![EURONEXT]

EURONEXT DERIVATIVES CORPORATE ACTIONS POLICY

Issued: 27 October 2017
Effective: 27 October 2017

CONTENTS

1.   INTRODUCTION

1.1   This Policy Document details the policy of Euronext Derivative Markets in relation to Corporate Actions. It is issued pursuant to, and should be read in conjunction with, the terms of the relevant formal contract specifications and Trading Procedures.

1.2   This Policy Document explains Euronext's policy in relation to Corporate Actions in respect of:

   a.   Option Contracts (as defined in section 2.1); and

   b.   Futures Contracts (as defined in section 2.1).

1.3   This Policy Document is structured as follows:

   a.   section 2 defines terms used throughout this Policy Document;

   b.   section 3 provides background information;

   c.   section 4 describes Euronext's policies and conventions in respect of Corporate Actions;

   d.   section 5 outlines the methodology to be used to formulate adjustments in respect of Option Contracts and Futures Contracts; and

   e.   section 6 outlines the Corporate Action types and the adjustment methodology.

   f.   the Appendices provide further information on the calculation of Fair Value and Equalisation Payments for Option Contracts and Futures Contracts.

2. DEFINITIONS

2.1 The following provisions apply to, or should be noted in connection with, the interpretation of this Policy Document:

Adjustment Ratio	means the ratio that will be multiplied by the Daily Settlement Prices and/or Exercise Prices, and by which Lot Sizes will be divided, in order to adjust contract terms to cater for a Corporate Action
Amsterdam Contracts	means Option and Futures Contracts that are listed on Euronext Amsterdam
Amsterdam Option Contracts	means Option Contracts that are listed on Euronext Amsterdam
Brussels Contracts	means Option and Futures Contracts that are listed on Euronext Brussels
COB Option Contracts	Means Options Contracts which are available through the Euronext Central Order Book markets.
Corporate Action Notice	means a Notice issued to the market containing information concerning contract adjustments
Corporate Action	means a. a cash and/or scrip dividend, a bonus or scrip issue, a rights issue, a share split, subdivision or consolidation, a demerger or any other event affecting or giving rise to a right or entitlement attaching or accruing to the Shares of, or ownership of Shares in, a company; or b. a takeover, merger or any arrangement, transaction or series of transactions which will or may result in the acquisition by any person or persons or any associated person or persons of a substantial proportion of the Shares of a company; or c. any other event which, in the opinion of Euronext, necessitates an amendment to be made to terms of an Option Contract and/or Futures Contract in respect of the Shares of a company
Cum entitlement	Means, in respect of a share, with the right, before a date determined and published from time to time by the Relevant Stock Exchange, to any Relevant Entitlement relating thereto
Daily Settlement Price	means the price calculated and published by Euronext and which is used by the Clearing House to perform daily margin calculations
Delivery Buyer	means the person who is obliged to take delivery of one lot pursuant to the exercise or assignment of an option
Delivery Seller	means the person who is obliged to make delivery of one lot pursuant to the exercise or assignment of an option
EDSP	means the Exchange Delivery Settlement Price, as defined in the relevant contract specifications
Ex entitlement	means, in respect of a share, without the entitlement, on or after a date determined and published from time to time by the Relevant Stock Exchange, to any Relevant Entitlement relating thereto

Exercise	means to use the right one has as the holder of an option
Fair Value	means the price calculated by Euronext when Option Contracts and/or Futures Contracts are closed out for a cash amount, after a merger or takeover or delisting
Flex Option Contracts	means flexible Individual Equity Options which are exclusively available through the Euronext derivatives matching facility AtomX
Futures Contracts	means collectively the term for (i) futures contracts on individual Shares (cash settlement and physical delivery) and (ii) Single Stock Dividend Futures
Last Trading Day	means the last market day on which a contract is available for trading
Lot Size	means the number of underlying Shares or baskets of Shares of one Option Contract or Futures Contract
Minimum Price Movement	means the tick size of a contract, as defined in the relevant contract specifications or Trading Procedures
Euronext	means, as the context requires, one or all of the following Relevant Euronext Market Undertakings where Option Contracts and Futures Contracts are made available for trading, including Amsterdam, Brussels, Lisbon and Paris
Open Interest	means the number of positions held at the close of any one business day
Option Contracts	means Option Contracts (cash settlement & physical delivery), listed on Euronext, on individual Shares or Exchange Traded Funds ("ETF")
Package Method	means a method of adjusting contract specifications for existing contracts to cater for Corporate Actions, in which the original underlying deliverable is substituted by a package of other Shares or deliverable security
Policy Document	means this document
Ratio Method	means a method of adjusting contract specifications for existing contracts to cater for Corporate Actions, where the relationship between the contract before and after the event is altered using a ratio specified by Euronext
Relating Option or Future Contract	means, in case of Single Stock Dividend Futures, an Option Contract or futures contract on individual Shares whereby the underlying Shares of the Relating Option or Future Contract are the source of the underlying dividend of the Single Stock Dividend Future.
Reference Price	means the price specified by Euronext and which shall be used as a reference price to determine the adjustments to be made further to a Corporate Action
Relating COB Contract	means the COB Option Contract which has the same underlying value as the Flex Option Contract
Relevant Entitlement	means any one or more of a cash dividend, scrip dividend, bonus issue, scrip issue, rights issue, or any other right or entitlement, attaching or accruing to, or otherwise affecting, from time to time, a share or

	ownership of a share
Relevant Stock Exchange	means the primary stock exchange on which such Shares are available for trading
Scrip Dividend	A dividend payment where shareholders have the right to choose whether to receive a cash dividend or Shares.
Shares	means, as the context requires, the relevant security, depository receipt or other such instrument which is the subject of the underlying of the relevant contract
Single Stock Dividend Futures	Means futures contracts on projected dividend(s) on individual Shares (cash settlement).
Standard Lot Size	means the number of underlying Shares in a contract, other than an O-class contract and Single Stock Dividend Futures, as specified in the relevant contract specifications
Stock Dividend	A dividend payment made in the form of additional Shares.
Trading Code	means the code under which the contract or class of contracts is trading on UTP$^{®}$
Underlying Currency Unit	means the currency of denomination of the underlying deliverable which is the subject of a lot

3.   BACKGROUND

3.1   The publication of this Policy Document is intended to minimise uncertainty over the method of contract adjustment to be adopted by Euronext when a company announces a Corporate Action and, consequently, to limit any unanticipated effect on contract prices when Euronext thereafter announces its specific intentions on the contract adjustment.

