX® futures (FDAX) and EURO STOXX 50® futures (FESX), then the corresponding leg volume will be considered separately for these two products. The ordered volume and number of orders of the legs of a calendar spread in FESX is counted towards the ordered volume and number of orders of the FESX. The case of a volatility strategy in the EURO STOXX 50® options (OESX) differs from this. This strategy is comprised of OESX as well as FESX. The ordered volume and number of orders of a volatility strategy is added to the ordered and traded volume of the OESX itself.

3.1.2 Traded Volume and Number of Trades

The traded volume and the number of trades are based on all trades in the order book. The traded volume is the sum of contracts traded on a given day in a given product. Special handling is required for orders and quotes that combine several legs, such as strategies.

A strategy-trade is split into its components and the corresponding volumes are incorporated into the overall traded volume as well as the number of trades of the primary product. For example, if a strategy trade involves a spread between FDAX and FESX, then the corresponding leg volume will be considered separately for these two products. The traded volume and number of trades of the legs of a calendar spread in FESX is counted towards the traded volume and number of trades of the FESX. The case of a volatility strategy in the OESX differs from this. This strategy is comprised of OESX as well as FESX. The traded volume and number of trades of a volatility strategy is added to the ordered and traded volume of the OESX itself.

In case the traded volume or the number of trades is below a certain minimum value, it will be replaced with the volume based minimum value or respectively the transaction based minimum value. A typical minimum value is 1,000.

3.1.3 Calculation per Member ID

3.1.4 General remarks

Messages

Each message will be treated as an equivalent combination of multiple order submissions and deletions having the same economic effect. For example:

- A two-sided **quote submission** is treated like a **simultaneous submission** of two orders
- A two-sided **quote replacement** is treated like **simultaneous submission and deletion** of two orders
- An **order modification** is treated like an **order deletion and resubmission**
- A **failed IOC** is treated like an **order submission and deletion**

Messages in complex instruments will be treated like multiple equivalent messages in the corresponding outright instruments. For the volume based metrics the leg ratio of the strategies will be considered. For example, an order submission in the calendar spread is treated like two orders in both expiries. Suppose a complex instrument consisting of two options legs – the first leg has a leg ratio of two, the second leg has a leg ratio of three. For a submitted order which has been traded, the sizes will be multiplied with five (the sum of the two leg ratios), while the counters will be multiplied with two (the number of the instruments).

Minimum Quotation Requirements

The Minimum Quotation Requirements reflect the parameters from the commercial Liquidity Provider schemes. The parameters are defined along the three dimensions of the commercial schemes:

1. Spread requirements (e.g. 10% of the bid price, or 2 ticks)
2. Size requirement (e.g. 10 lots)
3. Time requirement (e.g. 8.5 hours for 140 option strikes, or 8 hours for the front month futures contract)

However, there are some differences if the quotation requirements do not restrict on a specific instrument or a specific timeframe throughout the day.

In case there are multiple commercial Liquidity Provider Schemes in a product, the Minimum Quotation Requirements create a synthetic scheme for this particular product, along the weakest requirement within the three dimensions, e.g.:

1. The size requirement is from the scheme which requires the smallest size
2. The spread requirements are from the scheme with the widest spreads
3. The time requirement is from the scheme with the smallest required time

Eurex Exchange Minimum Quotation Requirements necessitate that a participant quotes at a high frequency for various instruments, which means that participants generate higher transaction counts compared to those participants that do not engage in quotation of products (even if a participant fulfills only minimum requirements).

Therefore, in case the participant fulfills the Minimum Quotation Requirements, the limit needs to be raised to a much higher level. Eurex Exchange does not want to discourage participants from quoting more instruments than the required ones.

3.2 Definition of the Maximum Order to Trade Ratios

Figure 1 shows all components that influence the limit for the volume and transaction based Order to Trade Ratio.

