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EFFECT OF HERDING BEHAVIOR ON STOCK MARKET LIQUIDITY AT NAIROBI SECURITIES EXCHANGE

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Abstract

This study purposed to establish the effect of herding behavior on stock market liquidity at NSE. It effectively deployed a descriptive research design where the study population was all 65 firms currently listed at NSE. The study sampled firms that consistently appeared in the NSE 20 index between January 2017 and December 2022. The sampling technique was purposive as the sample was selected on the basis of individual judgment. Secondary data obtained from NSE included monthly data for equity turnover, market capitalization, NSE 20 index and closing prices of NSE 20 constituent firms. A linear regression model controlling for market returns was used. Turnover ratio, CSSD and NSE 20 returns were used to respectively proxy stock market liquidity, herding behavior and market returns. The study found that herding behavior and market returns were both insignificant predictors of stock market liquidity. Additionally, the explanatory power of the model as indicated by r-squared was found to be very low as it stood at 1.1%. This was an indication that stock market liquidity was largely influenced by other factors other than herding behavior and market returns. Diagnostic tests revealed that the model did not violate the assumptions of classical linear regression hence, the regression results were regarded reliable. On the basis of these findings, the study concluded that herding had no significant effect on stock market liquidity at NSE and recommended that measures implemented by NSE to boost market liquidity should be more informed by those factors proven to significantly affect market liquidity at the bourse.

Keywords: Herding behaviour, Market liquidity, Market return, Listed firm, Securities exchange

INTRODUCTION

Herd mentality is a bias that links human decision-making behavior to social influence (Vipond, 2023). According to Sias (2004), herding is where a unit of investors, over a given span, move in unison into or out of alike securities while Hirshleifer and Teoh (2003) view herding as behavioral similarity that leads to convergence towards the market average. In its irrational form, investors overlook their own neutral, independent analysis and instead, emulate the cues of the mass blindly (Wang, 2021). The focus of this particular study rests on establishing its impact on the liquidity of NSE. A liquid market is one in which transaction costs are low, security trades are quick and the effect of the trades on price is negligible even when the trades are large (Naik & Reddy, 2021).

A market's liquidity can be informed by how efficient it is. According to Downey (2023), market inefficiency can stem from reduced liquidity, information asymmetry as well as from behavioral influences. EMH postulates that an efficient market is one that supports fair pricing of securities making it difficult to beat the market since for every security, prices reflect all relevant information (Fama, 1970). Nyamute, Lishenga, and Oloko (2015) showed that rational qualities such as lucidity do not always underlie decision making as assumed by EMH and in reality, biases such as herding exist. The behavior can stem from uncertainty and an innate desire to be part of a group (Hayes, 2022). Prospect theory explains that in times of uncertainty, people tend to weigh their decision alternatives in terms of potential gains and losses and will choose those options that effectively minimize their losses (Kahneman & Tversky, 1979) while information cascades theory poses that when people follow the bandwagon at the expense of their own intelligence, information known to them fails to be reflected in the public sphere as it has been stifled hence securities ultimately diverge from their true value (Bikhchandani & Sharma, 2000).

Herding Behaviour

Herding is the practice of investors making choices that chart the same path over a given span (Nofsinger & Sias, 1999). It is imitation of others' deeds (Welch, 2000). It is putting aside individual beliefs and information to instead parrot the choices of other people or trail the market (Hwang & Salmon, 2004). To examine herding, the CSSD and CSAD models, respectively pioneered by Christie and Huang (1995) and Chang, Cheng, and Khorana (2000), are widely used. Christie and Huang (1995) postured that, when the market is under tremendous strain, the propensity to herd is heightened and that unlike rational asset pricing models, dispersion decreases when people herd. Adem and Sarioğlu (2020) note that, the CSSD model is linear and it tests for herding by assessing the extreme market returns while the CSAD model is non-

linear and it does not restrict itself to only the extremes. Other herding models include Hwang and Salmon's (2004) model that uses the volatility of beta coefficients.

