AUGUST 2011

STOXX® STRATEGY INDEX GUIDE

STOXX

INNOVATIVE. GLOBAL. INDICES.

CONTENTS

CONTENTS

1. INTRODUCTION TO THE STOXX INDEX GUIDES

The STOXX index guides are separated into the following sub-sets:

- The STOXX calculation guide provides a general overview of the calculation of the STOXX indices, the dissemination, the index formulas and adjustments due to corporate actions.
- The STOXX methodology guide contains the index specific rules regarding the construction and derivation of the indices, the individual component selection process and weighting schemes.
- The STOXX strategy guide contains the formulas and description of all non-equity/strategy indices.
- The STOXX dividend points calculation guide describes the STOXX dividend points products.

2. EURO STOXX 50 BUYWRITE

2.1. OVERVIEW

The EURO STOXX 50 BuyWrite Index reflects the so-called 'buy-write option' strategy. With this strategy, which is also referred to as covered call, an investor buys the EURO STOXX 50 index (price or total return indeces) as an underlying instrument and simultaneously sells a EURO STOXX 50 call option.

The index is based on the EURO STOXX 50 price index or on the EURO STOXX 50 total return index and a EURO STOXX 50 call option traded at Eurex.

2.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 BuyWrite (Price)	CH0029148886	SX5EBP
EURO STOXX 50 BuyWrite (Net Return)	CH0026600970	SX5EBW

2.EURO STOXX 50 BUYWRITE

2.3. CALCULATION

2.3.1. THE EURO STOXX 50 BUYWRITE INDEX FORMULA

Two versions of the EURO STOXX 50 BuyWrite index are available:

EURO STOXX 50 BuyWrite Index

The EURO STOXX 50 BuyWrite Index combines the EURO STOXX 50 (total return) Index and a EURO STOXX 50 call option.
On regular trading days the EURO STOXX 50 BuyWrite Index is calculated as follows:

$$ESTBX50(BW)_t = \frac{\left[\frac{ESTX50(TR)_t}{ESTX50(TR)_{EXP}} \cdot ESTX50(P)_{EXP}\right] - C_t}{ESTX50(P)_{EXP} - C_0} \cdot ESTX50(BW)_{EXP}$$

The rolling is carried out monthly on every third Friday, i.e. on the expiry date (EXP).

$$ESTBX50(BW)_{EXP} = \frac{\left[\frac{ESTX50(TR)_{EXP}}{ESTX50(TR)_{EXP-1}} \cdot ESTX50(P)_{EXP-1}\right] - C'_{EXP}}{ESTX50(P)_{EXP-1} - C'_0} \cdot ESTX50(BW)_{EXP-1}$$ Where:

$ESTX50(BW)_t$	= EURO STOXX 50 BuyWrite index at time (t)
$ESTX50(BW)_{EXP}$	= Settlement value of EURO STOXX 50 BuyWrite index at the previous expiry date (EXP)
$ESTX50(BW)_{EXP-1}$	= Settlement value of EURO STOXX 50 BuyWrite index at the last expiry date before the previous expiry date(EXP-1)
$ESTX50(TR)_t$	= Last price of EURO STOXX 50 (Total Return) index at time t
$ESTX50(TR)_{EXP}$	= Settlement price of EURO STOXX 50 (Total Return) index at the previous expiry date (EXP)
$ESTX50(TR)_{EXP-1}$	= Settlement price of EURO STOXX 50 (Total Return) index at the last expiry date before the previous expiry date (EXP-1)
$ESTX50(P)_{EXP}$	= Settlement price of EURO STOXX 50 (Price) index at the previous expiry date (EXP)
$ESTX50(P)_{EXP-1}$	= Settlement price of EURO STOXX 50 (Price) index at the last expiry date before the previous expiry date (EXP-1)
C_t	= Last price of the EURO STOXX 50 call option at time t
C_0	= Inclusion price of the EURO STOXX 50 call option; i.e. averages of all best bids quoted on Eurex between 12:15 – 12:45 CET on the last expiry date (EXP)
C'_{EXP}	= Settlement price of old EURO STOXX 50 call option at the last expiry date (EXP)
C'_0	= Inclusion price of the old EURO STOXX 50 call option; i.e. averages of all best bids quoted on Eurex between 12:15 – 12:45 CET on the last expiry date (EXP-1) before the previous expiry date (EXP)

2.EURO STOXX 50 BUYWRITE

The EURO STOXX 50 BuyWrite (price) index

The EURO STOXX 50 BuyWrite (price) Index combines the EURO STOXX 50 (price) Index and a EURO STOXX 50 call option.

On regular trading days the EURO STOXX 50 BuyWrite (price) Index is calculated as follows:

$$ESTX50(BW\,Price)_t = \frac{ESTX50(P)_t - C_t}{ESTX50(P)_{EXP} - C_0} \cdot ESTX50(BW\,Price)_{EXP}$$

The rolling is carried out monthly on every third Friday, i.e. on the expiry date (EXP).

$$ESTX50(BW\,Price)_{EXP} = \frac{ESTX50(P)_{EXP} - C'_{EXP}}{ESTX50(P)_{EXP\text{-}1} - C'_0} \cdot ESTX50(BW\,Price)_{EXP\text{-}1}$$

Where:

$ESTX50(BWPrice)_t$	= EURO STOXX 50 BuyWrite index at time (t)
$ESTX50(BWPrice)_{EXP}$	= Settlement value of EURO STOXX 50 BuyWrite (Price) index at the previous expiry date (EXP)
$ESTX50(BWPrice)_{EXP-1}$	= Settlement value of EURO STOXX 50 BuyWrite (Price) index at the last expiry date before the previous expiry date (EXP-1)
$ESTX50(P)_{EXP}$	= Settlement price of EURO STOXX 50 (Price) index at the previous expiry date (EXP)
$ESTX50(P)_{EXP-1}$	= Settlement price of EURO STOXX 50 (Price) index at the last expiry date before the previous expiry date (EXP-1)
C_t	= Last price of the EURO STOXX 50 call option at time (t)
C_0	= Inclusion price of the EURO STOXX 50 call option; i.e. averages of all best bids quoted on Eurex between 12:15 – 12:45 CET on the last expiry date (EXP)
C'_{EXP}	= Settlement price of old EURO STOXX 50 call option at the last expiry date (EXP)
C'_0	= Inclusion price of the old EURO STOXX 50 call option; i.e. averages of all best bids quoted on Eurex between 12:15 – 12:45 CET on the last expiry date (EXP-1) before the previous expiry date (EXP)

2.3.2. ROLLING

The EURO STOXX 50 BuyWrite Index requires a monthly rollover procedure, whereby the old EURO STOXX 50 call option ceases trading at noon (12:00 CET) on the pre-determined expiry date, i.e. the third Friday of a month, and is replaced by a new EURO STOXX 50 call option whose last trading day falls on the next expiry date. The new one-month EURO STOXX 50 call option must have a remaining lifetime of one month, and must be 5 percent out-of-the-money (i.e. the highest strike price below or equal to the EURO STOXX 50 settlement price plus 5 percent).

2.3.3. TRADING SUSPENSION

If there is a suspension of the EURO STOXX 50 Index (price or total return) or the EURO STOXX 50 call option that is included in the EURO STOXX 50 BuyWrite Index, the index will be calculated using the latest prices that were available.

2.EURO STOXX 50 BUYWRITE

If a suspension occurs on an expiry date during the averaging process, i.e. 12:15 - 12:45 CET, only bids made before the suspension will be considered.

In cases where the averaging procedure does not start at all (i.e. the suspension starts before 12:15 CET) then the averaging will be delayed until the end of the suspension on the same index business day. The averaging process will start 30 minutes after the end of the suspension and it will then take 30 minutes.

If the suspension continues until the end of trading then the averaging will be delayed until the next index business day at 12:15 CET.

3. EURO STOXX 50 PUTWRITE

3.1. OVERVIEW

The EURO STOXX 50 PutWrite Index replicates the performance of a collateralized put option strategy. The index is based on a quarterly scheme with monthly put option tranches, i.e.

» the investment notional is invested into the three-month Euribor market;
» monthly put options are written in three tranches;
» intra-quarter put options are cash settled by borrowing in the one-month Euribor market if necessary.

The index is based on the EURO STOXX 50 put option traded at Eurex and Euribor.

3.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 PutWrite (Price)	CH0106231670	SX5E3P

3.3. CALCULATION

3.3.1. INDEX FORMULA

At time t

Write a number N_t of puts with price p_t and strike K_t

» Invest $I_t + p_t N_t$ at the three-month EURIBOR rate r_t^3
» The number of puts Nt is given by the condition of total cash collateralization at t+1:

$$\left(I_t + p_t N_t\right)\left(1+\frac{\Delta_{t,t+1}}{360}\cdot r_t^3\right) = N_t K_t \Rightarrow N_t = \frac{I_t\left(1+\frac{\Delta_{t,t+1}}{360}\cdot r_t^3\right)}{K_t - p_t\left(1+\frac{\Delta_{t,t+1}}{360}\cdot r_t^3\right)}$$

Where:

I_t = EURO STOXX 50 PutWrite index at time (t)

$\Delta_{t,t+1}$ = Actual number of calendar days of the first option tranche
The strike K_t is chosen 5 percent out-of-the-money, i.e. it represents the lowest strike of available EUREX put options that is above 95 percent of the EURO STOXX 50 settlement price.

3.EURO STOXX 50 PUTWRITE

At time t+1

» Write a number N_{t+1} of puts with price p_{t+1} and strike K_{t+1}
» Borrow/lend the cash balance

$$C_{t+1} = \left(N_{t+1}p_{t+1} - N_t p_t^s\right)$$

(can be positive or negative) from settling the N_t put options at price p_t^s (which is zero if the option matures out-of-the-money) of the previous tranche and writing the new tranche at the one-month Euribor market at rate r_{t+1}.

