THE Nigerian STOCK EXCHANGE

REVISED NSE MARKET STRUCTURES

June 2018

Table of Contents

THE Nigerian STOCK EXCHANGE

THE Nigerian STOCK EXCHANGE

1
Enhancements have been made to the Equities Market Structure to enhance it's pricing efficiency and depth.

2
The Market Structure will include regulatory and technological changes in order to drive a more competitive market.

3
The Exchange is introducing opening and closing auctions with imbalance sessions as an efficient price setting mechanism.
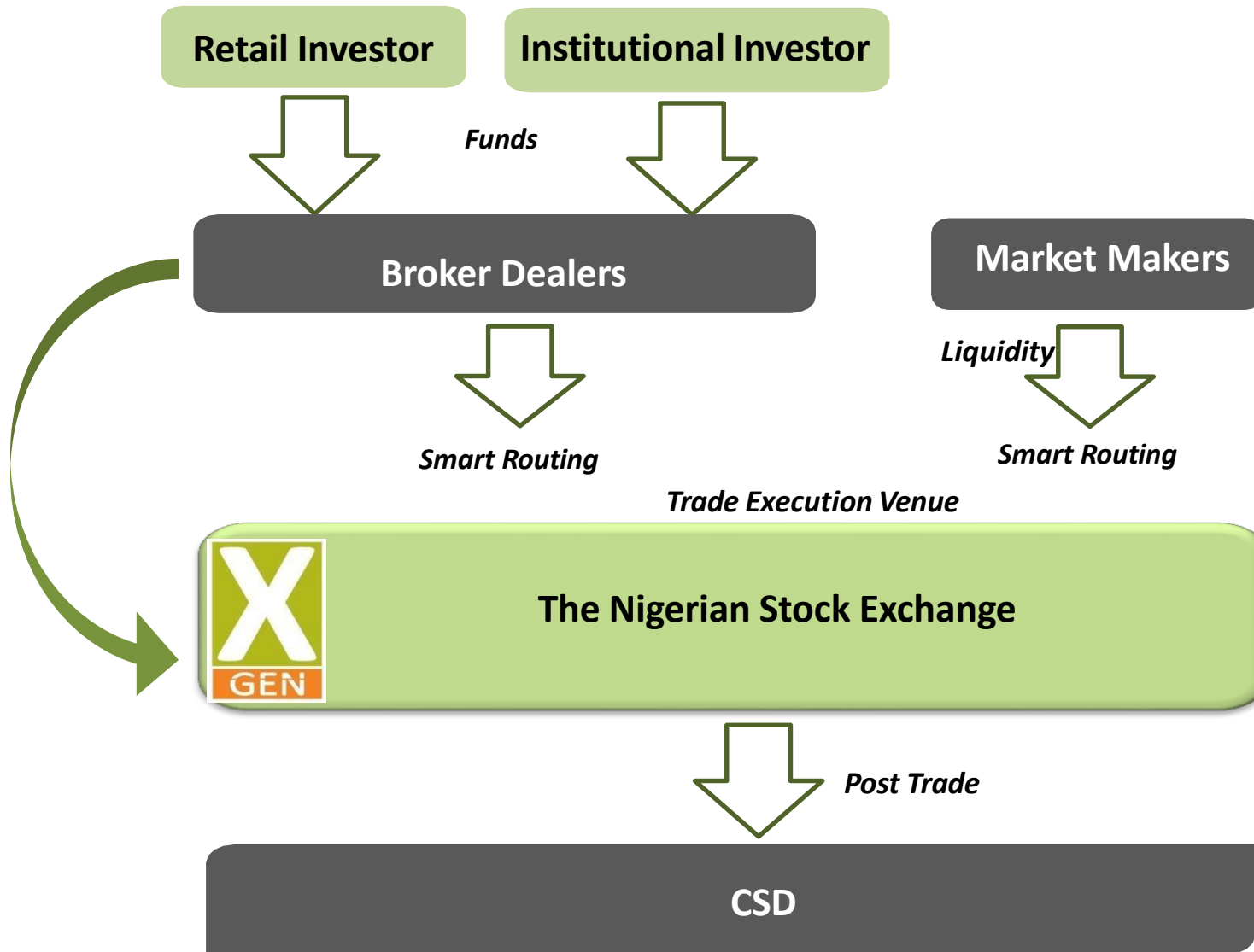
4
The new market structure creates a level playing field for all market participants and allows for deploying new strategies.
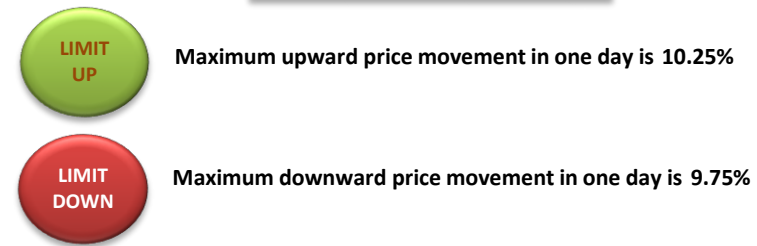
5
The hybrid nature of the market will facilitate reduced spreads, best execution and boost liquidity.