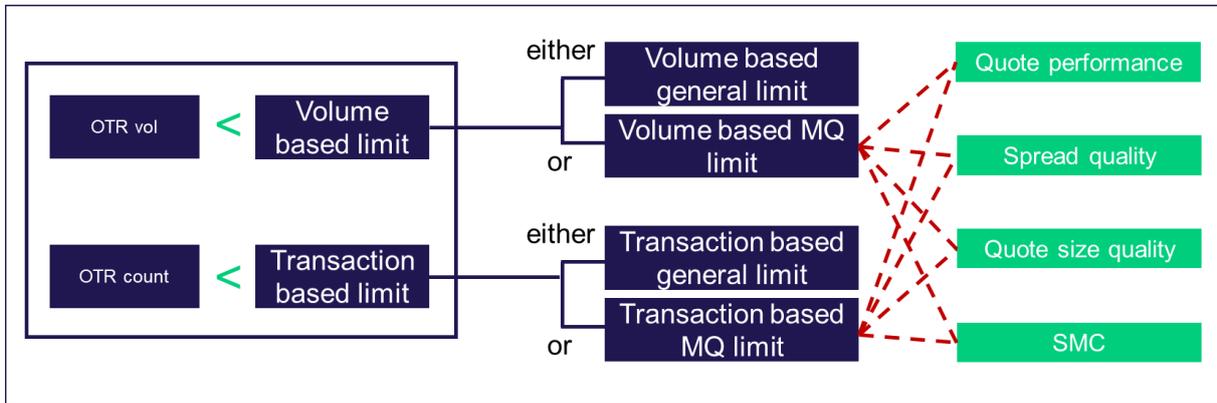


Figure 1 : Overview of factors affecting the limit used for the volume and transaction based Order to Trade Ratio

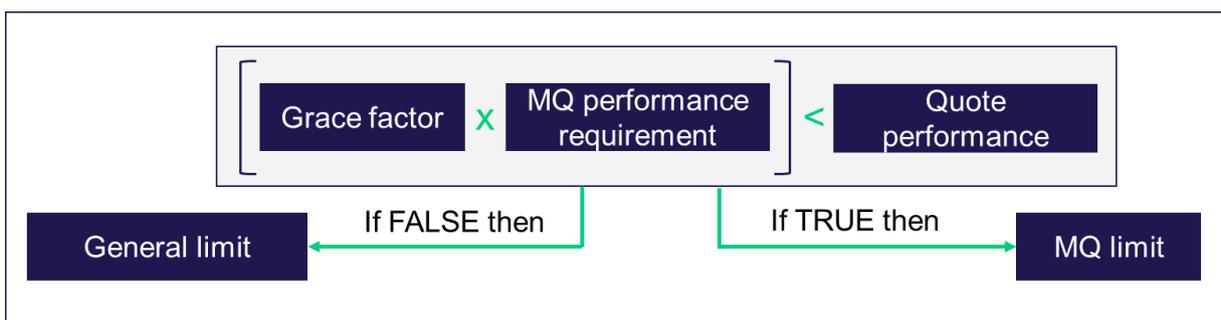
- **General Limit**

Independent of the behavior, each participant has a maximum allowed volume and transaction based Order to Trade Ratio for each product. The values are defined based on a base limit, a product specific factor and a volatility factor. The base limits are predefined depending on the product type. The product factor is predefined and depending on the product. If no explicit definition of a product factor is available, the default value of 1.0 will be applied. The volatility factor is a monotonically increasing step function based on the so-called volatility indicator.

- **Limit for Market Participants fulfilling the Minimum Quotation Requirements**

This component is applicable only in case of products where the Minimum Quotation Requirements are available and for the participants that satisfy the condition shown in Equation 3. The grace factor allows participants with a quote performance lower than the one defined with the minimum quotation performance requirement to be eligible for the Minimum Quotation Limit (MQ limit). Equation 4 shows the formula to calculate the volume based MQ limit and Equation 5 shows the formula to calculate the transaction based MQ limit.

Foremost, it is necessary to decide whether the MQ limit is applicable. This decision is taken by checking whether the participant under consideration meets the condition related to the quote performance described by Equation 3.