» The number of put options N_{t+1} is given by the condition of total cash collateralization at t+2:

$$C_{t+1}\left(1+\frac{\Delta_{t+1,t+2}}{360}r_{t+1}^1\right) + \left(I_t + p_t N_t\right)\left(1+\frac{\Delta_{t,t+2}}{360}\cdot r_t^3\right)$$

$$= \left(N_{t+1}p_{t+1} - N_t p_t^s\right)\cdot\left(1+\frac{\Delta_{t+1,t+2}}{360}\cdot r_{t+1}^1\right) + \left(I_t + p_t N_t\right)\cdot\left(1+\frac{\Delta_{t,t+2}}{360}\cdot r_t^3\right) = N_{t+1}K_{t+1}$$

$$\Rightarrow N_{t+1} = \frac{-N_t p_t^s\left(1+\frac{\Delta_{t+1,t+2}}{360}\right) + \left(I_t + p_t N_t\right)\cdot\left(1+\frac{\Delta_{t,t+2}}{360}\cdot r_t^3\right)}{K_{t+1} - p_{t+1}\left(1+\frac{\Delta_{t+1,t+2}}{360}\cdot r_{t+1}^1\right)}$$

Where:

$\Delta_{t+1,t+2}$ = Actual number of calendar days of the second option tranche
$\Delta_{t,t+2}$ = Actual number of calendar days of the first and second option tranche
The strike K_{t+1} is chosen 5 percent out-of-the-money, i.e. it represents the lowest strike of available EUREX put options that is above 95 percent of the EURO STOXX 50 settlement price.

At t+1 the index level reads:

$$I_{t+1} = \left(I_t + p_t N_t\right)\left(1+\frac{\Delta_{t,t+1}}{360}\cdot r_t^3\right) - N_t p_t^s$$

3.EURO STOXX 50 PUTWRITE

At time t+2

» Write a number N_{t+2} of puts with price p_{t+2} and strike K_{t+2}
» Borrow/lend the cash balance

$$C_{t+2} = \left(N_{t+2}p_{t+2} - N_{t+1}p^{s}_{t+1}\right) + C_{t+1}\left(1 + \frac{\Delta_{t+1,t+2}}{360} \cdot r^{1}_{t+1}\right)$$

(can be positive or negative) from settling the N_{t+1} put options at price $p_{t+1}{}^{s}$ (which is zero if the option matures out-of-the-money) of the previous tranche and writing the new tranche at the one-month EURIBOR market at rate $r_{t+2}{}^{1}$.

» The number of option N_{t+2} is given by the condition of total cash collateralization at t+3:

$$C_{t+2}\left(1 + \frac{\Delta_{t+2,t+3}}{360} \cdot r^{1}_{t+2}\right) + \left(I_t + p_t N_t\right)\left(1 + \frac{\Delta_{t,t+3}}{360} \cdot r^{3}_{t}\right) = N_{t+2}K_{t+2}$$

$$\Leftrightarrow \left(\left(N_{t+2}p_{t+2} - N_{t+1}p^{s}_{t+1}\right) + C_{t+1}\left(1 + \frac{\Delta_{t+1,t+2}}{360} \cdot r^{1}_{t+1}\right)\right)\left(1 + \frac{\Delta_{t+2,t+3}}{360} \cdot r^{1}_{t+2}\right) + \left(I_t + p_t N_t\right) \cdot \left(1 + \frac{\Delta_{t,t+3}}{360} \cdot r^{3}_{t}\right)$$
$$= N_{t+2}K_{t+2}$$

$$\Rightarrow N_{t+2} = \frac{\left(-N_{t+1}p^{s}_{t+1} + C_{t+1}\left(1 + \frac{\Delta_{t+1,t+2}}{360} \cdot r^{1}_{t+1}\right)\right) \cdot \left(1 + \frac{\Delta_{t+2,t+3}}{360} \cdot r^{1}_{t+2}\right) + \left(I_t + p_t N_t\right) \cdot \left(1 + \frac{\Delta_{t,t+3}}{360} \cdot r^{3}_{t}\right)}{K_{t+2} - p_{t+2}\left(1 + \frac{\Delta_{t+2,t+3}}{360} \cdot r^{1}_{t+2}\right)}$$

Where:

$\Delta_{t+2,t+3}$ = Actual number of calendar days of the second option tranche
$\Delta_{t,t+3}$ = Actual number of calendar days of the first, second and third option tranche
The strike K_{t+2} is chosen 5 percent out-of-the-money, i.e. it represents the lowest strike of available EUREX put options that is above 95 percent of the EURO STOXX 50 settlement price.

At t+2 the index level reads:

$$I_{t+2} = \left(I_t + p_t N_t\right) \cdot \left(1 + \frac{\Delta_{t,t+2}}{360} \cdot r^{3}_{t}\right) + C_{t+1}\left(1 + \frac{\Delta_{t+1,t+2}}{360} \cdot r^{1}_{t+1}\right) - N_{t+1}p^{s}_{t+1}$$

3.EURO STOXX 50 PUTWRITE

At time t+3

The new index level reads (with p_{t+2}^{s} denoting the settlement price of the third option tranche N_{t+2}):

$$I_{t+3} = \left(I_t + p_t N_t\right) \cdot \left(1 + \frac{\Delta_{t,t+3}}{360} \cdot r_t^3\right) + C_{t+2}\left(1 + \frac{\Delta_{t+2,t+3}}{360} \cdot r_{t+2}^1\right) - N_{t+2} p_{t+2}^s$$

Afterwards, the scheme is applied iteratively.

3.3.2. ROLLING

The EURO STOXX 50 PutWrite index requires a monthly rollover procedure, whereby the old EURO STOXX 50 put option ceases trading at noon (12:00 CET) on the pre-determined expiry date, i.e. the third Friday of a month, and is replaced by a new EURO STOXX 50 put option whose last trading falls on the next expiry date. The new one-month EURO STOXX 50 put option must have a remaining lifetime of one month, and must be 5 percent out-of-the-money (i.e. the lowest strike price above or equal to the EURO STOXX 50 settlement price minus 5 percent).

3.3.3. TRADING SUSPENSION/ NON-TRADING DAYS

If there is a suspension of the EURO STOXX 50 put option which is included in the EURO STOXX 50 PutWrite index, the index will be calculated using the latest prices available.

If a suspension occurs on an expiry date during the averaging process, i.e. 12:15 - 12:45 CET only bids made before the suspension will be considered.

In cases where the averaging procedure does not start at all (i.e. the suspension starts before 12:15 CET), the averaging will be delayed until the end of the suspension on the same index business day. The averaging process will start 30 minutes after the end of the suspension and it will then take 30 minutes.

If the suspension continues until the end of the trading, the averaging will be delayed until the next index business day at 12:15 CET.

Interest is accrued on all calculation dates of the EURO STOXX 50 PutWrite Index.

4. STOXX SHORT AND LEVERAGE

4.1. OVERVIEW

Leveraged indices are linked to the changes in the underlying index, applying a leverage factor to movements in the underlying index. Therefore, a positive change of the underlying index will result in the corresponding leveraged performance of leveraged indices compared to the closing level from the last rebalancing.
Short indices are linked inversely to the changes in the underlying index, applying a negative leverage factor to movements in the underlying index. Therefore, investing in short indices yields the reverse performance of the underlying index, compared to the closing level from the last rebalancing.

The leverage effect causes a disproportionate change in capital employed during positive and negative market movements. This effect can be achieved by raising additional capital and reinvesting into the underlying index (positive leverage) or by investing capital from purchases and additional interests (negative leverage). Investors can make use of this opportunity to employ a profitable investment strategy with low initial capital in order to multiply the chances of profit considerably. On the other hand this leverage effect carries the inherent risk of a disproportionate capital loss ('downside risk').

4.2. BASIC DATA

Index	ISIN	Symbol	Leverage
EURO STOXX 50 Daily Leverage (Price)	CH0029194906	SX5EL	2
EURO STOXX 50 Daily Leverage (Net Return)	DE000A0Z3K43	SX5TL	2
EURO STOXX 50 Daily Short (Gross Return)	CH0029194971	SX5TS	-1
EURO STOXX 50 Daily Double Short (Gross Return)	CH0048222092	SX5T2S	-2
EURO STOXX 50 Optimal Daily Leverage (Net Return)	CH0123471655	SX5ODLEN	L*
STOXX Europe 600 Daily Short (Gross Return)	CH0108503878	SXXGRS	-1
STOXX Europe 600 Daily Double Short (Gross Return)	CH0048222100	SXXR2S	-2
STOXX Europe 600 <Supersector> Daily Short (Gross Return)	<see Vendor Code sheet>		-1
STOXX Europe 600 <Supersector> Daily Double Short (Gross Return)	<see Vendor Code sheet>		-2
EURO STOXX 50 Monthly Leverage (Net Return)	CH0116915999	SX5TLM	2
EURO STOXX 50 Monthly Double Short (Gross Return)	CH0116916005	SX5GT2SM	-2
<further indices as listed in the STOXX vendor code sheet>			

4.3. CALCULATION

4.3.1. THE STOXX SHORT / LEVERAGE INDEX FORMULA

The Daily Leverage indices are calculated as follows:

$$LevIDX_t = LevIDX_T \cdot \left[\underbrace{1 + L \cdot \left(\frac{IDX_t}{IDX_T} - 1 \right)}_{\text{LEVERAGE TERM}} + \underbrace{((1-L) \cdot IR_T + L \cdot c_M) \cdot \frac{d}{360}}_{\text{FINANCE/INTEREST TERM}} \right]$$

4.STOXX SHORT AND LEVERAGE

Where:
LevIDX = Leverage index
IDX = underlying index
IR = interest rate: see table below for the daily indices. The EURIBOR (1M) is used for the monthly indices

c_M = cost to borrow (considered for European short indices only)
t = Time of calculation
T = Time of last rebalancing day prior to t (last trading day for the daily and third Friday for the monthly indices)
D = Number of calendar days between t and T

The 'leverage term' describes the effect of Price index movements on the leveraged index portfolio.
The 'financing term' indicates the costs of raising capital and reinvesting in the index portfolio (positive leverage)
The 'interest term' indicates the interest received from lending capital and the cost to borrow the index portfolio (negative leverage)
The interest rate depends on the region:

Region / Country	Interest rate (currency)
Americas	USD-LIBOR
Europe / Eurozone	EUR-EONIA
UK	GBP-LIBOR
Oceania	AUD-LIBOR
Asia	USD-LIBOR
Latam	USD-LIBOR
BRIC	USD-LIBOR
Global	USD-LIBOR

4.3.2. COST OF BORROWING

The STOXX Daily Short indices are designed to ensure a high degree of tradability and replicability.