Using the CSSD, Christie and Huang (1995) found no proof of herding in the US between 1925 and 1988. Chang, Cheng and Khorana (2000) employed the CSAD model and daily data from 1963 to 1997. They registered no proof of herding in the US and Hong Kong markets, significant proof for South Korean and Taiwan markets and partial proof for Japan. Adem and Sarioğlu (2020) used modified versions of the CSSD and CSAD models to examine herding in the Istanbul Stock Exchange. Using the modified CSSD, they found herding existed during down market conditions only while the modified CSAD model detected, in up and down market states, herding behavior. Its existence was evidenced using all data types including monthly data from 2000 to 2018 leading them to conclude that herding was a continuous rather than a short term phenomena.

Stock Market Liquidity

Stock market liquidity is the ability of a market to expeditiously implement trading transactions with the volumes traded being large, transaction costs subdued and effect on price mild (Naik & Reddy, 2021). It is a multi-faceted variable whose definition encompasses key features related to liquidity. These are: tightness, immediacy, depth, breadth, and resilience (Sarr & Lybek, 2002). Categorically, liquidity measures mostly employ low rather than high frequency data (Le & Gregoriou, 2020). Specific liquidity measures include trading volume, turnover ratio, bid-ask spreads and Amihud's (2002) illiquidity ratio among many others. To represent stock market liquidity, many studies compute individual stock liquidity and then average the liquidity of stocks in the cross-section sampled (Muktiyanto, 2015; Vo and Phan, 2016; and Galariotis, Krokida, and Spyrou, 2016 inter alia).

The impact of liquidity on stock returns was investigated by Amihud and Mendelson (1986) using NYSE stock data spanning the period 1961 to 1980. Bid-ask spreads were used to measure liquidity. The study registered significant evidence that as bid-ask spreads increased, the return required by an investor also increased. The spread effect reduced when amortized over longer spans implying that high spread (low-liquidity) investments were more suitable for investors with long time horizons than short time horizons. Rhee and Wang (2009) found that stock market liquidity at Jakarta Stock Exchange was negatively influenced by foreign ownership where they employed spread, depth and price sensitivity measures of liquidity. Koske, Tuwei and Kimwolo (2019) used the turnover ratio to assess the impact of stock market liquidity on the chance of financial distress at NSE and found a negative link existed.

Herding Behavior and Stock Market Liquidity

Herding behavior causes prices of stocks to move away from their fundamental value and if securities fail to revert back to their true value, in the long run, it becomes unsustainable for trades to be executed at overvalued or undervalued prices (Hayes, 2022). As a result, trading activity diminishes and a concurrent exit of security traders may ensue inevitably causing the liquidity of a given market to decay (Galariotis, Krokida, & Spyrou, 2016). This heightens the instability of those particular markets and in extreme cases, the markets may break down (Vo & Phan, 2016).

Poon, Rockinger, and Stathopoulos (2013) employed the S&P 1500 index and found that during the 2007-2008 financial crisis, sell-side institutional herding negatively affected liquidity as it raised the proportional quoted spread and liquidity risk indicated by liquidity beta. For the period 2005 to 2017, Vo and Phan (2016) examined Vietnam's stock market before, during and after the financial crisis and through Granger Causality tests, they found a bi-directional effect existed between CSAD and market liquidity for pre-crisis and post-crisis spans. At the Nigerian stock market, Osamor, Anene, and Saka (2019) studied the influence of stock market liquidity on herding behavior from 2001 to 2015 placing focus on the conglomerate and consumer goods sectors. Comparatively, during high and low liquidity, the study found partial evidence of herding in the conglomerate sector while in the consumer goods sector, herding was not evidenced.

Nairobi Securities Exchange

NSE is a securities trading facility based in Kenya. It was officially registered under the Societies Act in 1954 and is regulated by CMA (NSE, 2023). It purposes to connect investors to available investment opportunities and thus plays a key role in steering Kenya's and Africa's economic growth. The Exchange is part of various membership organizations including ASEA and EASEA, World Federation Exchange and Association of Futures Market (NSE, 2023).

In 1988, the Government of Kenya released 20% share ownership in KCB and this became the first privatization facilitated by the bourse (NSE, 2023). According to IOSCO (2007), availing an ample level of shares in the market for active trading enriches liquidity. By reducing share concentration, the level of free float in the market will not only be increased but the investor base will also be expanded (IOSCO, 2007). Kenya Airways was privatized in 1996 and more than 110, 000 investors became shareholders as the Government condensed its ownership at the airline to 26%. In 2001, NSE was fragmented into various segments; MIMS, AIMS and FISMS (NSE, 2023).