3.2   Euronext envisages that, in most situations, contracts will be adjusted in accordance with this Policy Document. However, it should be noted that in certain circumstances this may not be possible or appropriate, and Euronext retains the right to determine how contracts should best be adjusted (if at all).

3.3   Euronext will issue one or more Corporate Action Notices in respect of each Corporate Action where adjustment to an Option Contract or Futures Contract is required or expected under the terms of this Policy Document.

4.   POLICY AND CONVENTIONS

4.1   APPLICATION OF ADJUSTMENTS

The methodology detailed in this Policy Document is based on the principle that, when the Shares underlying an Option Contract (which has not been exercised) or a Futures Contract become ex entitlement, contracts on such Shares should be amended to reflect in economic terms (as far as practicable) a holding equivalent to the ex-entitlement Shares and the Relevant Entitlement, and may be effected as follows:

■ by altering the exercise prices of Option Contracts, creating Reference Prices for use as the basis for the determination of variation margin flow for Futures Contracts; and the Lot Size of the respective contracts; or

■ by substituting the underlying Shares in a proportion determined by the ex-entitlement holding with the new underlying Shares; or

■ by settling (closing) Option Contracts and Futures Contracts at their respective Fair Value.

Where the timing of a Corporate Action requires an adjustment to be made to Option Contracts or Futures Contracts prior to authorisation from shareholders, regulatory bodies or any other such party that has power to disqualify the Corporate Action, such adjustments will be made in order to maintain the contract's relationship with the underlying Shares. Adjustments made in the above manner are irrevocable, irrespective of whether approval is or is not obtained.

4.2   ADJUSTMENT OF LOT SIZE

For Futures Contracts, the lot size of all delivery months up to and including the furthest delivery month with open interest shall be adjusted by being divided by the ratio. For Option Contracts, the lot size of all expiry months up to and including the furthest maturity with open interest shall be adjusted by being divided by the ratio.

4.3   ROUNDING

Where application of the Ratio Method results in an adjusted exercise price that is not equal to an eligible exercise price in accordance with the relevant contract terms and/or trading procedures the exercise price will be rounded to the nearest eligible exercise price, and in the event that the unrounded exercise price is exactly halfway between two eligible exercise prices, then it shall be rounded up to the next eligible exercise price. Where application of the Ratio Method results in a rounded exercise price that is equal to zero, all open positions in that specific series will be cancelled and cash settled at intrinsic value, as determined on the business day preceding the Effective Date of the Corporate Action.

When the Ratio Method is applied, the resultant Reference Price will be rounded to the nearest increment of the Minimum Price Movement, or to such number of decimal places determined and advised by Euronext and in the event that the unrounded Reference Price is exactly halfway between two eligible Reference Prices, then it shall be rounded up to the next eligible Reference Price.

Where the application of the Ratio Method results in a Lot Size which is not equal to an increment of one share, the adjusted Lot Size will be rounded, to the nearest whole share, and in the event that the unrounded Lot Size is exactly halfway between two eligible Lot Sizes, then it shall be rounded up to the next eligible Lot Size. Where the application of the Ratio Method results in a rounded Lot Size that is equal to zero, all open positions in the contract will be cancelled and cash settled using the equalisation payment methodology (see section 4.5).

4.4   O-CLASS CONTRACTS

With respect to Amsterdam Contracts and Brussels Contracts, except those Amsterdam Option Contracts that have an underlying value that is listed Deutsche Boerse (Xetra), where application of the Ratio Method results in a Lot Size that is greater than the Standard Lot Size, Euronext will introduce an additional contract that will contain those Shares which are in excess of the Standard Lot Size (the O-class). Apart from the different Lot Size, the O-class will have the same specifications as the adjusted original contract. Therefore, holders of a position will still hold existing contracts with a Standard Lot Size and receive one additional contract for every existing contract held, that will contain Shares in excess of the Standard Lot Size. The additional contracts introduced will be designated with a Trading Code that usually has an "O" placed at the end of the Trading Code (hence "O-class"), and where this is not possible, with another letter.

If application of the Ratio Method results in a Lot Size that is smaller than the Standard Lot Size, Euronext will change the Trading Code of the contract, to become an O-class. At Euronext's discretion, contracts with the same expiry months as the affected contracts may be introduced with the Standard Lot Size, and will be designated with the original Trading Codes as the existing contract prior to adjustment.

No new strike prices, maturities and/or expiry months will be made available for O-class contracts.

4.5   EQUALISATION PAYMENTS

For Option Contracts, an equalisation payment will be made to neutralise the effect observed due to rounding of the Lot Size as mentioned in section 5.1. (as described in Appendix 2).

The equalisation payment amount will be determined by Euronext and its transfer between clearing members arranged by LCH.Clearnet.

4.6   NOTIFICATION OF CORPORATE ACTIONS

Euronext will inform participants of Corporate Actions via publication of a Corporate Action Notice. A Corporate Action Notice will be published in respect of a Corporate Action when information made public by the company gives sufficient certainty of that company's intention to effect a Corporate Action. A Corporate Action Notice will detail the adjustment methodology Euronext intends to apply, and the subsequent application of such adjustment, ceteris paribus.

Where necessary, at the close of business on the last day that a company's Shares are trading cum entitlement, Euronext will publish a Corporate Action Notice confirming adjustments made to Option Contracts or Futures Contracts.

5. ADJUSTMENT METHODOLOGIES

Where adjustments to the terms of a contract are required under the terms of this Policy to cater for a Corporate Action, Euronext shall use either of the Ratio Method or the Package Method, or substitute the underlying Shares of a contract.

