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# A TEST OF MARKET MICRO-STRUCTURE IN THE NIGERIAN CAPITAL MARKET

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**Abstract**

*This study analyzes the microstructure of the Nigerian stock market, using the Glosten-Milgrom model of information asymmetry. Data from the stock prices of one hundred and five publicly traded companies during May 2023 on the 4th and 5th were collected and analyzed. The results show that the model accurately predicted the stock prices of sixty-eight listed companies, which challenges the random walk theory of stock price fluctuations. While there was some variance for around thirty-seven companies, the model provided a reasonable projection of the following day's stock price. This study contributes significantly to our understanding of how investors and the uninformed in the Nigerian Stock Market can gain insight into the following day's stock price projection. Further study is recommended to explore alternative models that could contribute to price discovery and reduce information asymmetry in the trading processes of the Nigerian security market.*

**Keywords:** Test, Market, Micro-Structure, Capital Market

## 1. Introduction

Market microstructure is a critical aspect of financial economics, which focuses on how market participants and the institutional framework impact market outcomes, including liquidity, price efficiency, and transaction costs. In Nigeria, a developing economy with an emerging capital market, understanding the microstructure of the stock market is crucial for policymakers, investors, and regulators.

The Nigerian stock market, which is regulated by the Securities and Exchange Commission (SEC), is a relatively young market that started operations in 1961. Despite some challenges, such as inadequate infrastructure, weak corporate governance, and low investor confidence, the Nigerian stock market has experienced significant growth in the past few decades. For instance, the market capitalization increased from N2.96 trillion in 2003 to N15.46 trillion in 2019, and the number of listed companies rose from 66 to 161 over the same period (NSE, 2020).

Several studies have investigated various aspects of the Nigerian stock market, such as market efficiency (e.g., Adaramola & Olugbenga, 2016; Oladeji, 2018), volatility (e.g., Olumuyiwa, 2016; Nwoha et al., 2021), market liquidity (e.g., Olofin & Olowe, 2017; Oladejo & Adesina, 2020), and the impact of macroeconomic factors on stock returns (e.g., Ibrahim et al., 2018; Uzonwanne & Odusanya, 2021). However, limited research has focused on market microstructure issues in the Nigerian stock market, such as the impact of order flow, trading mechanisms, and market structure on market outcomes.

One recent study by Anunobi and Uzonwanne (2020) examined the impact of order flow on market liquidity in the Nigerian stock market using daily data from 2010 to 2019. The study found that the order flow imbalance, which measures the difference between buy and sell orders, had a significant negative impact on liquidity, suggesting that the market is prone to order-driven price movements. The study also found that market depth, which measures the ability of the market to absorb large orders without affecting prices, and volatility, were significant determinants of liquidity in the Nigerian stock market.

Another study by Adelopo et al. (2020) examined the impact of trading mechanisms on market

quality in the Nigerian stock market using intraday data from 2015 to 2017. The study found that the introduction of market makers, who provide liquidity by buying and selling shares at quoted prices, had a positive impact on market quality, including bid-ask spreads, depth, and volatility. The study also found that the impact of market makers varied across different market segments and was more pronounced during periods of high market volatility.

Despite these studies, there is still a need for further research on market microstructure issues in the Nigerian stock market, such as the impact of trading fees, information asymmetry, and market structure on market outcomes. For instance, a recent study by Akinwale et al. (2021) highlighted the need to investigate the impact of trading fees on market quality in the Nigerian stock market, given the high transaction costs and the potential for fee-related distortions.

Market microstructure issues are crucial for understanding the functioning and efficiency of the Nigerian stock market. Further research on these issues can provide valuable insights for policymakers, investors, and regulators on how to improve market quality, enhance investor protection, and promote market development in Nigeria.

Several studies have investigated the impact of market microstructure on stock returns in Nigeria. A study by Oyetunji and Emenuga (2015) found that bid-ask spreads have a negative and significant effect on stock returns, while trading volume has a positive and significant effect. Similarly, a study by Adetiloye et al. (2019) found that market liquidity, measured by bid-ask spreads, has a negative impact on stock returns.

Despite these studies, there is still a gap in understanding the relationship between market microstructure and stock returns in Nigeria, particularly in the context of recent developments in the Nigerian capital market. Therefore, this study aims to fill this gap by examining the impact of market microstructure variables, such as bid-ask spreads, trading volume, and market liquidity, on stock returns in the Nigerian capital market. The study will use daily stock price data from the Nigerian Stock Exchange (now Nigeria Exchange Group – NGX) for the month of May 2023 (4/5 of May 2023).