The bourse has over the years taken steps to upgrade its trading infrastructure which in effect enhances liquidity by increasing the efficiency at which orders are executed. Modernized

systems support extended trading hours, improve market access, enhance price discovery and encourage trading activity leading to higher traded volumes (IOSCO, 2007). In 2004, NSE automated the clearing and settlement process of traded shares. It effected live trading for equities on its Automated Trading System in 2006 and in 2007, effected its WAN platform. Trading hours also increased from three hours to six hours in 2008 (NSE, 2023). In 2013, GEMS, was created. In 2014, NSE demutualized and officially became a self-listed entity (NSE, 2023). In 2021, the bourse strategically commenced day trading in equity securities. Day trading was introduced as a means to boost liquidity and implies shares of the same security are purchased and sold or sold and purchased on the same account, on the same day (NSE, 2021).

Though the NSE has implemented measures to increase trading activity, in the past few months, its performance has notably descended. Bulinga (2023) explains that limited investor education on the stock market and pressures stemming from political uncertainty, worsening economy, COVID-19 and the effects of the Russia-Ukraine war have led many investors to adopt a cautionary wait-and-see attitude consequently lessening trading activity at the bourse. A soundness report by CMA indicated that in the quarter ended March 2023, the MSCI Kenya Index fell by 18.73% due to sinking demand (CMA, 2023). Additionally, at least 42% of foreign investors were reported to have exited NSE as at September 2023 prolonging the bearish trend at the bourse (Muiruri, 2023). This massive exit is worrying and is likely the result of losses experienced at NSE given the depreciating shilling and rising inflation. If this trend continues, NSE's liquidity will continue to subside.

Research Problem

Liquidity is an important feature of efficient financial markets. It facilitates fair pricing of securities necessary to entice traders to frequently buy and sell and supports speedy execution of market orders (Naik & Reddy, 2021). However, due to herding behavior, the liquidity of a given market may be eroded. Poon, Rockinger, and Stathopoulos (2013) found that institutional sell-side herding reduced the liquidity of the US stock market. According to Hikouatcha, Bidias, Kamdem and Nzongang (2018), when stock markets are liquidity-deficient, their advancement is hindered and capital mobilization is lessened. IOSCO (2007) reports that such markets are highly fragile.

Though stock market liquidity has been examined in literature, most studies on its determinants are more attentive to the impact of market indicators and macro-economic variables. For instance, Chordia, Roll, and Subrahmanyam (2001), Muktiyanto (2015) and Tayeh (2016) examined how market returns, market volatility, interest rates and prior macro-economic announcements affected stock market liquidity. At market level, literature review

further shows that studies on herding behavior at NSE have concentrated more on establishing whether or not it exists. Oluoch (2010) used CSAD to examine herding during the GFC while Muema (2014) used CSAD to examine herding during certain IPO's. Mwimali (2012) used CSSD and found no evidence of herding from 1996 to 2012. Ayuko (2015) used CSAD and found no evidence of herding from 2001 to 2014 while Orayo (2016) used CSSD and evidenced herding in the period 2009 to 2015. Moreover, previous studies at NSE have assessed the effect of herding on other market features other than market liquidity such as market volatility, market reaction and market perfomance (Orayo, 2016; Cherono, Nasieku, and Olweny, 2017; Masema, 2019). On the basis of these studies, a conceptual gap is identified in that, the effect of herding on stock market liquidity at NSE has yet to be examined.

Additionally, studies assessing the link between herding and market liquidity were done in foreign markets presenting a contextual gap. For instance, Vo and Phan (2016) assessed the relationship in Vietnam's stock exchange. Galariotis, Krokida, and Spyrou (2016) focused on UK, US, Germany, France and Japanese markets while El-Gayar, El-Hayes, and Metawa (2021) focused on the Egyptian market. The results obtained by these studies may therefore not apply to NSE owing to aspects such as difference in the level of economic growth and development. El-Gayar, El-Hayes, and Metawa (2021) performed event studies and found that for some events, a drop in CSAD herding measure caused a drop in stock market liquidity while in others, it was followed by an increase in stock market liquidity. This shows a conflicting gap exists hence, there is need to establish how herding affects market liquidity, specifically at NSE.

