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A Test of Market Microstructure Model: Evidence from Nigerian Stock Market

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Abstract

This paper undertakes a test of market microstructure model in the Nigerian stock market. Precisely the Glosten and Milgrom information asymmetry model was tested. The result from this study reveals that the model can be used to predict or forecast next day's stock price. Thus, knowledge of market microstructure will assist investors in profiting from their stock market investment. The study therefore recommends that awareness of market microstructure needs to be created for the mass of investors who daily flood the market without knowing the ways and processes of price movement. A formal system of market microstructure education is necessary in our universities and professional settings. Also, the regulatory institutions should be seen to enforce the rules of procedure strictly as this will encourage market acts devoid of infraction and malfeasance and will instil confidence in market participants.

Key words: Market Microstructure, Information Asymmetry, Bid-Ask Price, Insider Trading, Nigerian Stock Market

JEL Classification: G14

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Introduction

Market microstructure explains how latent demands of investors are eventually transformed into volumes and prices (Madhavan, 2000). The term 'market microstructure' is generally credited to Garman (1976), who used it in the title of an article investigating inventory costs and market making. The term has become a vivid heading for the study of economic issues influencing prices, quotes and trades. The goal of the traditional asset pricing is to comprehend what should be the price of asset and ignore the process by which prices of assets are shaped. It also fails to resolve how prices change to reveal news. It does not address how investors' subjective valuations of asset 'get into' the price. In practice, news and investors' assessments are transformed into asset prices via trading. This seems to suggest that the trading rules, and the strategies traders develop in response to these rules, will impact the way security prices vary over time in reaction to fresh information (Madhavan, 2000).

Market microstructure emerged as a field of study in finance as a consequence of trading frictions and asymmetric information that instigated discrepancy between actual and expected

prices. Hence, market microstructure focusses on how good or bad an exchange's rules facilitate effective trading. According to O'Hara (1987), market microstructure theory evolves to explain the process through which prices of assets are determined and it is an aspect of finance that deals with the information of how exchange happens in markets. While the microstructure theory concentrates on the exchange of real or financial assets, a plethora of evidence is accessible on the microstructure of financial markets owing to the accessibility of transactions data from them. The focus of market microstructure study is to study how the working mechanisms of a market influence transaction costs, prices, volume, quotes and trading behavior. New advances have permitted an extension into the study of the effect of market microstructure on the incidence of market abuse, such as insider trading, market manipulation and broker-client conflict.

A basic proposition of microstructure theory is that values of security do not need to reveal comprehensive information expectations due to a diversity of frictions. The literature of microstructure challenges the efficient market hypothesis by investigating the process that prices could diverge away (or converge close to) informationally efficient equilibrium prices because rational participants are acting strategically (Biais, Bruno & Chester, 2005). Strategic behaviour indicates restricted liquidity or uneven access to information in the secondary market. Short-range changes amongst transaction prices and long-term fundamental prices come up as a result of costs attributed to costs of transacting order, as well as strategic behaviour or asymmetric information.

Market microstructure has continued to be an area of rising interest for academics in the last two decades, as the existence of this phenomenon has been examined by researchers in most mature capital markets of the world. However, empirical test of market microstructure model in Nigerian stock market is scanty apart from the study by Osamwonyi and Aigboduwa (2011) and Eguavoen (2016). This paper seeks to empirically test information asymmetry modelling framework provided by Glosten and Milgrom (1985), which could help uninformed investors to predict downward/upward daily movement of security prices in the Nigerian capital market. Furthermore, this research will improve on the previous studies carried out in Nigeria by providing statistical evidence to ascertain there is no significant change between the actual price and forecast price or not.

The objective of this paper is to determine how uninformed investors/traders in the Nigeria stock market could be assisted to have idea about next day's stock price with previous day stock price with a view to timing the market and profiting thereby from it.

Review of Relevant Literature

Design and Structure of Nigerian Capital Market

Nigerian Capital Market is the hub of national economy as it serves as the pivot for capital formation and investments. Established in 1960 first as the Lagos Stock Exchange and subsequently transformed to the Nigerian Security Exchange (NSE) in 1977, the security market has anticipated to play a key and critical role in financing and growing the private (real and nominal) sector through the mobilization of medium and long-term investment capital. Prior to its automation in 1999 and a host of other structural, legal/regulatory, technological and institutional reforms from its inception to 2006, the market was characterized with low trade as the impact of the market remained unfelt in the economy. However, the introduction of the automated trading system in 1999 as well as other structural, legal and economic reforms that followed targeted at ameliorating this problem. The reforms constituted a microstructure change in the stock market.

