


# Eurex Bonds

## Market Model

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# 1 Introduction

Eurex Bonds was conceived as an electronic communication network (ECN) and provides participants with an electronic platform for off-exchange, "wholesale" trading in fixed-income bonds. Also, by having networked the Eurex Bonds® trading platform into the settlement system of Eurex Clearing AG, a direct link between spot and futures markets is available for the first time to enable electronic basis trading of bonds via a central order book. The necessary liquidity in the bond and basis trading markets is provided by market makers.

Eurex Bonds GmbH was founded in October 2000 as a joint initiative of Eurex Frankfurt AG and leading financial institutions. The organization is a private law joint venture with the purpose of establishing and operating an electronic platform for bond and basis trading in debt issues.

Eurex Bonds is based on the electronic trading system Xetra® and has a direct link to the derivative market Eurex® for basis trading.

## 2 Fundamental Principles of the Market Model

The Eurex Bonds market model defines the mechanism of matching orders to trades in the Xetra trading system and describes the link to the Eurex system for basis trades. It describes price determination, priority of orders and quotes as well as the type and scope of information made available to market participants during trading sessions.

The market model serves as a basis for legal requirements in the "Eurex Bonds Rules and Regulations" and the "Terms and Conditions for Transactions at the Frankfurter Wertpapierbörse" which serve to regulate electronic trading at the Frankfurter Wertpapierbörse. The remarks on electronic trading within the Rules and Regulations contain further conditions, which are not described in this document but which still have to be taken into account during trading.

The Eurex Bonds market model is order and quote driven. Order types are limit orders and iceberg orders.

The market model is based on the following fundamental principles for trading:

1. An instrument can only be traded continuously or via Pre-arranged Trade Facility.

2. Orders and quotes can be entered during pre-trading and continuous trading; post-trading allows the entry of orders valid from the next business day.

3. Orders and quotes are executed according to price/time priority.

4. Trading is anonymous, i.e., market participants cannot distinguish pre-trade on the trading screen which market participant entered the order.

5. All order sizes can be traded on Eurex Bonds, i.e., round lots as well as odd lots are supported. One round lot corresponds to the minimum lot size or a multiple thereof. Odd lot orders consist of an odd lot part (smaller than the instrument specific round lot size) and possibly of further round lot parts. During continuous trading only round lot sizes are considered for price determination. Odd and round lots can be traded in the OTC function: Pre-arranged Trade Facility.

6. Basically, only limit orders are supported during continuous trading.

7. The last determined price of an instrument during continuous trading serves generally as reference price.

8. The order is valid for a maximum of 90 days (i.e. 90 calendar days including the current day (=T+89)) from the date of entry.

9. Trade confirmations are disseminated immediately after the respective trade, the counterparty information shows the Central Counterparty of Eurex Clearing except for Pre-arranged trades where the information on the counterparty is disclosed.

10. The accounting cut-off is carried out daily subsequent to the post-trading phase.

11. Yield term trading is supported on instrument segment level for zero bonds.

12. The settlement period for bonds and basis trades is T+3, for Bubills T+2.

# 3 Products and Segmentation

The Eurex Bonds trading platform currently offers the following products:

**Cash Bond** Products

- German Government Bonds
- German Treasury Discount Papers (Bubills)
- Agencies
- Jumbo Mortgage Bonds
- German State Bonds

**Basis** Products

The basis represents a combination of bonds and futures contracts that has its own price. Buying the basis involves the purchase of a certain amount of bonds and the simultaneous sale of a corresponding number of futures contracts. The exact opposite holds true when selling the basis.

In general two different types of basis instruments are provided:

- *Deliverable* basis instruments:
  - The combination of German debt issues with a remaining term to maturity of 1.75 years and 2.25 years, and the current Schatz future contract (FGBS).
  - The combination of German debt issues with a remaining term to maturity of 4.5 years and 5.5 years, and the current Bobl future contract (FGBM).
  - The combination of German debt issues with a remaining term to maturity of 8.5 years and 10.5 years, and the current Bund future contract (FGBL).
- *Non-deliverable* basis instruments:
  - Selected German debt issues, which are not deliverable components of the baskets of the respective Euro Bund, Euro Bobl and Euro Schatz futures, in combination with a tradable future at Eurex (as defined by Eurex Bonds)

A trading segment consists of a specific number of instruments for which trading is organized in the same way. Certain parameters of the Eurex Bonds market model concerning yield term trading and trading times can be configured for one trading segment. A combination of parameters is selected for each trading segment, which specifies the trading process in the respective segment.

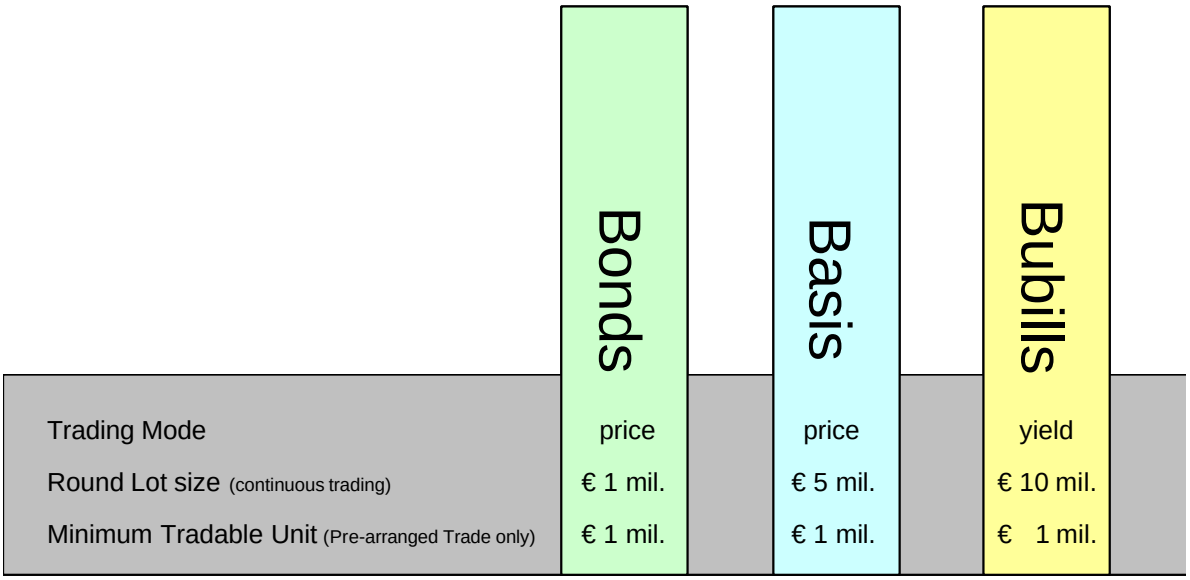



Diagram 1: Trading segments and trading modes

# 4 Market Participants

All market participants have equal privileges when trading bonds and basis on Eurex Bonds and thus may enter orders and quotes into the system. Furthermore, to guarantee sufficient liquidity in all products, a number of market participants have committed to act as market makers.