Equation 3 : Decision whether MQ limit is applicable

Example: Suppose, for a certain product

- Grace factor = 0.10
- Minimum quotation performance requirement = 0.85
- Values of Quote Performance (QP) for two participants A and B: $QP_A = 0.70$ and $QP_B = 0.05$

Calculation:

$$\text{Grace Factor} \times \text{MQ performance requirement for the given product} = 0.10 \times 0.85 = 0.085$$

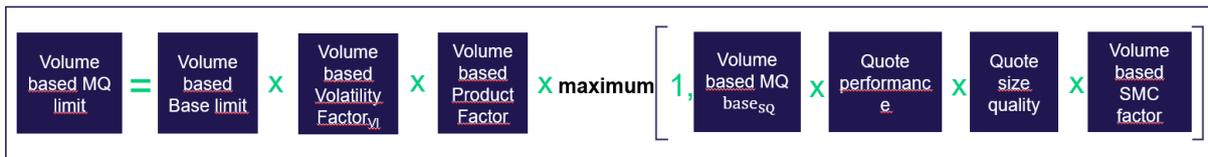
Therefore:

Since 0.085 is less than $QP_A \rightarrow$ MQ limit will be applicable for A

Since 0.085 is NOT less than $QP_B \rightarrow$ MQ limit will NOT be applicable for B

Equation 4 shows the formula to calculate the MQ limit for the volume based Order to Trade Ratio.

Equation 5 shows the formula to calculate the MQ limit for the transaction based Order to Trade Ratio.



Equation 4 : Calculation of the minimum quotation limit for the volume based Order to Trade Ratio



Equation 5 : Calculation of the minimum quotation limit for the transaction based Order to Trade Ratio

The following text describes various factors shown in Equation 4 and Equation 5.

• **Volatility Indicator (VI):**

The volatility indicator is solely calculated based on the best bid and ask prices on a fixed 5-minute time grid. The average of the bid and ask prices is called mid-quote and is below referred to as $price_{t,d}$ with grid-points $t \in \{0, 1, \dots, n\}$ on day d. The first grid-point refers to the first observation on the fixed grid on day s (e.g. at 1:15 CET), and n refers to the last observation on day d (e.g. at 22:00 CET). In corner cases it may happen, that the orderbook is one sided (i.e., either the ask or bid side is empty) – in such cases only the available side is considered. Please note: Bid and Ask Prices refer to the public orderbook, hence resting market orders are ignored.

The volatility indicator is calculated by the following steps:

1. Calculate the sum of 5-minute squared log-returns (intraday volatility for day d) over all n 5-min intervals t of a trading day

$$\text{volatility}_{intraday,d} = \sum_{t=1}^n \log \left(\frac{\text{price}_{t,d}}{\text{price}_{t-1,d}} \right)^2$$

2. Calculate the squared overnight log-return (in the same instrument) (overnight volatility)

$$\text{volatility}_{overnight,d} = \log \left(\frac{\text{price}_{first,d}}{\text{price}_{last,d-1}} \right)^2$$

With

$$\text{price}_{first,d} = \text{price}_{t-1,d}, \text{ with } t = 1$$

$$\text{price}_{last,d-1} = \text{price}_{t,d-1}, \text{ with } t = n$$

3. Take the sum of intraday and overnight volatility and scale it to a 30-day volatility by multiplying with $\sqrt{30} \cdot 100$, in the following this will be called RV_{Raw}

$$RV_{raw,d} = \sqrt{(\text{volatility}_{overnight,d} + \text{volatility}_{intraday,d})} \sqrt{30} \cdot 100$$

4. Take the average of the RV_{Raw} over the last m days (later on referred as Averaging Window), this term is called volatility indicator

$$\text{Volatility Indicator}_d = \max \left\{ \frac{1}{m-1} \sum_{t=1}^{m-1} RV_{raw,d-t}, RV_{raw,d} \right\}$$

The volatility factor is defined based on the value of the volatility indicator. The rationale for this factor is that if the volatility is increasing, then more quote updates are required to reflect the changes in the market price. Depending on the volatility indicator, values of the volatility factor change. Table 4 shows example values for the volatility factor per volatility indicator (VI).

