

The Long and the Short End of the Latency Spectrum

(with pretty pictures)

Stefan Schlamp

21 September 2023

OpenDay 2023

Two A7 Use Cases

Using Public and Non-Public Data



The Short End

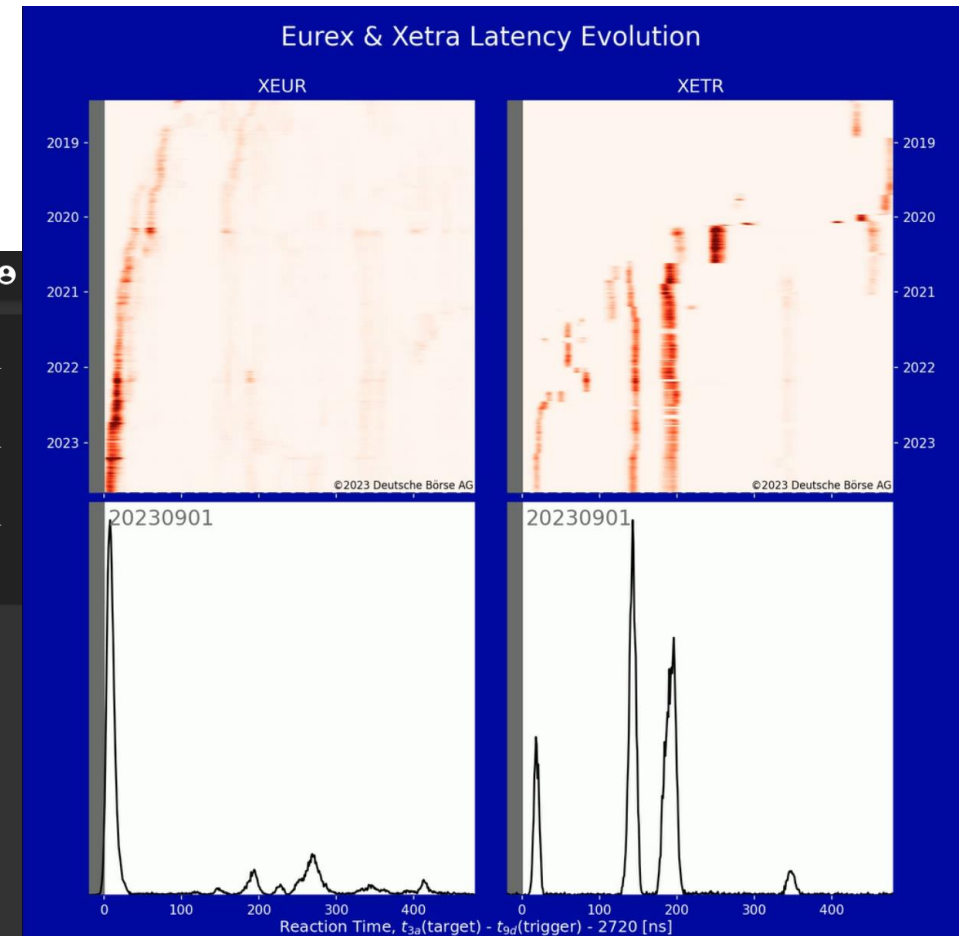
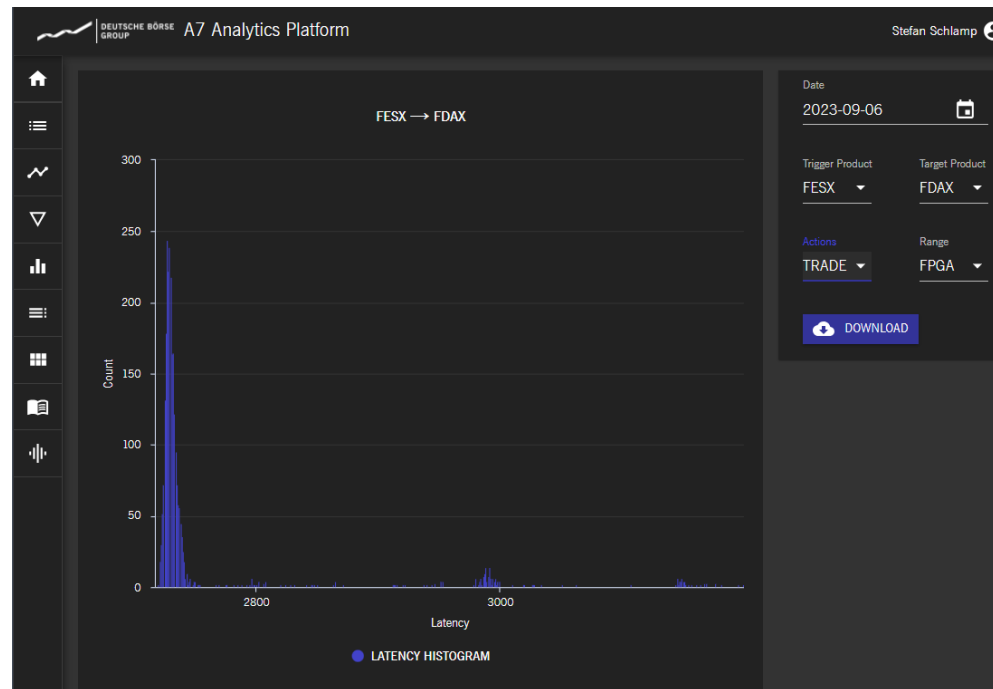
The Short End