Eurex Clearing AG acts as central counterpart between buyers and sellers, thus guaranteeing trading anonymity as well as contractual fulfillment of each and every transaction. Each market participant has the opportunity to choose either Clearstream or Euroclear for the settlement of its cash market trades. As soon as a buy or sell order is executed in the system, related settlement instructions are forwarded automatically.

All executed basis trades are automatically broken down by the system into two components. The resulting cash market position (the "cash leg") is forwarded directly to the appropriate settlement organization. The number of futures contracts (the "futures leg") is calculated simultaneously and booked into the corresponding participant's futures account with Eurex Clearing AG. These positions can be netted against existing positions from other futures trades. Margining and regulation are in accordance with the clearing conditions of Eurex Clearing AG.

The users of the system can be divided into several categories:

- Traders
  Traders are individually admitted for trading on Eurex Bonds. A trader can act as agent trader (account A), as proprietary trader (account P) or as liquidity provider ("Designated Sponsor", account D). Orders will be flagged accordingly.

- Other users
  Administrators are users which are not admitted or authorized for trading (they assign and maintain authorization rights for the member's personnel). This category also includes personnel in settlement, operation and supervision as well as information users.

# 5 Clearing and Settlement

Trading on Eurex Bonds in continuous trading is anonymous. Eurex Clearing serves as the central counterparty for all Eurex Bonds trades (order book and pre-arranged trades).

Members may maintain up to 16 different settlement location and accounts. For each member a default settlement account and location must be defined that can be changed on trader level. Members may select Clearstream or Euroclear as settlement locations.

Trade maintenance functionalities on Eurex Bonds allow the maintenance of settlement location and account of a trade on the same business day.

Eurex Bonds routes all trades to Eurex Clearing where settlement instructions are directly sent to the respective settlement location.

The following diagram gives on overview on the process flow of a cash trade during continuous trading. The main flow can also be applied for trades generated within the Pre-arranged Trade facility:

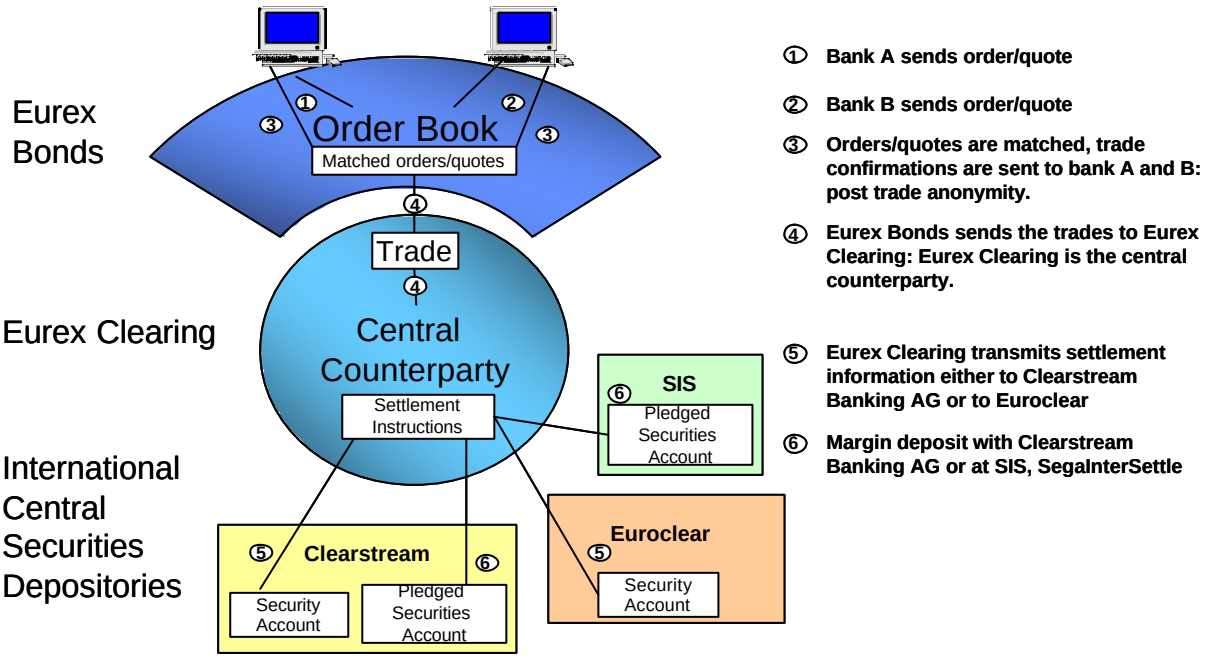



Diagram 2: Process flow of a cash bond trade

# 6 Provision of Additional Liquidity by Market Makers

Eurex Bonds market makers are appointed to act as market makers in one or more Product Segments. They receive reduced transaction fees in case of fulfillment of their Market Maker obligations.

Market Makers are obligated to enter quotes into the system in their own name and on their own account with regard to the assigned instruments. It is not possible for Market Makers to enter one-sided quotes into the system.

A quote is the simultaneous entry of a buy and sell limit order in Eurex Bonds. Quotes entered into the system are good-for-day. Only one quote per instrument per member's trader group can be placed in the order book.

## 6.1 Market Maker Obligations

On a monthly basis Market Makers are required to quote an average of 80% within a 5 hour period per trading day for the chosen segments with a given spread and a minimum quotation size.

Eurex Bonds assigns the instruments to be quoted on a monthly basis, for each segment a defined number of instruments has to be quoted.

## 6.2 Assessment of Performance and Privileges

During the performance measurement it is checked whether all quotes meet the quality requirements concerning:

- Minimum quantity,
- Minimum Quotation time in continuous trading,
- Maximum bid/ask spread.

These criteria are used to assess the performance of the respective Market Maker. In case the respective Market Maker fulfills the minimum requirements on a monthly basis, reduced transaction fees are applied for all trades of the member in the respective product segment.

# 7 Order Types

The following *order sizes* can be traded on Eurex Bonds:

- During continuous trading only round lots can be traded. A *round lot* is composed of round lot parts or multiples thereof.

- Odd lots can only be entered in the OTC function “Pre-arranged Trade facility”. An *odd lot* is equal or a multiple of the minimum tradable unit.

If an order consists of a round lot and an odd lot part, only the round lot size is taken into account for the price determination, the odd lot part of the order will be kept in the system until the order is deleted by the originator or the system on reaching its maximum validity. Both order parts have the same order number. By means of a partial execution, the round lot part respectively the odd lot part of an order could change.

An order modification leads to a new time priority if either the limit is changed or the order modification has a negative impact on the priority of the execution of other orders in the order book (e.g. increase of the volume of an existing order). However, if the volume of an existing order should be decreased, the current valid time priority will remain. If a new time priority is appointed, the order will receive a new order number.

