EUREX Architects of trusted markets

Use Cases – Buxl Options

17 February 2022

Executive Summary

Background

- In September 2020, Eurex expanded its suite of Options on Fixed Income Futures with the launch of Options on BUXL Futures.
- Product Design had simulated trading strategies at launch, based on volatility approximated through the volatility relationship of Bund and Buxl Futures.
- After more than one year of trading, these strategies are revisited to monitor their performance based on actual trading data

Scope of the Analysis

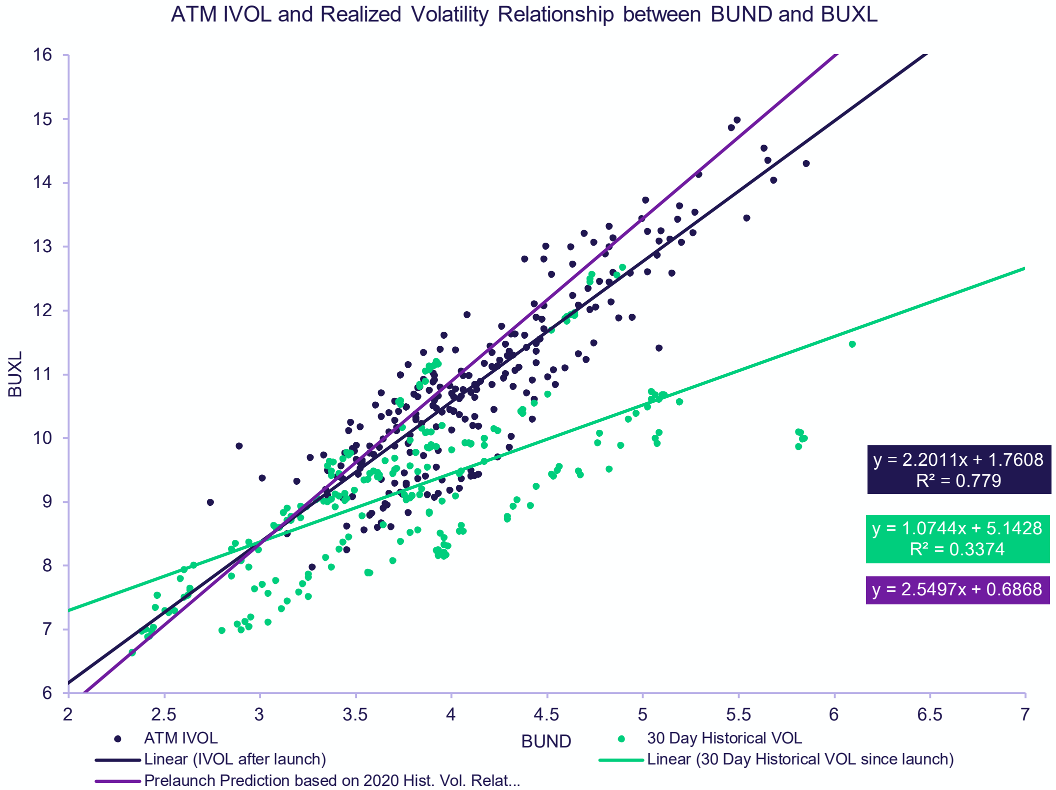
The analysis is split into 5 parts and addresses the following questions:

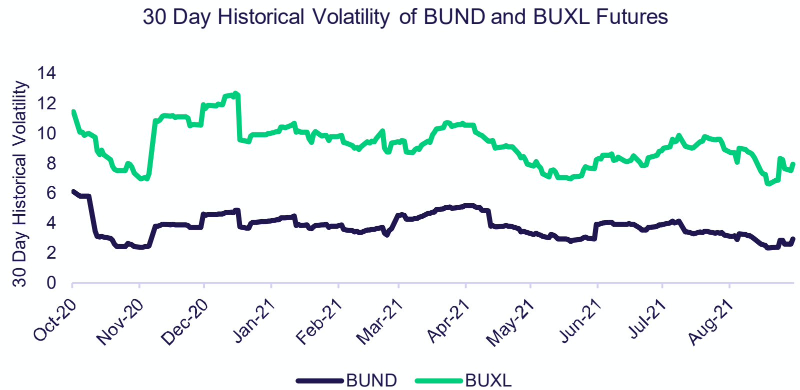
1. How did Buxl and Bund Futures volatility develop and was our approximation prior to launch reasonable?
2. How did Puts perform as hedge against movements in the underlying?
3. How do various Put Strategies perform in limiting premium paid and risk management.
4. How did a short volatility strategy perform cumulatively over the period?
5. How do returns of volatility strategies based on Bund and Buxl Futures relate?