6
Institutional and retail investors will enjoy lower execution costs while issuers will benefit from potentially cheaper cost of capital.

Retail Investor

Institutional Investor

Funds

Broker Dealers

Market Makers

Smart Routing

Liquidity

Smart Routing

Trade Execution Venue

X GEN

The Nigerian Stock Exchange

Post Trade

CSD

Market Microstructure Dealers Informed Traders Orders Spreads Bid Ask Traders Shares Brokers Liquidity Volatility Offer Exchanges Arbitrageurs Specialists Quote

THE Nigerian STOCK EXCHANGE

Current Equities Market Structure

1 **2** **3** **4** **5**

Pre-open	Pre-Open Adjust	Continuous Trading	Pre-Close Adjust	Close
9.30am - 10.05am	10.05am - 10.15am	10.15am - 2.:29pm	2.29pm - 2.30pm	2.30pm
Traders can enter orders Indicative opening price is continuously published to the market	Market Makers address imbalances and provide liquidity	Traders and Market Makers can enter orders including Pre-Close orders	MM Orders only Pre-Close orders are activated during Closing Auction	Market Closes

$\pm$5% Price Limit $\pm$5% Price Limit

Reference Price = Previous Close

New Reference Price is calculated after Pre-Open Adjust session

Closing Price is calculated after Pre-Close Adjust session

LIMIT UP — Maximum upward price movement in one day is 10.25%

LIMIT DOWN — Maximum downward price movement in one day is 9.75%

X GEN

2

New Equities Market Structure

New Equities Market Structure

1	**2**	**3**	**4**	**5**	**6**
Pre-open 9.30am – 9.55am	**Pre-open Imbalance** 9.55am - 10.00am	**Continuous Trading** 10.00am - 2.:20pm	**Pre-Close** 2.20pm - 2.25pm	**Pre-Close Imbalance** 2.25pm - 2.30pm	**Close** 2.30pm
Limit Orders MM Quotes TOP/TOV Calculated	Limit Imbalance Orders TOP/TOV/ Imbalance Published Order Amendment	Traders and Market Makers can enter orders	Unfilled Orders Market Orders Limit Orders MM Quotes TCP/TCV Calculated	Limit Imbalance Orders TCP/TCV/ Imbalance Published Order Amendment	

±10% Price Limit   Size test applies

Reference Price = Previous Close

Opening Price from Auction = NOOP

Closing Price from Auction= NOCP

Benefits of the New Market Structure
- Enables market makers to enhance liquidity and reduce imbalances
- Enhances pricing (Reduces spread)
- Dampens volatility around the open & close auctions and during continuous trading.