VI	Volatility factor
VI ≤ 8.0	1.00
8.0 < VI ≤ 12.0	1.50
12.0 < VI ≤ 20.0	2.00
20.0 < VI	4.00

Table 3 : Volatility indicator and Volatility factor for volume based OTR for product type OINX

- **Quote Performance (QP):**

The quote performance is the ratio of "covered time" to "required time".

- Covered time: This is the total time in all possible instruments even beyond the strike price window of a product the participant actually quotes in a day. To calculate the covered time, only those quotes that satisfy the constraints regarding the maximum spread and minimum quote size are considered. The "covered time" used in this context is the sum of all-time intervals across all outright instruments in a given product where a participant has quoted according to the Minimum Quotation Requirements.
- Required time: This is the total time in all possible series of the strike price window of a product the participant could quote in a day. A typical example is 7 strikes per expiration

for 6 expirations for both put and call for time per day, yields to required time = $7 \times 6 \times 2 \times 8.5$ hours = 714 hours. Please note the time per day will be replaced with the actual time for which the instruments were in continuous trading (i.e. removing the auctions, or in case of a system crash reducing the time)

The covered time is then set in relation to the required time of those outright instruments (i.e. an option strike) which need to be quoted to fulfil the Minimum Quotation Requirements. Therefore, the maximum quote performance is the relation of the number of outright instruments that have been listed in the entire product and the number of outright instruments that need to be quoted by participants. Please note, quotation activity in complex instruments is currently not considered.

For example, a participant is required to quote seven strikes (out of possible 15 in strike price window) to receive up to 100 percent (= 1.0) Market Maker performance (regarding the Minimum Quotation Requirements). If the participant quotes 15 series of the correspondence product, then this performance goes up to 214 percent (= 2.14). Thus, the quote performance is directly proportional to the amount of instruments a participant quotes. Another example: A participant is required to quote one futures expiration for 8.5 hours and he decides to quote this expiration for 20 hours. Hence, his quote performance will be $20 \text{ hours} / 8.5 \text{ hours} = 2.35$. Thus, the larger the cover time a participant quotes for given products, the higher is the value of the quote performance.

- **Spread Quality (SQ):**

The spread quality is a performance measure based on the average spread in relation to the required spread calculated for all outright instruments quoted by a participant in a product for a day. The spread quality is applicable only to those quotes, which satisfy the constraints regarding the maximum spread and the minimum quote size as defined by the Minimum Quotation Requirements. It is calculated using the following formula on a tick by tick basis for each instrument and aggregated per day using time weighted averages,

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

The rationale for this factor is that if the bid-offer spread becomes tighter, then more quote updates are required to reflect the changes in the market price. Depending on the spread quality, values of the MQ base factor change. Table 4 shows example values for MQ base factor per spread quality (SQ).

SQ	MQ base
SQ ≤ 0.2	2.00
0.2 < SQ ≤ 0.4	4.00
0.4 < SQ ≤ 0.6	6.00
0.6 < SQ	8.00

Table 4 : MQ base factor and spread quality for volume based OTR for product type OINX

- **Quote Size Quality (QSQ):**

Quote size quality is the average size (number of contracts) quoted per product for a given period. It is calculated on a tick by tick basis for each instrument and aggregated per day using time weighted averages.

The rationale for this factor is that higher sizes provided by participants will increase their respective OTRs, hence the limits need to be increased as well. Please note, only the volume based limit will be increased as we do not observe more orders and quotes if larger sizes are supplied.