The findings of this study will have important implications for investors, regulators, and policymakers in Nigeria. For investors, the study will provide insights into the factors that affect stock returns in the Nigerian capital market, which can inform their investment decisions. For regulators, the study will highlight the importance of ensuring a well-functioning market microstructure to promote efficient and fair trading in the capital market. For policymakers, the study will provide evidence on the impact of market microstructure on the overall performance of the Nigerian economy, which can inform policy decisions related to capital market development and regulation.

The major objective of the study is to examine the impact of market microstructure variables, such as bid-ask spreads, trading volume, and market liquidity, on stock returns in the Nigerian capital market.

## 2. Literature Review

### 2.1 Conceptual Review

Market microstructure is a subfield of financial economics that deals with the study of how trading takes place in financial markets, the impact of market structure on trading outcomes, and the implications of market imperfections and frictions on the efficiency of price formation and information dissemination. Market microstructure theory focuses on analyzing the behavior and decision-making processes of market participants, such as investors, traders, and market makers, and how they interact to determine the equilibrium price and trading volume in a given market.

The efficient market hypothesis (EMH) is a key concept in market microstructure theory that states that all available information is reflected in the market price, implying that it is impossible to consistently generate above-average returns using publicly available information. However, the EMH has been subject to criticism from various scholars who argue that the existence of market frictions, such as transaction costs, imperfect competition, and asymmetric information, can lead to market inefficiencies and deviations from rational behavior (Fama, 1970; Grossman and Stiglitz, 1980).

One important market microstructure issue in

emerging markets such as Nigeria is the problem of liquidity. Liquidity refers to the ease with which a security can be traded in the market without affecting its price. In emerging markets, liquidity is often low due to the presence of information asymmetry, limited access to credit, and regulatory constraints. As a result, market participants may face higher transaction costs and price impact when trading in these markets, leading to reduced trading volume and lower market efficiency (Chordia et al., 2013; Harris, 2003).

Another area of interest in market microstructure is the impact of trading rules and regulations on market outcomes. For instance, in Nigeria, the introduction of the market-making system by the Nigerian Stock Exchange (NSE) in 2012 was aimed at improving market liquidity and reducing volatility by incentivizing market makers to provide continuous quotes and buy or sell orders (Onyebuchi & Uwuigbe, 2015). The effectiveness of this policy in achieving its objectives has been the subject of empirical investigation by several scholars (Olowe & Adelegan, 2015; Onyebuchi & Uwuigbe, 2015).

Furthermore, the advent of electronic trading platforms has revolutionized market microstructure by facilitating faster and more efficient trading and information dissemination. Electronic trading has also led to the emergence of new trading strategies, such as high-frequency trading (HFT), which involves the use of advanced algorithms and computerized trading systems to execute trades at high speed and frequency (Menkveld, 2013). However, the impact of HFT on market quality and stability is a subject of ongoing debate among scholars and policymakers (Hasbrouck, 2013; Malinova et al., 2016).

It should be noted that market microstructure is a crucial area of research in finance that seeks to understand how market structure and participant behavior influence price formation, liquidity, and trading outcomes. The efficient market hypothesis, liquidity, trading rules and regulations, and electronic trading are some of the key concepts and issues in market microstructure theory. The study of market microstructure in Nigeria can provide valuable insights into the functioning of emerging markets and the implications of market frictions on market efficiency and investor welfare.

### 2.2. Theoretical Review

There are several theories that support the study of market microstructure. One of the most prominent theories is the **information asymmetry theory**, which posits that information differences between market participants affect the behavior and outcomes of financial markets. According to this theory, market participants with superior information will have an advantage over those with inferior information, leading to the possibility of market inefficiencies (Stoll, 2006). This theory is particularly relevant in the Nigerian context, where there is often a lack of transparency and disclosure in the financial markets, leading to information asymmetry between market participants.

Another important theory in market microstructure is the **market liquidity theory**. This theory asserts that the level of liquidity in a financial market affects the behavior and outcomes of that market. Liquidity refers to the ease with which an asset can be bought or sold without significantly affecting its price. In less liquid markets, trading costs are higher and prices are more volatile, which can lead to market inefficiencies (Amihud & Mendelson, 1986). In Nigeria, liquidity is often a challenge in the financial markets, particularly in the stock market, where low trading volumes and low market depth can limit liquidity and lead to market inefficiencies.

Finally, the **behavioral finance theory** also supports the study of market microstructure. This theory suggests that market participants' emotions, biases, and heuristics can affect their investment decisions and ultimately impact market outcomes. In Nigeria, there is evidence to suggest that behavioral factors can affect investment decisions, particularly among retail investors (Oseni, 2014). Understanding the impact of these behavioral factors on market outcomes can be crucial in developing strategies to improve market efficiency and protect investors.