- Latency advantage through
 - Short reaction time (lower bound reached?)
 - Faster feeds from leading venues (or economic events)
- During US Trading Hours, CME leads XEUR
 - ES → FESX → FDAX → equities
 - ZN → FGBL
- Short-wave data links provide 9 ms latency advantage over MW/fiber/MW
 - very low bandwidth
 - Weather, time-of-day dependent

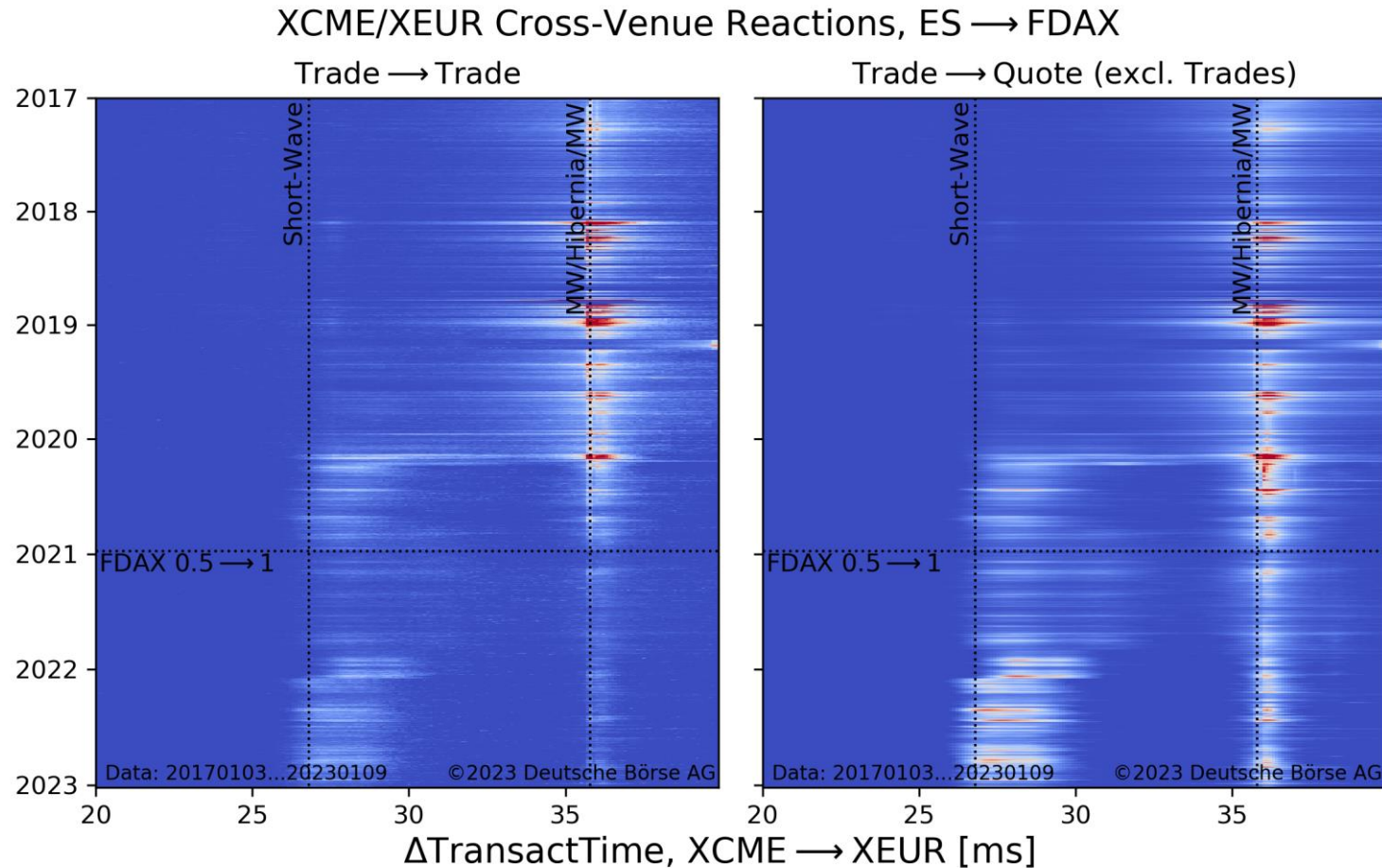


Traditionally: Latency = Wire-to-Wire

- „Faster not smarter“ limit
 - focus on reaction times.
 - reactions to XETR/XEUR signals.