- **Stressed Market Conditions Factor (SMC factor):**

This factor is dependent on two conditions: First, the occurrence of stressed market conditions in a given product and, second, the fulfillment of the relaxed Minimum Quotation Requirements during that period by the participant. If there were no stressed market conditions or the participant did not fulfill the relaxed Minimum Quotation Requirement the volume and transaction based SMC factor will be set to one (i.e. there is no impact on the OTR limit). If both conditions are met, i.e. the participant fulfilled the relaxed Minimum Quotation Requirements during stressed market conditions both the volume and transaction based SMC factor will be larger than one to account for the higher number of orders as well as the higher ordered volume due to the increasing number of quote updates during such periods.

4. Limit Parameters

This section contains the respective values to calculate the limit per product. Apart from the product specific factor, all parameters are defined based on the product type of the product. The product types are published in the product overview section on the Eurex website www.eurex.com:

Markets > Product Overview > Complete list of all Eurex products in csv format

The following tables show the parameters used to calculate the volume based OTR.

Please note: The limit is based on the product type of the product.

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	
					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	
					0.40	6.00	
					0.60	8.00	
Options on Money Market Futures	OFIT	0.10	1,000	200,000	0.00	2.00	1.20
					0.20	4.00	
					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	
					0.60	8.00	

* The table contains only the main product group per product type. The list of the product group names shown above in the table is not exhaustive.

Table 5 : Limit Parameters for the volume based OTR

Product name	Product ID	Volume based product factor
EURO STOXX 50® Variance Futures	EVAR	1500.00
Options on VSTOXX® Futures	OVS2	20.00
EURO STOXX 50® Index Options	OESX	0.80
EURO STOXX 50® Index Futures	FESX	0.80
Euro-Bobl Futures	FGBM	0.80
CONF Futures	CONF	0.50

Note: If a product is not included in the table, i.e. has no product factor assigned, the default value of 1.00 is applied.

Table 6 : Product Factors for the volume based OTR

The following tables show the parameters used to calculate the transaction based OTR.

Please note: The limit is based on the product type of the product.

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	0.10	1,000	1,500	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
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	0.10	1,000	10,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	
New asset classes	New asset classes	0.10	1,000	50,000	0.00	2.00	1.20
					0.20	4.00	
					0.40	6.00	
					0.60	8.00	

* The table contains only the main product group per product type. The list of the product group names shown above in the table is not exhaustive.

Table 7 : Limit Parameters for the transaction based OTR

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

Note: If a product is not included in the table, i.e., has no product factor assigned, the default value of 1.00 is applied.

Table 8 : Product Factors for the transaction based OTR

The following tables show the parameters used to calculate the volatility indicator as well as the corresponding volatility factors for the volume and transaction based OTR.

Product group*	Volatility Indicator				Volume Based OTR		Transaction Based OTR	
	Product Type	Reference Product	Rollover Window	Averaging Window	Volatility Indicator	Volatility Factor	Volatility Indicator	Volatility Factor
Equity Options	OSTK	FESX	1	10	0.00	1.00	0.00	1.00
Single Stock Futures	FSTK				8.00	1.50	8.00	1.50
Equity Index Futures	FINX				12.00	2.00	12.00	2.00
Volatility Index Futures	FVOL				20.00	4.00	20.00	4.00
Equity Index Options	OINX	FCEU	2	10	0.00	1.00	0.00	1.00
Equity Index Dividend Options	OFIX				3.00	1.50	3.00	1.50
Foreign Exchange Futures	FCUR				4.00	2.00	4.00	2.00
Foreign Exchange Options	OCUR				6.00	4.00	6.00	4.00
Fixed Income Futures	FBND	FGBL	2	10	0.00	1.00	0.00	1.00
Options on Fixed Income	OFBD				3.00	1.50	3.00	1.50
Futures					5.00	2.00	5.00	2.00
					10.00	4.00	10.00	4.00
Money Market Futures	FINT	FGBS	2	10	0.00	1.00	0.00	1.00
Options on Money Market	OFIT				0.50	1.50	0.50	1.50
Futures					1.00	2.00	1.00	2.00
					2.00	4.00	2.00	4.00
New asset classes	New asset classes	FESX	1	10	0.00	1.00	0.00	1.00
					8.00	1.50	8.00	1.50
					12.00	2.00	12.00	2.00
					20.00	4.00	20.00	4.00

Table 9 Parameters for calculating the volatility indicator and the corresponding volatility factors

5. Sample Calculation of the Order to Trade Ratio

In this subsection, step-by-step calculation of a volume based Order to Trade Ratio is explained with the help of a simple example. In an example for the transaction based Order to Trade Ratio we would replace the ordered volume with number of orders and traded volume with number of trades, apart from that it would have the same steps and is therefore omitted.