Key Findings

1. BUND implied volatility has proven to be an accurate predictor of BUXL implied volatility and confirms the linear model used in our back-test prior to the launch in September 2020.
2. Delta-hedged ATM Put portfolios perform well during periods with high realized volatility, regardless of chosen expiry.
3. Put Ladders can be used to reduce premium and outperform naked puts in the current rate regime.
4. Short straddles and strangles have performed well, however high realized volatility has to be risk-managed to avoid large losses.
5. Volatility spreads provide investors access to relative differences in implied volatility between Buxl and Bund

BUND implied volatility has proven to be an accurate predictor of BUXL implied volatility and confirms the linear model used in our back-test prior to the launch in September 2020

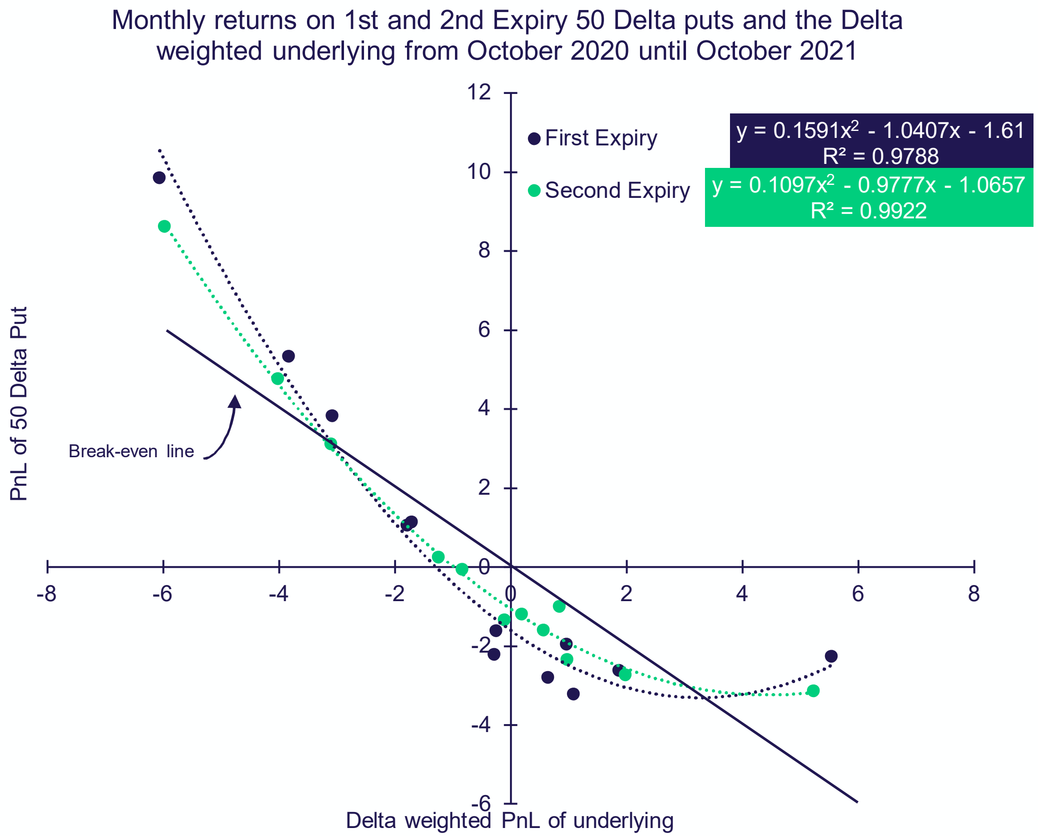




BUND as a predictor of BUXL volatility

- Implied Volatility of BUND and BUXL Futures was closely related in the year after the launch of BUXL Options.
- A linear regression based on this year's data is able to explain ~80% of variance of BUXL implied volatility.
- Using our model from last year we are still able to explain 69% of variance.
- 30 Day Historical Volatility did not follow a linear relationship as the linear model broke down to an R^2 of .34.
- Market quotes systematically overestimate the IVOL relationship of BUXL to BUND.