## 7.1 Basic Types

Only one order type is admitted for price determination during continuous trading:

- *Limit orders* are bid/ask orders, which are to be executed at their specified limit or better.

Order types can be specified further through additional execution conditions and validity constraints.

## 7.2 Execution Conditions for Continuous Trading

Limit orders in continuous trading can be defined by the following execution conditions:

- An *immediate-or-cancel order (IOC Order)* is an order, which is executed immediately and fully or as fully as possible. Non-executed parts of an IOC order are deleted without entry in the order book.

- A *fill-or-kill order (FOK Order)* is an order, which is executed immediately and fully or not at all. If immediate and full execution is not possible, the order is deleted without entry in the order book.

## 7.3 Validity Constraints

The validity of orders can be determined by means of further constraints. To this effect, the market model offers the following variations.

- *Good-for-day:* Order only valid for the current Eurex Bonds trading day.
- *Good-till-date:* Order only valid until a specified date (up to a maximum of 90 days (i.e. 90 calendar days including the current day (=T+89)) from the date of entry).
- *Good-till-cancelled:* Order only valid until it is either executed or deleted by the originator or the system on reaching its maximum validity of 90 days (i.e. 90 calendar days including the current day (=T+89)).

## 7.4 Iceberg Orders

In order to enable market participants to enter large orders into the order book without revealing the full volume to the market, iceberg orders are provided.

An *iceberg order* is specified by its mandatory limit, its overall volume and a peak volume. Both the overall volume and the peak volume must be a round lot.

The *peak* is the visible part of an iceberg order and is introduced into the order book with the original timestamp of the iceberg order according to price/time priority. In continuous trading, as soon as the peak has been completely executed and a hidden volume is still available a new peak is entered into the book with a new time stamp. Minimum peak sizes and minimum overall volumes are specified per trading segment.

The last peak introduced into the order book may be smaller than the peak size specified. Iceberg orders will not be marked as such in the order book. Iceberg orders are valid for the current trading day only (g*ood-for-day).* Additional execution conditions or trading restrictions can not be assigned to an iceberg order.

In addition, a factor which limits the overall volume of an iceberg order at a given peak quantity as outlined below, needs to be considered:

Peak Quantity * Factor = Overall Quantity

This factor is set at 20, i.e. a minimum of 5% of the overall volume of an iceberg order will need to be shown in the order book.

## 7.5 Handling of Orders and Quotes in Case of Events affecting Prices

Eurex Bonds can suspend trading in the event of extraordinary events affecting prices. Orders and quotes existing in the system are deleted.

### 7.5.1 Automatic quote deletion in case of connection loss

Eurex Bonds offers the following monitoring service:

- Each member can define one MISS (Member Integrated System Server) to be monitored by Eurex Bonds.
- If there is a connection loss between a member MISS and Eurex Bonds, all respective quotes (including also trader subgroups of the involved member) will be deleted by the system automatically.
- The automatic quote deletion takes place even if the process of re-establishing the connection between MISS and Eurex Bonds was successful.

# 8 Flow of Trading

Trading takes place all day and begins with the pre-trading phase followed by the trading phase and the post-trading phase. The system is not available for trading between the post-trading and pre-trading phase.

The pre-trading phase for bonds starts at 7:25 CET and ends at 8:30 CET; pre-trading for basis instruments starts at 8:20 CET and ends at 8:30 CET. The post-trading phase is the same for all instruments on Eurex Bonds, it starts at 17:30 CET and ends at 19:00 CET.

(All times are CET)

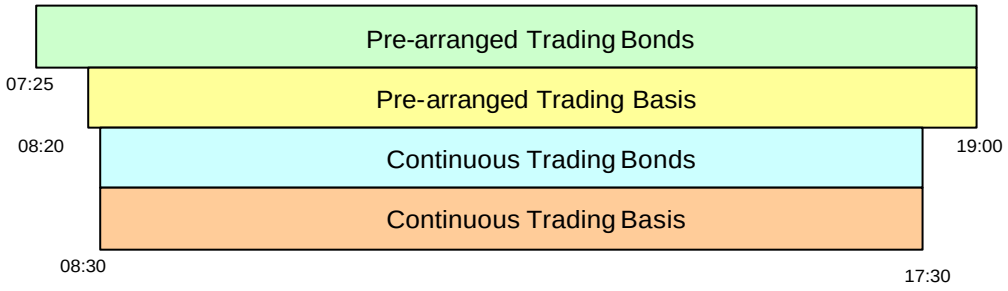



Diagram 3: Trading times

## 8.1 Pre-trading Phase

The pre-trading phase initiates the trading phase. Market participants can enter orders and quotes[1] for preparing the actual trading day and modify or delete their existing orders and quotes. Eurex Bonds confirms the member's order[1] entry and maintenance by order confirmation. Market participants do not receive an overview of the market's order book situation as the order book is closed during this phase. The last price fixed or the best bid/best ask limits of the previous day are displayed.

[1] In the order book quotes are always handled like two orders (a limit buy and a limit sell order). Therefore, the document refers in the following only to orders and not to quotes.

## 8.2 Trading Phase

During continuous trading price determination follows price/time priority; only round lots are taken into account.

## 8.3 Post-trading Phase

After the trading phase, new orders can be entered and existing orders can be modified or deleted in the post-trading phase. New order entries are taken into consideration in continuous trading on the following trading day depending on possible execution restrictions and validity constraints. It is also possible to modify trade attributes in the post-trading phase.

All instruments can be traded in continuous trading and the “Pre-arranged Trade Facility”. The Eurex Bonds Pre-arranged Trade facility is open during all phases.

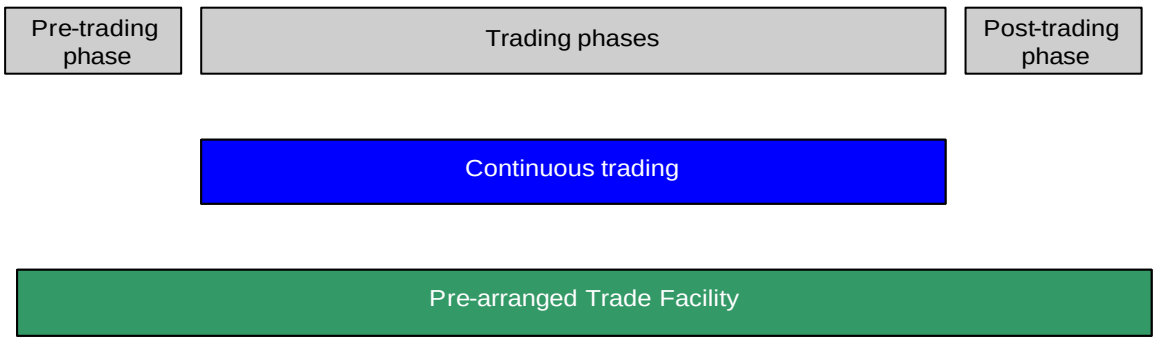



Diagram 4: Flow of trading

## 9 Trading Forms

Generally, the market model includes the trading forms continuous trading and Pre-arranged Trade Facility.