Suppose, following information is available for a particular product:

Date	Traded Volume	QP	SQ	QSQ	SMC fulfilled	Ordered Volume	OTR vol	Limit Type	Limit	Limit Usage
For 15th business day	10,500	0.65	0.15	100	No	800,000,000.00	76,189.48	MQ limit	1,560,000.00	0.05
For 16th business day	200	0.05	0.15	200	No	30,000,000.00	29,999.00	General limit	12,000.00	2.5

Further general information:

- Grace factor = 0.1
- MQ performance requirement = 0.85 (i.e. 85%)
- Base Limit = 12,000
- Product Factor = 1
- Volume based minimum value = 1,000
- SMC Factor = 1.20
- Volatility Indicator = 2

Calculations for the 15th business day:

Step 1: Calculation of the volume based OTR

$$OTR\ vol = \frac{Ordered\ Volume}{\max(Traded\ Volume,\ Volume\ Based\ Minimum\ Value)} - 1$$

$$OTR\ vol = \frac{800,000,000}{\max(10,500,\ 1,000)} - 1 = \frac{800,000,000}{10,500} - 1 = 76,189.48$$

Volume based OTR for the 16th business day = 76,189.48

Step 2: Calculation of the limit

A] First to check whether the MQ limit is applicable.

$$Grace\ factor \times MQ\ performance\ requirement = 0.10 \times 0.85 = 0.085$$

Since 0.085 is less than QP (= 0.65) → MQ limit will be applicable

B] Calculation of the MQ limit

For the given value of SQ, corresponding value of the MQ base based on Table 4 is found to be 2.00, i.e. MQ base = 2.00. And for given value of VI, corresponding Volatility Factor based on Table 3 is 1.00, i.e. Volatility Factor=1.00

Applying Equation 4:

$$MQ\ Limit = Base\ Limit \times Volatility\ Factor \times Product\ Factor \\ \times \max(1, MQ\ Base \times QP \times QSQ \times SMC)$$

$$MQ\ Limit = 12,000 \times 1.00 \times 1.00 \times \max(1, 2.00 \times 0.65 \times 100 \times 1) = 1,560,000.00$$

Limit for the 15th business day = 1,560,000.00

Step 3: Calculation of the limit usage for the 15th business day

$$Usage = \frac{OTR\ vol}{MQ\ Limit} = \frac{76,189.48}{1,560,000.00} = 0.05$$

Calculations for the 16th business day:

Step 1: Calculation of the volume based OTR

$$OTR\ vol = \frac{Ordered\ Volume}{\max(Traded\ Volume, Volume\ Based\ Minimum\ Value)} - 1$$

$$OTR\ vol = \frac{30,000,000}{\max(200, 1,000)} - 1 = \frac{30,000,000}{1,000} - 1 = 29,999$$

Volume based OTR for the 16th business day = 29,999

Step 2: Calculation of the limit

A] First to check whether the MQ limit is applicable.

$$Grace\ factor \times MQ\ performance\ requirement = 0.1 \times 0.85 = 0.085$$

Since 0.085 is larger than QP (= 0.05) → General limit will be applicable

B] Calculation of the general limit

Applying the equation for the general limit:

$$General\ Limit = Base\ Limit \times Volatility\ Factor \times Product\ Factor = 12,000 \times 1.00 \times 1.00$$

$$= 12,000$$

Limit for the 16th business day = 12,000

Step 3: Calculation of the limit usage for the 16th business day

$$Usage = \frac{OTR\ vol}{General\ Limit} = \frac{29,999}{12,000} = 2.5$$

Usage at the 16th business day = 2.5

Note:

As shown above, the final value of the Order to Trade Ratio is calculated at the end of the trading day. If the OTR value is less than the respective limit, it can be concluded that the participant has not violated the limit set by the Order to Trade Ratio.