Delta-hedged ATM Put portfolios perform well in case of high moves in the underlying, regardless of chosen expiry. Still, the premium is high so most positions have a negative PnL



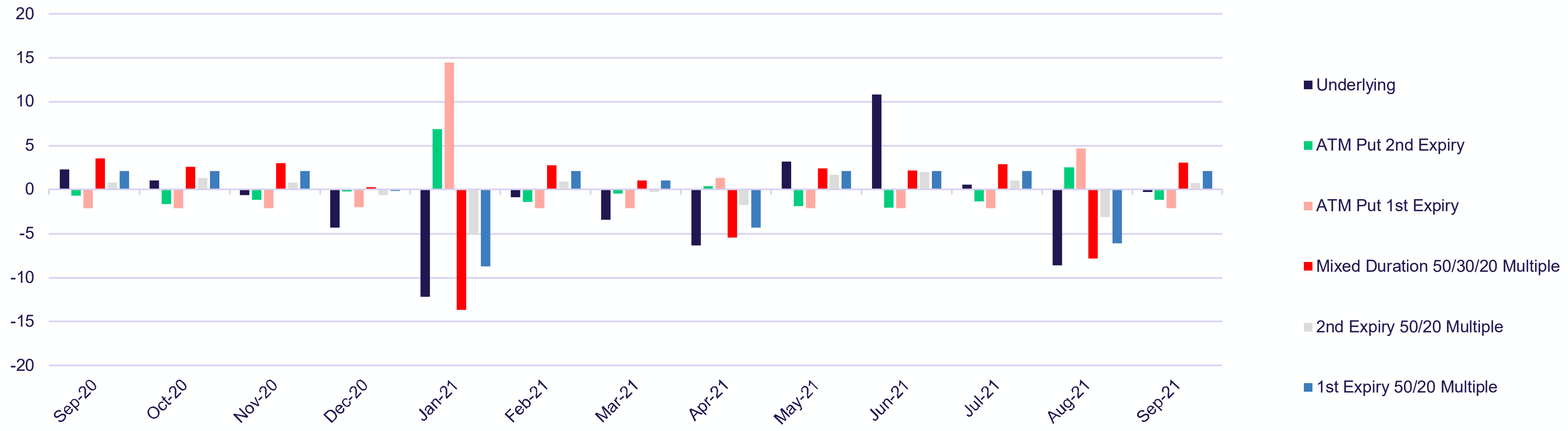
Methodology

- We looked at the theoretical prices of monthly puts on the first BUXL contract available using a binomial model.
- We use the Options with the delta closest to -0.5
- Options are rolled on the last trading day.
- We compare this to the PnL of the underlying weighted with the Delta to observe the hedging performance of the puts.

Key Points

- The portfolio of Delta * Underlying + Put performs well in case of high moves in the underlying, regardless of Expiry.
- Convexity is highest for bull runs in the underlying, showing the use case of limited loss of Options.
- The portfolio also broke even in bearish regimes, where premiums accelerate faster than the underlying.

Put Ladders can be used to reduce premium and outperform naked puts in the current rate regime, except in periods of protracted and high realized volatility