In cases where it is inappropriate or impossible to adjust contracts in line with the below methodologies, or in cases where the Corporate Action is an event other than those listed in section 6 of this Policy Document, Euronext will have regard, as far as practicable, to the principle detailed in paragraph 4.1 above in determining the appropriate adjustment.

5.1 RATIO METHOD

Where the Ratio Method is used to make adjustments to Option Contracts and Futures Contracts, Euronext will disclose the adjustment ratio if known or the equation necessary to calculate the ratio. The following conventions will apply for an application of the Ratio Method:

■ The adjustment ratio shall be calculated by dividing the ex-entitlement holding (or value thereof) by the cum entitlement holding (or value thereof), such that:

$$Adjustment\ Ratio = \frac{Ex\ entitlement\ holding}{Cum\ entitlement\ holding}$$

■ The adjustment ratio will be rounded, using normal mathematical rounding conventions, to eight (8) decimal places.
■ Application of the adjustment ratio with respect to exercise prices, the creation of Reference Prices, and Lot Sizes will be made with the rounded adjustment ratio.

For **Option Contracts** the ratio is used to alter the Lot Size (by dividing the lot size by the ratio) and the exercise price of each series (by multiplying the exercise price by the ratio). On exercise, Delivery Sellers are required to deliver the adjusted number of ex entitlement Shares in return for a consideration of the adjusted exercise price multiplied by the adjusted Lot Size.

Equalisation payments will be made for all **Option Contracts** to neutralise the effect observed due to rounding of the Lot Size (see section 4.5).

In the case of **Futures Contracts**, the ratio is used to alter the Lot Size (by dividing the Lot Size by the ratio) and to create the Reference Price of each contract (by multiplying the previous business day's Daily Settlement Price by the ratio). For **Amsterdam Contracts** and **Brussels Contracts**, where application of the Ratio Method results in a Lot Size that is greater than the Standard Lot Size, an additional contract will be introduced which contains the Shares which are in excess of the Standard Lot Size (the O-class, see section 4.4).

5.2 PACKAGE METHOD

The Package Method entails substituting the underlying Shares in a contract with a package of the ex-entitlement Shares and the proportionate number of entitlements.

In the case **of physical delivery Option Contracts**, on exercise, Delivery Sellers are required to deliver the ex-entitlement Shares and the proportionate number of entitlements in consideration for the exercise price multiplied by the Lot Size. Fractions of Shares will be settled in cash. No adjustment will be made to the lot size or exercise prices.

In the case of **cash settlement Option Contracts** on exercise, the EDSP will be determined by aggregating the components which form the package. Daily Settlement Prices will not be adjusted to create Reference Prices and no adjustment will be made to the lot size or to the Trading Code.

In the case of **cash settlement Futures Contracts**, the ex-event EDSP will be determined by aggregating the components which form the package. Daily Settlement Prices will not be adjusted to create Reference Prices and no adjustment will be made to the lot size or to the Trading Code.

On the Last Trading Day of **physical delivery Futures Contracts**, Delivery Sellers are required to deliver the number of ex-entitlement Shares they have contracted to sell together with the proportionate number of entitlements. Fractions of Shares will be settled in cash. Daily Settlement Prices will not be adjusted to create Reference Prices and no adjustment will be made to the lot size or to the Trading Code.

In all cases, no new delivery months will be introduced where the Package Method has been applied.

Where an underlying share in a created package is itself subject to a corporate action for which the ratio method is applicable, Euronext may adjust the number of the relevant Shares in the package. No adjustment will be made to the lot size or exercise prices.

6. CORPORATE ACTION TYPES

The following section details the adjustment methodology Euronext will apply to Option Contracts and Futures Contracts to determine what adjustments (if any) will be applied to cater for the following Corporate Actions:

- Bonus issues
- Stock splits and reverse stock splits
- Subdivision or consolidation of share capital
- Rights issues and open offers
- Dividends
- Demergers
- Liquidation
- Mergers and takeovers
- Share repurchases

As noted, Euronext retains the right to determine how any particular Corporate Action will be reflected in contract adjustments. However, as a general rule, the following provides details of the methodology applied to cater for the above Corporate Actions.

In cases in which not all shareholders are entitled to the Relevant Entitlement, Euronext will decide on a case by case basis whether an adjustment needs to be made. In doing so, Euronext will have regard, as far as practicable, to the principle detailed in paragraph 4.1.

6.1 BONUS ISSUES, STOCK SPLITS, REVERSE STOCK SPLITS, SUBDIVISIONS OR CONSOLIDATIONS OF SHARE CAPITAL

The Ratio Method will be used to adjust Option Contracts and Futures Contracts to cater for a bonus issue, stock split, reverse stock split, subdivision or consolidation of Shares.

The ratio shall be constructed as follows:

$$Adjustment\ Ratio = \frac{(P-E) \times \left(\dfrac{O}{N}\right)}{P}$$

Where:

P = The official closing price[1] of the cum entitlement Shares on the Relevant Stock Exchange
E = Value of the entitlement per share
O = Cum amount of Shares (old)
N = Ex amount of Shares (new)

For bonus issues, stock splits-, reverse stock splits, subdivisions or consolidations, P and E are irrelevant. Therefore the formula for the adjustment ratio for bonus issues, stock splits reverse stock splits, subdivisions or consolidations simply reads:

$$Adjustment\ Ratio = \frac{O}{N}$$

---

[1] Or such other price as defined in the relevant Corporate Action Notice.

In the case that the ratio results in a Lot Size divisible by the standard Lot Size to an exact integer, the open interest shall be adjusted rather than the Lot Size in order to maintain the equivalent economic exposure pre and post event.

6.2   RIGHTS ISSUES AND OPEN OFFERS

The Ratio Method will be used to adjust Option and Futures Contracts to cater for rights issues and open offers. The adjustment ratio will be calculated by creating a ratio of the theoretical ex-entitlement share price to the cum entitlement share price.