6. Customer Reports

Following reports are available on a daily* basis:

- TR100: Order to Trade Ratio Report
- CB069: Transaction Report
- TR103: Daily Order to Trade Ratio Parameter
- TR105: Minimum Quotation Requirement
- TR106: Order to Trade Ratio Detailed Transaction Report

These reports are available for the participants via the Common Report Engine (CRE). The participants themselves have to query these reports from the CRE. Every day, the reports for the previous trading day will be available. The CRE stores the reports for the last 10 trading days.

* Additionally, intraday versions of the reports TR100 and CB069 are available every 30 minutes, starting at 1:30 CET (for T7 FX starting at 0:30 CET). **Please note:** The publication of the report every 30 minutes is an indication. Due to processing procedures to the CRE the reports can be delayed.

6.1 TR100 Order to Trade Ratio Report

- The report is generated on a daily basis.
- It contains the daily data per product for all the elapsed trading days.
- Intraday versions of this report are made available every 30 minutes a day and can be used by the participants to track, for the respective trading day, number of transactions, ordered volume and traded volume – per product per limit type, per session ID and per trader ID. Due to the processing time of the reports there can be a delay of the intraday version up to 5 minutes. The report data will provide an aggregate of the current trading day. The intraday reports start at 1:30 CET (T7 FX: 0:30 CET), the last report of a day will be published at 21:30 CET (T7 FX: 22:30 CET).
- The intraday reports are available via CRE and will have the following name convention: 90RPTTR100ABCDEYYYYMMDDHHMM with ABCDE = MemberID.
- The cut-off time for the intraday report is shown in the field “**rptPrntEffTim**”, i.e. all activities at this timestamp will be considered in the report.
- As the name indicates, the columns ‘OTRvol’ and ‘OTRno’ show the daily volume and transaction based OTR.
 - $-1 \leq \text{OTR}$
- The columns ‘Limit Vol’ and ‘Limit Count’ show the volume and transaction based limits.
- The columns ‘LimUsageVol’ and ‘LimUsageCount’ show the ratio between the volume and transaction based OTR with the respective limit. This value shows which portion of the limit has been used by the OTR as indicated in Section 5, i.e. how close one came to a violation.
 - If the usage gets close to 1.0, then it would be a matter of concern.
- As the name indicates, the column ‘Violation’, shows whether a violation occurred on a given day.

6.2 CB069 Transaction Report

- If the values from TR100 for a particular product are observed to be so high that deeper investigation is necessary, then this report can be used to find out the further information at session ID level and/or trader ID level.
- Intraday versions of this report are made available every 30 minutes and can be used by the participants to track, for the respective trading day, number of transactions, ordered volume and traded volume – per product per limit type, per session ID and per trader ID. The report data will provide an aggregate of the current trading day.
- The intraday reports are available via CRE and will have the following name convention: 90RPTCB069EUREXXXXMMDDHHMM.
- The cut-off time for the intraday report is shown in the field “**rptPrntEffTim**”, i.e., all activities at this timestamp will be considered in the report.
- The intraday reports are available in the following formats: .csv and .xml
- The number of orders and the ordered volume are shown in the columns ‘Orders Count’ and ‘Ordered Volume’. The number of trades and the traded volume values are shown in the columns ‘Trades Count’ and ‘Traded Volume’ respectively.
- For the limit type ‘Standard’, the values of traded volume and ordered volume are not measured separately. “n/a” stands for not available

The CB069 report consists of three parts:

- ① The first part provides the information on number of transactions, number of orders, ordered volume, number of trades and traded volume per product per limit type.
- ② The second part provides additional granularity of session ID level to the information from the first part. The column ‘Session’ contains session IDs.
- ③ The third part provides additional granularity of trader ID level to the information from the first part. The column ‘User’ lists trader IDs.