Calculation:

$$c_M = \sum_i w_{i,M} \cdot c_{i,M}$$

Where:
n = Number of shares in the index
c_M = Cost of borrowing the index at time *M*
$c_{i,M}$ = Cost of borrowing of company *i* at time M
$w_{i,M}$ = Weight of the share *i* in the index

The cost of borrowing will be updated on a monthly basis after the close on the third Friday.

Data source: The data is provided to STOXX by data explorers, the aggregator of stock lending information.

4.STOXX SHORT AND LEVERAGE

4.3.3. CALCULATION OF THE OPTIMAL LEVERAGE FACTOR

The optimal leverage factor L* is determined every month based on the risk-return profile of the underlying index. Relevant factors are the growth rate of the underlying index and the volatility reflected by the VSTOXX index.

$$L^* = L_T^* = \min\left(4; \max\left(\frac{1}{2}; \frac{1}{2} + \frac{\mu - r}{\sigma^2}\right)\right)$$

Where:

r =IR_T

μ = growth rate of the underlying index; $\mu = \left(\frac{IDX_T}{IDX_0}\right)^{\frac{365}{T-T_0}} - 1$

σ = volatility of the underlying index; $\sigma = \begin{cases} \text{implied volatily} & \text{: if available} \\ \max\{Vol(20); Vol(60)\} & \text{: else} \end{cases}$

Vol(n) = realized volatility over n days; $Vol(n) = \sqrt{\frac{252}{n-1} \cdot \sum_{k=T-n+1}^{T} \left(\ln \frac{IDX_k}{IDX_{k-1}}\right)^2}$

For the European STOXX indices the implied volatility as measured by the VSTOXX index is considered in the calculation of the optimal leverage.

4.3.4. ADJUSTMENTS DUE TO EXTREME MARKET MOVEMENTS

Daily leveraged and short

If the underlying index drops by 25 percent at the time of calculation t compared to the closing price on the last trading day T, the leverage will be adjusted intraday. During the adjustment, the latest prices received before time t are considered. No additional refinancing costs ('financing term') are calculated.
The adjustment will be carried out by simulating a new day, by setting:

t = T (i.e. IDX_T = IDX_t and $LevIDX_T$ = $LevIDX_t$)
d = 0

Monthly leveraged and short

If the reference index (closing value) rises or falls by more than 40% in the course of the month, the monthly leveraged and short indices will be subject to an extraordinary adjustment. The leverage factor will be adjusted based on the closing value of the reference index. Herewith the risk of a potential total loss is minimized. The monthly leveraged and short indices have a floor value of zero.

The rebalancing will be carried out by simulating a new day:

t = T (i.e. IDX_T = IDX_t and $LevIDX_T$ = $LevIDX_t$)
d=0

With these adjustments the risk of a total loss is substantially limited.

4.STOXX SHORT AND LEVERAGE

4.3.5. TRADING SUSPENSION

The STOXX leverage and short indices are calculated on the same days and during the same time as the underlying STOXX indices are calculated.

If there is suspension of the underlying index, the leveraged and short indices will be calculated with the latest prices available.

5. STOXX MONTHLY LEVERAGE

6. EURO STOXX 50 VOLATILITY (VSTOXX)

6.1. OVERVIEW

6.1.1. CONCEPT

Volatility is a measure of the level of uncertainty prevailing in certain markets. In principle, there are two different approaches to estimate volatility. Historical volatility involves measuring the standard deviation of historical closing prices for any particular security over a given period of time. Implied volatility, on the other hand, is derived from option prices. This kind of volatility represents the estimates and assumptions of market participants involved in a trade, on the basis of a given option price.

The EURO STOXX 50 Volatility Index (VSTOXX) does not measure implied volatilities of at-the-money EURO STOXX 50 options, but the implied variance across all options of a given time to expiry. The options contract on the EURO STOXX 50 is one of the products of Eurex with the highest trading volume. This model has been jointly developed by Goldman Sachs and Deutsche Börse. It offers great advantages in terms of trading, hedging and introducing derivative products on this index. The main index VSTOXX is designed as a rolling index at a fixed 30 days to expiry that is achieved through linear interpolation of the two nearest of the eight available sub-indices. The VSTOXX and its eight sub-indices are updated every five seconds. The VSTOXX is calculated on the basis of eight expiry months with a maximum time to expiry of two years.

6.1.2. BASIC DATA

Index	Code	ISIN
VSTOXX	V2TX	DE000A0C3QF1
VSTOXX 60 days	VSTX60	DE000A1A4LU0
VSTOXX 90 days	VSTX90	DE000A1A4LV8
VSTOXX 120 days	VSTX120	DE000A1A4LW6
VSTOXX 150 days	VSTX150	DE000A1A4LX4
VSTOXX 180 days	VSTX180	DE000A1A4LY2
VSTOXX 210 days	VSTX210	DE000A1A4LZ9
VSTOXX 240 days	VSTX240	DE000A1A4L00
VSTOXX 270 days	VSTX270	DE000A1A4L18
VSTOXX 300 days	VSTX300	DE000A1A4L26
VSTOXX 330 days	VSTX330	DE000A1A4L34
VSTOXX 360 days	VSTX360	DE000A1A4L42
VSTOXX 1M	V6I1	DE000A0G87B2
VSTOXX 2M	V6I2	DE000A0G87C0
VSTOXX 3M	V6I3	DE000A0G87D8
VSTOXX 6M	V6I4	DE000A0G87E6
VSTOXX 9M	V6I5	DE000A0G87F3
VSTOXX 12M	V6I6	DE000A0G87G1
VSTOXX 18M	V6I7	DE000A0G87H9
VSTOXX 24M	V6I8	DE000A0G87J5

6.EURO STOXX 50 VOLATILITY (VSTOXX)

6.1.3. VSTOXX MAIN INDICES AND SUB-INDICES

The VSTOXX main indices are calculated for rolling 30, 60, 90, 120, 150, 180, 210, 240, 270, 300, 330 and 360 days to expiry via linear interpolation using the following sub-indices. The VSTOXX main indices are therefore independent of a specific time to expiry, i.e. they do not expire. This helps to eliminate effects that typically result in strong volatility fluctuations close to expiry.

Apart from the VSTOXX main indices (which is irrespective of a specific time to expiry), sub-indices for each time to expiry of the EURO STOXX 50 options, ranging from one month to two years, are calculated and distributed. For options with longer time to expire, no such sub-indices are currently available.

The various VSTOXX sub-indices are calculated on the basis of all options available. The calculations are based on the best bid and best ask available for these options in the Eurex system.

Index	Sub-index 1	Sub-index 2	Sub-index 3	Sub-index 4
EURO STOXX 50 Volatility (VSTOXX 30 days)	1M	2M	3M	
EURO STOXX 50 Volatility (VSTOXX 60 days)	2M	3M	6M	
EURO STOXX 50 Volatility (VSTOXX 90 days)	2M	3M	6M	9M
EURO STOXX 50 Volatility (VSTOXX 120 days)	3M	6M	9M	
EURO STOXX 50 Volatility (VSTOXX 150 days)	3M	6M	9M	
EURO STOXX 50 Volatility (VSTOXX 180 days)	3M	6M	9M	12M
EURO STOXX 50 Volatility (VSTOXX 210 days)	6M	9M	12M	
EURO STOXX 50 Volatility (VSTOXX 240 days)	6M	9M	12M	
EURO STOXX 50 Volatility (VSTOXX 270 days)	6M	9M	12M	18M
EURO STOXX 50 Volatility (VSTOXX 300 days)	9M	12M	18M	
EURO STOXX 50 Volatility (VSTOXX 330 days)	9M	12M	18M	
EURO STOXX 50 Volatility (VSTOXX 360 days)	9M	12M	18M	24M

6.EURO STOXX 50 VOLATILITY (VSTOXX)

6.2. CALCULATION

6.2.1. INPUT DATA

During the calculation hours for the VSTOXX and the eight corresponding sub-indices (8:50 to 17:30 CET), the following data is used via snapshots every five seconds:

EURO STOXX 50	- EURO STOXX 50 Index
OESX	- Best bid and best ask of all EURO STOXX 50 options
EONIA	- Euro OverNight Index Average - overnight interest rate
EURIBOR	- EURIBOR - Euro Interbank Offered Rates – money market reference rates for 1, 2, ... 12 months (calculated once a day, 11:00 CET, by the European Banking Federation)
REX	- Yield of the 2-year REX as the longer-term interest rate

Index Name	Period	Code	ISIN
EONIA	1 day	EU1D	EU0009659945
EURIBOR 1 month	1 month	EU1M	EU0009659937
EURIBOR 2 months	2 months	EU2M	EU0009652841
EURIBOR 3 months	3 months	EU3M	EU0009652783
EURIBOR 4 months	4 months	EU4M	EU0009652858
EURIBOR 5 months	5 months	EU5M	EU0009652866
EURIBOR 6 months	6 months	EU6M	EU0009652791
EURIBOR 7 months	7 months	EU7M	EU0009652874
EURIBOR 8 months	8 months	EU8M	EU0009652882
EURIBOR 9 months	9 months	EU9M	EU0009652890
EURIBOR 10 months	10 months	EU10	EU0009652908
EURIBOR 11 months	11 months	EU11	EU0009652916
EURIBOR 12 months	12 months	EU12	EU0009652809
REX 2-year (Price index)	2 years	REX2	DE0008469149

6.EURO STOXX 50 VOLATILITY (VSTOXX)

6.3. INDEX CALCULATION

The model for VSTOXX aims at making pure volatility tradable - i.e. the index should be trackable by a portfolio which does not react to price fluctuations, but only to changes in volatility. This is not directly achieved through volatility, but rather through variance or squared volatility. A portfolio of EURO STOXX 50 options with different exercise prices, anda given weighting, as described below, meets this requirement. So, the implied volatilities of all options at a given time to expiry are considered.