LIMIT UP   Maximum upward price movement in one day is 10%

LIMIT DOWN   Maximum downward price movement in one day is 10%

X GEN

3

Trading Schedule

SESSION	TIME	PARTICIPANT	ORDER TYPE	ACTIVITIES	ORDER DURATION	PRICE LIMIT
Pre-Open	9:30	MM, Traders	Limit	Order Entry/Amendment/Withdrawal Calculate TOP/TOV (visible to Market Control)	Good Till Open	Minimum Market Trade Quantity Required for price setting in all sessions +/-10%
			Quotes		Good Till Date	
					Day	
Pre-Open IO	9:55		Imbalance	Publish TOP/TOV/Order Imbalance IO Order Entry IO Order Amendment (on imbalance side) Price Improvement One side MM orders	Session	
Continuous Trading	10:00		Limit	Order Entry/Amendment/Matching	Immediate	
			Market		Day	
			Crossing		Good Till Date Pre-close	
			Negotiated			
			Private			
			FAK			
			FOK			
			AON			
			Quotes			
Pre-Close	14:20		Market	Order Entry	Good Till Close	
			Limit	Calculate TCP/TOV (visible to Market Control)	Good Till Date	
			Quotes		Day	
Pre-Close IO	14:25		Imbalance	Publish TOP/TOV/Order Imbalance IO Order Entry IO Order Amendment (on imbalance side) Price Improvement One side MM orders	Session	
Close	14:30		-		-	
End Of Day	15:00		-		-	

Changes

THE Nigerian STOCK EXCHANGE

Trading Session/Times	➤ Pre-open auction time reduced by 10mins to run from 9.30am to 10am. All market participants can take part in this session ➤ Continuous trading now starts from 10am and ends 2.20pm ➤ Pre-open adjust session and Pre-close adjust sessions removed. Pre-close session added. This session will last for 10mins and all market participants can take part in the session.
Imbalance Session	➤ As part of the pre-open, 5 minutes imbalance session is now included to address imbalances at the open and close ➤ A buy/sell imbalance indicates the existence of more orders to buy/sell at a the theoretical price to be filled than there are offsetting sell/buy orders ➤ Imbalance order type is received during this session on the other side of the imbalance to add liquidity ➤ Imbalance orders are limit type orders and have least priority during uncrossing ➤ Theoretical Price/Volume and Imbalance indicators will be displayed from the beginning of imbalance session ➤ During IO session, existing orders can be amended but not deleted ➤ Order amendment is only allowed for orders on the side of the book which will address the order imbalance. ➤ New price of amended order can only be price at TOP or better (Price Improvement) ➤ Imbalance orders can be priced at or better than theoretical price and can participate in determining theoretical price ➤ If auction book is empty/ there are no imbalance, imbalance order entry is not allowed
Participants	➤ Agency traders and market makers can participate in all sessions. ➤ No market participant has prior view of order book ➤ Market makers no longer have sole view of adjust sessions to address imbalance
Minimum Trade Quantity	➤ Size Test under pricing methodology rule now applies across all sessions including auctions ➤ There must be at least one potential trade that meets the Minimum Market Trade Quantity threshold in order for the Theoretical Opening Price and Theoretical Opening Volume to be set during the auction.
Limit Up Limit Down (LULD)	➤ 10% LULD rule now applies across market sessions ▪ Maximum Daily Upward movement now 10% as against 10.25% in previous structure ▪ Maximum Daily Downward Movement now 10% as against 9.75% in previous structure

Changes

Reference Price	➢ Currently should an Open Price be set on the transition to Continuous Trading, the Reference Price is updated from Previous Close Price to that Open Price. This will no longer be the case. The Reference Price will remain set to the Previous Close Price for the whole of the trading day
Theoretical Information	➢ TOP/TOV will be calculated but not published during the Pre Open and Close Sessions ➢ TOP/TOV will be published from the beginning of the imbalance sessions till the end of the open and close auction
Opening and Closing Price	➢ NSE is introducing the NSE Official Open/Close Price (NOOP). The NOOP/NOCP is established from the opening/closing match, i.e. the Open/close Price is not set to the Previous Close Price/Last Sale Trade. This occurs when at least one trade at the TOP/TCP satisfies the Minimum Market Trade Quantity threshold during the opening/closing match
Market Orders	During Pre-Open Auction Market Orders are not accepted During Pre-Close Market Orders are accepted
Auction Matching Priority	**PRIORITY** **ORDER TYPE** **ALLOCATION PRIORITY** 1st Market Orders* ORDER TYPE, PRICE, TIME 2nd Limit Orders ORDER TYPE, PRICE, TIME 3rd Imbalance Orders ORDER TYPE, PRICE, TIME ➢ Market orders are not allowed during Pre-open ➢ Matching priority during Continuous Trading will remain Price, Cross, Time.
Market Maker Quotes	➢ Market Makers are no longer allowed to enter one-sided order except to address imbalances during imbalance session ➢ If a Market Maker buy or sell order fully executes then the Market Makers order on the other side of the book will be withdrawn ➢ If a Market Maker buy or sell order is withdrawn then the Market Makers order on the other side of the book will be ➢ withdrawn ➢ During the imbalance sessions, MMs are allowed one-sided order entries
Order Book Depth	➢ Depth of order book during auction will no longer be visible to all market participants