The aim of the variation in microstructure was to increase the volume / rate of trade and liquidity, and to instill confidence in market participants through market transparency and market acts devoid of infraction and malfeasance. It was also meant to bring more firms to the market thereby increasing the number of listings and efficiency of the market and its market- makers and to make the market competitive among other capital markets. Consequently, the market became one of the fastest growing exchanges in Africa until 2008 when a depression set in so suddenly. With the introduction of emergency stabilization measures, the market picked up again.

As a computerized continuous exchange market with a central clearing mechanism, the Nigerian Stock Market has relatively (in comparison with other frontier exchanges in the globe) experienced a great amount of openness in relation to information on quotes, order, flows, volume of transaction and prices. According to Osamwonyi and Aigboduwa (2009), the Nigerian stock market appears to exhibit some significant level of inventory effect and spread in the price of transactions in January 2009, although the inventory effect is suggested to be weak.

Market Microstructure Theory: A Review

Theory of market microstructure offers two main ways to describe the setting and behavior of prices: inventory models and models based on asymmetric information. Inventory models examine the ambiguity in the movement of order and the risk associated with inventory and optimization issue of liquidity providers within probable risk aversion while the asymmetric information-based models, model the underlying forces of market and change procedures of prices utilizing perceptions based on the model of asymmetric information and adverse selection. The two main approaches in the models of asymmetric information are the models of sequential trade and models of strategic trade. In addition to the asymmetric information-based models there is also the synthetic model that combines the adverse selection and inventory/order handling cost.

Inventory-based Models

These models focus on inventory difficulty of a dealer who meets buyers and sellers arriving at different time. The models postulate the primary role of market-makers as liquidity providers and display exactly how the bid-ask spread rewards market-makers for price risk on inventory. Under the inventory model, the exchange procedure is a problem of matching where by the market maker that is being confronted by risk that is unbalance, utilizes price to stabilize demand and supply through time, with the main issues being the path of inventory and the doubt around the flow of order. Makers of the market realize the inventory mechanism by moving the quotes to produce the disparity of sell and buy orders. The spread between bid-ask rises with the risk aversion of the market maker, the amount of the deal, the risk of the security and the time limit, or it may reveal the dealer's market power. In modelling the spread resulting from risk based on inventory, the determinant of the bid price of dealer is considered. The bid price need to be fixed at a discount, beneath the agreed price of the security to pay for the risk of inventory.

Asymmetric Information Based Models

These models focus on explaining market behaviour that does not rely only on transaction costs, but also relies on asymmetric information. The essential feature of information-based models is that the trading process involves decisions made by traders who have superior information compared to others. These traders who have superior information (informed traders) purchase when stock price is very low, and they sell when the price of stock rises. From the point of view of the market-maker, he always loses with informed traders and bears the costs of these trades;

therefore, the market-maker has to to counterbalance these losses from uninformed traders. These gains arise from the bid-ask spread. Rational, competitive market-makers fix their bid and ask prices accordingly, and more extreme information asymmetries lead to wider bid-ask spreads. Two core types of asymmetric information models exist:- the sequential trade models and the strategic models.

Models Based on Sequential Trade

This is when unsystematically chosen traders successively come to the marketplace. The structure is founded on the notion of the presence of similarly informed traders. Consequently, they are referred to as 'informed traders', who buy or sell based on insider knowledge on the fundamental price of the security and 'liquidity traders', who buy or sell as a result of exogenous motives, such as liquidity aspects or portfolio adjustments. The notion of diverse sets of dealers offers the foundation for many asymmetric information based models. Scholars that have written papers in this area are O'Hara (2003); and Easley, Hvidkjaer & O'Hara (2003) among others.