The sub-indices are calculated according to the formula shown below:

(1) $$VSTOXX_i = 100 \cdot \sqrt{\sigma_i^2}$$

(2) $$\sigma_i^2 = \frac{2}{T_i} \sum_j \frac{\Delta K_{i,j}}{K_{i,j}^2} \cdot R_i \cdot M(K_{i,j}) - \frac{1}{T_i}\left(\frac{F_i}{K_{i,0}} - 1\right)^2, i = 1,2,...8$$

and:

T_i = Time to expiry of the i^{th} OESX

F_i = Forward price derived from the prices of the i^{th} OESX, for which the absolute difference between call and put prices (C and P) is smallest. Therefore:

(3) $$F_i = K_{min|C-P|} + R_i \cdot (C - P)$$

(Note: if a clear minimum does not exist, the average value of the relevant forward prices will be used instead.)

$K_{i,j}$ = Exercise price of the i^{th} out-of-the-money option of the i^{th} OESX expiry month in ascending order

$\Delta K_{i,j}$ = Interval between the relevant exercise prices or half the interval between the one higher and one lower exercise price. On the boundaries, the simple interval between the highest and second highest exercise price (or lowest and second lowest exercise price) is used:

(4) $$\Delta K_{i,j} = \frac{K_{i,j+1} - K_{i,j-1}}{2}$$

$K_{i,0}$ = Highest exercise price below forward price F_i

R_i = Refinancing factor of the i^{th} OESX

(5) $$R_i = e^{r_i \cdot T_i}$$

r_i = Risk-free interest rate to expiry of the i^{th} OESX

$M(K_{i,j})$ = Price of the option $K_{i,j} \neq K_{i,0}$

$M(K_{i,0})$ = Average of the put and call prices at exercise price $K_{i,0}$

The sub-indices are calculated up to two days prior to expiry. Each new sub-index is disseminated for the first time on the second trading day of the relevant EURO STOXX 50 options.

6.EURO STOXX 50 VOLATILITY (VSTOXX)

6.3.1. PRICE SCREENS

a. All option prices that are one-sided, i.e. that only have either a bid or an ask price, or options without a bid or an ask price at all, are screened out.

b. Only options that are quoted within the established maximum spreads for Eurex market makers are eligible. The maximum spread is derived from bid prices as shown in the table below:

Bid (index Points)	Maximum Spread
0 – 13.3	1.4
13.4 – 133.3	10 %
> 133.3	13.4

Example: Bid = 45.32 and Ask = 54.30: therefore the spread is 8.98.

The maximum spread for a bid price of 45.32 is: 45.32 · 0.10 = 4.532.

Therefore both prices (bid and ask) are rejected.

If Eurex activates fast market status, permitting market makers to increase their quotation spreads under very turbulent trading conditions, maximum spreads are accordingly set higher. This is also taken into account for the calculation of the VSTOXX, and, the applicable filter criteria is adjusted accordingly.

6.3.2. PREPARING DATA

a. Determining the prices used for the calculation.
The middle price is calculated for all eligible option prices, using the relevant best bid and ask prices.
The most recent of each of the following pieces of information is used subsequently:

» Settlement price (previous day)
» Middle price
» Last traded price

Example:

Underlying	Settlement	Bid (time)	Ask (time)	Mid (time)		Last-traded (time)		Price
4050	76.70	-	-	-				76.70
4100	53.71	-	-	-		54.01	(09:05)	54.01
4150	37.51	33.70 (09:04)	34.40 (09:05)	34.40	(09:05)			34.05
4200	22.54	17.29 (09:04)	19.53 (09:05)	18.41	(09:05)	20.21	(09:01)	18.41

b. 'Cutting the wings' - exclusion of options prices
This filter ensures that the various prices used (settlement, middle and last traded price) do not fall short of a minimum value of 0.5 index points. If there are two or more options with different exercise prices with a price of 0.5, only the one nearest to the at-the-money point is used for the calculation. Options that are too far out-of-the-money and therefore do not have much influence on the result of the calculation, are filtered out and not used for the calculation.

6.EURO STOXX 50 VOLATILITY (VSTOXX)

c. Determining the time to expiry Ti

T_i = $T_{Settlement\text{-}Calculation}/T_{year}$

$T_{Settlement\text{-}Calculation}$ = Seconds between index calculation and settlement

T_{Year} = Seconds per annum

Example:	Index Calculation:	25.11.2004 at 11:00 CET
	Expiry (i = 1):	17.12.2004 at 13:00 CET
	T1 =	1.908.000/(365 * 60 * 60 * 24)= 0.0605022831

d. Determining risk-free interest rates
Linear interpolation is used to determine the interest rates, which match the time to expiry of the OESX.

$$r_i = r(T_i) = \frac{T_{k+1} - T_i}{T_{k+1} - T_k} r(T_k) + \frac{T_i - T_k}{T_{k+1} - T_k} r(T_{k+1}) \qquad T_k \le T_i < T_{k+1}$$

e. The refinancing factor Ri is determined according to equation. $R_i = e^{r_i \cdot T_i}$

6.3.3. CALCULATION EXAMPLE

Determining the forward price F_i and the exercise price $K_{i,0}$

The forward price of the i^{th} expiry month is derived from OESX prices, for which the difference (in absolute terms) between call and put prices is smallest. Accordingly, the forward price F_1 of the 1^{st} expiry month and the exercise price $K_{i,0}$, which is the closest exercise price below the forward price F_i, are subject to the following:

$F_i = K_{i,0} + R_i \cdot (Call_i - Put_i)$

Example:

R_1 = 1.001298
$K_{1,0}$ = 4150
F_1 = 4151.401817

If there are several pairs of calls and puts with identical differences, a forward price will be calculated for each of the corresponding exercise prices. $K_{i,0}$ is accordingly defined as the closest exercise price below the simple average of these forward prices.

Determining the Option Price $M(K_{i,j})$

The price $M(K_{i,j})$, which is used for the j^{th} out-of-the-money option of the i^{th} expiry month, is determined as follows:

$$M(K_{i,j}) = \begin{cases} Put & : K_{i,j} < K_{i,0} \\ \frac{Put + Call}{2} & : K_{i,j} = K_{i,0} \\ Call & : K_{i,j} > K_{i,0} \end{cases}$$

6.EURO STOXX 50 VOLATILITY (VSTOXX)

Calculation of the Sub-indices

$$VSTOXX_i = 100 \cdot \sqrt{\sigma_i^2}$$

$$\sigma_i^2 = \frac{2}{T_i} \sum_j \frac{\Delta K_{i,j}}{K_{i,j}^2} \cdot R_i \cdot M(K_{i,j}) - \frac{1}{T_i}\left(\frac{F_i}{K_{i,0}} - 1\right)^2$$

Exercise price $K_{i,j}$	$\Delta K_{i,j}$	Call	Put	Call-Put	$M(K_{i,j})$	$\frac{\Delta K_{i,j}}{K_{i,j}^2} R_i M(K_{i,j})$
2350	50	472.00	0.60	471.40	0.60	0.0000054370
2400	50	422.30	1.00	421.30	1.00	0.0000086880
2450	50	372.80	1.50	371.30	1.50	0.0000125055
2500	50	322.40	2.30	320.10	2.30	0.0000184157
2550	50	273.50	3.30	270.20	3.30	0.0000253966
2600	50	225.15	4.60	220.55	4.60	0.0000340528
2650	50	177.85	6.70	171.15	6.70	0.0000477446
2700	50	132.40	12.00	120.40	12.00	0.0000823749
2750	50	90.90	21.00	69.90	21.00	0.0001389617
2800	50	57.90	35.40	22.50	46.65	0.0002977672
2850	50	29.50	58.25	28.75	29.50	0.0001817497
2900	50	13.10	92.00	78.90	13.10	0.0000779501
2950	50	5.00	134.10	129.10	5.00	0.0000287520
3000	50	1.50	180.90	179.40	1.50	0.0000083405
3050	50	0.70	229.55	228.85	0.70	0.0000037656
3100	50	0.60	230.00	229.40	0.60	0.0000031244

∑ 0.0009750263

$$\sigma_i^2 = 0.047701564 - 0.001582260 = 0.046119304$$

$$VSTOXX_1 = 100 \cdot \sqrt{0.046119304} = 21.4754055$$

6.3.4. CALCULATION OF VSTOXX

Apart from the eight sub-indices for the various option series, the VSTOXX is defined as the main index with a constant remaining time to expiry of 30 days (this index is therefore not linked to a specific time to expiry). The VSTOXX is determined by linear interpolation of the sub-indices which are nearest to the remaining time to expiry of 30 days. If there are no such surrounding sub-indices, the VSTOXX is calculated using extrapolation. In this case, the two nearest available indices are used, which are as close to the time to expiry of 30 calendar days as possible.