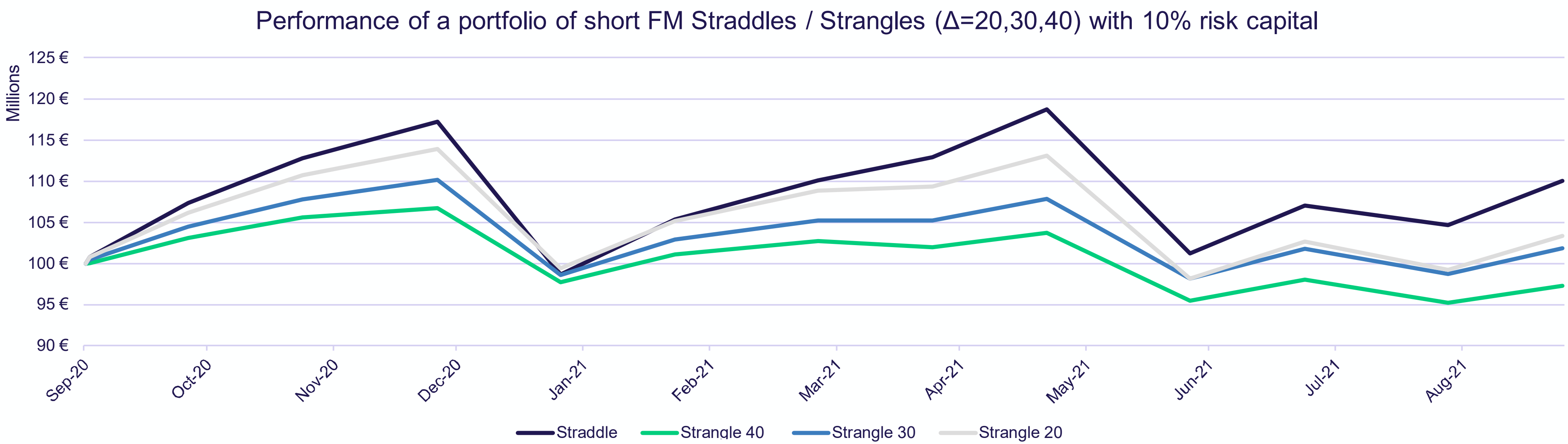


Key Points

- Naked Puts do perform well for large drawdowns with limited downside exposure.
- Delta-hedged Time Spread Ladders do perform well except for large drawdowns.
- First Expiry Puts are more susceptible to underlying risk and overperform on the upside while underperforming on the downside.

Strategy Name	Composition			
	Weighing	Delta	Long / Short	Expiry
Time Spread Ladder 50/30/20	1	50	Long	2nd
	1	20	Short	1st
	1	30	Short	1st
2nd Expiry 50/20 Multiple	1	50	Long	2nd
	2	20	Short	2nd
1st Expiry 50/20 Multiple	1	50	Long	1st
	2	20	Short	1st

Short straddles and strangles have performed well, however high realized volatility has to be risk-managed to avoid large losses