A methodological gap is also identified in terms of variable measurement. While El-Gayar, El-Hayes, and Metawa (2021) respectively used CSAD and the logarithim of trade volume to measure herding and stock market liquidity, Poon, Rockinger, and Stathopoulos (2013) used a head-count ratio and quoted spread. Vo and Phan (2016), Galariotis, Krokida, and Spyrou (2016) used CSAD and Amihud's (2002) ratio, modified by Karolyi, Lee and Dijk's (2012) method. To differentiate from these studies, alternative measures can be employed. For instance, CSSD can be used to measure herding behavior while turnover ratio can be used to measure liquidity.

Given the adverse effects of low liquidity, conceptual, contextual, conflicting and methodological gaps identified, this study is motivated. The intent is thus to answer: How does herding behavior affect stock market liquidity at NSE?

Research Objective

To assess the effect of herding behavior on stock market liquidity at Nairobi Securities Exchange

REVIEW OF LITERATURE

Theoretical Review

Efficient Market Hypothesis

Pioneered by Fama (1970), EMH posits, if a market is informationally efficient, a company's stock will quickly and wholly assimilate information related to it into its current price, rendering efforts to estimate stock prices needless. The theory is rooted on the assumptions that trades are random and investors are rational. Acts of irrational investors are expected to be neutralized by arbitrage pursuits in the market leading security prices to be fair (Lindhe, 2012). In its weak form, all prior information regarding a security will be mirrored in the price while in its semi-strong form, prices integrate all public information. In its strong form, security prices register in totality, public and private information, hence, even inside information will be pointless and excess risk-adjusted returns will be unattainable (Fama, 1970).

Grossman and Stiglitz (1980) elucidated that the existence of markets that are informationally efficient lies on the proportion of investors who actively remain updated on the market through news and own analysis which could be costly. Thus, if majority of investors choose to overlook their own research and instead invest through passive channels, then the informational efficiency of the market lowers (Chen, 2022). Omuchesi, Bosire and Monica (2014) cited that NSE's efficiency was weak-form and found that automation did not significantly impact NSE's efficiency. A study by Njuguna (2016) found that between 2001 and 2015, NSE's efficiency had been amplified and concluded that this was due to internet connectivity and improved trading infrastructure which facilitated faster information transmission, heightened price discovery and supported speedy execution of market orders.

Critics of the theory argue that, if prices inevitably adjust as opined by EMH, then cases of market bubbles and crashes witnessed in financial markets would not have surfaced (Robinhood, 2022). Furthermore, studies have established that behavioral biases such as herding, overconfidence and loss aversion exist and thus investors are not always rational as postured by EMH (Nyamute, Lishenga, and Oloko, 2015; Hunguru, Sibanda, and Tadu, 2020 among others). Dons in the behavioral sphere cite that investors are normal rather than rational and that arbitrage activities are narrowed due to risk and expense limits (Wang, 2021). Further, that uniform information is not always accessed by investors and that even if they did, it does not certainly mean they process it equally as assumed by EMH (Robinhood, 2022). This study considers EMH to be relevant in that it provides a background against which market liquidity can be investigated. This is because, for a market to be liquid, it must have the ability to support fair pricing of securities even when met with sudden shocks such as those propelled by investors' irrationality which can manifest through herding behavior. Market liquidity and market efficiency

are therefore interrelated and it can be argued that liquidity increases with a market's efficiency and vice versa.

Information Cascades Theory

Information cascades theory can be traced to Bikhchandani, Hirshleifer and Welch (1992). The theory postures an information cascade is sparked when an individual's decision is tied to resolutions made by others with private intelligence being disregarded. Its progression is steered by implied spoken messages amongst involved parties and when fresh intelligence is openly shared or there is entry of more erudite parties, the cascade can shake easily and its course diverted (Palmer, 2022).