1.0 Determining Imbalance

Table 1 – Order Book by order end of the PRECLOSE session

Market Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
2	25,000	1.03	1.03	60,000	5
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

TCP/TCV is calculated from beginning of the auction session

Table 2– Aggregates Order Book at the end of PRECLOSE Session

MEV

PRICE	CUMULATIVE BUY	CUMULATIVE SELL	TRADEABLE	IMBALANCE
1.03	45,000	70,000	45,000	25,000 (S)
1.02	75,000	10,000	10,000	65,000 (B)
1.01	125,000	10,000	10,000	115,000 (B)
1.00	125,000	10,000	10,000	115,000 (B)

This results in a TCP of 1.03 and a TCV of 45,000.
The imbalance is on the sell side hence there is a Sell Imbalance. The Sell Imbalance is 25,000.
Only imbalance buy orders with a price greater than or equal to 1.03 will be accepted.
Existing limit orders can only be amended to a price greater than or equal 1.03, i.e. the TCP.

1.1 Allocation sequence at end of auction

TCP/TCV is now published

The order book is as illustrated in Table 1
The imbalance is as illustrated in Table 2
Enter following IO orders during the IO session:
(#8) with a price of 1.03 and a quantity of 10,000.
(#9) with a price of 1.04 and a quantity of 15,000

Table 3 – Order Book by order during PRECLOSE IO

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
9	15,000	1.04	1.03	60,000	5
2	25,000	1.03			
8	10,000	1.03			
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

IO-Session Order

The TCP is 1.03.

Allocation sequence :
•Order #7 trades with order #3 with a price of 1.03 and a quantity of 10,000
•Order #7 trades with order #5 with a price of 1.03 and a quantity of 10,000
•Order #2 trades with order #5 with a price of 1.03 and a quantity of 25,000
•Order #9 trades with order #5 with a price of 1.03 and a quantity of 15,000
•Order #8 trades with order #5 with a price of 1.03 and a quantity of 10,000

IO-Least priority

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

2.0 IO order with better price does not change TCP

Enter a buy order (#8) during the IO session with a price of 1.04 and a quantity of 35,000.

Table 4 –Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
8	35,000	1.04	1.03	60,000	5
2	25,000	1.03			
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

Table 5 –Aggregates Order Book at the end of PRECLOSE IO Session

PRICE	CUMULATIVE BUY	CUMULATIVE SELL	TRADEABLE	IMBALANCE
1.04	35,000	70,000	35,000	45,000 (S)
1.03	80,000	70,000	70,000	10,000 (S)
1.02	110,000	10,000	10,000	100,000 (B)
1.01	160,000	10,000	10,000	150,000 (B)
1.00	160,000	10,000	10,000	150,000 (B)

The TCP is 1.03.

- Order #7 trades with order #3 with a price of 1.03 and a quantity of 10,000
- Order #7 trades with order #5 with a price of 1.03 and a quantity of 10,000
- Order #2 trades with order #5 with a price of 1.03 and a quantity of 25,000
- Order #8 partially trades with order #5 with a price of 1.03 and a quantity of 25,000
- Order #8 with balance of 10,000 units is expired

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

3.0 IO order with better price changes TCP

Enter a buy order (#8) during the IO session with a price of 1.04 and a quantity of 55,000

Table 6 – Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
8	55,000	1.04	1.03	60,000	5
2	25,000	1.03			
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

Table 7– Aggregates Order Book at the end of PRECLOSE Session

PRICE	CUMULATIVE BUY	CUMULATIVE SELL	TRADEABLE	IMBALANCE
1.04	75,000	70,000	70,000	5,000 (B)
1.03	100,000	70,000	70,000	30,000 (B)
1.02	130,000	10,000	10,000	120,000 (B)
1.01	180,000	10,000	10,000	170,000 (B)
1.00	180,000	10,000	10,000	170,000 (B)