For the avoidance of doubt, Euronext will make adjustments to Option Contracts and Futures Contracts where the entitlement issue creates an exclusive entitlement to existing shareholders, irrespective of the tradability of the entitlement. Euronext will interpret a rights issue or an open offer to shareholders as a Corporate Action that creates an exclusive entitlement to shareholders, insofar that the entitlement has positive value.

Calculations of the value of the entitlement and the adjustment ratio for a straightforward issue are as follows:

Value of the Relevant Entitlement per share

$$E = \frac{(P - d - S)}{\left(\dfrac{h}{r} + x\right)}$$

Where:

E	=	Theoretical value of an entitlement
P	=	The official closing price[2] of the cum entitlement share on the Relevant Stock Exchange
S	=	Subscription price of one new share
d	=	Dividend to which new shareholders are not entitled
h	=	Number of existing Shares specified as eligible for the entitlement
r	=	Number of new Shares specified as the entitlement
x	=	1

Adjustment Ratio

$$\text{Adjustment Ratio} = \frac{(P - E)}{P}$$

The ratio will be applied to exercise prices of each series and Daily Settlement Prices as described in section 5.1 of this Policy, at the close of business on the last business day that the company's Shares are trading cum entitlement.

Where an entitlement issue entitles shareholders to take up securities that are not pari passu in all respects to those Shares which derived the entitlement, or will not immediately convert into those Shares, Euronext may determine the value of the entitlement by means of a members' survey. The survey will be conducted on the last business day that the company's Shares are trading cum entitlement.

---

[2] Or such other price as defined in the relevant Corporate Action Notice

It should be noted that where a market auction facility is available on the Relevant Stock Exchange, Euronext may, at its discretion, use the closing price of the rights from the market auction on the last cum entitlement trading day to determine a theoretical ex entitlement share price.

Euronext will have regard, where possible, to any adjustment or valuation methodology applied to any index which the underlying share may be a constituent of, to cater for the event.

6.3 DIVIDENDS

In the case of cash, Stock or Scrip Dividends, Option Contracts and Futures Contracts will only be adjusted if these dividends are special. Euronext will use the following criteria for deciding whether a dividend should be considered to be a special dividend:

a. The declaration by a company or ETF-issuer of a dividend additional to those dividends declared as part of the company's or ETF's normal results and dividend reporting cycle; merely an adjustment to the timing of the declaration of a company's or ETF's expected dividend would not be considered as a special dividend circumstance; or

b. The identification of an element of a dividend paid in line with a company's or ETF's normal results and dividend reporting cycle as an element that is unambiguously additional to the company's or ETF's normal payment.

For the purpose of clarification, Euronext will not make adjustment for the following situations:

1. Payment of ordinary dividends, irrespective of how they are financed;

2. The issue of redeemable Shares or any other entitlement in lieu of an ordinary dividend; or

3. An unexpected increase or decrease, resumption or cessation, or change in frequency to an ordinary dividend.

The Ratio Method will be used in making adjustments to Option Contracts and Futures Contracts to cater for special dividends, and shall be calculated as follows:

$$\text{Adjustment Ratio} = \frac{(P - Od - Ed)}{(P - Od)}$$

Where:

P = The official closing price[3] of the cum entitlement share on the Relevant Stock Exchange.

Od = Any ordinary dividend amount per share, to be paid to the shareholders or ETF-holders as published by the issuer which has the same ex-date as Ed

Ed = The special dividend amount per share to be paid to the shareholders or ETF-holders as published by the issuer

6.4 DEMERGERS

The Package Method will be used to cater for demergers where Shares of the demerged company can be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the demerger. If the Shares of a demerged company cannot be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to

---

[3] Or such other price as defined in the relevant Corporate Action Notice.

trading and/or listed and of which the underlying Shares are subject to the demerger, then the Ratio Method will be applied to Option Contracts and Futures Contracts.

The adjustment ratio will be calculated as follows:

$$Adjustment\,Ratio = \frac{(Cum\,entitlement\,share\,price - value\,of\,demerged\,company\,per\,share)}{Cum\,entitlement\,\,share\,price}$$

In the case that a demerger results in the creation of two or more companies, Shares of those demerged companies will be subject to the above conditions, such that if the Shares of each demerged company cannot be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the demerger, then the Ratio Method will be applied to Shares of those demerged companies, in their respective proportions.

In determining the value of a demerged company's Shares for the purpose of applying the Ratio Method, Euronext may conduct a members' survey on the last date which the company's Shares are trading cum entitlement. However, on or prior to this date, if the value of Shares in the demerged company can be determined from market trading on any facility operated by the Relevant Stock Exchange, then this value will be used in place of a members' survey.

If the demerged company is already traded on an exchange designated by Euronext, Euronext may adjust the contracts in accordance with the Ratio Method.

6.5   LIQUIDATION

Where a company or ETF is delisted from its Relevant Stock Exchange as a consequence, amongst other things, of liquidation or bankruptcy Option Contracts and Futures Contracts will be settled according to their intrinsic value.

Where the underlying Shares in question are suspended from trading but still transferable through the relevant settlement system, trading, exercise and settlement in the Option Contracts may still be allowed.

6.6   MERGERS AND TAKEOVERS

To cater for a merger or takeover, Euronext will use the structure of the headline offer ("offer consideration") to determine what adjustment methodology to apply to Option Contracts and Futures Contracts.

In general all Takeover offers shall lead to the calculation of implied volatilities for the purpose of (a possible) Fair Value settlement as described in Appendix 1, whether the offer is in stock, or in cash or in a combination of both.

The Ratio Method will be applied where the offer consideration is **composed purely of Shares** in another company, and those Shares which form the headline offer can be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the merger and/or takeover. In applying the Ratio Method to substitute the underlying value of the Option Contracts and/or Futures Contracts the ratio will be calculated as follows:

$$Adjustment\,Ratio = \frac{x}{y}$$

Where **y** is equal to the number of Shares offered under the headline offer for every **X** Shares held in the underlying company. This ratio will be applied as described in section 5.1 of this Policy, such that the underlying Shares of the contract will be substituted in the same proportion as determined by the headline offer, for the Shares that form the offer consideration. Use of the Ratio Method will ensure Daily Settlement Prices and exercise prices are adjusted in line with the level of the new underlying Shares.