6.EURO STOXX 50 VOLATILITY (VSTOXX)

$$VSTOXX = 100 \cdot \sqrt{\left[T_i \cdot \sigma_i^2 \left[\frac{N_{T_{i+1}} - N_T}{N_{T_{i+1}} - N_{T_i}} \right] + T_{i+1} \cdot \sigma_{i+1}^2 \cdot \left[\frac{N_T - N_{T_i}}{N_{T_{i+1}} - N_{T_i}} \right] \right] \cdot \frac{N_{365}}{N_T}}$$

$$= \sqrt{\left[T_i \cdot VSTOXX_i^2 \cdot \left[\frac{N_{T_{i+1}} - N_T}{N_{T_{i+1}} - N_{T_i}} \right] + T_{i+1} \cdot VSTOXX_{i+1}^2 \cdot \left[\frac{N_T - N_{T_i}}{N_{T_{i+1}} - N_{T_i}} \right] \right] \cdot \frac{N_{365}}{N_T}}$$

Where:

N_{Ti} = Time to expiry of the i^{th} OESX

N_{Ti+1} = Time to expiry of the $i + 1^{st}$ OESX

N_T = Time for next days

N_{365} = Time for a standard year

7. EURO STOXX 50 VOLATILITY-BALANCED

7.1. OVERVIEW

The EURO STOXX 50 Volatility-Balanced index aims to provide superior risk-adjusted returns relative to the EURO STOXX 50 Index by coupling a base investment in EURO STOXX 50 with a dynamic allocation to equity volatility (VSTOXX Short-Term Futures Index) depending on the prevailing volatility regime.

The index is based on the EURO STOXX 50 Net Return (Symbol: SX5T) and the VSTOXX Short-Term Futures Excess Return Index (Symbol: VST1ME).

The volatility regime on any index business day is determined on the basis of Realised Volatility for the period of past 20-days ("RV") and 1-month Implied Volatility 1-month back ("IV") as reflected by the VSTOXX Index. The current volatility regime determines the Equity and Volatility Exposure.

Daily Indicator	Volatility Regime	Equity Exposure	Volatility Exposure
RV < IV - 1%	Stable Volatility Regime	97.5%	2.5%
IV - 1% ≤ RV ≤ IV + 1%	Unpredictable Volatility Regime	90%	10%
RV > IV + 1%	Increasing Volatility Regime	70%	30%

In addition a stop-loss criterion is applied: if the weekly performance of the Excess Return Index shows a loss of 5% or more, both equity and volatility allocations are moved completely into a cash position.

7.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX Volatility-Balanced (Excess Return)	CH0128045587	SX5EVBE
EURO STOXX Volatility-Balanced (Total Return)	CH0128045595	SX5EVBT

7.3. CALCULATION

The EURO STOXX 50 Volatility-Balanced index is calculated as excess and total return index on every Index Business Day ("t") where an Index Business Day is each Eurex VSTOXX futures trading day which is also a EuroSTOXX 50 Index Publication Day.

7.3.1. INDEX FORMULAS

Excess Return Index ("ERI")

$$ERI(t) = ERI(t-1) \cdot \left[1 + EE(t-2) \cdot \left(\frac{EI(t)}{EI(t-1)} - 1 - RI(t-1) \cdot \frac{d}{360} \right) + VE(t-2) \cdot \left(\frac{VI(t)}{VI(t-1)} - 1 \right) \right]$$

Where:

EI = equity index (EURO STOXX 50)

VI = volatility index (VSTOXX Short-Term Futures index)

7.EURO STOXX 50 VOLATILITY-BALANCED

EE = Equity Exposure
VE = Volatility Exposure
RI = Interest Rate (1 month Euribor)
d = number of calendar days between index business day t-1 and t

Total Return Index ("TRI")

$$TRI(t) = TRI(t-1) \cdot \left[\frac{ERI(t)}{ERI(t\text{-}1)} + RI(t\text{-}1) \cdot \frac{d}{360} \right]$$

7.3.2. EQUITY AND VOLATILITY EXPOSURE

Current 1-month Implied Volatility („CIV")

$$CIV(t) = \frac{VSTOXX(t)}{100}$$

Where:
VSTOXX = VSTOXX index

Current 1-month Realised Volatility („CRV")

$$CRV(t) = \sqrt{\frac{252}{20} \cdot \sum_{j=0}^{19} \left[\ln\left(\frac{EI(t-j)}{EI(t-j-1)} \right)^2 \right]}$$

Target Volatility Exposure („TVE")

$$TVE(t) = \begin{cases} 2.5\% & : CRV(t) < CIV(t-20) - 1\% \\ 30\% & : CRV(t) > CIV(t-20) + 1\% \\ 10\% & : \text{else} \end{cases}$$

Stop loss

$$SL(t) = \begin{cases} 1 & : \frac{ERI(t)}{ERI(t-5)} - 1 \leq -5\% \\ 0 & : \text{else} \end{cases}$$

Volatility Exposure

$$VE(t) = \begin{cases} \max[0, VE(t-1) - 10\%] & : SL(t) = 1 \\ \max[TVE(t), VE(t-1) - 10\%] & : SL(t) = 0 \wedge TVE(t) < VE(t-1) \\ \min[TVE(t), VE(t-1) + 10\%] & : SL(t) = 0 \wedge TVE(t) \geq VE(t-1) \end{cases}$$

Equity Exposure

$$EE(t) = \begin{cases} 1 - VE(t) & : SL(t) = 0 \\ 0 & : \text{else} \end{cases}$$

8. EURO STOXX 50 DVP FUTURES

8.1. OVERVIEW

Dividends offer new opportunities to investors – either asset or retail managers – as they:

- are considered on a long-dated horizon as one of the main sources of performance in a portfolio;
- are considered as a good hedge against inflation;
- offer on a long-dated horizon some diversification against pure equity exposure;
- offer an attractive upside due to a structural imbalance in flows: the longer end of the curve tends to be under the net selling pressure coming from the issuance of structured products;
- tend to exhibit lower volatility than equities.

With the EURO STOXX 50 DVP Futures Index, STOXX Ltd. provides investors with synthetic exposure to the gross return (including income from interest) of the EURO STOXX 50 DVP futures listed for trading on Eurex.

The EURO STOXX 50 DVP Futures Index is designed to benefit from the characteristics of the dividends cycle and the dividends market.

- From the December expiry of year (n - 1) to the December expiry of year n, the index notional is invested in equal numbers of EURO STOXX 50 DVP futures corresponding to the years n, n+1, n+2, n+3, n+4, (Fn, Fn+1, Fn+2, Fn+3, Fn+4).
- The cash position is invested at EONIA.
- In December of year n, when the future Fn expires, the index notional would be invested in the contract Fn+5, such that the adjusted numbers of contracts of Fn+1, Fn+2, Fn+3, Fn+4, Fn+5 are the same. For instance, in December 2010, when all the 2010 dividends have been paid, the index will get a new exposure to 2015 dividends.
- In line with the expiry structure of the EURO STOXX 50 DVP Futures, each of the five future contracts is assigned to a specific expiry. Ten maturities are available for dividend futures. The index only considers the five nearest maturities simultaneously.

8.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 DVP Futures (Price)	CH0109185402	SX5EDFT

8.EURO STOXX 50 DVP FUTURES

8.3. CALCULATION

8.3.1. INPUT DATA

During the calculation hours of the EURO STOXX 50 DVP Futures Index, the following data is used via snapshots every 15 seconds:

» Eurex futures prices (first five year contracts) on the EURO STOXX 50 DVP
» EONIA - overnight interest rate - money market investment

If one or more Eurex DVP futures included in the index is no longer listed, STOXX Ltd. may decide on the appropriate measures in consultation with the STOXX management board and notify at that time.

8.3.2. INDEX FORMULA

From the December expiry of year (n-1) to the December expiry of year n:

$$\text{Index}_t = \text{Index}_{t-1}\left[1 + \text{EONIA}(t-1)/360 \cdot d\right] + N_t \begin{bmatrix} F_n(t) - F_n(t-1) + F_{n+1}(t) - F_{n+1}(t-1) + \\ F_{n+2}(t) - F_{n+2}(t-1) + F_{n+3}(t) - F_{n+3}(t-1) + \\ F_{n+4}(t) - F_{n+4}(t-1) \end{bmatrix}$$

Where:

t	= Time of calculation
d	= Number of calendar days between t and t-1
n	= Maturity tranche
F	= Trade price of the futures contracts
EONIA	= Overnight interest rate*
N_t	= $\text{index}_{t-1}/[F_n(t-1)+F_{n+1}(t-1)+F_{n+2}(t-1)+F_{n+3}(t-1)+F_{n+4}(t-1)]$ is the numbers of contracts

*Euro Overnight index Average (EONIA) is the effective reference rate computed daily as a weighted average of all overnight unsecured lending transactions undertaken in the interbank market by the European Central Bank.