The TCP becomes 1.04.
Allocation sequence at end of auction:
- Order #7 trades with order #3 with a price of 1.04 and a quantity of 10,000
- Order #7 trades with order #5 with a price of 1.04 and a quantity of 10,000
- Order #8 partially trades with order #5 with a price of 1.04 and a quantity of 50,000
- Order #8 with balance of 5,000 units is expired

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
2	25,000	1.03			
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

4.0 Order amendment during IO Session

Order 6 (table 6 above) price is amended to 1.04

Table 8– Order Book by Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
6	20,000	1.04	1.03	60,000	5
8	55,000	1.04			
2	25,000	1.03			
4	10,000	1.02			
1	50,000	1.01			

Table 9– Calculating the imbalance; order amendment

PRICE	CUMULATIVE BUY	CUMULATIVE SELL	TRADEABLE	IMBALANCE
1.04	95,000	70,000	70,000	25,000 (B)
1.03	120,000	70,000	70,000	30,000 (B)
1.02	130,000	10,000	10,000	120,000 (B)
1.01	180,000	10,000	10,000	170,000 (B)
1.00	180,000	10,000	10,000	170,000 (B)

The TCP is 1.04
Allocation sequence at end of auction:
- Order #7 trades with order #3 with a price of 1.04 and a quantity of 10,000
- Order #7 trades with order #5 with a price of 1.04 and a quantity of 10,000
- Order #6 trades with order #5 with a price of 1.04 and a quantity of 20,000
- Order #8 partially trades with order #5 with a price of 1.04 and a quantity of 30,000
- Order #8 with balance of 25,000 units is expired.

5.0 TCP changes during IO Session

The TCP is 1.03. Enter (#8) with a price of 1.03 and a quantity of 1,000,000

Table 10 - Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
2	25,000	1.03	1.03	60,000	5
8	1,000,000	1.03			
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

The TCP is 1.03. Order #8 causes the imbalance to flip.
Enter sell order #9 with a price of 1.00 and a quantity of 2,000,000.

Table 11 - Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
2	25,000	1.03	1.00	2,000,000	9
8	1,000,000	1.03	1.03	60,000	5
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

The TCP is now 1.00.

4

6.0 IO Order Price Validation (Buy side)

The TCP at the end of Preclose session is 1.03

Table 12 - Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
7	20,000		1.00	10,000	3
2	25,000	1.03	1.03	60,000	5
4	10,000	1.02			
6	20,000	1.02			
1	50,000	1.01			

7.0 IO Order Price Validation (Sell side)

Table 13 - Order Book By Order

ORDER NO	QUANTITY	PRICE	PRICE	QUANTITY	ORDER NO
1	50,000	1.00	1.00	20,000	2

The TCP is 1.00.
The imbalance is calculated as illustrated in the table below.

PRICE	CUMULATIVE BUY	CUMULATIVE SELL	TRADEABLE	IMBALANCE
1.00	50,000	20,000	20,000	30,000 (B)

Enter a sell order during the IO session with a price of 1.01 and a quantity of 25,000.
The order is rejected as the order price is not less than or equal to the TCP.

7.1 IO Order Rejection

Enter a buy order during the IO session with a price of 1.01 and a quantity of 25,000.
The order is rejected as the order imbalance is on the buy side therefore only sell orders are accepted.

8.0 NSE Official Opening Price

Previous Close Price was 0.97

Table 15 - Order Book By Order

Order No	Aggregate	Qty	Price	Price	Qty	Aggregate	Order No
1	55,000	55,000	0.98	0.97	3,000	3,000	2
3	89,000	34,000	0.98	0.98	63,000	66,000	5
4	154,000	65,000	0.97	0.98	40,000	106,000	6
7	254,000	100,000	0.96	0.99	3,368	109,368	8
11	324,000	70,000	0.95	0.99	60,000	169,368	9
				0.99	330,000	499,368	10
				0.99	45,790	545,158	12