If those Shares which form the offer consideration cannot be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the merger and/or takeover, then the open positions in the Option Contracts and Futures Contracts will be settled at their theoretical Fair Value (as described in Appendix 1).

Where the offer consideration is **composed purely of cash**, the open positions in the Option Contracts and Futures Contracts will be settled at their theoretical Fair Value (as described in Appendix 1).

Where the **offer is composed of both Shares and cash,** and if the share element cannot be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the merger and/or takeover, then all open positions in the Option Contracts and Futures Contracts will be settled at their theoretical Fair Value. If the share element can be delivered, settled and/or traded in the Relevant Euronext Market Undertaking where the Option Contracts and Futures Contracts are admitted to trading and/or listed and of which the underlying Shares are subject to the merger and/or takeover, then the Ratio Method will be applied, such that the resulting contracts would become contracts purely on the share element. In this case the ratio will be based on the share price of the company issuing the bid.

Generally Euronext will seek to use the official closing price of the Shares on the market where the company has its primary listing. However in cases where the company issuing the bid has its primary listing in a different time zone than the target company, Euronext may use an official closing/opening price established on a secondary venue, use **a VWAP calculation** or use the EDSP calculation. Lastly, if the price of the share of the company issuing the bid is not available or cannot be determined at an appropriate time, Euronext reserves the right to calculate the ratio on the basis of the share price of the target company.

In the circumstance that the cash element represents over 67% of the total offer consideration, the open positions in the Option Contracts and Futures Contracts will be settled at their theoretical Fair Value (as described in Appendix 1), and the Ratio Method will not be applied. For the avoidance of doubt, once Euronext has determined the proportion of cash and made such announcement as to the type of adjustment methodology, the methodology will not then be changed simply due to share price movements affecting the proportion of cash.

$$adjustment\ ratio = \frac{(Pt - C) * \frac{O}{N}}{Pt}$$

$$Pt = C + (N*S)$$

Where:

Pt = Theoretical value of one share of the target company
N = Number of Shares of the offeror received per share of the target company
O = 1
C = Cash element of the offer per share held

S   =   Cum event share price of the company that is issuing the offer (being the offeror)

Adjustments to Options and Futures Contracts will be made when a relevant offer is declared effective by the offerer and If the threshold of the majority of the outstanding Shares (50% + 1) is met.

In the case of Tender Offers, whereby the relevant offer is a mandatory offer by law, Euronext will use a threshold of 75% of the outstanding Shares to determine whether the relevant offer is effective.

6.7   SHARE REPURCHASES

Euronext will generally treat instances where a company repurchases its own Shares in the market as a non-adjustable event. However, on occasions where a company makes an offer for its own Shares at a premium to the prevailing market price, and where shareholders have equal opportunity to participate in the offer, Euronext may, where practical deem the share repurchase as an adjustable event.

6.8   DELISTING

Where a company or ETF is delisted from its Relevant Stock Exchange on request of the relevant company or ETF-issuer and, as a consequence, the underlying Shares are no longer deliverable on an exchange designated by Euronext, Euronext shall use the Fair Value method to settle the open positions in the Option Contracts and Futures Contracts as described in Appendix 1. The determination of the implied volatilities, for the purpose of settlement of the Options at their theoretical Fair Value, shall be based on the settlement prices of the relevant Options series over a ten business day period preceding the public announcement of the (intended) delisting by the company, ETF-issuer or the Relevant Stock Exchange.

6.9   SPECIAL CIRCUMSTANCES

If the underlying Shares of the Options and/or Futures Contracts are no longer tradable and/or deliverable due to circumstances not described in the Corporate Actions Policy, Euronext will decide on a case by case basis what the consequences for the Options and/or Futures Contracts will be, and will inform the regulator of the Relevant Euronext Market Undertaking on which the options and/or futures are traded before issuing a Corporate Action Notice.

7.   SPECIAL PRODUCTS LISTED ON EURONEXT

7.1   SINGLE STOCK DIVIDEND FUTURE

Unless otherwise stated in the Policy, Single Stock Dividend Futures will be adjusted for a Corporate Action in case the Relating Option or Future Contract is adjusted. The adjustment method for the Single Stock Dividend Futures will be equal to the adjustment method of the Relating Option or Future Contract. In case of a Ratio Method adjustment, the calculated ratio of the Relating Option or Future Contract will be used for adjustment of the Single Stock Dividend Futures. In case that a Corporate Action results in a settlement at theoretical Fair Value of the Relating Option or Future Contract (as described in Appendix 1), Euronext will settle the Single Stock Dividend Futures against their theoretical Fair Value in accordance with Appendix 1. For the sake of completeness Euronext would like to point out that the trigger for adjusting the Single Stock Dividend Future will be the corporate action on the underlying Share and not on the dividend amount paid on the underlying share.

APPENDIX 1: CALCULATION OF FAIR VALUE

The Fair Values of Options and Futures contracts are calculated on the effective date (for reference also see art 6.6).

A.1.1 OPTION CONTRACTS

For the purpose of settling Option Contracts at fair value, Euronext will use the Cox Ross Rubenstein option valuation model.

Euronext reserves the right, in special circumstances, to consult a panel of market parties and independent experts instead of using the fair value method described below.

A.1.1.1 Determination of implied volatility for COB Option Contracts

The option valuation model takes several factors into account, including the volatility of the option, interest and future dividends. For the purpose of settling Options Contracts at fair value, Euronext will use an average implied volatility based on the settlement prices of the relevant Options series over a ten trading day period preceding the announcement of the takeover bid[4].

For each day of the ten day period an implied volatility is determined for each series based on:

- The settlement price of each series[5]
- The underlying share price at the time of the settlement price calculation

Subsequently, the average of each series implied volatility over the 10 day period is calculated, excluding the lowest and the highest implied volatility observation of that series over the ten day period[6].

