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Recipients: All Eurex Bonds members
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U **Action Required** U **High Priority**

Break-even Products for Inflation-linked Bonds: Simulation

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Content may be most important for:	**Attachment:**
Ü Front Office / Trading Ü Middle + Back Office Ü IT / System Administration	Break-even Concept

Eurex Bonds plans to introduce Break-even Products for inflation-linked bonds at the beginning of the third quarter of 2008. The exact date of introduction will be published in due time by circular.

The new break-even instruments comprise simultaneous trading of two individual transactions, split up into one inflation-linked (real) bond and one nominal bond.

To provide you with the opportunity to extensively test the planned break-even instruments before production start, we will make these officially available in the Eurex Bonds simulation environment as of June 11, 2008.

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Break-even Products for Inflation-linked Bonds: Simulation

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As a special service we offer you to act as counterparty in simulation between June 11 and June 17, 2008.

This means Eurex Bonds will provide liquidity in both instruments so that you will be able to conclude your orders and quotes successfully within the system.

Please feel free to contact us as of now for any questions and suggestions you may have.

Instrument details:

1. DE000A0V8L61- Break-Even Trade Apr.16 1,5% / Jan.16 3,5%

Instrument group	Bond
Minimum quote size in million	EUR 5.000.000
Quotation	Yield Spread Terms
Tick size	0.001
Underlying Real Bond	DE0001030500
Underlying Nominal Bond	DE0001135291

2. DE000A0V8L79 – Break-Even Trade Apr.13 2,25% / Jan.13 4,5%

Instrument group	Bond
Minimum quote size in million	EUR 5.000.000
Quotation	Yield Spread Terms
Tick size	0.001
Underlying Real Bond	DE0001030518
Underlying Nominal Bond	DE0001135218

The hedge ratio will be calculated automatically.

For further product information please see attached concept.

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Break-Even

One click trading on Eurex Bonds
A Functional Proposal

What is Break-Even?

- The gap in yields between nominal and inflation-linked bonds of similar maturity and credit quality
- The Break-Even can serve as an indication of current market expectation of the long-term rate of inflation
- If inflation averages more than the break-even, the inflation-linked investment will outperform the fixed-rate
- Conversely, if inflation averages below the break-even, the fixed-rate will outperform the inflation-linked

Instrument Details

- The Break-Even instrument represents two bonds, a nominal bond, which is a regular German government bond, and a real bond (inflation-linked bond), wherein you buy/sell or sell/buy both bonds in one trade
- The Break-Even instrument will be traded in the EXB System, but single leg creation for settlement will be done in the backend automatically
- Tradable Hedge Ratio can be calculated and will be used to calculate both settlement amounts
- The BE-ISIN has to be set up like a Basis Instrument: no CCP availability, and no yield calculation in Xetra
- Trade Confirmation
  - Two trade confirmations for each single leg
  - Price, Size, Market Value
  - Break-Even-Order-Size/-Prize

Break-Even Instrument Definition

- Calculation of Break-Even is calculated with following formula:
  BE = yield nominal bond – yield real bond

- Buy a BE-Instrument = buy a real bond, sell a nominal bond
  A sell of a BE instrument is vice versa

- Bid is < ask, therefore
  bid-quotes are in descending order and
  ask-quotes are in ascending order within the order book

Break-Even Instruments in Simulation

The following Break-Even Instruments are currently listed in Eurex Bonds Simulation:

Break-Even Instrument:	**DE000A0V8L79**	**BE I/L 4/13 2,25 / 01/13 4,5**
Creates following Cash Legs:		
Inflation-linked Bond:	DE0001030518	Bundlink 15.04.2013 2,25
Nominal Bond:	DE0001135218	Bundesanleihe 04.01.2013 4,5%

and:

Break-Even Instrument:	**DE000A0V8L61**	**BE I/L 4/16 1,5 / 01/16 3,5**
Creates following Cash Legs:		
Inflation-linked Bond:	DE0001030500	Bundlink 15.04.2016 1,5%
Nominal Bond:	DE0001135291	Bundesanleihe 04.01.2016 3,5%

Hedge Ratio Calculation Path

§ **Given Input within a quote/trade (example):**

Break-Even %	2.279%
Linker Volume traded	100 mio.
Index ratio per settlement day	1,03328
Clean-Price_{nom}	102,38