The following table shows the trading parameters applied in the two trading forms for different Eurex Bonds instrument groups*:

| Instrument Group | Tick size | Round Lot size (Continuous Trading) | Minimum tradable unit (Pre-arranged Trade Facility) | Minimum Peak Quantity (iceberg order) | Minimum Overall Quantity (iceberg order) | Settlement Period default in business days | Settlement period range in business days (Pre-arranged Trade facility) |
|---|---|---|---|---|---|---|---|
| **AGEN** | depending on remaining lifetime:<br><= 2 years: 0.001<br>> 2 years and <= 7 years: 0.005<br>> 7 years: 0.01 | 1 million | 1 million | 10 million | 10 million | 3 | from 2 up to 89 |
| **BASE** | 0.001 | 5 million | 1 million | 15 million | 15 million | 3 | 2 or 3 |
| **BILL** | 0.001<br>(yield terms) | 10 million | 1 million | 10 million | 10 million | 2 | from 2 up to 89 |
| **BOND** | depending on remaining lifetime:<br><= 2 years: 0.001<br>> 2 years and <= 7 years: 0.005<br>> 7 years: 0.01 | 1 million | 1 million | 10 million | 10 million | 3 | from 2 up to 89 |
| **JUMB** | depending on remaining lifetime:<br><= 2 years: 0.001<br>> 2 years and <= 7 years: 0.005<br>> 7 years: 0.01 | 1 million | 1 million | 5 million | 5 million | 3 | from 2 up to 89 |

Table 1: Trading parameters

*The following instrument groups are defined at Eurex Bonds:

AGEN: Agencies

BASE: Basis Instruments

BOND: German Government Bonds

BILL: German Treasury Discount Papers

JUMB: Jumbo Mortgage Bonds and German State Bonds

## 9.1 Continuous Trading

Only round lots are allowed during continuous trading. Each new order is immediately checked if it is executable against orders on the other side of the order book. The execution of orders during continuous trading is effected according to price/time priority. In this trading model, the order book is open. Limits, accumulated order volumes per limit and the number of orders per limit are displayed.

## 9.2 Pre-arranged Trade Facility

During the whole trading day (pre-trading, trading and post-trading phase), all participants have the opportunity to enter Pre-arranged trades in Eurex Bonds. For the use of this function, it is not required that the trader is activated by the Eurex Bonds Market Supervision.

All order sizes including odd lots are supported in the Pre-arranged Trade Facility.

Entered Pre-arranged trades must be approved by the counterparty. Subsequently, both counterparties receive a trade confirmation generated by the system. Unconfirmed trades are automatically deleted by the system at the end of the trading day. Eurex Bonds transmits the confirmed Pre-arranged trades to Eurex Clearing for the subsequent clearing and settlement processing.

The settlement period within the „Pre-arranged Trade Facility“ can be varied for bonds and Bubills from T+2 to T+89 and for basis instruments from T+2 to T+3.

## 10 Basis Trading

Eurex Bonds offers a proprietary "Basis" instrument type that provides a direct link between the cash market on Eurex Bonds and the derivatives market on Eurex within one transaction.

Basis in derivatives trading language is commonly referred to the difference between cash and futures price. A basis trade accordingly involves the purchase of a bond and the simultaneous sale of an interest rate futures contract (or vice versa).

Basis instruments on Eurex Bonds can be traded in continuous trading and within the Pre-arranged Trade facility.

After the conclusion of a transaction via Eurex Bonds, the basis trade is automatically broken down by the system into its two components. The resulting futures position is directly posted into the member's Eurex future positions, while the cash leg is booked in Eurex Bonds.

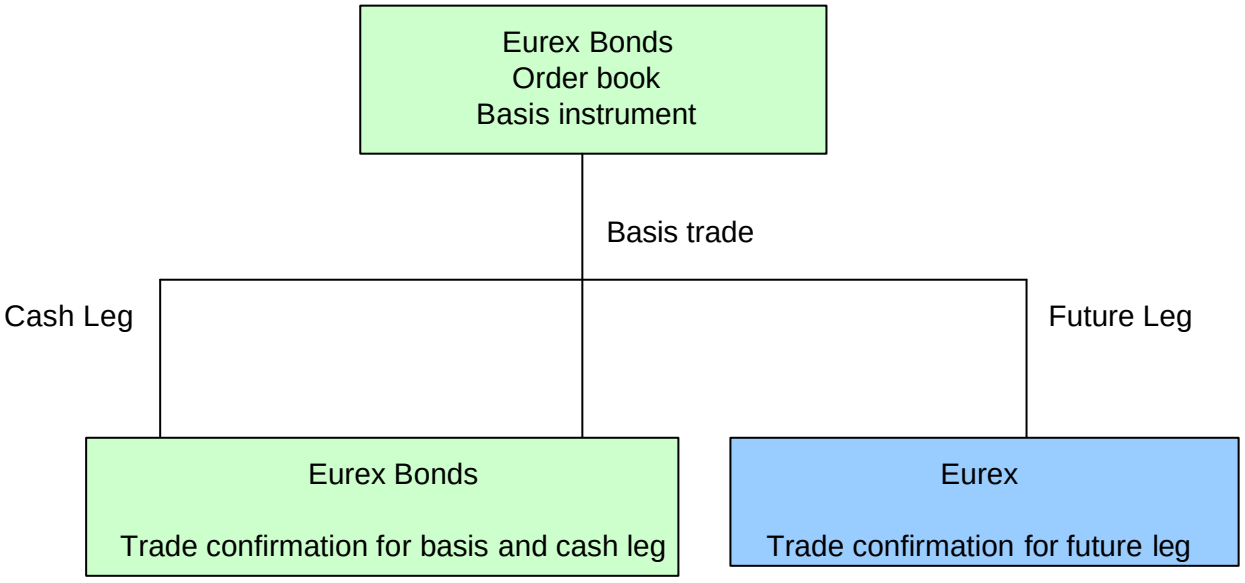



Diagram 5: Basis trading

Cash leg transactions will be entered into Eurex Bonds using the trader's original Eurex Bonds User ID. Futures leg transactions will be entered into Eurex using the dedicated Eurex User ID provided by the member.

Eurex futures positions are generally posted as opening transactions to the respective position accounts and may be subject to all usually available position maintenance and trade adjustment transactions e.g.

- open-close adjustment
- trade-account transfer
- give-up

- Position-closing adjustment etc.

Especially netting against positions from Eurex futures trading will be possible.

## 10.1 Additional reference data

The basis instrument represents a bond and futures contract combination. The underlying bond information can be retrieved from the Eurex Bonds instrument reference data. Additionally the instrument short and long name specifies the underlying future contract.