8.EURO STOXX 50 DVP FUTURES

8.3.3. ROLLING

On December expiry of year n, the number of contracts has to be adjusted by a rolling factor $RF_{N\text{-}N+1}$ so that the index notional is invested in a new number of contracts in the next five EURO STOXX 50 DVP futures after the roll. The rolling factor $RF_{N\text{-}N+1}$ is calculated as follows:

$$RF_{N-N+1} = \frac{F_n(t) + F_{n+1}(t) + F_{n+2}(t) + F_{n+3}(t) + F_{n+4}(t)}{F_{n+1}(t) + F_{n+2}(t) + F_{n+3}(t) + F_{n+4}(t) + F_{n+5}(t)}$$

Consequently, on the roll date in December, the switch of contract has no impact on the value of the index:

$$\begin{aligned} Index_t &= EONIA + N_t \cdot \left[F_n(t) + F_{n+1}(t) + F_{n+2}(t) + F_{n+3}(t) + F_{n+4}(t)\right] \text{with EONIA} \\ &= Index_{t-1} \cdot EONIA(t-1)/360 \cdot d \\ &= EONIA + RF_{N-N+1} \cdot N_t \cdot \left[F_{n+1}(t) F_{n+2}(t) + F_{n+3}(t) + F_{n+4}(t) + F_{n+5}(t)\right] \end{aligned}$$

On the following day, the index is computed normally, invested in year n+1 to n+5, thus we have entered a new period until the next expiry.

For instance, let's assume that the final close of the index on December expiry of year n is 500, EONIA is zero and that each of the DVP futures corresponding to the years n, n+1, n+2, n+3, n+4 is equal to 100:
$F_n(t) = F_{n+1}(t) = F_{n+2}(t) = F_{n+3}(t) = F_{n+4}(t) = 100$ i.e. this means $N_t = 1$

On this particular date, the index switches its indexation from the DVP futures corresponding to the year n to the indexation of year n+5. If we assume that $F_{n+5}(t) = 50$, we have a rolling factor equal to

$$RF_{N-N+1} = \frac{500}{450}$$

8.3.4. CONSEQUENCES OF AN INDEX DISRUPTION EVENT

If an index disruption event in relation to the Eurex futures contract occurs on index dissemination days, then STOXX Ltd. will calculate the value of the index based on the most recent prior futures prices published by the Eurex.

If an exchange fails to open due to unforeseen circumstances, STOXX Ltd. may determine not to publish the index for that day.

In situations where an exchange introduces a holiday during the month of the index calculation, the index will not be published on such a holiday.

9. STOXX VOLATILITY FUTURES

9.1. OVERVIEW

The EURO STOXX 50 Volatility (VSTOXX) Short-Term Futures Index replicates the performance of a long position in constant-maturity one-month forward, one-month implied volatilities on the underlying EURO STOXX 50 Index. The EURO STOXX 50 Volatility Mid-Term Futures Index replicates a constant 5-month forward, one-month implied volatility.

Both indices constantly roll over each month on a daily basis: the EURO STOXX 50 Volatility Short-Term Futures Index from the first month of the Eurex VSTOXX Futures contract to the second month, and the EURO STOXX 50 Volatility Mid-Term Futures Index from the fourth month to the seventh month..

The VSTOXX Short-Term Futures index is intended to provide a return of a long position in constant-maturity one-month forward one-month implied volatilities on the underlying EURO STOXX 50 Index.

The VSTOXX Short-Term Futures Index comprises the following:

VSTOXX Short-Term/Mid-Term Futures Excess Return Index: VSTOXX Short-Term Futures Index ER returns are calculated from a long Eurex VSTOXX futures position that is continuously rolled over the period between the first and second or fourth and seventh month Eurex VSTOXX Futures contracts.

VSTOXX Short-Term/Mid-Term Futures Total Return Index: VSTOXX Short-Term Futures Index TR returns are calculated from a long Eurex VSTOXX futures position that is continuously rolled over the period between the first and second or fourth and seventh month Eurex VSTOXX futures contracts. The VSTOXX Short-Term Futures Index TR also incorporates interest accrual on the notional value and reinvestment into the index.

9.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 Volatility Mid-Term Futures (Total Return)	CH0115971191	VMT5MT
EURO STOXX 50 Volatility Mid-Term Futures (Excess Return)	CH0115971233	VMT5ME
EURO STOXX 50 Volatility Short-Term Futures (Total Return)	CH0109515863	VST1MT
EURO STOXX 50 Volatility Short-Term Futures (Excess Return)	CH0110459747	VST1ME

9.3. CALCULATION

9.3.1. INPUT DATA

If one or more Eurex VSTOXX futures included in the index are no longer listed, STOXX Ltd. may decide on appropriate measures in consultation with the STOXX management board and notify at that time.

9.STOXX VOLATILITY FUTURES

9.3.2. INDEX FORMULA

Excess Return Calculation

$$IndexER_t = IndexER_{t-} \left[\frac{\sum_{i=1}^{2} w_{i,t-1} \cdot F_{i,t}}{\sum_{i-1}^{2} w_{i,t-1} \cdot F_{i,t-1}} \right]_1$$

Where:

$IndexER_t$	= VSTOXX Short-Term Futures Excess Return Index value on index business day t
t	= index business day on which the index is computed
$W_{i,t}$	= Weight of the i^{th} futures contract on index business day t
$F_{i,t}$	= Middle price of i^{th} futures contract on index business day t
Index Business Day	= A Eurex VSTOXX futures business day

Total Return Calculation

$$IndexTR_t = IndexTR_{t-} \left[\frac{\sum_{i=1}^{2} w_{i,t-1} \cdot F_{i,t}}{\sum_{i-1}^{2} w_{i,t-1} \cdot F_{i,t-1}} + \frac{d \cdot EONIA_{t-1}}{360} \right]_1$$

Where:

$IndexTR_t$	= VSTOXX Short-Term Futures Total Return Index value on index business day t
d	= Number of calendar days between index business day t and preceding index business day t-1
$EONIA_{t-1}$	= The Euro Overnight Index Average (EONIA) is the effective reference rate (expressed as a percentage) computed daily as a weighted average of all overnight unsecured lending transactions undertaken in the interbank market by the European Central Bank on the preceding index business day t-1.

9.STOXX VOLATILITY FUTURES

9.3.3. ROLLING

The VSTOXX Short-Term Futures Index rolls futures positions on a daily basis. The roll period starts from, and includes, the monthly EUREX VSTOXX futures settlement date and runs up to, but excludes, the subsequent monthly Eurex VSTOXX futures settlement date.

Rolling between the first month future (F1) and the second month future (F2) takes place over n index business days. The weights allocated to each F1 and F2 on any given index business day t are determined as follows:

$$w_{1,t} = 100 \cdot \frac{p_t}{n}$$

$$w_{2,t} = 100 \cdot \frac{n-p_t}{n}$$

Where:

Roll period	= The period from, and including, the most recent Eurex VSTOXX futures settlement date up to, but excluding, the subsequent Eurex VSTOXX futures settlement date
n	= The total number of index business days in the current roll period
p_t	= The number of index business days remaining in the current roll period, starting with the following index business date up to and including the last index business day in the current roll period (Note:, on the last index business date of the period, $p_t = 0$)

At the close of the last index business day of any roll period (the index business day immediately preceding a Eurex VSTOXX futures settlement date) all of the weight is allocated to the second month Eurex VSTOXX futures contract. On the Eurex VSTOXX futures settlement date, the second month contract position becomes the first month contract at settlement. On the Eurex VSTOXX futures settlement date and on each subsequent index business day of the new roll period, a fraction of the first month contract is sold and an equal notional amount of the second month Eurex VSTOXX futures contract is bought. This way the allocation to the first month contract is progressively rolled into the following month contract over the roll period.

9.3.4. CONSEQUENCES OF AN INDEX DISRUPTION EVENT

If an index disruption event in relation to the Eurex futures contract occurs on index dissemination days, then the following applies:

STOXX Ltd. will calculate the value of the index based on the most recent middle futures prices published by Eurex and the roll for that day will be carried to the next index business day, as described in the roll period section.

If an exchange fails to open due to unforeseen circumstances, STOXX Ltd. may determine not to publish the index for that day.

In situations where an exchange introduces a holiday during the month of the index calculation, the index will not be published ,and the roll for that day will be carried to the next index business day, as described in the roll period section.

10. EURO STOXX 50 RISK CONTROL INDICES

10.1. OVERVIEW

With STOXX Risk Control indices a target volatility concept is applied to the EURO STOXX 50 Index and other STOXX indices. Whereas the risk profile of a standard index like the EURO STOXX 50 Index is the outcome of the existing market-cap weighted index concept, the EURO STOXX 50 Risk Control Index supervises the risk up to a target volatility of 5 percent, 10 percent, 12 percent,15 percent or 20 percent. In order to control for risk, the index shifts between a risk-free money market (measured by EONIA) and a risky investment (measured by the EURO STOXX 50 Index).

If on a daily basis the risk of the current EURO STOXX 50 Risk Control Index composition is below the targeted risk of 15 percent / 20 percent, the allocation will be adjusted towards the risky asset. If the current risk profile is above the targeted 20 percent, the allocation will be adjusted towards the risk-free component (EONIA).