Model of Glosten and Milgrom (1985)

In this model, there is a payoff for assets and this is either low or high with assumed probability which is shown after the market has closed. The entire traders consist of informed traders being aware of the real security payoff and uninformed traders who trade unsystematically with same chance. Traders that are informed buy (sell) if the real security price is increased (decreased). The percentage of traders who have privileged information participate in the market is assumed. Dealers do not have superior information and assume on the security's real worth through the past trade record. Specifically, looking at the buy (sell) request of a trader, the dealer calculates the tentatively anticipated price of the security assuming that a trade is either a buy or sell. The dealers then fix the bid (ask) quote in a way to ensure that predictable profit from buyer (seller) who are uninformed are protected by the loss to buyer (seller) who are informed. After the ensuing trade, the dealer updates their beliefs on the asset's correct value using their previous views. The resultant bid-ask spread emanates from the security's possible prices (low vs. high), their resultant probabilities, and the comparative percentage of informed traders. The main influence of models based on sequential trade is that the prices of trade will follow a martingale – simply put, this means that the market maker's best prediction of future prices is current price, order movement is interrelated (sells is likely to move with sells, buys is likely to go with buys), over time as the bid-ask spreads drop the dealer's doubt also reduce and individual buy or sell have price influence.

According to Glosten and Milgrom (1985), when the ask price is higher and the bid price is lower than the expectation of V, i.e. $A_t \geq E_t [V] \geq B_t$. The disparity is stringent if adverse selection is likely. Whatsoever that escalates adverse selection would escalate spread: that is, when the insider information becomes better; the ratio of informed to uninformed arrival rates rise; the elasticity of uninformed demand and supply move up.

Furthermore, the model also reveals that the first difference of trading price process is serially uncorrelated. Hence the spreads owing to monopoly power, transaction costs and risk aversion result in negative serial correlation, while spreads solely owing to adverse selection do not lead to negative serial correlation.

Glosten-Milgrom Bid-ask spread model can be demonstrated by assuming that security will have two likely values - a highest value, V^H, and a lowest value, V^L - with the same probability.

Informed investor who is aware of the actual value is given the probabilityπ. Supposing there is neutrality of risk, informed traders price the security at $\bar{a} = ((V^H + V^L)/2$. The ask-price A becomes the anticipated value of the security provisional on trade at the ask-price:

$$A = V^H \pi + \bar{a}(1-\pi)$$

The bid-price is $B = V^H \pi + \bar{a}(1-\pi)$

Since investors who have superior information buy (sell) at the ask (bid) when they know the security value is V^H (V^L), the ask price is higher than the bid price.

The spread between the bid ask price, is given by: $A - B = \pi (V^H - V^L)$

Where V^H = the high value of an asset

V^L = the low value of the same asset

π = probability of informed investors' presence.

This model however did not adequately address how swiftly prices will congregate on informational efficiency.

Strategic Trade Models

Under the preceding model, that is model based on sequential trade, a trader takes part in a market just once. Hence, the trader never considers the influence of her trade decision on the consequent conduct of others. Therefore, traders who are informed, buy or sell largest likely amounts since they need not to give likely adverse price effects in impending trades. This condition is totally not the same with the strategic trade model, where traders continually partake in the market and consequently act strategically. Research papers in this aspect of finance include (Kyle, 1985 and 1984; Foster and Viswanathan, 1996) among others.

Synthetic Model

Biais, Glosten, and Spatt (2005) developed an exciting synthetic model that integrates together the adverse selection and inventory/order handling cost. Under the synthetic model, it is assumed that there are only risk averse informed traders and risk averse market makers (no uninformed traders for simplicity).

Empirical Review

Using transactions data recorded in the American Stock Exchange options specialists trading book, Ho and Macris (1984) test a model of dealer pricing. The data comprises the dealers' inventory situation and transactions were categorized as being purchase or sales. Their outcome reveals that the amount of spread is directly linked to security risk and inventory influences are significant. The specialist quotes are affected by the inventory position: both the bid and ask prices decrease (increase) when inventory is positive (negative).

Hasbrouck (1988) modelled the New York Stock Exchange intraday data on volume and quoted prices employing vector autoregressive method and granger causality test. The result reveals that the intraday buy and sell volume and quote revision display robust reliance in both ways, result was in line with both the inventory control and asymmetric information models. The researcher further examines the effect of on trade innovation on quote revisions. The result

