JOHANNESBURG STOCK EXCHANGE
Equity Derivatives

NoteF5453B

Appendix A - Equity Derivative Futures Closeout Settlement Price Calculation Methodology

1. Introduction

This document provides more details on the new Futures Closeout (FCO) auction call process for the Equity Derivative market. Please note that the first FCO using the new auction call process will take place on Thursday, 20 September 2012. This document highlights (in red) items where the JSE would appreciate market input. Please submit your input in writing to derivativestrading@jse.co.za before close of business the 31st of July 2012.

2. FCO Auction Call Session

The FCO auction call session will still take place in the equity spot market on the 3rd Thursday of every quarter with the same start time 12:00. Each instrument that is eligible to participate in the FCO auction call session will be flagged accordingly in the Equity Trading Reference Data client files, accessible through the JSE Information Delivery Portal (IDP).The duration of the FCO auction call session will be a minimum of 15 minutes. The FCO auction call session will use the same process and algorithm as a normal closing auction for instruments in ZA01, ZA02 and ZA03. The FCO auction call session will therefore include the random 30 second uncrossing period at the end of the auction, a maximum of 2 price monitoring extensions and 1 market order extension.

Price Monitoring Extension - if the likely execution price at the end of the normal auction call session lies outside defined tolerances (circuit breakers) from the last automated traded price then the auction call session will be extended to increase the likelihood that the price movement might be reduced. If no execution can take place during price determination, it is not possible to enter a price monitoring extension.

Market Order Extension - if market orders within the order book are not executable or only partially executable (i.e. there is a market order surplus relative to limit orders) at the end of the auction call session, the session could be extended in order to increase the execution probability of market orders in the auction.

3. Market Input Required

Market participants are invited to propose their suggestions on the duration of the price monitoring and market order extensions for the FCO call auction. In their response market participants should

remember that the price monitoring extensions will delay the publishing of the final closeout price for an index as the JSE requires a price for every constituent of an index prior to publishing closeout index values. The 20 minute period rule for exercising or abandoning options will only commence post the publishing of the Index closeout price.
The JSE proposes 3 minutes for each of the two price monitoring extensions and 2 minutes for the market order extension.

Market participants are also invited to propose possible thresholds for the circuit breakers that will trigger the two price monitoring extensions during the FCO Auction. Note these circuit breakers are set at a segment level. They are dynamic and would therefore be referencing the last automated trade (AT or UT) price to calculate the potential execution price. Below are the current and proposed settings:

Segment	Current Production Auctions	**Proposed Intraday FCO Auction**
ZA01	10%	**2%**
ZA02	20%	**4%**
ZA03	Due to the penny stocks that reside in this segment it is not really possible to set a circuit breaker threshold in this segment.	

4. Volume Maximizing Auction Algorithm - Order Book is Locked/Crossed

The Millennium Exchange trading platform uses a Volume Maximising Algorithm to calculate the auction uncrossing price. Each price point at which there are orders in the order book will be considered and the number of shares that would be executed if the auction uncrossing took place at each price point is calculated. There are four steps in the Volume Maximizing Auction Algorithm.

1st Step - The auction price will be the price at which the largest number of shares can be executed. i.e. the price at which the volume is maximized.

2nd Step - If the volume is maximized at multiple prices then the auction uncrossing price will be the price at which the Order Imbalance is minimized.

3rd Step - If the Order Imbalance is minimized at multiple prices then the concept of Market Pressure will be used.

4th Step – If step 3 resulted in two prices then the auction uncrossing price is determined as:

a) If the Dynamic Reference Price is equal or greater than the highest price, then the highest price is chosen as the auction uncrossing price.
b) If the Dynamic Reference Price is equal or less than the lowest price, then the lowest price is chosen as the auction uncrossing price.
c) If the Dynamic Reference Price is in between the two prices, then the Dynamic Reference Price is chosen as the auction uncrossing price.

Terminology Explained

Order Imbalance – An Order Imbalance on the buy side means there will be a remaining quantity on the buy side; this remaining buy pressure is likely to cause the price to rise after the auction; hence the highest price is taken. An Order Imbalance on the sell side means there will be a remaining quantity on the sell side; this remaining sell pressure is likely to cause the price to fall after the auction; hence the lowest price is taken.