- To avoid extreme leveraged positions, a maximum exposure of 150 percent towards the risky asset is introduced.
- A tolerance level of 5 percent around the target volatility of 15 percent / 20 percent is implemented to avoid high allocation turnover due to minimal deviations from the targeted risk level of 15 percent / 20 percent.
- To control for outliers, an average of the three past volatility observations is used. To determine the final asset allocation, the maximum of all 3-day averages over the past 20-days is considered.
- The future expected volatility of the EURO STOXX 50 Index (measured by the EURO STOXX 50 Volatility Index (VSTOXX)) is applied. This distinguishes the index from most existing concepts which take into account the historical volatility

10.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 Risk Control 10% (Total Return)	CH0118856118	RC10IVTR
EURO STOXX 50 Risk Control 10% (Excess Return)	CH0118856126	RC10IVER
EURO STOXX 50 Risk Control 12% (Total Return)	CH0118856134	RC12IVTR
EURO STOXX 50 Risk Control 12% (Excess Return)	CH0118856142	RC12IVER
EURO STOXX 50 Risk Control 15% (Total Return)	CH0117326766	RC15IVTR
EURO STOXX 50 Risk Control 15% (Excess Return)	CH0117326758	RC15IVER
EURO STOXX 50 Risk Control 20% (Total Return)	CH0116915981	SX5TRCTR
EURO STOXX 50 Risk Control 20% (Excess Return)	CH0116915973	SX5TRCER
EURO STOXX 50 Risk Control 5% (Total Return)	CH0118856159	RC05IVTR
EURO STOXX 50 Risk Control 5% (Excess Return)	CH0118856167	RC05IVER
<further indices as listed in the STOXX vendor code sheet>		

10.EURO STOXX 50 RISK CONTROL INDICES

10.3. CALCULATION

10.3.1. INDEX FORMULA

$$IndexTR_t = IndexTR_{t-1} \times \left[1 + w_{t-1} \times \left(\frac{SX5T_t}{SX5T_{t-1}} - 1\right) + (1 - w_{t-1}) \times \left((EONIA_{t-1} + x)\frac{Diff(t-1,t)}{360}\right)\right]$$

$$IndexER_t = IndexER_{t-1} \times \left(1 - EONIA_{t-1}\frac{Act(t-1,t)}{360}\right) \times$$

$$\left[1 + w_{t-1}\left(\frac{SX5T_t}{SX5T_{t-1}} - 1\right) + (1 - w_{t-1})\left((EONIA_{t-1} + x)\frac{Diff(t-1,t)}{360}\right)\right]$$

$IndexER_t$	Excess Return Index level on index level determination date t
$IndexER_{t-1}$	Excess Return Index level on index level determination date t -1
$IndexTR_t$	Net Return Index level on index level determination date t
$IndexTR_{t-1}$	Net Return Index level on index level determination date t -1
w_{t-1}	Equity Weight on index level determination date t - 1
$SX5T_t$	Level of the EuroStoxx50 Net Return on index level determination date t
$SX5T_{t-1}$	Level of the EuroStoxx50 Net Return on index level determination date t -1
$EONIA_t$	The EONIA rate on the index level determination date t
x	Cost of borrowing: If $w_{t-1} \leq 1$ x=0 otherwise x=50 Basis Points
Diff(t-1,1)	Difference between determination date t-1 and t measured in calendar days

10.3.2. DETERMINATION OF THE TARGET WEIGHT (TGTW)

On any index level determination date t, the target weight is to be determined as follows:

$$Tgtw_t = \frac{TgtVol}{Max_{i\in[t-19,t]}\left[AverageVSTOXX_{3,i}\right]}$$

TgtVol15% / 20%

Average $VSTOXX_{3,i}$	is the average of the close values of the VSTOXX for index level determination date i-2, i-1 and i
VSTOXX	is the close value of the VSTOXX index as published by STOXX Ltd. under the symbol V2TX
$Max_{i\in[t-19,t]}\left[AverageVSTOXX_{3,i}\right]$	is the maximum value of average $VSTOXX_{3,i}$ for i ranging from t-19 to t.

10.EURO STOXX 50 RISK CONTROL INDICES

10.3.3. DETERMINATION OF EQUITY WEIGHT (W) AND INDEX REBALANCING DAYS

The equity weight on the index start date is to be equal to the target weight at the index start date,

$$w_0 = \mathrm{Min}(\mathrm{Cap}, \mathrm{Tgtw}_0)$$

On any index level determination date t subsequent to the index start date, the equity weight is to be determined as follows:

(i) If $\mathrm{abs}\left\{1 - \frac{w_{t-1}}{\mathrm{Tgtw}_{t-1}}\right\} > \mathrm{Tolerance}$

then that index level determination date t will be an index rebalancing day and $w_T = \mathrm{Min}(\mathrm{Cap}, \mathrm{Tgtw}_{t-1})$

(ii) Otherwise, index level determination date t will not be an index rebalancing day and $w_t = w_{t-1}$

Tolerance	5%
$w_{t/t-1}$	Equity weight on index level determination date t / t – 1
Tgtw_{t-1}	Target weight on index level determination date t
Cap	150%

11. STOXX BLUE CHIP RISK CONTROL INDICES

11.1. OVERVIEW

A target volatility concept is applied to the STOXX BC Risk Control Indices. Whereas the risk profile of the underlying index is the uncontrolled outcome of the existing market-cap weighted index concept, the Risk Control Indices controls for risk by aiming for a target volatility of 5% (10%, 15% and 20%). In order to control for risk, the index shifts between a risk free money market investment (measured via EONIA for Europe, USD Libor Overnight for America, Asia and Global, GBP Libor Overnight for Great Britain as well as AUD Libor Spot Next for Oceania) and a risky part (measured by the respective underlying equity index).

11.2. BASIC DATA

Various versions of the STOXX Blue Chip Risk Control indices are available for a broad number of countries for target volatility of 5%, 10%, 15% and 20%. For more details please consult the Data Vendor Code sheet on the STOXX website[1].

11.3. CALCULATION

11.3.1. INDEX FORMULA

$$STOXXRC_t = STOXXRC_{t-1} \times \left(1 - IR_{t-1}\frac{Diff(t-1,t)}{360}\right) \times \left[1 + w_{t-1}\left(\frac{STOXXBC_t}{STOXXBC_{t-1}} - 1\right) + (1 - w_{t-1})\left((IR_{t-1})\frac{Diff(t-1,t)}{360}\right)\right]$$

where:

STOXX RC_t	Level of the STOXX Risk Control Index on Index Level
$STOXXRC_{t-1}$	Level of the STOXX Risk Control Index on Index Level Determination Date t -1
w_{t-1}	Equity Weight on Index Level Determination Date t
STOXX BCt	Level of the underlying Blue Chip Index on Index Level Determination Date t
STOXXBCt-1	Level of the underlying Blue Chip Index on Index Level Determination Date t -1
IR_{t-1}	Interest rate on the Index Level Determination Date t-1 (according to above given allocation)
Diff(t-1,t)	Difference between t-1 and t measured in calendar days

Region / Country	Interest rate (currency)
Americas	USD-LIBOR
Europe / Eurozone	EUR-EONIA
UK	GBP-LIBOR
Oceania	AUD-LIBOR
Asia	USD-LIBOR
Latam	USD-LIBOR
BRIC	USD-LIBOR
Global	USD-LIBOR

[1] http://www.stoxx.com/

11.STOXX BLUE CHIP RISK CONTROL INDICES

11.3.2. DETERMINATION OF THE TARGET WEIGHT

On any Index Level Determination Date t, the Target Weight shall be determined as follows:

$$Tgtw_t = \frac{TgtVol}{MaxRealizedVol_{t,(20,60)}}$$

where:

$TgtVol = 10\%$

$MaxRealizedVol_{20,60}$ is the maximum of the realized volatilities measured over 20 days and 60 days

$$RealizedVol_{t,n} = \sqrt{\frac{252}{n} \cdot \sum_s \left[\log\left(\frac{STOXXBC_s}{STOXXBC_{s-1}} \right) \right]^2}$$

where:

n	19 (59)
s	ranging from t-18 to t (t-58 to t)

11.3.3. DETERMINATION OF THE EQUITY WEIGHT AND INDEX REBALANCING DAYS

The Equity Weight on the Index Start Date shall be equal to the Target Weight at the Index Start Date,

$$w_0 = Min(Cap, Tgtw_0)$$

On any Index Level Determination Date t subsequent to the Index Start Date, the Equity Weight shall be determined as follows:

(i) If $abs\left\{1 - \frac{w_{t-1}}{Tgtw_{t-1}}\right\} > Tolerance$

then the Index Level Determination Date t will be an Index Rebalancing Day and

$$w_t = Min(Cap, Tgtw_{t-1})$$

(ii) Otherwise, Index Level Determination Date t will not be an Index Rebalancing Day and

$$w_t = w_{t-1}$$

where:

Tolerance	5%
$w_{t/t-1}$	Equity Weight on Index Level Determination Date t / t – 1
$Tgtw_{t-1}$	Target Weight on Index Level Determination Date t-1
Cap	150%

12. EURO STOXX 50 INVESTABLE VOLATILITY

12.1. OVERVIEW

Volatility is a measure of the level of uncertainty prevailing in certain markets. In principle, there are two different approaches to estimating volatility. Historical volatility involves measuring the standard deviation of historical closing prices for any particular security over a given period of time. Implied volatility is derived from option prices; this kind of volatility represents the estimates and assumptions of market participants involved in a trade, on the basis of a given option price.

The VSTOXX index (calculated by STOXX) is a measure of current implied volatility, as measured using EURO STOXX 50 index options. Because the VSTOXX index is calculated using spot implied volatility levels, however, the returns of the VSTOXX index are not directly replicable.

The EURO STOXX 50 Investable Volatility index is a volatility index which provides exposure to forward implied volatility in a form which can be directly replicated. The EURO STOXX 50 Investable Volatility index is designed as a rolling index which targets a constant 3-month (90-day) forward, 3-month maturity volatility exposure. The index is calculated entirely using VSTOXX sub-index levels calculated and published by STOXX.

The model for the EURO STOXX 50 Investable Volatility index aims at making volatility tradable – i.e. the daily returns of the index should be replicable through holding a portfolio of liquid derivative instruments. As a result, rather than linking the index level to current spot implied variance levels, as in the calculation of the main VSTOXX index, the EURO STOXX 50 Investable Volatility index returns on a daily basis are linked to the movement in forward volatility levels between EURO STOXX 50 option expiries determined using the spot implied variance level to each option expiry (as implied by the VSTOXX sub-index level for each expiry.)

The EURO STOXX 50 Investable Volatility index has been jointly developed by Bank of America Merrill Lynch and STOXX. It offers great advantages in terms of transparency and the trading and hedging of tracking products linked to the index.