For each bond which is part of a basis product on Eurex Bonds, daily closing prices are calculated using the futures settlement price and the most recent basis quotation or basis execution price.

*The hedge ratio* for the following trading day is calculated using the respective bond's and the Cheapest-to-deliver bond closing prices and the future's settlement price and will be fixed for the following trading day.

The hedge ratio with a precision of two decimals is converted into the *number of futures contracts* per basis round lot size, rounded to the closest integer value.

The hedge ratio, the conversion factor and the number of future contracts per million is published by Eurex Bonds each time the reference data changes.

## 10.2 Account mapping for basis trading

A trader on Eurex Bonds can act as agent trader (account A), as proprietary trader (account P) or as Market Maker ("Designated Sponsor", account D). Orders will be flagged accordingly.

Posting of both cash and futures transactions will be made using the account mapping as shown in the example below. For the futures leg the member has the opportunity to specify on which account the transaction should be mapped. If nothing is specified the default value will be taken.

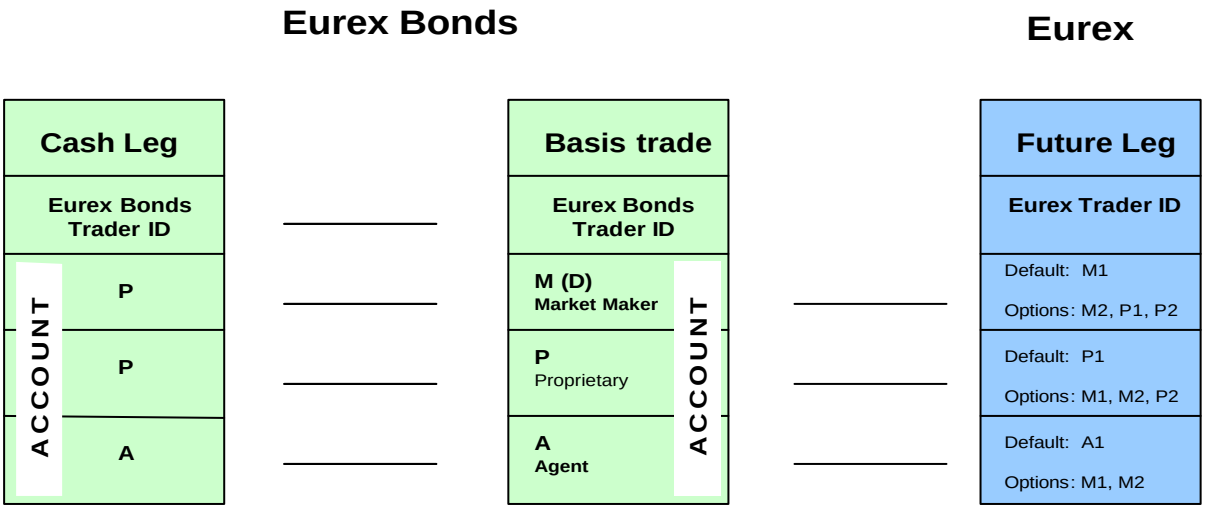



Diagram 6: Account mapping in Basis trading

## 10.3 Mapping of text fields in basis trading

The Eurex Bonds platform provides two user defined text fields within the basis order entry:

- Member Internal Order Number
- Text

Eurex provides three text fields (reference fields)

- Member Internal Order Number
- Text
- Customer

Since a basis trade leads to a cash leg on Eurex Bonds and simultaneously to a future leg on Eurex, each Eurex Bond member can choose between two alternatives of how text fields are filled within basis trading.

### 10.3.1 Standard mapping of text fields

Within this alternative the contents of the basis text fields will be copied into the text fields for cash leg and futures leg as described below:

1. Default entries may be specified for each Eurex Bonds User ID within the profile settings on the Trading Front-end. Any such default text has to be at most 12 digits long, otherwise it will be right truncated when copied to the respective Eurex text field.
2. The additionally available field „Customer“ on the Futures leg will contain „EB“ plus the Eurex Bonds transaction number of the Basis Trade execution
3. In addition to the mapping of text fields, the time stamp of the trade confirmation of the basis will be copied into the cash leg field „OTC Trade Time“.

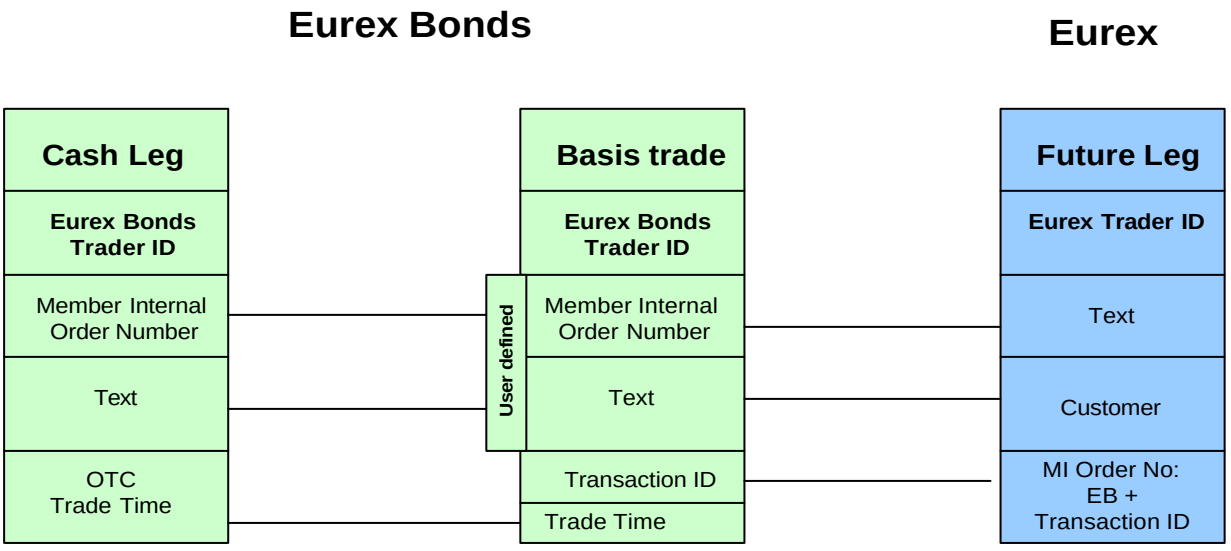



Diagram 7: Standard text field mapping

### 10.3.2 Enhanced mapping of basis trade components

With this alternative a link between the basis trade and the resulting future and cash leg is offered by providing the Eurex Bonds basis trade ID within the cash and future leg as described below:

- The field “Text“ in the Cash leg will contain "EB“ plus the Eurex Bonds transaction number of the Basis Trade execution.
- The field "Member Internal Order Number“ in the Future leg will contain "EB“ plus the Eurex Bonds transaction number of the Basis Trade execution.