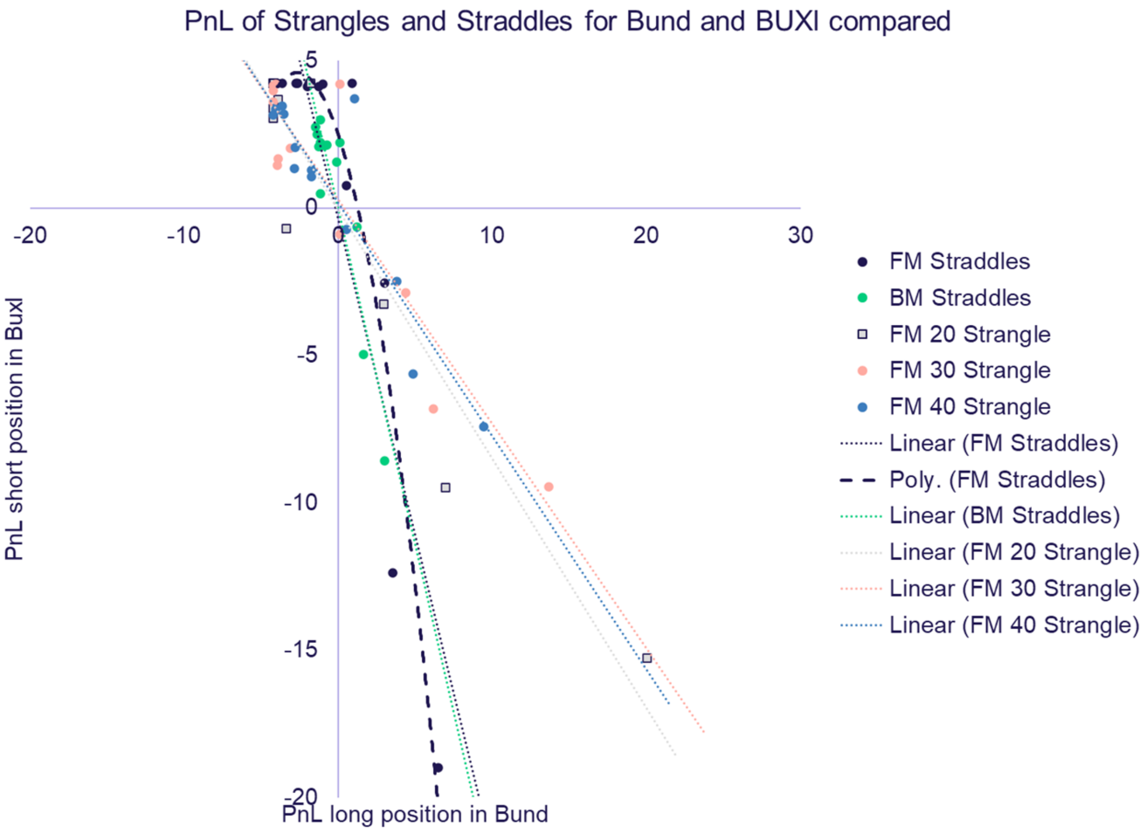
Methodology

- Every portfolio starts with € 100,000 and sets 10% as the **risk budget**.
- The position is entered such that the risk budget is collected as premium
- The Position is closed on the last trading day and a position for the next month is instantly entered.

Key Points

- Out of the observed Short Vol strategies, short Straddles have been the most successful strategies since launch.
- Interestingly the 40 Δ Strangle portfolio performs worse than for 30 Δ and 20 Δ.
- The positions are highly volatile and have to be risk managed accordingly.

Volatility spreads provide investors access to relative differences in implied volatility between Buxl and Bund



Key Takeaways

- Volatility-strategies based upon monthly Buxl Options regress well on those based on monthly Bund Options.
- Best correlation is achieved with Backmonth Straddles.

As the market generally overestimates IVOL of Buxl compared to Bund, **a volatility spread strategy could be an promising alternative investment strategy.**

- Going short FM Buxl Straddles and long FM Bund Straddles performs close to linear in the first and second quadrant and flattens in the third.
- Adjusting the amount of contracts to linear relationship would have allowed for a successful hockey stick trade.

Disclaimer

Deutsche Börse AG (DBAG), Clearstream Banking AG (Clearstream), Eurex Frankfurt AG, Eurex Clearing AG (Eurex Clearing) and Eurex Repo GmbH (Eurex Repo) are corporate entities and are registered under German law. Eurex Global Derivatives AG is a corporate entity and is registered under Swiss law. Clearstream Banking S.A. is a corporate entity and is registered under Luxembourg law. Deutsche Boerse Asia Holding Pte. Ltd., Eurex Clearing Asia Pte. Ltd. and Eurex Exchange Asia Pte. Ltd are corporate entities and are registered under Singapore law. Eurex Frankfurt AG (Eurex) is the administrating and operating institution of Eurex Deutschland. Eurex Deutschland is in the following referred to as the “Eurex Exchange”.

All intellectual property, proprietary and other rights and interests in this publication and the subject matter hereof (other than certain trademarks and service marks listed below) are owned by DBAG and its affiliates and subsidiaries including, without limitation, all patent, registered design, copyright, trademark and service mark rights. While reasonable care has been taken in the preparation of this publication to provide details that are accurate and not misleading at the time of publication DBAG, Clearstream, Eurex, Eurex Clearing, Eurex Repo as well as the Eurex Exchange and their respective servants and agents (a) do not make any representations or warranties regarding the information contained herein, whether express or implied, including without limitation any implied warranty of merchantability or fitness for a particular purpose or any warranty with respect to the accuracy, correctness, quality, completeness or timeliness of such information, and (b) shall not be responsible or liable for any third party’s use of any information contained herein under any circumstances, including, without limitation, in connection with actual trading or otherwise or for any errors or omissions contained in this publication.