reveals that trade innovations positively influence quote revisions, signifying that information influences controls inventory influence. This outcome might be as a result of inventory influences that are spread over a longer period than information influences. Hasbrouck (1991) also investigated the information content of stock trades utilizing a vector autoregressive method. The result reveals a significant information effect. Madhaven and Smidt (1993) examined the extent to which asymmetric information influences security pricing using specialist actual data of inventory and also examined the magnitude to which information asymmetry is really an issue in asset pricing. Utilizing previous prices as a representation for mean beliefs, they recover the weight positioned by a dealer on the flow of order as a sign of future value and differentiates this from inventory influence. The outcome of their study shows that information asymmetry plays a vital role in intraday price changes. In contrast, a weak result was reported for the intraday inventory influence, a result also confirmed by Hasbrouck and safianos (1993) utilizing another methodology. Osamwonyi and Aigboduwa (2011) test the information asymmetry model of Glosten and Milgrom (1985) using data from the Nigeria stock market. Their result shows that the model can be used to predict upward/downward movement of stock prices in the Nigeria stock market. Eguavoen (2016) tested the information asymmetry model of Glosten and Milgrom (1985) using data from the Nigeria stock market. The result reveals that the upward and downward movement of price for the following day can be forecasted in the Nigeria stock market. Ogbeide and Umana (2017) tested the Glosten and Milgrom (1985) model utilizing data from the Nigeria stock market. The result showed that the model forecasted correctly the prices of stock of about four listed firms, hence going against the random walk movement, whereas for about 12 firms, the model did show how present day's stock price can be a bit high or low of next day's price.

From the review of past studies above, it can be said that the empirical tests of market microstructure model are limited, particularly from the perspective of the Nigerian stock market. The present study is therefore an attempt to seek new evidence as well as an addition to the existing study carried out in Nigeria.

Methodology

The population of this study is all securities listed in the Nigerian stock market. The sample of the study comprises of all securities traded in the Nigerian stock market whose high and low prices were published as on 27th and 28th July, 2017. The data for this study was extracted from Nigerian stock exchange website.

By developing the model of Copeland and Galai into a sequential trade framework, Glosten and Milgrom (1985) display how insider information over time can be integrated into prices. In their model, the dealer and other uninformed shareholders found out what the right price is by studying the flow of order. Therefore the dealer considers information in the order flow when fixing his prices so that, prices congregate close to informationally efficient prices. Osamwonyi and Aigboduwa (2011) have stated that bid-ask spread estimation using Glosten-Milgrom model can be shown by assuming that a security can assume two likely values – a high value, V^H, and a low value, V^L - with equivalent probability. Enlightened investors who are aware of the true value are presented with probability (π). Assuming risk neutrality, informed investors estimate the security at $\bar{a} = \frac{(V^H + V^L)}{2}$. The ask price A is then the anticipated value of the security dependent on trade at the ask price: $A=V^H \pi + \bar{a} (1-\pi)$. The bid price is $B = V^L \pi + \bar{a} (1-\pi)$.

Given that informed traders trade at the bid (ask) only if they consider the security price is V^H (V^L), the ask price is higher than the bid price.

The bid-ask spread, is given by: A — B = (V^H - V^L)

Where V^H = the high value of a security

V^L = the low value of the same security

π = probability of presence of informed investors.

This is based on the probability of meeting traders who are informed on the amount of security price uncertainty. Furthermore, Glosten and Milgrom (1985) also revealed that prices progress over time as a martingale, indicating at each the information is transmitted through trade.

Empirical Analysis

In order to successfully test whether the model of Glosten and Milgrom (1985) can help investors in the Nigerian Stock Market to predict next day stock prices and thus reduce information asymmetry, 50 companies were selected using high and low price values of two trading days' stock prices which are 27th and 28th July, 2017. Also, the probability of encountering enlightened or informed investors in the market (π) is pegged at 50%. Following analysis are carried out:

Table 1: Bid-Ask Analysis

S/N	Security	$\pi(V^H-V^L)$	$V^L - \pi(V^H-V^L)$	Forecast	Actual Price as @ 28/07/2017
		₦: K	₦: K	₦: K	₦: K
1	ACCESS	0.5(10.3 - 10.2) = 0.05	10.2 - 0.50(10.3 - 10.2)=10.15	10.15	10.11
2	AFRIPRUD	0.5(3.2 - 3.17) = 0.02	3.17 - 0.50(3.2 - 3.17)=3.155	3.16	3.16
3	AIICO	0.5(0.56-0.54) = 0.01	0.54 - 0.50(0.56 - 0.54)=0.53	0.53	0.55
4	CADBURY	0.5(11.2-11.2) = 0	11.2- 0.50(11.2 - 11.2)=11.2	11.20	10.45
5	CHAMPION	0.5(2.9-2.74) = 0.08	2.74 - 0.50(2.9 - 2.74)=2.66	2.66	2.85
6	CONOIL	0.5(36.4-36.4) = 0	36.4 - 0.50(36.4 - 36.4)=36.4	36.40	36.40
7	CONTINSURE	0.5(1.37-1.34) = 0.02	1.34 - 0.50(1.37 - 1.34)=1.325	1.33	1.37
8	CUSTODYINS	0.5(3.57-3.3) = 0.135	3.3 - 0.50(3.57 - 3.3)=3.165	3.17	3.60
9	DANGCEM	0.5(244.99-243) = 0.99	243-0.50(244.99243)=242.005	242.01	235.51
10	DANGFLOUR	0.5(5.55-5.22) = 0.17	5.22 - 0.50(5.55 - 5.22)=5.055	5.06	5.25
11	DANGSUGAR	0.5(9.88-9.26) = 0.31	9.26 - 0.50(9.88 - 9.26)=8.95	8.95	10.86
12	DIAMONDBNK	0.5(1.33-1.26) = 0.04	1.26 - 0.50(1.33 - 1.26)=1.225	1.23	1.28
13	ETERNA	0.5(3.85-3.8) = 0.03	3.8 - 0.50(3.85 - 3.8)=3.775	3.78	3.80
14	ETI	0.5(16.53-15.75) = 0.39	15.75-0.50(16.5-15.75)=15.36	15.36	17.00
15	FBNH	0.5(6-5.95) = 0.025	5.95 - 0.50(6 - 5.95)=5.925	5.93	5.78
16	FIDELITYBK	0.5(1.33-1.29) = 0.02	1.29 - 0.50(1.33 - 1.29)=1.27	1.27	1.28
17	FIDSON	0.5(3.51-3.25) = 0.13	3.25 - 0.50(3.51 - 3.25)=3.12	3.12	3.38
18	FLOURMILL	0.5(30-28) = 1	28 - 0.50(30 - 28)=27	27.00	29.00
19	GUARANTY	0.5(41-39.45) = 0.775	39.45-0.50(41 - 39.45)=38.675	38.68	41.10

20	GUINNESS	0.5(66-65) = 0.5	65 - 0.50(66 - 65)=64.5	64.50	65.05
21	HONYFLOUR	0.5(2.07-2) = 0.035	2 - 0.50(2.07 - 2)= 1.965	1.97	2.05
22	INTBREW	0.5(31.5-30) = 0.75	30 - 0.50(31.5 - 30)= 29.25	29.25	32.00
23	JAIZBANK	0.5(0.63-0.6) = 0.015	0.6 - 0.50(0.63 - 0.6)= 0.585	0.59	0.66
24	LINKASSURE	0.5(0.57-0.57) = 0	0.57 - 0.50(0.57 - 0.57)= 0.57	0.57	0.59
25	LIVESTOCK	0.5(0.86-0.82) = 0.02	0.82 - 0.50(0.86 - 0.82)= 0.8	0.80	0.78
26	MANSARD	0.5(2.2-2.1) = 0.05	2.1 - 0.50(2.2 - 2.1)= 2.05	2.05	2.10
27	MAYBAKER	0.5(3.44-3.25) = 0.095	3.25 - 0.50(3.44 - 3.25)= 3.155	3.16	3.23
28	NAHCO	0.5(2.9-2.9) = 0	2.9 - 0.50(2.9 - 2.9)= 2.9	2.90	2.78
29	NASCON	0.5(9.5-9.5) = 0	9.5 - 0.50(9.5 - 9.5)= 9.5	9.50	9.46
30	NB	0.5(173.77-163) = 5.385	163-0.50(173.77-163)=157.615	157.62	171.62
31	NEIMETH	0.5(0.81-0.81) = 0	0.81 - 0.50(0.81 - 0.81)= 0.81	0.81	0.80
32	NEM	0.5(1.26-1.15) = 0.055	1.15 - 0.50(1.26 - 1.15)= 1.095	1.09	1.28
33	NESTLE	0.5(955.5-950) = 2.75	950-0.50(955.5 - 950)= 947.25	947.25	1003.27
34	OANDO	0.5(8.19-7.98) = 0.105	7.98 - 0.50(8.19- 7.98)= 7.875	7.88	7.80
35	OKOMUOIL	0.5(74.41-74.41) = 0	74.41-0.50(74.41-74.41)= 74.41	74.41	74.41
36	PRESCO	0.5(71-70) = 0.5	70 - 0.50(71 - 70)= 69.5	69.50	73.20
37	PZ	0.5(23-22.9) = 0.05	22.9 - 0.50(23 - 22.9)= 22.85	22.85	23.30
38	SEPLAT	0.5(488-488) = 0	488 - 0.50(488 - 488)= 488	488.00	488.00
39	STANBIC	0.5(38.76-37) = 0.88	37 - 0.50(38.76 - 37)= 36.12	36.12	37.53
40	TOTAL	0.5(270-270) = 0	270 - 0.50(270 - 270)= 270	270.00	270.00
41	TRANSCORP	0.5(1.5-1.48) = 0.01	1.48 - 0.50(1.5 - 1.48)= 1.47	1.47	1.49
42	UACN	0.5(17-16.6) = 0.2	16.6 - 0.50(17 - 16.6)= 16.4	16.40	16.58
43	UAC-PROP	0.5(2.77-2.77) = 0	2.77 - 0.50(2.77 - 2.77)= 2.77	2.77	2.75
44	UBA	0.5(10.49-10.04) = 0.225	10.04-0.50(10.49-10.04)=9.815	9.82	9.81
45	UCAP	0.5(3.03-3) = 0.015	3 - 0.50(3.03 - 3)= 2.985	2.99	3.00
46	UNITYBNK	0.5(0.61-0.59) = 0.01	0.59 - 0.50(0.61 - 0.59)= 0.58	0.58	0.64
47	VITAFOAM	0.5(2.75-2.7) = 0.225	2.7 - 0.50(2.75 - 2.7)= 2.675	2.68	2.88
48	WAPCO	0.5(61.45-60) = 0.725	60 - 0.50(61.45 - 60)= 59.275	59.28	60.75
49	WEMABANK	0.5(0.56-0.54) = 0.01	0-.54 - 0.50(0.56 - 0.54)= 0.53	0.53	0.54
50	ZENITHBANK	0.5(26-25.06) = 0.47	25.06- 0.50(26 - 25.06)= 24.59	24.59	25.90