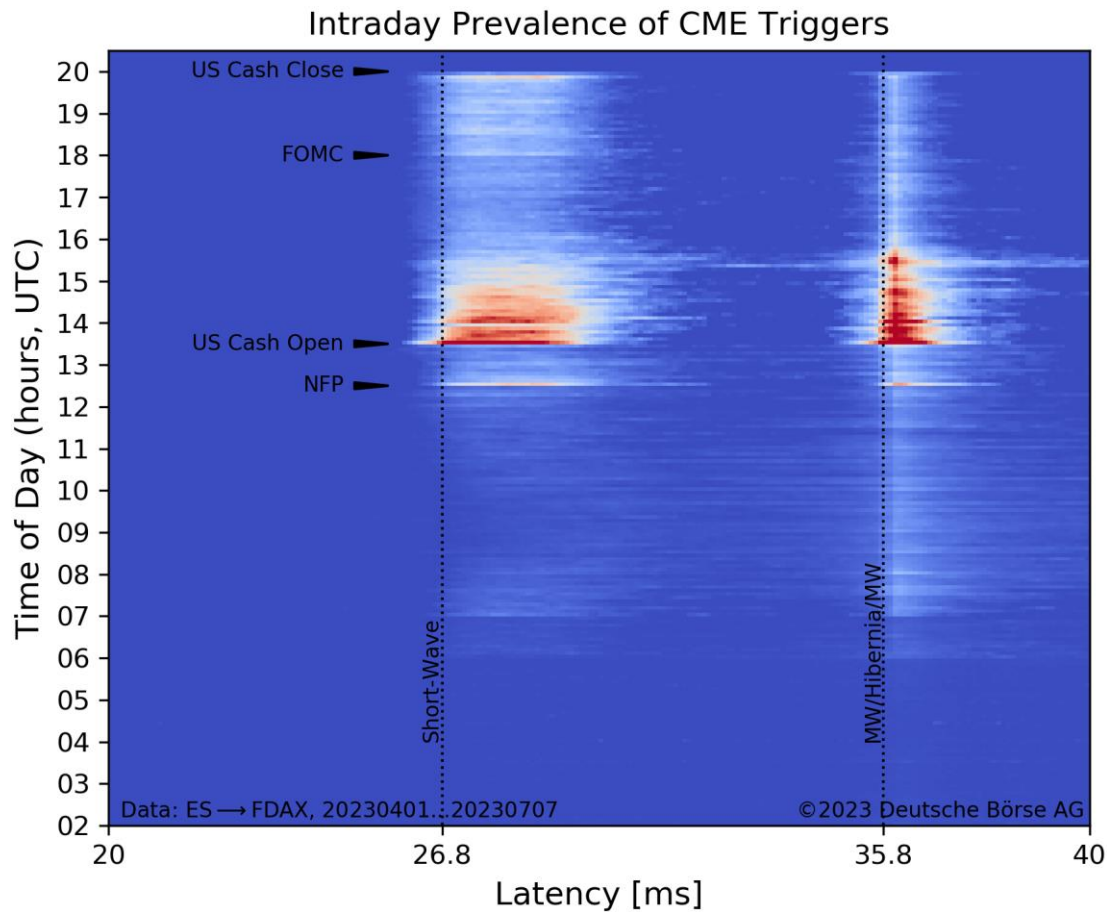


Short Wave Signals Usage for ES → FDAX



- Short-wave usage started 2020.
- Wide peaks → visually less prominent.
- Dominates „traditional“ triggers.
- Heavier use for quoting than for aggressive trading (tick size mismatch).
- Race is over before one is aware of it (no late cancels, no missed IOCs).
- Also present in other pairs (ZN/FGBL).
- Very little usage in the opposite direction.