Table 15 –Aggregates Order Book at the end of PRECLOSE IO Session

Price	Cummulative Buy	Cummulative Sell	Tradable	Imbalance
0.99	0	545158	0	545,158 (S)
0.98	89,000	106000	89,000	17,000 (S)
0.97	154,000	3000	3,000	151,000 (B)
0.96	254,000	0		254,000 (B)
0.95	324,000	0		324,000 (B)

The TCP is 0.98 and there's a Sell Imbalance

Enter a buy order during the IO session with a price of 0.98 and a quantity of 15,000. The order i accepted
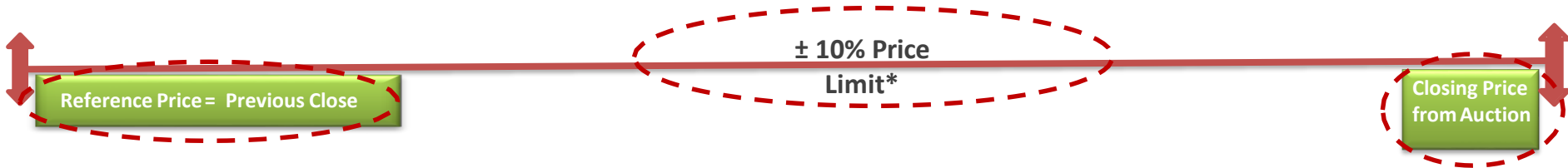
Allocation sequence at end of auction:
- Order #1 trades with order #2 with a price of 0.98 and a quantity of 3,000
- Order #1 partially with order #5 with a price of 0.98 and a quantity of 52,000
- Order #3 partially trades with order #5 with a price of 0.98 and a quantity of 11,000
- Order #3 partially trades with order #6 with a price of 0.98 and a quantity of 23,000
- Order #3 partially trades with order #12 with a price of 0.98 and a quantity of 15,000
- Order #12 with balance of 2,000 units is expired

Previous Close	NOOP	TOV	TOP
0.97	0.98	89,000	0.98

ETF and Fixed Income Market Structures

Market Structure- ETFs

ETF Market Structure

Pre-Open 9.30 a.m.-10.00 a.m.	Continuous Trading 10.00 a.m. - 2.:30 p.m.	Close 2:30pm
Traders can enter orders — Indicative opening price is continuously published to the market	Traders and Market Makers can enter orders including Pre-Close orders	Market Closes

Reference Price = Previous Close

± 10% Price Limit*

Closing Price from Auction

LIMIT UP — Maximum upward price movement in one day is 10% For Equity backed ETFs only. For all others, there is no limit on movement

LIMIT DOWN — Maximum downward price movement in one day is 10% For Equity backed ETFs only. For all others, there is no limit on movement

2

Trading Schedule- ETFs

Session	Time	Order Type	Activities	Order Duration	Price Limit
Pre-Open	9:30	Limit Quotes	Order Entry/Amendment/Withdrawal Calculate TOP/TOV (Visible to Market Control)	Good Till Open Good Till Date Day	+/-10% for **Equity ETFs only**
Continuous Trading	10:00	Limit Market Crossing Negotiated Private FAK FOK AON Quotes	Order Entry/Amendment/Matching	Immediate Day Good Till Date Pre-Close	
Close	14:30	-	-	-	
End of Day	15:00	-	-	-	

ETF Market	LULD
Equity ETFs	10% LULD for the entire trading session to mirror the Equity Market Structure.
Fixed Income ETFs	No Limit
Commodity/Currency ETFs & other underlying securities that trade for at least 24 hours	No Limit

THE Nigerian STOCK EXCHANGE

Fixed Income Market Structure

Continuous Trading
10.00 a.m. - 2.:30 p.m.

Close
2.30 p.m.

Traders and Market Makers can enter orders/quotes

Market Closes

Reference Price = Previous Close

Closing Price= last trade price

All auction periods have been removed and the Fixed Income market opens at 10am and trades until close of the market at 2.30pm

Trading Schedule- Fixed Income

Session	Time	Order Type	Activities	Order Duration	Price Limit
Continuous Trading	10:00	Limit Market Crossing Negotiated Private FAK FOK AON Quotes	Order Entry/Amendment/Matching	Immediate Day Good Till Date Pre-Close	No Limit
Close	14:30	-	-	-	
End of Day	15:00	-	-	-	