Once determined these implied volatilities are fixed until the moment of settlement, regardless of any changes in the price of the underlying share in the intervening period.

If during the course of a takeover the offerer increases the offer consideration or makes any other change to the respective offer (such as extending the acceptance period), new implied volatilities will not be calculated. In addition, should a counter bid be launched by another company whilst a bid is still active (i.e. has not expired or been withdrawn), then the implied volatilities, calculated as described above and in relation to the initial bid, will be used if the counter bid should be declared effective.

Calculation of fair value

The Cox-Ross-Rubinstein binomial model is used to calculate the fair value of an option. This method sets up a matrix of possible underlying prices during the lifetime of the option, based on a given starting price.

Step 1: Adjustment of the underlying value to take account of future dividends.

Before a matrix of underlying prices can be constructed, the starting price has to be adjusted to take account of dividends that will be paid out during the lifetime of the option. This is done by subtracting the discounted cash value of all the expected dividends over the lifetime of the option from the starting price.

---

[4] For the purpose of this policy, a bid is deemed to be announced as soon as a firm price has been mentioned by the company issuing the bid. This could be an intended bid.

[5] If the settlement price of any series is lower than the lowest possible theoretical price of that series, then the implied volatility will be based on the lowest possible theoretical price. For the purpose of determining implied volatilities, the lowest possible theoretical price is deemed to be the intrinsic value, corrected to take into account interest and future dividend payments.

[6] If an option has been listed for less than ten trading days at the time that its implied volatility is determined, the implied volatility will be calculated on the basis of the days it has been listed. In addition, if the option has been listed for less than seven trading days, the lowest and highest implied volatility will not be excluded.

$$S = Z - \sum_{i=1}^{m} D_i\, e^{-rt_i}$$

D_i = Dividends amounts published by Markit Dividends[7],[8] where the ex-date is during the option lifetime

m = The number of dividends paid out during the option's lifetime

r = Interest rate over the option's lifetime[9]

S = Share price, adjusted to take dividends into account[10]

Z = Starting price of the share

t_i = Time remaining until dividend payment (in years)

Step 2: The underlying value matrix

Once the starting price of the underlying has been adjusted, the matrix can be constructed by dividing up the remaining lifetime of the option into "n" periods. The value of "n" is:

■ the number of days remaining in the option's lifetime if this number is smaller than 100
■ 100 in all other cases

now

expiry
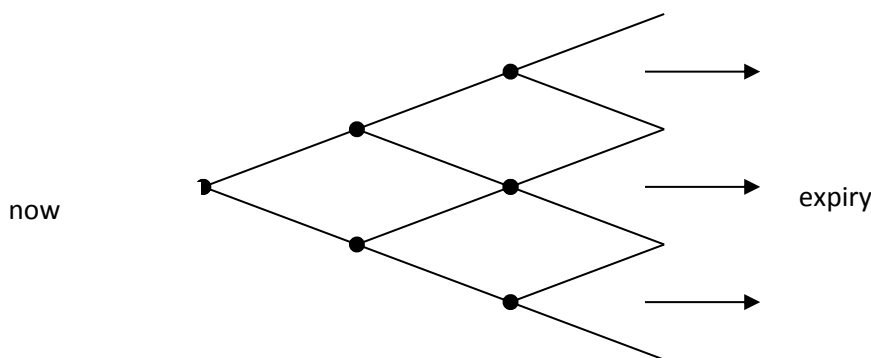
The matrix

The following formula is used to calculate the simulated prices used in the matrix:

$$u = e^{\sigma\sqrt{\frac{t}{n}}}$$

Where:

---

[7] If the information available on Markit Dividends is not sufficient then Euronext may extrapolate these forecasted dividends, If there is no information available on Markit Dividends then Euronext may use historical dividends and/or forecasted dividends from different information sources and extrapolate these when necessary.

[8] The data provided by Markit is on "as if" basis and neither Markit, its affiliates nor any other person or entity that has participated in any respect in the development or collection of the data makes any warranty, express or implied, as to be accuracy, timeliness or completeness of the data or as to the results to be attained from the use of the data. There are no express or implied terms of merchantability or fitness for a particular purpose or use, and no reliance shall be placed upon any warranty, guaranty or representation made by Markit, its affiliates or any data provider. The data shall not be used, copied, redistributed or transferred without the appropriate license from Markit.

[9] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates.

[10] In the case of an offer as described in section 6.6, the share price will represent either a cash only offer price or, in the case of a share only or mixed offer, the value of the offer determined by Euronext.

σ = implied volatility of the option

t = remaining lifetime of the option

n = number of periods into which the option's lifetime is divided

u = relative upward price movement in the binomial model

Step 3: Calculation of underlying prices

From every junction in the matrix an upward price movement and a downward price movement can be simulated by either multiplying or dividing the price at the junction by "u". The result of this sum should then be added to the cash value of the future dividends at that point in time. This simulated price is then used for the next step in the simulation, and the process repeated until the entire matrix has been filled with underlying prices.

Step 4: Determination of the value of the option at expiry

The value of the option at expiry can be calculated as follows, using the simulated price matrix.

$$c = maximum(S - X, 0)$$

$$p = maximum(X - S, 0)$$

Where:

c = value of the call

S = simulated price of the underlying

X = strike price of the option

p = value of the put

Step 5: Probability of a price increase or decrease

The matrix can also be used to calculate the probability of a price increase or decrease, using the following formula.

$$K = \frac{(e^{r\,t/n} - \frac{1}{u})}{(u - \frac{1}{u})}$$

Where

K = probability of a price increase

The probability of a price decrease (L) is then 1-K.

Step 6: Calculation of option prices

The option values at expiry can be used to recalculate the option price matrix in the other direction. This is done by calculating the option price at each junction on the basis of the two preceding prices (one corresponding to the higher price and one to the lower).