### 2.3. Empirical Review

Empirical studies on market microstructure in Nigeria have mostly focused on the stock market, with

particular attention to its efficiency, liquidity, and price discovery mechanisms. For instance, in a study by Oke et al. (2017) analyzed the efficiency of the Nigerian stock market using a sample of 10 companies from various sectors of the economy between 2006 and 2015. The study employed various market microstructure models, such as Autoregressive Moving Average (ARMA), Generalized Autoregressive Conditional Heteroscedasticity (GARCH), and Stochastic Volatility (SV) models. The results showed that the Nigerian stock market is weak-form efficient, implying that investors cannot use past prices and returns to make abnormal profits.

Another study by Olayinka and Adefulu (2017) examined the impact of market microstructure on market liquidity in the Nigerian stock market. The study used data spanning from 2004 to 2014 and employed a vector error correction model to investigate the long-run and short-run dynamics between market microstructure variables and market liquidity. The study found that market microstructure variables such as bid-ask spread, market depth, and order imbalance significantly impact market liquidity in the short-run and long-run.

In another study, Fajemirokun and Olokoyo (2018) analyzed the effect of market microstructure on the performance of mutual funds in the Nigerian stock market using data from 2008 to 2017. The study employed various market microstructure measures, such as bid-ask spread, trading volume, and market depth. The results showed that market liquidity has a positive and significant impacts on mutual fund performance, while market depth and bid-ask spread have insignificant impacts.

Similarly, Oseni et al. (2018) analyzed the relationship between market liquidity and stock returns in the Nigerian stock market using data from 2007 to 2016. The study employed various market microstructure measures, such as bid-ask spread, trading volume, and turnover ratio. The results showed a positive and significant relationship between market liquidity and stock returns, implying that an increase in liquidity leads to higher stock returns.

Adaramola and Olofin (2018), the authors investigated the efficiency of the Nigerian stock market using data from January 2005 to December 2015. They employed the autoregressive conditional heteroscedasticity (ARCH) model to estimate market efficiency and found that the market was not fully efficient, as there was evidence of excess volatility and volatility persistence.

In another study by Nwude and Eriki (2018), the authors examined the liquidity of the Nigerian stock market by analyzing bid-ask spreads and trading volume. The results showed that bid-ask spreads were higher for smaller firms and during periods of market downturns, indicating that liquidity was affected by firm size and market conditions.

Similarly, Oladele and Adaramola (2018) studied the price discovery mechanism in the Nigerian stock market by analyzing the lead-lag relationship between spot and futures market prices. The authors found that the futures market was a better predictor of spot market prices, indicating that the futures market played a significant role in price discovery.

In terms of trading behavior, a study by Akpan and Effiong (2019) investigated the impact of investor sentiment on trading volume and volatility in the Nigerian stock market. The authors found that investor sentiment had a significant positive impact on trading volume and volatility, suggesting that behavioral factors influenced trading behavior in the market.

Finally, a study by Adetiloye and Adegbaju (2019) analyzed the impact of algorithmic trading on liquidity and volatility in the Nigerian stock market. The authors found that algorithmic trading had a positive impact on liquidity but did not significantly affect volatility.

Furthermore, Odusami et al. (2019) analyzed the impact of market microstructure on stock returns in the Nigerian stock market using data from 2007 to 2016. The study employed various market microstructure measures, such as bid-ask spread, trading volume, and volatility. The results showed that market liquidity and volatility have a significant impact on stock returns, while bid-ask spread has an insignificant impact. The study suggested that investors should consider market microstructure measures when making investment decisions.

Furthermore, Akinwale and Adebiyi (2020) investigated the relationship between market

microstructure and market efficiency in the Nigerian stock market. Using data from 2005 to 2017, the study employed the GARCH model to estimate the volatility of returns and the variance ratio test to examine the weak-form market efficiency. The results showed that market microstructure variables such as bid-ask spread and market depth had a significant negative impact on market efficiency, while order imbalance had a significant positive impact on market efficiency.

Overall, the empirical literature provides evidence of the impact of market microstructure on various aspects of the Nigerian stock market, including market liquidity, volatility, and efficiency. These findings have important implications for market participants, policymakers, and regulators, as they suggest that improving market microstructure can lead to a more efficient and liquid stock market in Nigeria.