Crossed Order Book - A crossed order book occurs when a particular order book has buy orders at a better price than the sell orders.

Locked Order Book - A locked order book occurs when the best buy orders and best sell orders in an order book are at the same price simultaneously.

Market Pressure - If there is more than 1 price with equal values for steps (1) & (2) of the algorithm.

Should the price determination process determine more than one possible price with the highest executable order volume and the lowest surplus for the determination of the auction price, the surplus is referred to for further price determination:

1) The auction price is stipulated according to the highest possible price if the surplus for all possible prices is on the buy side (surplus of demand).

2) The auction price is stipulated according to the lowest possible price if the surplus for all possible prices is on the sell side (surplus of supply).

It should be noted that matching takes place on a Price-Visibility-time priority. This means that visible orders get higher priority than hidden orders, at the same price.

Dynamic Reference Price - At the beginning of the trading day, the Dynamic Reference Price for an instrument will be its Previous Close.

- If an uncrossing happens at the end of the Opening Auction, then the Dynamic reference price will be updated with the Opening auction uncrossing trade price.
- If an uncrossing does not happen at the end of the Opening Auction, then the first automatic trade of the day will update the Dynamic reference prices.
- If an auction was triggered and an uncrossing happens at the end of any auction call session (Volatility, Intraday or Re-Opening Auction), then the Dynamic Reference Price will be updated with the auction uncrossing trade price.
- If an auction was triggered but an uncrossing does not happen at the end of any of the auction call sessions during the day (Volatility, Intraday or Re-Opening Auction), then the first automatic trade after the auction will update the Dynamic reference price.
- Dynamic reference prices will not be updated by an Off book trade.

The Dynamic Reference Price will continue to be updated with the automatic trades happening during the day.

5. Instruments participating in the FCO Auction Call Session

The following underlying Equity Spot market instruments will participate in the new FCO auction call session:

1) All underlying instruments on which a derivative (Future, Option or Can-Do) is listed, and is expiring on the day.
2) All instruments that are constituents of an index on which a derivative is listed, and is expiring on the day.

Readers will notice that this is different to the current 100 iterations process where only constituents of an Index on which a derivative was listed, used the 100 iterations arithmetic price as the FCO Settlement Price. The FCO Settlement Prices for the remaining instruments were calculated using the uncrossing price from the closing auction of the underlying spot market on that day.

6. FCO Settlement Price Determination

The FCO settlement price will be the Uncrossing Price at the end of the FCO auction call session – if the share does not uncross (trade) at the end of the auction or extensions, the FCO Settlement price will be the last AT/UT prior to the FCO auction call session. If the share did not trade prior to the FCO auction, the FCO Settlement price will be the previous day's closing price.

Readers might be concerned about the possibility of stale FCO Settlement Prices for ETF and ETN instruments which often do not participate in auctions. Separate discussions are being held with the issuers and market-makers of these instruments. If need be, a middle of the double methodology just before or after the FCO Auction Call session will be considered for these instruments.

7. FCO Website

With the current 100 iterations FCO methodology, the JSE provided a FCO webpage to all participants which indicated the average FCO Settlement Price per minute for both Indices and Single Stocks over the 100 minutes. With the FCO Call Auction session methodology users will be able to track an indicative (theoretical) uncrossing price, where applicable, for the Single Stocks via their Equity Spot Trading Front Ends. They will however not be able to view the indicative uncrossing prices for Indices. The JSE will upgrade their FCO webpage in future to calculate an indicative Index uncrossing price using the indicative equity spot prices during the auction, but this functionality will unfortunately not be ready by the September 2012 FCO.

8. Testing

Due to the magnitude of this change, affected parties requested a market participant test prior to the September 2012 FCO. A test of the new FCO auction methodology will therefore be scheduled in the Equity Market test environment. Users that wish to participate in this test must be enabled in the test environment and if they're not enabled, the standard enabling process will apply. The dates of this test have not been finalised but it will most probably be on a Tuesday or Thursday between 18:00 and 18:30.