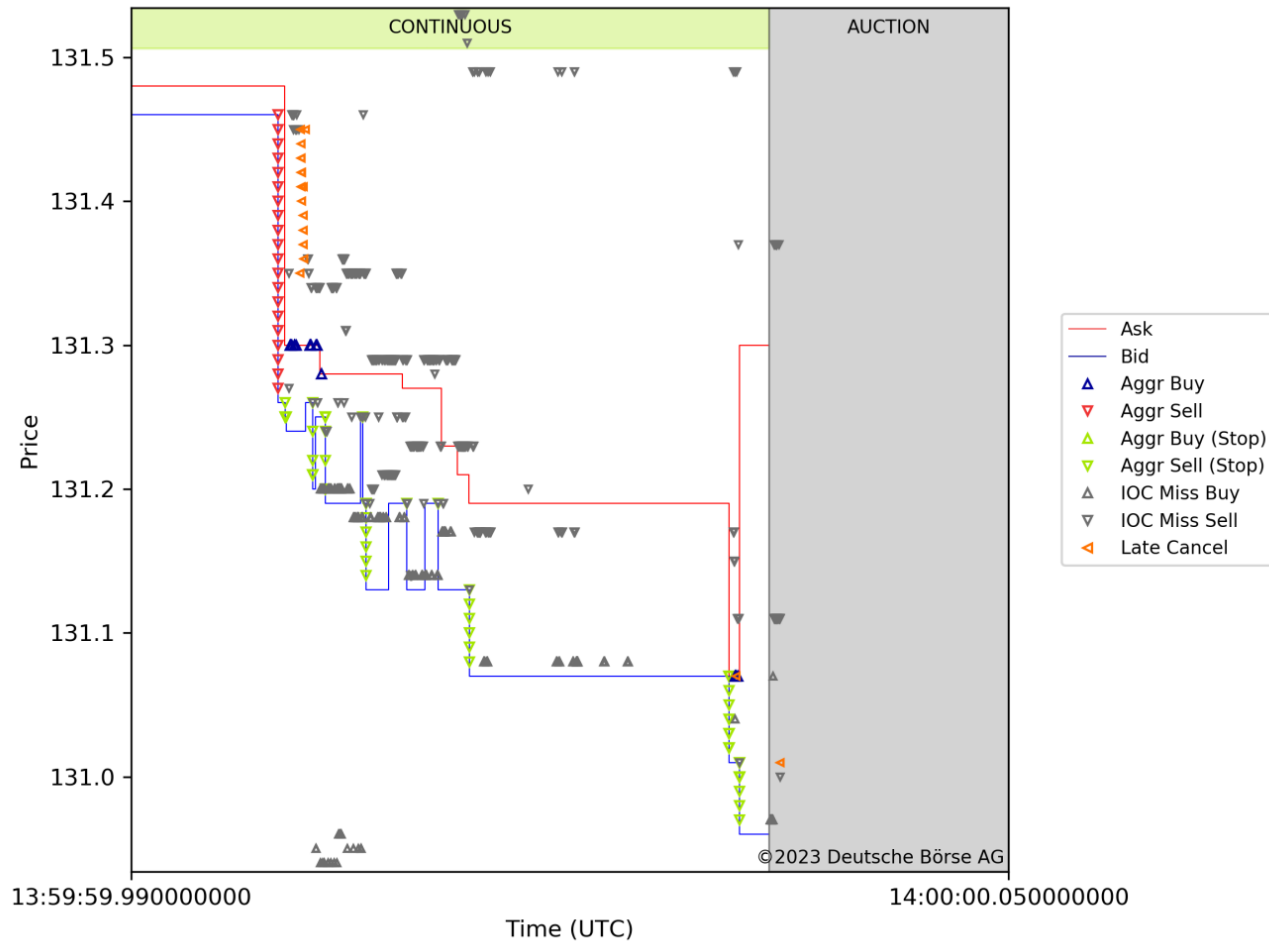
Intraday Usage



- Pre-US Open: crickets (other than NFP)
- US Cash Open/Close
- ECO US

- A7 algo to extract list of trade timestamps for trigger instrument.
- A7 algo to extract list of trade and non-trade timestamps for target instrument.
- Histogram/visualization in python.

ISM Release at 20230706T14:00:00Z



- 19-level trade-through in FGBL
- resulted in volatility auction
- t_{3a} of aggressive order: 1.354 μ s past 14:00:00Z
- includes $t_1 \rightarrow t_{3a}$
- sub- μ s vendor \rightarrow participant + participant w2w