The following future leg information about the future leg will be available in the cash leg of the underlying contract, separated by underscore “_”, e.g. “LU_50_101.010”):

Product: (L: Bund Future, M: Bobl Future, S: Schatz Future)

Maturity: (H: March, M: June, U: September, Z: December)

Size: (up to 99999)

Price: (price with three decimals)

Additionally two user defined text fields within the basis order entry are forwarded to the future leg. The contents of these text fields will be copied into the text fields of the future leg as described below.
Default entries may be specified for each Eurex Bonds User ID within the profile settings on the Trading Front-end. Any such default text has to be at most 12 digits long, otherwise it will be right truncated when copied to the respective Eurex text field.

Enhanced mapping is an optional enhancement and can be chosen by the member. It will be activated upon request.

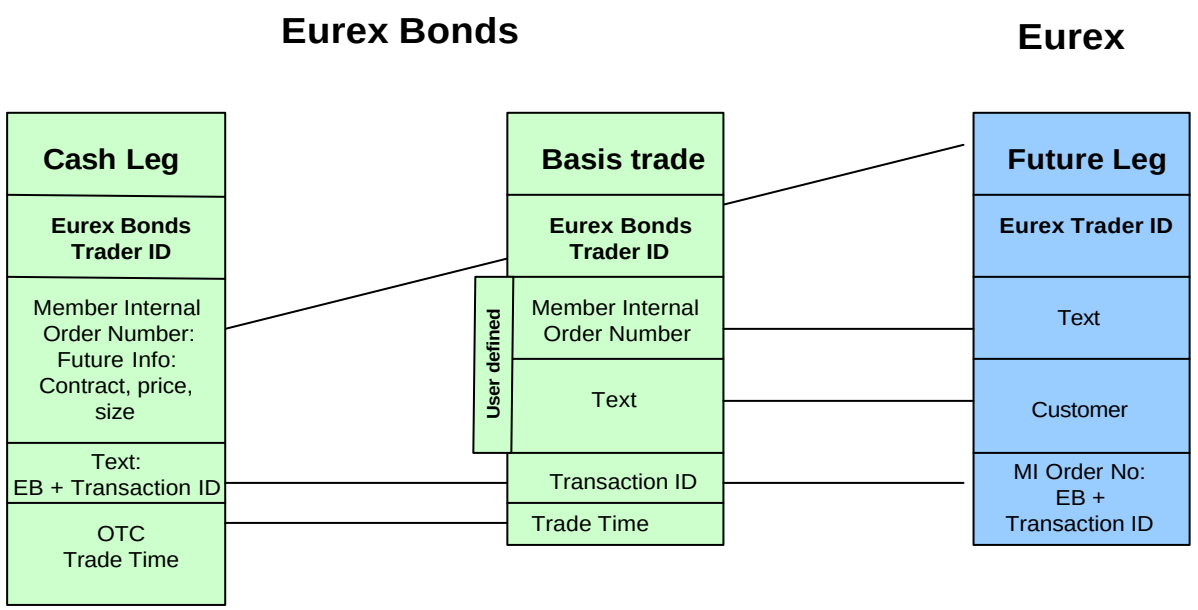



Diagram 8: Enhanced mapping

# 11 Yield term trading

Eurex Bonds provides a yield term trading functionality for the instrument segment Treasury discount papers (Unverzinsliche Schatzanweisungen or "Bubills"). In this market the entry of yields is the common way to post an offer to the market.

For all instruments traded in yields it is mandatory that orders, quotes, and Pre-arranged trades have to be entered in yield (using price field) via VALUES API interface and the Xetra J-Trader GUI.

The display of the inside market/ public order book will show the yields on the bid side in ascending order, i.e. lowest bid as best bid, whereas the yields on the ask side are displayed in descending order.

For the calculation of the price for Bubills the “true money market“ yield calculation method is used:

$$C = R/(1+p*L/(360*100))$$

Definitions:

L = remaining duration of Bubill (calendar days given by: maturity date – settlement date)
C = price
P = yield in %
R = redemption value in % (100 for full redemption)

Trade confirmations, and responses to trade inquiries, will include the price (five decimal places) and not the yield in the price and average price fields.

The last trading day of a Bubill on Eurex Bonds will be three business days before expiry (T-3).

# 12 Illustration of Price Determination Processes

## 12.1 Basic Matching Rules for Continuous Trading

Each new incoming order is immediately checked for execution against orders on the other side of the order book which will be executed according to price/time priority. Orders can be executed fully in one or more steps, partially or not at all. Thus, each new incoming order may generate none at all, one or several trades.

Orders or non-executed parts thereof or remaining peaks of an iceberg order are entered in the order book and sorted according to price/time priority.

Price determination in continuous trading for instruments is carried out in addition to price/time priority according to the following rules depending on the trading mode.

### 12.1.1 Matching rules for instruments traded in price terms

*Rule 1 (Price term trading):* If a limit order meets an order book with limit orders only on the other side, the highest bid limit or lowest ask limit, respectively, in the order book determines the price.

*Rule 2 (Price term trading):* If an incoming order does not meet any order in the order book or if an incoming limit order meets an order book with limit orders only on the other side of the book and the limit of the incoming buy (sell) order is lower (higher) than the limit of the best sell (buy) order in the book, no price is determined.

The following diagrams give an outline of how price determination rules affect possible order book constellations in continuous trading for instruments traded in price terms.

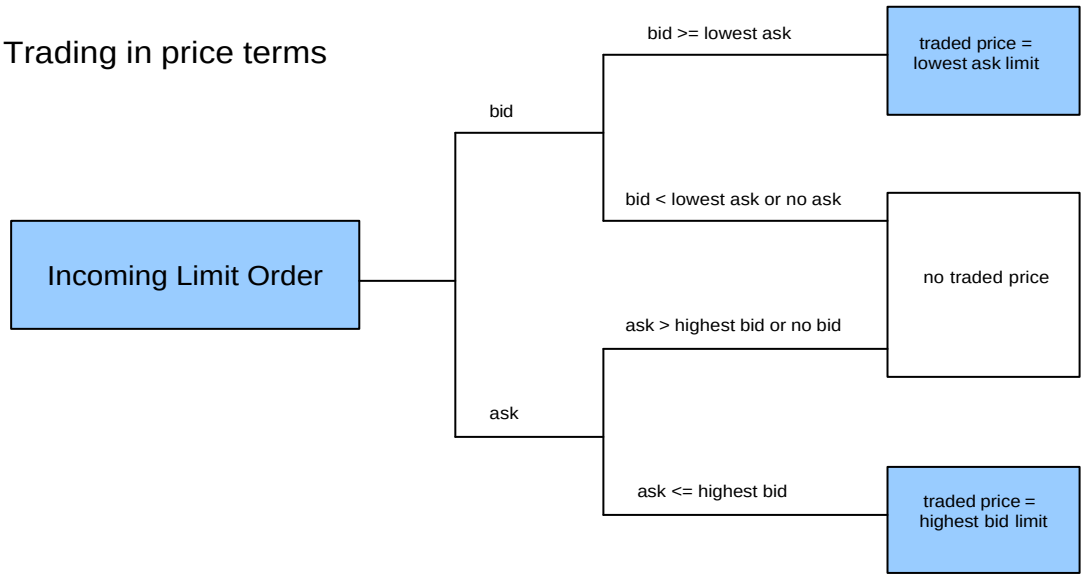



Diagram 9: Matching rules price term trading

### 12.1.2 Matching rules for instruments traded in yield terms

As the order book for instruments traded in yields is inverted (best bid = lowest limit and best ask = highest limit) the following matching rules are applied:

*Rule 3 (Yield term trading):* If a limit order meets an order book with limit orders only on the other side, the lowest bid limit or highest ask limit, respectively, in the order book determines the price.