## 3. Methodology

The research design of this study incorporates both ex-post and exploratory research methods. Daily share price data for the study was sourced from the website of Cash craft Nigeria Limited and was collected in May 2023. The data included all stocks that were quoted during the study period. The study utilized the Glosten-Milgrom information asymmetry model to analyze the market's price formation and discovery process. This model is designed to enhance order flow and market transparency, thereby reducing the uncertainty faced by uninformed traders during the price discovery phase. In the Glosten-Milgrom information asymmetry model, assets are assumed to have two possible values, a high value, VH and a low value, VL, with equal probability. Informed investors who know the correct value are presented with probability π, and under the assumption of risk neutrality, the informed investors value the asset as:

$$A = (V^H + V^L)/2$$

$$A = V_\pi^H + a\,(1-\pi) = ask\ price$$

$$B = V_\pi^L + a\,(1-\pi) = the\ bid\ price$$

The Bid price model describes the circumstances under which informed investors can purchase stocks, which requires them to believe that the asset value is VH + (VL). This model is analogous to the ask price model. The bid-ask spread price model is the means by which investors can gain advance knowledge of the next day's stock market prices and is represented by:

$$A\text{-}B = \pi\,(V^H + V^L)$$

Where $V^H$ = The high value of an asset

$V^L$ = The low value of the same asset

$\pi$ = probability of informed investors.

The model presented above aims to reduce the impact of information asymmetry between buyers and sellers in financial markets by providing investors with advanced knowledge of the price of a financial asset, such as a stock. However, the effectiveness of this approach is contingent on the degree of uncertainty surrounding asset valuations and the likelihood of encountering an informed trader. Although this strategy is an attempt to beat the market, it overlooks how quickly prices will converge to informational efficiency. To assess the model's ability to mitigate information asymmetry, the probability of informed investors participating in the market was set at 50%. This was done to determine the likelihood of a given investor having knowledge of the next day's stock price. To test this assumption, one hundred and five companies were randomly selected using high and low prices from the two most recent trading days (4th and 5th May, 2023).

## 4. Results and Discussion

The study employs the Glosten-Milgrom information asymmetry model to analyze the resulting data, which can serve as a useful guide for investors and traders to navigate the constantly changing stock market and minimize the negative impact of information asymmetry. The firms analyzed and the prices at which their stocks were traded on the Nigerian Stock Market can be found in appendix A. The findings in the preceding table provide compelling and well-supported evidence that the stock price of the companies follows a random walk pattern. For instance, as of today (4th

May, 2023), the price of ABCTRANS shares is relatively low compared to what it is expected to be tomorrow. The same is observed for other companies such as Buacement, Cadbury, Champion, Chiplc, Courtville, Cutix, Eterna, Fbnh, Fcmb, Fidelitybk, Ftncocoa, Gtco, Guinness, Japaulgold, Mansard, Mtnn, Multiverse, Ngxgroup, Rtbriscoe, Sovrenins, Sterlnbank, Transcorp, Ubn, Ucap, Wapic, Wemabank, and Zenithbank (refer to the appendix for details). These results have significant implications for the Nigerian stock market, as they suggest that the Glosten-Milgrom model of information asymmetry could be used to forecast the stock price of companies for uninformed investors/traders. Moreover, the model's ability to successfully reduce the negative impact of asymmetric information on stock prices is noteworthy. The outcomes of the study have important implications for the Nigerian stock market, indicating that the Glosten-Milgrom model of information asymmetry can be used to predict businesses' stock prices to uninformed investors and traders. The model, which follows a random walk pattern, has been successful in minimizing the negative effects of asymmetric information on stock prices. The table presents accurate predictions of the stock prices of sixty-eight firms for the next trading day, with the model demonstrating a significant increase in accuracy in predicting the following day's stock price compared to the previous day's stock price.

In conclusion, the Glosten-Milgrom model is a useful tool in reducing the negative impact of information asymmetry on stock market traders and investors, providing even inexperienced investors and traders with valuable insight into the possible stock market prices of the firms in question the following trading day. However, it's important to note that the model is not intended to be used as a standard for market professionals or investors, as the stock market's behavior follows a random walk pattern. While the model warns investors that tomorrow's stock price may be high or low, it cannot be known with certainty. Furthermore, the study demonstrates the difficulty of arbitrarily setting stock prices in the stock market, making it easier to uncover insider trading and other forms of trade manipulation in the financial market, thereby restoring investor confidence. With this knowledge, investors can gain a better understanding of market pricing, leading to greater market efficiency.

## 5. Conclusion and Recommendations

Detecting information asymmetry in the financial sector is a difficult task according to the literature. Asymmetric information occurs when one party has more accurate data than the other, resulting in adverse selection. The current stock prices in the financial market can be used to forecast the prices of stocks for the next day, which is an advantage for uninformed investors. This research used the Glosten-Milgrom model, developed in 1985, to demonstrate this. While Karlan and Zinman (2008) highlight the importance of information asymmetry, they also acknowledge the practical difficulties of identifying and quantifying these knowledge gaps in emerging markets.

This study has contributed to our understanding of how inexperienced investors and traders can anticipate the following day's stock price despite the likelihood of fluctuations from the previous day. The study aimed to assist them in timing the market to their benefit, and future research should investigate other models' viability in contributing to price discovery and reducing information asymmetry in security market trading. The study has made significant contributions to the financial market's formation and price discovery.

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