Participant	Participant Long Name							
XXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX							
Product	Limit Type	Transactions Count	Ordered Volume	Orders Count	Trades Count	Traded Volume		
FDAX	Standard	60	n/a	n/a	n/a	n/a		
FDAX	All	60	250	60	50	130		
FESX	Standard	5	n/a	n/a	n/a	n/a		
FESX	All	5	60	5	5	60		

BU	BU Long Name		BU Identifier					
XXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		123					
Session	Product	Limit Type	Transactions Count	Ordered Volume	Orders Count	Trades Count	Traded Volume	
90000001	FDAX	All	20	100	20	40	100	
90000001	FDAX	Standard	20	n/a	n/a	n/a	n/a	
90000001	FESX	All	2	50	2	2	50	
90000001	FESX	Standard	2	n/a	n/a	n/a	n/a	
90000002	FDAX	All	40	150	40	10	30	
90000002	FDAX	Standard	40	n/a	n/a	n/a	n/a	
90000002	FESX	All	3	10	3	3	10	
90000002	FESX	Standard	3	n/a	n/a	n/a	n/a	

User	Product	Limit Type	Transactions Count	Ordered Volume	Orders Count	Trades Count	Traded Volume	
TRD001	FDAX	Standard	40	n/a	n/a	n/a	n/a	
TRD001	FDAX	All	40	150	40	10	30	
User	Product	Limit Type	Transactions Count	Ordered Volume	Orders Count	Trades Count	Traded Volume	
TRD002	FESX	Standard	2	n/a	n/a	n/a	n/a	
TRD002	FESX	All	2	10	2	2	10	
User	Product	Limit Type	Transactions Count	Ordered Volume	Orders Count	Trades Count	Traded Volume	
TRD003	FDAX	Standard	20	n/a	n/a	n/a	n/a	
TRD003	FDAX	All	20	100	20	40	100	
TRD003	FESX	Standard	3	n/a	n/a	n/a	n/a	
TRD003	FESX	All	3	50	3	3	50	

Figure 2 : Structure of the daily CB069 report

6.3 TR103 Eurex Daily OTR Parameter

- The report shows the current parameters used for the Eurex OTR calculation.
- The report is generated on a daily basis.
- It contains the daily data per product for all elapsed as well as the current trading day.
- The reports are available via CRE and will have the following name convention:
90RPTTR103PUBLIYYYYMMDD
- The columns 'graceFactorVol' and 'graceFactorCnt' show the respective grace factors for ordered volume and number of orders.
- The columns 'minimumValueVol' and 'minimumValueCnt' show the minimum values for the ordered volume and number of orders.
- The columns 'baseVol' and 'baseCount' show the volume and transaction based limits.

- The columns 'prodFactVol' and 'prodFactCnt' show the product factors for volume and transaction based OTR.
- As the name indicates, the column 'smcFactor' shows the stressed market factor for the OTR calculation.

6.4 TR105 Minimum Quotation Requirement

- The report shows the minimum quotation requirements per product.
- The report is generated on a daily basis.
- It contains the daily data per product for all the elapsed trading days.
- The reports are available via CRE and will have the following name convention:
90RPTTR105PUBLIYYYYMMDD
- The columns 'MinQuoteSize' and 'minQuoteSizeSMC' show the minimum quote size during normal and stressed market conditions.

6.5 TR106 Order to Trade Ratio Detailed Transaction Report

- This report combines the information from the TR100 and the CB069 to ease the identification of user IDs / session IDs which causes OTR violations and cases close to a violation
- The report is generated on a daily basis.

Detailed information on the structure of all the reports is available on the Eurex website

www.eurex.com:

Support > Initiatives & Releases > T7 Releases > Choose the current T7 Release > System Documentation > Under "Reports" you will find the "T7 XML Report Reference Manual" for the respective release

Details and manuals on further T7 Releases can be found [here](#).