*Rule 4 (Yield term trading):* If an incoming order does not meet any order in the order book or if an incoming limit order meets an order book with limit orders only on the other side of the book and the limit of the incoming buy (sell) order is higher (lower) than the limit of the best sell (buy) order in the book, no price is determined.

The following diagrams give an outline of how price determination rules affect possible order book constellations in continuous trading for instruments traded in yield terms.

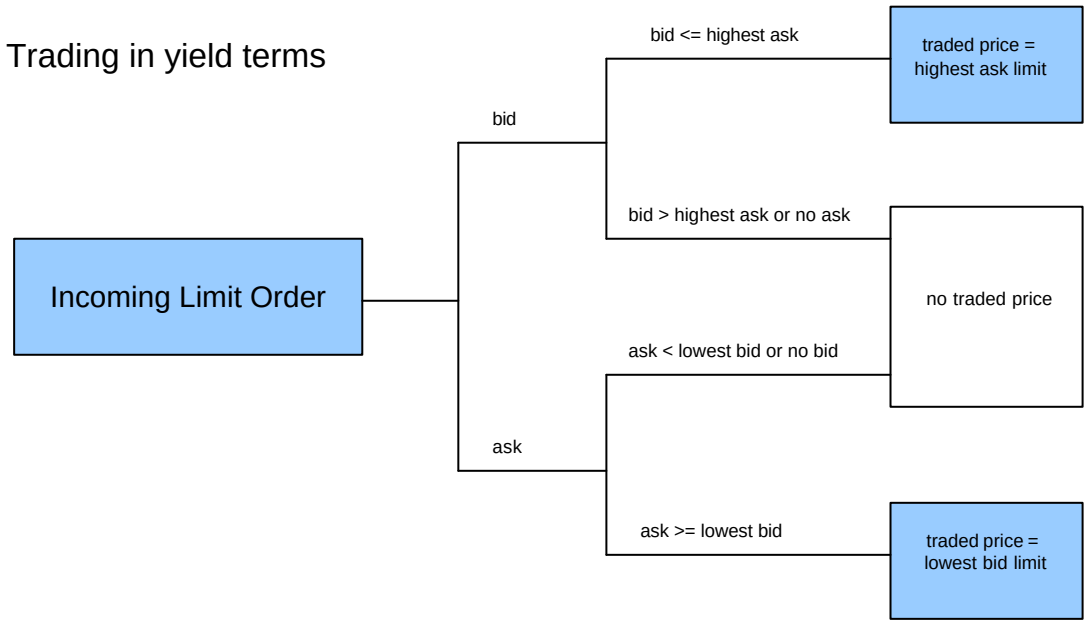



Diagram 10: Matching rules yield term trading

## 12.1.3 Matching Examples

This chapter is subdivided into two sections: the first section (12.1.3.1) provides matching examples which cover the order book situations mentioned in the diagrams presented above. In the second section (12.1.3.2) additional examples are provided which cover special order book situations, e.g. volatility interruptions and the functionality of iceberg orders.

### 12.1.3.1 Matching Examples for Basic Matching Rules

The following examples are meant to clarify the basic matching rules for continuous trading by carrying out the price determination using exemplary order book constellations.

*Example 1: A limit order meets an order book with limit orders on the other side of the order book. (instrument traded in price terms).*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| 9:33 | 50,000,000 | 102.05 | | | |

| Bid | | | | | Ask | |
|---|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time | |
| 9:33 | ~~50,000,000~~ | 102.05 | | | | Incoming order: Ask order, limit 102, quantity 50 million |

The highest bid limit is higher than or equal to the lowest ask limit. Both orders are executed at the highest bid limit of 102.05.

*Example 2: A limit order meets an order book with limit orders only on the other side of the order book: (instrument traded in price terms).*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | 102.05 | 30,000,000 | 9:33 |

Incoming order:
Bid order, limit 103,
quantity 30 million

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | 102.05 | ~~30,000,000~~ | 9:33 |

The highest bid limit is higher than or equal to the lowest ask limit.
Both orders are executed at the lowest ask limit of 102.05.

*Example 3: A limit order meets an order book with limit orders only on the other side of the order book. (instrument traded in price terms)*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 9:33 | 70,000,000 | 99 | | | |

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 9:33 | 70,000,000 | 99 | 100 | 20,000,000 | 10:01 |

Incoming order:
Ask order, limit 100,
quantity 20 million

The highest bid limit is lower than the lowest ask limit.
The incoming ask order is entered into the order book. A price is not determined and no orders are executed.

*Example 4:* *A limit order meets an order book in which there are no orders. (instrument traded in price terms)*

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | | | |

Incoming order:
Bid order, limit 100,
quantity 40 million

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 10:01 | 40,000,00 | 100 | | | |

The incoming bid order is entered into the order book. A price is not determined and no orders are executed.

*Example 5: A limit order meets an order book with limit orders on the other side of the order book. (instrument traded in yield terms).*

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| 9:33 | 50,000,000 | 1.998 | | | |

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| 9:33 | ~~50,000,000~~ | 1.998 | | | |

Incoming order:
Ask order, limit 1.999
quantity 50 million

The lowest bid limit is lower than or equal to the highest ask limit. Both orders are executed at the lowest bid limit of 1.998.

*Example 6: A limit order meets an order book with limit orders only on the other side of the order book: (instrument traded in price terms).*

.

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | 1.999 | 30,000,000 | 9:33 |

Incoming order:
Bid order, limit 1.998,
quantity 30 million

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | 1.999 | ~~30,000,000~~ | 9:33 |

The lowest bid limit is lower than or equal to the highest ask limit.
Both orders are executed at the lowest ask limit of 1.999.

*Example 7: A limit order meets an order book with limit orders only on the other side of the order book. (instrument traded in yield terms)*

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 9:33 | 70,000,000 | 1.999 | | | |

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 9:33 | 70,000,000 | 1.999 | 1.998 | 20,000,000 | 10:01 |
| | | | | | |

Incoming order:
Ask order, limit 1.998,
quantity 20 million

The lowest bid limit is higher than the highest ask limit.
The incoming ask order is entered into the order book. A price is not determined and no orders are executed.