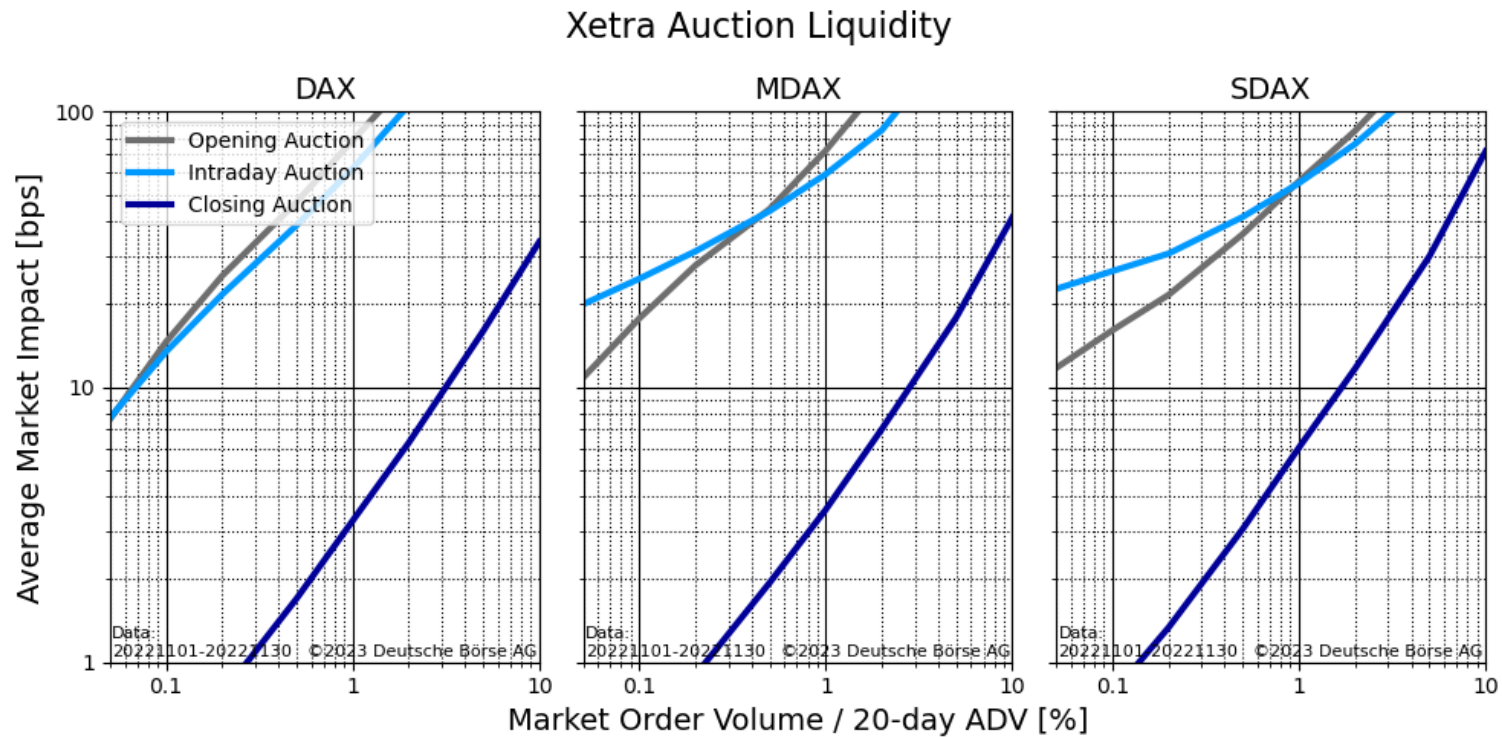
The Long End

Xetra Auctions

Xetra Auction Simulations

- Auction volumes (particularly closing auction) are huge (>30%).
- Some participants almost exclusively trade in auctions.
- Book is dark; only indicative uncrossing price/volume/imbalance disseminated.
- Beyond narrow range of imbalance, cannot simulate auction outcome.
- How to backtest strategies that execute in the auctions?

Static Market Impact Model



- From production data or from Xetra research, compute average market impact curves
- Cannot get fill rates.
- Day-to-day, instrument-to-instrument variations.

Xetra Auction Simulations

- Coming feature in A7.
- Based on pre-uncross L3 order book.
- Repeat uncrossing logic in the presence of additional order(s) given side, price (or market), quantity, priority.
- Anticipated coverage: DAX/MDAX/SDAX
- T+N
- All scheduled auctions (opening, midday, closing).
- GUI (primarily for testing, demo, debugging) and API access.

The screenshot shows the A7 Analytics Platform interface for Xetra Auction Simulations. The interface is dark-themed and includes a sidebar with navigation icons. The main content area is divided into several sections:

- Auction**:
 - Date: 2022-02-01
 - Product: LIN
 - Auction: Intraday
 - Auction Start Time: 12:34:56.123456789
 - Auction End Time: 65:43:21.987654321
 - Orig. Uncross Price: 45.23
 - Orig. Matched Volume: 241
- Simulation Order**:
 - Order Side: Buy
 - Order Type: Limit
 - Order Limit Price: 1.23
 - Order Quantity: 1