Source: Computed by researcher, 2017 *π = 0.50*

Table 2: Comparative Report between 27/07/2017 and 28/07/2017

S/N	Security	Forecast	Actual Price as @ 28/07/2017	Difference
		₦ : K	₦ : K	₦ : K
1	ACCESS	10.15	10.11	-0.04
2	AFRIPRUD	3.16	3.16	0.00
3	AIICO	0.53	0.55	0.02
4	CADBURY	11.20	10.45	-0.75
5	CHAMPION	2.66	2.85	0.19
6	CONOIL	36.40	36.4	0.00
7	CONTINSURE	1.33	1.37	0.04
8	CUSTODYINS	3.17	3.60	0.43
9	DANGCEM	242.01	235.51	-6.50
10	DANGFLOUR	5.06	5.25	0.19
11	DANGSUGAR	8.95	10.86	1.91
12	DIAMONDBNK	1.23	1.28	0.05
13	ETERNA	3.78	3.80	0.02
14	ETI	15.36	17.00	1.64
15	FBNH	5.93	5.78	-0.15
16	FIDELITYBK	1.27	1.28	0.01
17	FIDSON	3.12	3.38	0.26
18	FLOURMILL	27.00	29.00	2.00
19	GUARANTY	38.68	41.10	2.42
20	GUINNESS	64.50	65.05	0.55
21	HONYFLOUR	1.97	2.05	0.08
22	INTBREW	29.25	32.00	2.75
23	JAIZBANK	0.59	0.66	0.07
24	LINKASSURE	0.57	0.59	0.02
25	LIVESTOCK	0.80	0.78	-0.02
26	MANSARD	2.05	2.10	0.05
27	MAYBAKER	3.16	3.23	0.07
28	NAHCO	2.90	2.78	-0.12
29	NASCON	9.50	9.46	-0.04
30	NB	157.62	171.62	14.00
31	NEIMETH	0.81	0.80	-0.01
32	NEM	1.09	1.28	0.19
33	NESTLE	947.25	1003.27	56.02
34	OANDO	7.88	7.80	-0.08
35	OKOMUOIL	74.41	74.41	0.00
36	PRESCO	69.50	73.20	3.70
37	PZ	22.85	23.30	0.45
38	SEPLAT	488.00	488.00	0.00