*Example 8: A limit order meets an order book in which there are no orders. (instrument traded in yield terms)*

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | | | |
| | | | | | |

Incoming order:
Bid order, limit 1.999,
quantity 40 million

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| 10:01 | 40,000,00 | 1.999 | | | |
| | | | | | |

The incoming bid order is entered into the order book. A price is not determined and no orders are executed.

### 12.1.3.2 Matching examples showing the functionality of iceberg orders

In contrary to the previous examples, in the following an initial order book situation which changes stepwise in multiple stages is provided to explain the functionality of iceberg orders. Beyond this, in contrary to the display in the order book of Eurex Bonds, orders at same price level are displayed separately (in Eurex Bonds they are displayed in an aggregated view per limit). Furthermore, the peaks of an iceberg order are written in italics (in Eurex Bonds they are not marked at all).

The following examples refer to instruments traded in price terms.

*An iceberg order is entered into the order book and meets limit orders only on the other side of the order book.*

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| 9:01:00 | 6,000,000 | 102 | 103 | 1,000,000 | 8:55:00 |
| 9:02:00 | 2,000,000 | 101 | | | |

| **Bid** | | | | | **Ask** |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| 9:01:00 | ~~6,000,000~~ | 102 | *101* | *2,000,000* | *9:05:00* |
| 9:02:00 | ~~2,000,000~~ | 101 | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 40,000,000 | 9:05:00 |

Incoming order:
Ask iceberg order, limit 101
overall volume 50 million,
peak 10 million,
time: 9:05:00

The peak of the iceberg order is executed against the orders in the order book as far as possible (6 million at 102; 2 million at 101). The remaining peak of the iceberg order (2 million) is entered into the order book according to price/time priority with a remaining volume of 40 million behind it.

Another iceberg order is entered into the order book:

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| | | | *101* | *2,000,000* | *9:05:00* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 40,000,000 | 9:07:00 |

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| | | | *101* | *2,000,000* | *9:05:00* |
| | | | *101* | *5,000,000* | *9:08:01* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 40,000,000 | 9:05:00 |
| | | iceberg | 101 | 25,000,000 | 9:08:01 |

Incoming order:
Ask iceberg order, limit 101,
overall volume 30 million,
peak 5 million,
time: 9:08:01

The peak of the iceberg order can not be executed against orders on the other side of the book. The visible part (peak) of the iceberg order is entered into the order book according to price/time priority with a volume of 25 million behind it.

*A new bid limit order meets the order book.*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | *101* | *2,000,000* | *9:05:00* |
| | | | *101* | *5,000,000* | *9:08:01* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 40,000,000 | 9:05:00 |
| | | iceberg | 101 | 25,000,000 | 9:08:01 |

Incoming order:
Bid limit order,
limit 101,
quantity 14 million,
time: 9:10:40

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | *101* | ~~*2,000,000*~~ | ~~*9:07:00*~~ |
| | | | | *3,000,000* | *9:10:40* |
| | | | *101* | ~~*5,000,000*~~ | ~~*9:08:01*~~ |
| | | | | *5,000,000* | *9:10:40* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | ~~40,000,000~~ | 9:10:40 |
| | | | | 30,000,000 | |
| | | iceberg | 101 | ~~25,000,000~~ | 9:10:40 |
| | | | | 20,000,000 | |

The incoming limit order first is executed against the peak of the iceberg order at 101 with a volume of 2 million. Before the next peak of this iceberg order is introduced, the peak of the iceberg order at the same limit is executed (5 million).

A new peak of the first iceberg order is introduced into the book with a new time stamp (9:10:40) and a remaining volume of 30 million behind it.

A new peak of the second iceberg order is introduced into the book with a new time stamp (9:10:40) and a remaining volume of 20 million behind it.

Then the remaining part of the incoming order (7 million) is executed against the new peak of the first iceberg order. The remaining part of this iceberg order (3 million) is shown in the book with a volume of 30 million behind it.

*Another limit order is entered into the order book.*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| | | | 101 | 3,000,000 | *9:10:40* |
| | | | 101 | 5,000,000 | *9:10:40* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 30,000,000 | 9:10:40 |
| | | iceberg | 101 | 20,000,000 | 9:10:40 |

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Volume | Limit | Limit | Volume | Time |
| | | | 101 | 3,000,000 | 9:10:40 |
| | | | 101 | 5,000,000 | 9:10:40 |
| | | | *101* | *2,000,000* | *9:13:13* |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | 30,000,000 | 9:10:40 |
| | | iceberg | 101 | 20,000,000 | 9:10:40 |

Incoming order:
Ask limit order, limit 101,
quantity 2 million,
time: 9:13:13

The new limit order can not be executed against orders on the other side of the book. It is entered into the order book according to price/time priority.

*A new bid limit order meets the order book.*

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | *101* | *3,000,000* | *9:10:40* |
| | | | *101* | *5,000,000* | *9:10:40* |
| | | | 101 | *2,000,000* | 9:13:13 |
| | | | 103 | *1,000,000* | 8:55:00 |
| | | iceberg | 101 | *30,000,000* | 9:10:40 |
| | | iceberg | 101 | *20,000,000* | 9:10:40 |

Incoming order:
Bid limit order,
limit 101,
quantity 18 million,
time: 9:15:00

| Bid | | | | | Ask |
|---|---|---|---|---|---|
| Time | Quantity | Limit | Limit | Quantity | Time |
| | | | *101* | ~~*3,000,000*~~ *2,000,000* | ~~*9:10:40*~~ *9:15:00* |
| | | | *101* | ~~*5,000,000*~~ *5,000,000* | ~~*9:10:40*~~ *9:15:00* |
| | | | 101 | ~~2,000,000~~ | ~~9:13:13~~ |
| | | | 103 | 1,000,000 | 8:55:00 |
| | | iceberg | 101 | ~~30,000,000~~ 20,000,000 | 9:15:00 |
| | | iceberg | 101 | ~~20,000,000~~ 15,000,000 | 9:15:00 |

The incoming bid limit order first is executed against the lowest ask limit on the other side of the order book which is represented by a peak (3 million) of an iceberg order at 101.

Before the next peak of the iceberg order is introduced, all other peaks and limit orders at the same limit have to be executed. Therefore, the next peak (5 million) and the next limit order (2 million) in the order book are executed against the incoming order.

A new peak of the first iceberg order is introduced into the order book with a new time stamp (9:15:00) and a remaining volume of 20 million behind it.

A new peak of the second iceberg order is introduced into the order book with a new time stamp (9:15:00) and a remaining volume of 15 million behind it.

The remaining volume of 8 million of the incoming order then is executed against the new peak of the first iceberg order at 101. A remaining peak of this iceberg order of 2 million is shown in the order book.