

INDEX RULE BOOK

Dividend Indices

VCAC[®] Index

VAEX[®] Index

Version 16-01

Effective from 1 July 2016

indices.euronext.com

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1. INDEX SUMMARY

Factsheet	Volatility Indices
Index names	VCAC® VAEX®
Index type	Strategy, based on option market prices
Underlying Index	CAC 40, AEX
Base Currency	Euro

Note: the factsheet is a summary of the rule book for information purposes only. The text of the rule book is leading.

Reference Data

Index name	Isincode	Mnemo	Bloomberg Code	Reuters code	Base date	Base value	Publication since
CAC 40® Volatility Index	QS0011052139	VCAC	VCAC	.VCAC	n.a.	n.a.	03-09-07
AEX® Volatility Index	QS0011052147	VAEX	VAEX	.VAEX	n.a.	n.a.	03-09-07

2. GOVERNANCE AND DISCLAIMER

2.1 INDICES

This rule book applies to the following indices (hereinafter “index”) owned by Euronext N.V. or its subsidiaries (hereinafter jointly “Euronext”):

- VCAC® Index
- VAEX® Index

2.2 SUPERVISOR AND COMPILER

Euronext is the supervisor (“Supervisor”) and compiler of the index (“Compiler”). The Supervisor is responsible for monitoring the selection of constituents for the index and ensuring that the index offers a reliable and representative view of the market. The Compiler is responsible for the day-to-day management of the index and is also responsible for decisions regarding the interpretation of these rules.

2.3 CASES NOT COVERED IN RULES

In cases which are not expressly covered in these rules, operational adjustments will take place along the lines of the aim of the index. Operational adjustments may also take place if, in the opinion of the Compiler, it is desirable to do so to maintain a fair and orderly market in derivatives on this index and/or this is in the best interests of the investors in products based on the index and/or the proper functioning of the markets. The Compiler will report to the Supervisor if it took a decision about a case which is not specifically covered in the rules for comments and review.

2.4 RULE BOOK CHANGES

These rules may be supplemented, amended in whole or in part, revised or withdrawn at any time. Supplements, amendments, revisions and withdrawals may also lead to changes in the way the index is compiled or calculated or affect the index in another way. The Compiler will submit all decisions regarding supplementing, amending, revising or withdrawing these rules to the Supervisor for recommendations or approval.

2.5 LIABILITY

Euronext, the Compiler and the Supervisor are not liable for any losses resulting from supplementing, amending, revising or withdrawing the rules for the index.

The Compiler will do everything within its power to ensure the accuracy of the composition, calculation, publication and adjustment of the index in accordance with relevant rules. However, neither Euronext, nor the Compiler, nor the Supervisor are liable for any inaccuracy in index composition, share prices, calculations and the publication of the index, the information used for making adjustments to the index and the actual adjustments. Furthermore, Euronext, the Compiler and the Supervisor do not guarantee the continuity of the composition of the index, the continuity of the method of calculation of the index, the continuity of the dissemination of the index levels, and the continuity of the calculation of the index.

2.6 OWNERSHIP AND TRADEMARKS

Euronext owns all intellectual and other property rights to the index, including the name, the composition and the calculation of the index. AEX®, AEX-Index®, CAC® and CAC 40® are registered trademarks of Euronext.

3. CALCULATION AND PUBLICATION

3.1 DISSEMINATION OF INDEX VALUES

3.1.1 Calculation and dissemination

The index is calculated daily and published every 15 seconds on the days when the Euronext Markets are open for trading.

3.2 OPENING

Dissemination of index values will start at 09:05 on the days when the Euronext Markets are open for trading.

3.3 CALCULATION CONDITION

The Compiler may set a minimum number of valid data points. If this condition is not met, the previous level will be published.

4. CALCULATION

4.1 GENERAL

The Volatility Indices are calculated according to a formula that is based on the VIX methodology. This methodology is enhanced in order to take into account specific characteristics of the underlying option markets.

4.2 CALCULATION FORMULA

The Index is a rolling index that assumes a constant 30 days horizon. The 30 days is arrived at by time weighted interpolation of the two sub-indices that are nearest to the remaining time to expiry of 30 days (T_1 and T_2 are the two expiry dates of the Monthly option series).

- Option prices are excluded when:
 - ITM
 - $\frac{Ask - Bid}{0.5 * (Ask + Bid)} > 0.5$
- ATM strike is the strike which minimize the $ABS(C_{mid} - P_{mid})$

The interpolated volatility of the index is calculated using the formula:

$$VOLIND = 100 * \sqrt{\left[T_1 \sigma_1^2 \left(\frac{N_{T_2} - N_T}{N_{T_2} - N_{T_1}} \right) + T_2 \sigma_2^2 \left(\frac{N_T - N_{T_1}}{N_{T_2} - N_{T_1}} \right) \right] * \frac{N_{365}}{N_T}}$$

Where:

N_{T_i} number of seconds to expiry of the i^{th} maturity of the index option

N_T number of seconds NDAYS (NDAYS=30) days

N_{365} number of seconds for a standard year

Determining the time to expiry T_i (expressed in fraction of year)

$$T_i = \frac{T_{settlement-calculation}}{T_{year}} = \frac{N_{T_i}}{N_{365}} \quad \text{is expressed in fraction of year}$$

Determine the volatility of expiry σ_i

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

Where:

T_i time to expiry of the i^{th} maturity

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

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

$K_{i,j}$ Exercise price of the j^{th} out-of-the-money option of the i^{th} 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 the second highest exercise price (or lowest and second lowest exercise price) is used:

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

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

R_i Refinancing factor of the i^{th} expiry, $R_i = E^{r_i * T_i}$

r^i risk-free interest rate to expiry of the i^{th} maturity

$M(K_{i,j})$ Price of the option (call or put) $K_{i,j}$, where $K_{i,j} \neq K_{i,0}$