This publication is published for information purposes only and shall not constitute investment advice respectively does not constitute an offer, solicitation or recommendation to acquire or dispose of any investment or to engage in any other transaction. 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.

Eurex and Eurex Clearing offer services directly to members of the Eurex Exchange respectively to clearing members of Eurex Clearing. Those who desire to trade any products available on the Eurex market or who desire to offer and sell any such products to others or who desire to possess a clearing license of Eurex Clearing in order to participate in the clearing process provided by Eurex Clearing, should consider legal and regulatory requirements of those jurisdictions relevant to them, as well as the risks associated with such products, before doing so.

Only Eurex derivatives that are CFTC-approved may be traded via direct access in the United States or by United States persons. A complete, up-to-date list of Eurex derivatives that are CFTC-approved is available at: http://www.eurexchange.com/exchange-en/products/eurex-derivatives-us. In addition, Eurex representatives and participants may familiarise U.S. Qualified Institutional Buyers (QIBs) and broker-dealers with certain eligible Eurex equity Options and equity index Options pursuant to the terms of the SEC’s July 1, 2013 Class No-Action Relief. A complete, up-to-date list of Eurex Options that are eligible under the SEC Class No-Action Relief is available at: http://www.eurexchange.com/exchange-en/products/eurex-derivatives-us/eurex-options-in-the-us-for-eligible-customers... Lastly, U.S. QIBs and broker-dealers trading on behalf of QIBs may trade certain single-securityFutures and narrow-based security indexFutures subject to terms and conditions of the SEC’s Exchange Act Release No. 60,194 (June 30, 2009), 74 Fed. Reg. 32,200 (July 7, 2009) and the CFTC’s Division of Clearing and Intermediary Oversight Advisory Concerning the Offer and Sale of Foreign SecurityFutures Products to Customers Located in the United States (June 8, 2010).

Trademarks and Service Marks

Buxl®, DAX®, DivDAX®, eb.rexx®, Eurex®, Eurex Repo®, Eurex Strategy WizardSM, Euro GC Pooling®, FDAX®, FWB®, GC Pooling®,,GCPI®, MDAX®, ODAX®, SDAX®, TecDAX®, USD GC Pooling®, VDAX®, VDAX-NEW® and Xetra® are registered trademarks of DBAG. All MSCI indexes are service marks and the exclusive property of MSCI Barra. ATX®, ATX® five, CECE® and RDX® are registered trademarks of Vienna Stock Exchange AG. IPD® UK Quarterly Indexes are registered trademarks of Investment Property Databank Ltd. IPD and have been licensed for the use by Eurex for derivatives. SLI®, SMI® and SMIM® are registered trademarks of SIX Swiss Exchange AG. The STOXX® indexes, the data included therein and the trademarks used in the index names are the intellectual property of STOXX Limited and/or its licensors Eurex derivatives based on the STOXX® indexes 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. Bloomberg Commodity IndexSM and any related sub-indexes are service marks of Bloomberg L.P. PCS® and Property Claim Services® are registered trademarks of ISO Services, Inc. Korea Exchange, KRX, KOSPI and KOSPI 200 are registered trademarks of Korea Exchange Inc. BSE and SENSEX are trademarks/service marks of Bombay Stock Exchange (BSE) and all rights accruing from the same, statutory or otherwise, wholly vest with BSE. Any violation of the above would constitute an offence under the laws of India and international treaties governing the same.
The names of other companies and third party products may be trademarks or service marks of their respective owners.

Eurex Deutschland qualifies as manufacturer of packaged retail and insurance-based investment products (PRIIPs) under Regulation (EU) No 1286/2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs Regulation), and provides key information documents (KIDs) covering PRIIPs traded on Eurex Deutschland on its website under the following link: http://www.eurexchange.com/exchange-en/resources/regulations/eu-regulations/priips-kids.

In addition, according to Art. 14(1) PRIIPs Regulation the person advising on, or selling, a PRIIP shall provide the KID to retail investors free of charge.