§ **Calculation (Yield- and Price Calculation with ICMA-Method)**

1. Clean-Price_{nom} **à** YIELD_{nom}	YIELD_{nom}	3,9308%
2. Clean-Price_{nom} + AccrInt_{nom} = Dirty-Price_{nom}	Dirty-Price_{nom}	103,744
3. Dirty-Price_{nom} **à** Duration_{nom} **à** ModDuration_{nom}	ModDuration_{nom}	4,128
4. Dirty-Price_{nom} /10000 * ModDuration_{nom} = PVO1_{nom}	PVO1_{nom}	0,04282
5. YIELD_{nom} - BE = YIELD_{linker}	YIELD_{linker}	1,6518%
6. YIELD linker **à** $\text{Clean-Price}_{linker}$	$\text{Clean-Price}_{linker}$	102,83
7. ($\text{Clean-Price}_{linker}$ + AccrInt) * IR = $\text{Dirty-Price}_{linker}$	$\text{Dirty-Price}_{linker}$	106,31
8. $\text{Dirty-Price}_{linker}$ **à** Duration_{linker} **à** $\text{ModDuration}_{linker}$	$\text{ModDuration}_{linker}$	4,6862
9. $\text{Dirty-Price}_{linker}$ /10000 * $\text{ModDuration}_{linker}$ = PVO1_{linker}	PVO1_{linker}	0,04982
10. Hedge-Ratio= PVO1_{linker} / PVO1_{nom}	Hedge-Ratio	1,16337
11. Volume_{nom}=Volume_{linker} * Hedge-Ratio	Volume_{nom}	116,337 mio *

* This will be rounded to 1 million = 116 million.

Price Priority

The following price chain has to be implemented in the MisTool to ensure a permanent price information.

Rank	Price	Price Source
1	Quote Nominal Bond	Eurex Bonds
2	Today's Price Nominal Bond	Eurex Bonds
3	Quote Real Bond	Eurex Bonds
4	Today's Price Real Bond	Eurex Bonds
5	Quote Basis *	Eurex Bonds/Eurex
6	Today's Price Basis *	Eurex Bonds/Eurex
7	Futures price *	Eurex
8	3rd party Provider	Manual (Reuters, Bloomberg)

* Calculation see next slide

Calculation of Nominal Bond Price via Eurex Futures (see Price Priority 5-7)

eurex bonds

- In case of an unavailability of quotes and prices for the nominal and the real bond, the price of the nominal bond is calculated via the corresponding Eurex Futures Price:

  $\text{Clean-Price}_{nom} = \text{Price}_{Basis} + \text{Price}_{Future} * \text{Conversion Factor}$

- If there is no Basis-Price or Basis-Quote available, the Clean-Price of the Nominal Bond is calculated without the Basis-Price

  $\text{Clean-Price}_{nom} = \text{Price}_{Future} * \text{Conversion Factor}$

- The calculation of the conversion Factor is identical to Eurex with following Method:

$$\frac{1}{(1+not/100)^{f}} \times \left[\frac{c}{100} \times \frac{\delta_1}{act2} + \frac{c}{not} \times \left((1+not/100) - \frac{1}{(1+not/100)^{n}} \right) + \frac{1}{(1+not/100)^{n}} \right] - \frac{c}{100} \times \left(\frac{\delta_1}{act2} - \frac{\delta_a}{act1} \right)$$

Definition:

DD	Delivery date	act1	NCD-NCD1y, where $\delta_a < 0$
NCD	Next coupon date after delivery date		NCD1y-NCD2y, where $\delta_a \geq 0$
NCD1y	1 year before the NCD		
NCD2y	2 years before the NCD	δ_1	NCD1y-LCD
LCD	Last coupon date before the delivery date. Start interest period if last coupon date not available	act2	NCD-NCD1y, where $\delta_1 < 0$
			NCD1y-NCD2y, where $\delta_1 \geq 0$
δ_a	NCD1y-DD	f	$1+\delta_a / act1$
n	Integer years from the NCD until the maturity date of the bond	c	Coupon
not	Notional coupon of futures contract		

General Information

- Nominal Value for settlement will be rounded to the nearest million.
- Each Break-Even Instrument trade has its own trade ID in the system. The trade ID of the two underlying bonds are different. It is intended to put the original trade ID as a reference into the trade confirmation into a text field.
- The Hedge Ratio will be calculated in real-time (see page 7). If desired, this real- time HR can be published in the text field of the trade confirmation as well.
- The ISIN for Break-Even Instruments are unique for any real/nominal combination.
- It is intended to start with the two Bund i/l bond April 16 and April 13 combined with Jan 16 and Jan 13 Bund, respectively. Enhancements can easily be done with regards to French and Italian Linkers.

Instrument Set-up (Eurex Bonds internally)

§ Instrument parameter

Field	bonYldTrd	YldCalcMethod	InstrTyp	Instr Group
Content	*space*	*space*	*ANL*	*base/bond*
Comment	No yield calculation and empty display in column bid/askYield	No calculation / no on screen display	“normal” orderbook order: bid descending and ask ascending order	Difference: minQuoteSize 5/1 roundLotQty 5/1