39	STANBIC	36.12	37.53	1.41
40	TOTAL	270.00	270.00	0.00
41	TRANSCORP	1.47	1.49	0.02
42	UACN	16.40	16.58	0.18
43	UAC-PROP	2.77	2.75	-0.02
44	UBA	9.82	9.81	-0.01
45	UCAP	2.99	3.00	0.01
46	UNITYBNK	0.58	0.64	0.06
47	VITAFOAM	2.68	2.88	0.20
48	WAPCO	59.28	60.75	1.47
49	WEMABANK	0.53	0.54	0.01
50	ZENITHBANK	24.59	25.90	1.31

Source: Computed by researcher, 2017

Table 1 and 2 above reveal that there is no significant difference between the actual price and forecast price which confirms the relevance of Glosten and Milgrom (1985) model in calculating bid/ask spread which can be used to predict next day's stock price. The Tables reveal that the model gave exact prediction for five companies stock (AFRIPRUD, CONOIL, OKOMUOIL, SEPPLAT and TOTAL) while for other stocks it predicted the upward or downward movements in their next day prices with slight difference. This result is in tandem with the findings of Osamwonyi and Aigboduwa (2011) and Eguavoen (2016). The analysis above has clearly x-rayed how uninformed traders and investors could have idea about next day's price of stock in the stock market.

Comparative Test of Forecast and Actual Price

To ascertain if there is statistical proof that the mean difference between the forecast and actual price is significantly different from zero (i.e., to confirm whether there is a Statistically significant dissimilarity between the forecast and actual price), a Paired Samples t Test is carried out. The hypotheses can be stated in two separate forms that indicate similar notion and which is alike mathematically:

H_0: $\mu_1 = \mu_2$ (*"the two population means are equivalent"*)

H_1: $\mu_1 \neq \mu_2$ ("the two population means are not equivalent")

OR

H_0: $\mu_1 - \mu_2 = 0$ ("the difference between the two population means is equal to 0")

H_1: $\mu_1 - \mu_2 \neq 0$ ("the difference between the two population means is not 0")

Where; μ_1 is the mean of the population of the first variable (forecast price) while μ_2 is the mean of the population of the second variable (actual price).

The computed value of *t* is then compared to the critical value of *t* with degree of freedom = *n* - 1 from the t distribution table for a chosen confidence level. If the computed value of t is higher than the critical value of *t*, then the null hypothesis is rejected (and it is concluded that there is significant difference between the means).

The outcome of the Paired Samples *t* Test is presented below:

Table 3 : Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	FORCAST	54.66	50	154.423	21.839
	ACTPRICE	56.34	50	161.083	22.781

Table 4 : Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	FORCAST & ACTPRICE	50	1.000	.000

Table 5 : Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	FORCAST-ACTPRICE	-1.681	8.182	1.157	-4.006	.644	-1.453	49	.153

Source: SPSS Output, 2017

The result display above consists of: Samples Paired Statistics, Samples Paired Correlations, and Samples Paired Test. Samples Paired Statistics show the descriptive univariate statistics for forecast and actual price. Notice that the size of the sample is 50; the reason being that the paired t-test is utilized when there are no-missing numbers for the two variables. Samples Paired Correlations display the bivariate coefficient of Pearson correlation (with a two-tailed test of significance) for each pair of variables used. Samples Paired Test displays the results of the test of hypothesis.

Conclusions and Decision

Based on the results, the following become evident:

- Forecast and Actual prices were perfectly and directly related (r = 1.000, p is less than 0.000)
- No significant average discrepancy between Forecast and Actual prices (t_{49} = -1.453, p < 0.153)
- On average, Forecast price were ₦1.68 kobo lower than Actual price (95% CI [-4.01, 0.65])

The statistical evidence further validates earlier position that there is no significant discrepancy between the actual price and forecast price which confirms the relevance of Glosten and Milgrom (1985) model in calculating bid-ask spread which can be used to predict next day's stock price.

Conclusion and Recommendations

The aim of this paper was to empirically test market microstructure model using data from the Nigeria stock market, specifically the Glosten and Milgrom information asymmetry model

was tested. The result from this study reveals that the model can be used to predict or forecast next day's stock price. This position was further confirmed using statistical evidence. Based on this finding, the study concludes that knowledge of market microstructure will assist investors in profiting from their stock market investment.

In light of the outcome of this empirical investigation, the following are offered as recommendations:

1. Awareness of market microstructure needs to be created for the mass of investors who daily flood the market without knowing the ways and processes of price movement.
2. A formal system of market microstructure education is necessary in our universities and professional settings.

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