12.2. BASIC DATA

Index	ISIN	Symbol
EURO STOXX 50 Investable Volatility (Total Return)	CH0116915965	IVSTXTR
EURO STOXX 50 Investable Volatility (Excess Return)	CH0117221314	IVSTXER

12.EURO STOXX 50 INVESTABLE VOLATILITY

12.3. CALCULATION

12.3.1. INPUT DATA

During the calculation time for the EURO STOXX 50 Investable Volatility index the following data are used (via snapshots every 60 seconds):

VSTOXX - EURO STOXX 50 Volatility index levels for the first, second and third month expiry and the second and third quarterly expiries.

EONIA - Euro Overnight index Average – overnight interest rate

Index Name	Expiry	Code	ISIN
VSTOXX 1M	First month	VSTX1M	DE000A0G87B2
VSTOXX 2M	Second month	VSTX2M	DE000A0G87C0
VSTOXX 3M	Third month	VSTX3M	DE000A0G87D8
VSTOXX 6M	Second quarter	VSTX6M	DE000A0G87E6
VSTOXX 9M	Third quarter	VSTX9M	DE000A0G87F3

12.3.2. UNDERLYING VSTOXX SUB-INDICES

Apart from the main VSTOXX index (which has no specific time to expiry), sub-indices for each time to expiry of the EURO STOXX 50 options, ranging from one month to two years, are calculated and distributed. The various VSTOXX sub-indices are calculated on the basis of all options available. The calculations are based on the best bid and best ask available for these options in the Eurex system.

The EURO STOXX 50 Investable Volatility index is calculated using forward implied volatility levels between quarterly EURO STOXX 50 option expiry dates by directly referencing VSTOXX sub-index levels representing spot implied volatility for each option expiry date.

12.3.3. COMPOSITE VSTOXX 3M

The VSTOXX 3M Composite represents a quarterly rolling 'front quarter' variance contract, which rolls on the EURO STOXX 50 quarterly option expiry date in line with the VSTOXX 6M and VSTOXX 9M sub-indices.

The VSTOXX 3M Composite is calculated according to the formulas shown below:

(1) VSTOXX 3M Comp. (t) = VSTOXX 1M* (t); if t ≤1M before the next quarterly expiry date

VSTOXX 2M (t); if 1M<t ≤ 2M before the next quarterly expiry date

VSTOXX 3M (t); if 2M<t ≤ 3M before the next quarterly expiry date

and:

» VSTOXX 1M* (t) is equal to VSTOXX 1M* (t-1) where t ≤ 2D before the next quarterly expiry date

» VSTOXX 1M* (t) is equal to VSTOXX 1M (t) otherwise

12.EURO STOXX 50 INVESTABLE VOLATILITY

12.3.4. FORWARD-STARTING IMPLIED VOLATILITY LEVELS

3-month forward-starting implied volatility levels for the period between the first quarter and second quarter, and second quarter and third quarter

(2) $$FSV_{3M-6M}(t) = \sqrt{\frac{TM_{6M}(t) \times VSTOXX\ 6M^2(t) - TM_{3M}(t) \times VSTOXX\ 3M\ Comp^2(t)}{TM_{6M}(t) - TM_{3M}(t)}}$$

(3) $$FSV_{6M-9M}(t) = \sqrt{\frac{TM_{9M}(t) \times VSTOXX\ 9M^2(t) - TM_{6M}(t) \times VSTOXX\ 6M^2(t)}{TM_{9M}(t) - TM_{6M}(t)}}$$

and:

- TM3M (t) is the number of calendar days remaining until the next quarterly EURO STOXX 50 options expiry date (in March, June, September or December).
- TM6M (t) is the number of calendar days remaining until the subsequent quarterly EURO STOXX 50 options expiry date.

12.3.5. WEIGHTINGS

The weightings applied to each of the forward-volatility levels are calculated on the basis of the number of days to the forward-start date of each, with the target of a 3-month weighted average time to maturity, according to the formulas shown below.

(4) $$\omega_{3M-6M}(t) = \frac{TM_{6M}(t) - ATM}{TM_{6M}(t) - TM_{3M}(t)}$$; where $TM_{3M}(t) \geq 7$ days

(5) $\omega_{3M-6M}(t) = 0\%$; otherwise

(6) $\omega_{6M-9M}(t) = 100\% - \omega_{3M-6M}(t)$

(7) $$U_{3M\text{-}6M}(t) = \frac{ICV(t) \times \omega_{3M\text{-}6M}(t)}{FSV_{3M\text{-}6M}(t)};$$

(8) $$U_{6M\text{-}9M}(t) = \left[U_{6M\text{-}9M}(t-1) - U_{3M\text{-}6M}(t)\right] \times \frac{FSV_{3M\text{-}6M}(t)}{FSV_{6M\text{-}9M}(t) \times (1 + 0.75\%)}$$.; if t-1 was a quarterly option expiry date

$$U_{6M\text{-}9M}(t) = U_{6M\text{-}9M}(t-1) + \left[U_{3M\text{-}6M}(t-1) - U_{3M\text{-}6M}(t)\right] \times \frac{FSV_{3M\text{-}6M}(t)}{FSV_{6M\text{-}9M}(t) \times (1 + 0.75\%)}$$; otherwise

and

- ATM=90 days (the target time to expiry);
- TM3M (t) is the number of calendar days remaining until the next quarterly EURO STOXX 50 options expiry date (in March, June, September or December);
- TM6M (t) is the number of calendar days remaining until the subsequent quarterly EURO STOXX 50 options expiry date;
- IV(t) is the EURO STOXX 50 Investable Volatility index base index level, calculated as described below (where IV(0) = 100 as at the index inception date).

12.EURO STOXX 50 INVESTABLE VOLATILITY

12.3.6. INDEX CALCULATION

The EURO STOXX 50 Investable Volatility index levels are calculated according to the formulas shown below.

(9) $$IV(t) = U_{3M\text{-}6M}(t-1) \times FSV_{3M\text{-}6M}(t) + U_{6M\text{-}9M}(t-1) \times FSV_{6M\text{-}9M}(t)$$

(10) $$IVSTX\ ER\ (t) = IVSTX\ ER\ (t-1) \times \left(1 + 1.5 \times \left[\left(\frac{IV\ (t)}{IV\ (t\text{-}1)} - 1\right)\right]\right)$$

(11) $$IVSTX\ TR\ (t) = IVSTX\ TR\ (t-1) \times \left(\frac{IVSTX\ ER\ (t)}{IVSTX\ ER\ (t-1)} + EONIA(t-1) \times \frac{DC(t)}{360}\right)$$

(12) $$IVSTXVOL = \omega_{3M-6M}(t) \cdot FSV_{3M-6M}(t) + \omega_{6M-9M}(t) \cdot FSV_{6M-9M}(t)$$

and:

- IVSTX ER(0) = 100 as at the index inception date
- IVSTX TR(0) = 100 s at the index inception date
- DC(t) is the number of calendar days from (and including) day t-1 to (but excluding) day t
- EONIA (t-1) is the daily Effective Overnight index Average (EONIA) fixing for day t-1

12.3.7. INDEX DISRUPTIONS

In order to account for abnormal market conditions (e.g. mistrades) a filter mechanism is applied: if a VSTOXX sub-index should deviate by more than 20 percent from the preceding index value, the index dissemination is suspended. The index is resumed if

- the calculated index value deviates by not more than 20 percent from the last published value or
- the index movement is considered to be caused by regular market conditions

Should any of the underlying indices used in the calculation of the EURO STOXX 50 Investable Volatility index be suspended, the index will remain stable until all sub-indices are available.

13. STOXX GLOBAL FX HEDGED INDICES

13.1. OVERVIEW

A currency-hedged index is designed to represent returns for global index investment strategies that involve hedging currency risk, but not the underlying constituent risk. The currency-hedged strategy indices eliminate the risk of currency fluctuations at the cost of potential currency gains.
The STOXX Global Blue-Chip Indices are offered in the following hedged versions:

- EUR Hedged
- USD Hedged
- GBP Hedged
- CHF Hedged
- JPY Hedged
- RMB Hedged

13.2. BASIC DATA

Index	ISIN	Symbol
< indices as listed in the STOXX vendor code sheet>		

13.3. CALCULATION

The currency hedged methodology follows a standard portfolio approach when hedging currency risk by writing currency forwards:

$$H\_IDX_t = H\_IDX_0 \cdot \left(\underbrace{\frac{UH\_IDX_t}{UH\_IDX_0}}_{\text{Performance of unhedged index}} + \sum_{c=1}^{C} HR^c \cdot \left(\underbrace{\frac{FX_0^c}{FF_0^c}}_{\text{Cost to hedge on the forward contract}} - \underbrace{\frac{FX_0^c}{IFF_t^c}}_{\text{Estimated gain or loss}} \right) \right)$$

$$IFF_t^c = FX_t^c + \left(1 - \frac{t}{T}\right) \cdot \left(FF_t^c - FX_t^c\right)$$

where:

H_IDX	= Hedged index
UH_IDX	= Unhedged reference index (in hedged currency)
t=0	= last calculation day of preceding month
t	= day of index calculation / number of calender days since t=0
T	= number of calendar days in current month
C	= number of different currencies to be hedged

13.STOXX GLOBAL FX HEDGED INDICES

HR = currency hedge ratio
FX = Spot Rate (hedged currency / currency c)
FF = Forward Rate (hedged currency / currency c)

The hedge ratio can be varied to arrive at index portfolios that are over- and under-hedged to varying degrees. Furthermore it can be used to hedge multi-currency portfolios:

$$HR^c = \sum_{n=1}^{N_c} w_n$$

where:
Nc = number of constituents with currency c
wn = weight of constituent n in the reference index