 - Order Priority: AuctionEnd
 - Buttons: PERFORM, UNCROSS
- Auction Outcome**:
 - Uncross Price: 23.45
 - Matched Volume: 2
 - Fill Quantity: 10

Thank you!

Stefan Schlamp

Head of Quantitative Analytics

Deutsche Börse AG
Mergenthalerallee 61
65760 Eschborn

Phone +49 69 21116833

E-mail Stefan.schlamp@deutsche-boerse.com

Fuel your brain!

#OpenDay2023

@DeutscheBoerse

stefan.schlamp@deutsche-boerse.com

OpenDay 2023



DEUTSCHE BÖRSE
GROUP

Disclaimer

© Deutsche Börse Group 2023

This publication is for informational purposes only. None of the information in this publication constitutes investment advice and does not constitute an offer to sell or a solicitation of an offer to purchase any contract, share or other financial instrument. This publication is not intended for solicitation purposes but only for use as general information. All descriptions, examples and calculations contained in this publication are for illustrative purposes only.

Deutsche Börse AG, Frankfurter Wertpapierbörse (FWB®, the Frankfurt Stock Exchange), Eurex Frankfurt AG, Eurex Deutschland and Eurex Clearing AG do not represent that the information in this publication is comprehensive, complete or accurate and exclude liability for any consequence resulting from acting upon the contents of this or another publication, in so far as no wilful violation of obligations took place or, as the case may be, no injury to life, health or body arises or claims resulting from the Product Liability Act are affected.