The option value that corresponds to the higher price is multiplied by "K", the option value for the lower price is multiplied by "L" and the two amounts are added together. The result is multiplied by the previously calculated value to calculate its cash value at that moment in time as follows:
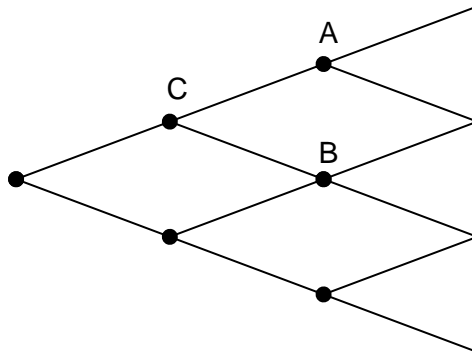
$$C = \left(K * A \; + \; L * B \right) * e^{-r\,t/n}$$

Early exercise (this only applies to American Style options; the below adjustments for early exercise are not made for European Style options)

Finally, it is possible to determine the advisability of exercising of the option ahead of expiry at each junction in the matrix. If the value calculated for an option at a given junction is less than the intrinsic value of the option, it may be advisable to exercise the option. In that case, the intrinsic value of the option should be used for further calculations.

Step 6 is repeated until the final value of the option has been calculated.

**The calculation (steps 1 to 6) is then repeated using a value of "n-1", and the average of the two calculations.**

A.1.1.2   Determination of implied volatility for Flex Option Contracts

For the determination of implied volatility for Flex Option Contracts, to cater for a merger or takeover , Euronext will use the implied volatilities as calculated for the Relating COB Contract (see section A.1.1.1). The principles for determination of implied volatility for strike prices in Flex Option Contracts will be as follows:

- Flex Option Contract strike prices higher than the highest existing COB Option Contract strike price or lower than the lowest existing COB Option Contract strike price in the same expiry month:

  The implied volatility of the highest existing COB Option Contract strike price in the specific expiry month will be used for all higher Flex Option Contract strike prices in that expiry month. Similarly, the implied volatility for the lowest existing COB Option Contract strike price in the specific expiry month will be used for all lower Flex Option Contract strike prices in that expiry month.

- Flex Option Contract strike prices in between existing COB Option Contract strike prices in the same expiry month:

  The implied volatility for the Flex Option Contract strike prices will be calculated by interpolation of the implied volatilities of the existing COB Option Contract strike prices in the specific expiry month.

- Strike prices in Flex Option Contract expiry months in between existing COB Option Contract expiry months:

  The implied volatility for the strike prices of the Flex option Contract expiry month will be calculated by interpolation of the implied volatility of the two equal strike prices in the nearest COB Option Contract expiry months. If for a specific Flex Option Contract strike price only one equal COB Option Contract strike price is available, then the implied volatility will be calculated by interpolation by using the two nearest COB Option Contract strike prices.

- Strike prices in Flex Option Contract expiry months with an expiry date after the furthest COB Option Contract expiry month:

  The implied volatility of strike prices of the furthest COB Option Contract expiry month will be used for Flex Option Contract strike prices in expiry months with an expiry date after the furthest COB Option Contracts expiry month.

A.1.1.3   Introduction of new series after the publication of implied volatilities

The option valuation model takes several factors into account, including the volatility of the option, interest and future dividends. For the purpose of settling Options Contracts at fair value, Euronext will use an average implied volatility based on the settlement prices of the relevant Options series over a ten trading day period preceding the announcement of the takeover bid.

In the event that new series are introduced after the initial publication of implied volatilities, the implied volatility for these new series shall be determined as follows:

Determination of implied volatility for new series in the Central Order Book

- New strike prices higher than the highest existing strike price or lower than the lowest existing strike price in the same expiry month:

The implied volatility of the highest existing strike price in the specific expiry month will be used for all higher new strike prices in that expiry month. Similarly, the implied volatility for the lowest existing strike price in the specific expiry month will be used for all lower new strike prices in that expiry month.

- New strike price in between existing strike prices in the same expiry month:

  The implied volatility for the new strike price will be calculated by interpolation of the implied volatilities of the existing strike prices in the specific expiry month.

- New strike prices in expiry month in between existing expiry months:

  The implied volatility for the strike prices in a new expiry month will be calculated by interpolation of the implied volatility of the two equal strike prices in the nearest expiry months. If for a specific new strike price only one equal strike price is available, then the implied volatility will be calculated by interpolation by using the two nearest strike prices.

- New strike prices in expiry months with an expiry date after the furthest expiry month:

  The implied volatility of strike prices of the furthest expiry month will be used for new strike prices in expiry months with an expiry date after the furthest expiry month.

Determination of implied volatility for new series in Flex Option Contracts

- New strike prices higher than the highest existing COB strike price or lower than the lowest existing COB strike price in the same expiry month:

  The implied volatility of the highest existing COB strike price in the specific expiry month will be used for all higher new strike prices in that expiry month. Similarly, the implied volatility for the lowest existing COB strike price in the specific expiry month will be used for all lower new strike prices in that expiry month.

- New strike prices in between existing COB strike prices in the same expiry month:

  The implied volatility for the new strike prices will be calculated by interpolation of the implied volatilities of the existing COB strike prices in the specific expiry month.

- New strike prices in expiry months in between existing COB expiry months:

  The implied volatility for strike prices in a new expiry month will be calculated by interpolation of the implied volatility of the two equal strike prices in the nearest COB expiry months. If for a specific strike price only one equal COB strike price is available, then the new implied volatility will be calculated by interpolation by using the two nearest COB strike prices.

- New strike prices in expiry months with an expiry date after the furthest COB expiry month:

  The implied volatility of strike prices of the furthest COB expiry month will be used for new strike prices in new expiry months with an expiry date after the furthest COB expiry month.

A.1.2 CALCULATION OF THE THEORETICAL VALUE FOR FUTURES

Euronext will use the following model for the purpose of settling Futures Contracts at theoretical value.

Step 1: Adjustment of the price of the underlying security for future dividend flow:

For futures, the price of the underlying security has to be adjusted for future dividends paid out during the remaining life time of the Futures Contract. Future dividends will be determined by Markit[11],[12].

$$D^* = \sum_{i=1}^{n} D_i \, e^{-r t_i}$$

Where:

Di = Dividends that are ex entitlement in period i
D* = Present value of the future dividends during the remaining life of the Futures Contract
r = Interest rate for the remaining life of the future[13]
ti = The time to payment of a dividend divided by 365
n = Total number of all dividend payable in period i during the remaining life of the Futures Contract

Step 2: Calculation of the futures price

$$F = (S - D^*) e^{r(T-t)}$$

Where:

F = The futures price
S = The share price[14]
T-t = The remaining life of the Futures Contract[15]
r = Interest rate for the remaining life of the Futures Contract[16]
D* = Present value of the future dividends during the remaining life of the Futures Contract

A.1.3 CALCULATION OF THE THEORETICAL VALUE FOR SINGLE STOCK DIVIDEND FUTURES

Euronext will use the following model for the purpose of settling Single Stock Dividend Futures at theoretical Fair Value. Future dividends will be determined by Markit[17],[18] .

_____

[11] If the information available on Markit Dividends is not sufficient then Euronext may extrapolate these forecasted dividends, If there is no information available on Markit Dividends then Euronext may use historical dividends and/or forecasted dividends from different information sources and extrapolate these when necessary.

[12] The data provided by Markit is on "as if" basis and neither Markit, its affiliates nor any other person or entity that has participated in any respect in the development or collection of the data makes any warranty, express or implied, as to be accuracy, timeliness or completeness of the data or as to the results to be attained from the use of the data. There are no express or implied terms of merchantability or fitness for a particular purpose or use, and no reliance shall be placed upon any warranty, guaranty or representation made by Markit, its affiliates or any data provider. The data shall not be used, copied, redistributed or transferred without the appropriate license from Markit.

[13] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates.

[14] In the case of an offer as described in section 6.6 the share price will represent either a cash only offer price or, in the case of a share only or mixed offer, the value of the offer determined by Euronext

[15] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates

[16] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates.

[17] If the information available on Markit Dividends is not sufficient then Euronext may extrapolate these forecasted dividends, If there is no information available on Markit Dividends then Euronext may use historical dividends and/or forecasted dividends from different information sources and extrapolate these when necessary.

Step 1: Determination of the present value of the future dividends

$$D^* = \sum_{i=1}^{n} D_i\, e^{-r_i t_i}$$

Where:

D^* = Present value of the future dividends with an 'ex'-date within the remaining time of the December cycle of this Futures Contract

D_i = Future dividends with an 'ex'-date within the remaining time of the December cycle of this Futures Contract

r_i = Interest rate for the remaining time to the ex-date of the future dividend [19]

t_i = The time to the ex-date of the future dividend divided by 365

n = Total number of future dividends with an 'ex'-date within the remaining time of the December cycle of this Futures Contract

Step 2: Calculation of the futures price

$$F = (D_h + D^*)\, e^{r(T-t)}$$

Where:

F = The futures price

D_h = Sum of the dividends with an ex-date already passed during the December cycle of this Futures Contract

D^* = Sum of present values of the future dividends with an 'ex'-date within the remaining time of the December cycle of this Futures Contract

r = Interest rate for the remaining life of the Futures Contract[20]

T-t = The remaining life of the Futures Contract[21]

---

[18] The data provided by Markit is on "as if" basis and neither Markit, its affiliates nor any other person or entity that has participated in any respect in the development or collection of the data makes any warranty, express or implied, as to be accuracy, timeliness or completeness of the data or as to the results to be attained from the use of the data. There are no express or implied terms of merchantability or fitness for a particular purpose or use, and no reliance shall be placed upon any warranty, guaranty or representation made by Markit, its affiliates or any data provider. The data shall not be used, copied, redistributed or transferred without the appropriate license from Markit.

[19] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date (and/or ex-dividend date) shall be determined by linear interpolation of the two nearest relevant available Interest Rates.

[20] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates.

[21] For the purpose of the Fair Value Method, Interest Rates from the source defined in the relevant Corporate Action Notice shall be used. The interest rate for the relevant expiry date shall be determined by linear interpolation of the two nearest relevant available Interest Rates

APPENDIX 2: EQUALISATION PAYMENTS

A.2.1   EQUALISATION PAYMENT AND THE RATIO METHOD

In the case that an equalisation payment is made necessary under this Policy Document, the Ratio Method will be applied in the following manner (as described in section 5.1):

1. The exercise prices (K) will be multiplied by the ratio to create the adjusted exercise prices (K1), rounded as described in section 4.3.

2. The Lot Size (Q) will be divided by the ratio to create the new Lot Size (Q1) which will be rounded to the nearest whole share (Q2) as described in section 4.3.

A.2.2   EQUALISATION PAYMENT CALCULATION

1. The settlement price of the modified series (c) must be equal to the ratio (R) multiplied by the settlement price of the unadjusted series.

2. The theoretical position has to be preserved post an adjustment, such that:

   Q1 x K1 = Q x K

   However, as the new Lot Size is rounded to the nearest whole share (Q2), this relationship will not always hold true, so that, where rounding has occurred:

   Q2 x K1 $\neq$ Q x K

   The variation (V) of a position (expressed as a percentage) is thus:

   $$V = \frac{(Q2 \times R) - Q}{Q}$$

3. The equalisation payment (S) for each series is calculated as follows:

   S = c x V x Q

   Where:

c	=	Series settlement price of the previous day
V	=	The Variation of a position (expressed as a percentage)
Q	=	The Lot Size before the corporate action

4. If S < 0, then option buyers will receive S. If S>0, then option sellers will receive S.

DISCLAIMER

The **Euronext Derivatives Markets** comprise the markets for derivatives operated by Euronext Amsterdam, Euronext Brussels, Euronext Lisbon and Euronext Paris, referred to respectively as the Amsterdam, Brussels, Lisbon and Paris markets. Whilst all reasonable care has been taken to ensure that this document is accurate and not misleading, Euronext shall not be liable (except to the extent required by law) for the use of the information howsoever arising. Euronext expressly disclaims all warranties, expressed or implied, as to the accuracy of any of the content provided, or as to the fitness of the information for any purpose.