Securities traded on the Frankfurt Stock Exchange and Eurex derivatives (other than EURO STOXX 50® Index Futures contracts, EURO STOXX® Select Dividend 30 Index Futures contracts, STOXX® Europe 50 Index Futures contracts, STOXX® Europe 600 Index Futures contracts, STOXX® Europe Large/Mid/Small 200 Index Futures contracts, EURO STOXX® Banks Sector Futures contracts, STOXX® Europe 600 Banks/Industrial Goods & Services/Insurance/Media/Personal & Household Goods/Travel & Leisure/Utilities Futures contracts, Dow Jones Global Titans 50 IndexSM Futures contracts, DAX® Futures contracts, MDAX® Futures contracts, TecDAX® Futures contracts, SMIM® Futures contracts, SLI Swiss Leader Index® Futures contracts, RDXxt® USD - RDX Extended Index Futures contracts, Eurex inflation/commodity/weather/property and interest rate derivatives) are currently not available for offer, sale or trading in the United States nor may they be offered, sold or traded by persons to whom US tax laws apply. The fund shares listed in XTF Exchange Traded Funds® are admitted for trading on the Frankfurt Stock Exchange. Users of this information service who legally reside outside Germany are herewith advised that sale of the fund shares listed in XTF Exchange Traded Funds may not be permitted in their country of residence. The user makes use of the information at their own risk.

Legal validity of this disclaimer

In the event that individual parts of or formulations contained in this text are not, or are no longer, legally valid (either in whole or in part), the content and validity of the remaining parts of the document are not affected.

Trademarks

The following names and designations are registered trademarks of Deutsche Börse AG or an affiliate of Deutsche Börse Group:

1585®; A7®; Buxl®; C7®; CDAX®; CEF®; CEF alpha®; CEF ultra®; CFF®; Classic All Share®; Clearstream®; CX®; D7®; DAX®; DAXglobal®; DAXplus®; DB1 Ventures®; DBIX Deutsche Börse India Index®, Deutsche Börse®, Deutsche Börse Capital Markets Partner®, Deutsche Börse Commodities®, Deutsche Börse Venture Network®, Deutsches Eigenkapitalforum®, DivDAX®, eb.rexx®, eb.rexX Jumbo Pfandbriefe®, ERS®, eTriParty®, Eurex®, Eurex Bonds®, Eurex Clearing Prisma®, Eurex Improve®, Eurex Repo®, Euro GC®, ExServes®, EXTF®, F7®, FDAX®, FWB®, GC Pooling®, GCPI®, GEX®, Global Emission Markets Access – GEMA®, HDAX®, iNAV®, L-DAX®, L-MDAX®, L-SDAX®, L-TecDAX®, M7®, MDAX®, N7®, ODAX®, ÖkoDAX®, PROPRIIS®, REX®, RX REIT Index®, SCHATZ-FUTURE®, SDAX®, ShortDAX®, StatistiX®, T7®, TecDAX®, Technology All Share®, TRICE®, USD GC Pooling®, VDAX®, VDAX-NEW®, Vestima®, Xscreen®, Xemac®, Xentric®, Xetra®, Xetra-Gold®, Xpect®, Xpider®, XTF®, XTF Exchange Traded Funds®, We make markets work®

The names and trademarks listed above do not represent a complete list and, as well as all other trademarks and protected rights mentioned in this publication, are subject unreservedly to the applicable trademark law in each case and are not permitted to be used without the express permission of the registered owner. The simple fact that this publication mentions them does not imply that trademarks are not protected by the rights of third parties.

The STOXX® indices, the data included therein and the trademarks used in the index names are the intellectual property of STOXX Ltd., Zug, Switzerland and/or its licensors. Eurex' derivatives based on the STOXX indices are in no way sponsored, endorsed, sold or promoted by STOXX and its licensors and neither STOXX nor its licensors shall have any liability with respect thereto.

STOXX iSTUDIO® is a registered trademark of STOXX Ltd., Zug, Switzerland.

TRADEGATE® is a registered trademark of Tradegate AG Wertpapierhandelsbank.

EEX® is a registered trademark of European Energy Exchange AG.

Flexible is better.® is a registered trademark of Axioma, Inc.