A simple scenario of how informational cascades occur was provided by Bikhchandani and Sharma (2000). Suppose some investors in sequence are confronted with an option to either accept or reject investing in a project. Investor one opts to invest with his choice being footed on a good signal. Investor two observes this and if his signal is also good, he opts to invest. This resolution has been footed not only on his private analysis but also on his knowledge of investor one's actions. Contrariwise, investor three receives a bad signal suggesting rejection of investment. He disregards it and decides to invest simply because investors one and two chose to do so. This sparks an information cascade typified by copied behavior with the consequence being that, pivate intelligence known to subsequent parties is inhibited from reflecting in the public domain as it is suppressed. This fosters the belief that the majority are right, a position which can be invalid and can be the cause a collosal market wave (Palmer, 2022). A study by Tiniç, Iqba and Mahmud (2020) found that informational cascades explained buy-side herding at Borsa instanbul from 2005 to 2017 where irrational investors predominantly spawned continuous orders.

Doherty (2018) explained that one of the limitations of the theory is that cascading behavior cannot be directly tested by existing measures and more precise approaches are necessary to impart conclusive evidence on the phenomena. The theory is relevant to the study as it explains how herds originate and in addition, it furthers comprehension of how herding affects fair pricing of securities in that fair pricing is inhibited when valuable knowledge known to herders is repressed (Adem & Sarioğlu, 2020). As a result, prices digress from fundamentals adversely affecting trading activity and a market's liquidity.

Empirical Literature Review

Galariotis, Krokida, and Spyrou (2016) investigated the relationship between herd behavior and market liquidity in France, Germany, UK, US and Japan. They sampled 550 index-

component stocks constantly traded from 2000 to 2015. They examined herding in the market using the CSAD model for full samples and adjusted it to further assess samples subjectively defined on the basis of average liquidity. Their tests registered no herd behavior in the markets for full samples but when the CSAD model was adjusted for liquidity, sizeable proof of the behavior was observed for high and medium liquidity stocks, Germany being an exception. Granger Causality tests performed for all markets registered a bi-directional relation existed between CSAD and liquidity. Variance decomposition tests found that, besides Germany, herding had an effect on the variance of average market liquidity during and after the GFC.

Choi and Yoon (2020) assessed the existence of herding in the KOSPI and KOSDAQ stock markets from 2003 to 2018 using the CSAD approach and quantile regression. They also examined how investor sentiment, metered by Korea's fear index, VKOSPI, affects herding behaviour. They reported herding in both markets during down-market states but noherding was found in either markets for up and undefined market conditions. Further analysis reported herding in both markets during periods of high trade volume whereas reverse herding was reported in both markets during periods of low trade volume. They also found that investor sentiment positively affected herding behavior in the KOSDAQ market.

Rizal and Damayanti (2019) used CSAD and various GARCH models to examine herding in normal and asymmetric market conditions from 2000 to 2018. The Jakarta Islamic Index consisting of 30 stocks and the Indonesia Composite Index consisting of all stocks listed at the Indonesia Stock Exchange were employed. For overall market conditions, heavy evidence of herding was registered by most of the GARCH models. They also found heavy proof of herding during down-markets but for rising market states, evidence found suggested herding but it was not significant. Recommendations to test herding sector-wise were made with the argument being that market wide herding did not inevitably infer its existence in specific industry sectors.

Hunguru, Sibanda, and Tadu (2020) sampled 291 out of 6702 individual investors to investigate how behavioral factors influenced investment decisions at the Zimbabwe Stock Exchange as at 2018. They employed a Likert scaled questionnaire, correlation and multiple regression for analysis. They found that over 80% of changes in individual investment decisions were in aggregate explained by gambler's fallacy, mental accounting, herding, regret aversion, representativeness, overconfidence, loss aversion, anchoring and availability biases. A positive effect was reported for all these predictor variables. Comparatively, the heaviest influence was attributed to herding, loss aversion and regret aversion biases with a moderate effect being reported for the rest. These results evidenced that investment decisions are not always driven

by rationality and that psychological and social biases are key influencers of investment decisions.

In Nepal, Risal and Khatiwada (2019) assessed whether herding was influenced by hasty decisions and decision accuracy using age and level of investor experience as moderating variables. Correlation, univariate and multiple regression analysis were employed to assess the responses of 500 sampled investors which were gathered using a Likert scaled questionnaire. A positive and significant effect of hasty decisions on herd behavior was found while a negative and insignificant effect of decision accuracy was reported. Age and experience level were found to have an insignificant influence on the relationship between herding, hasty decisions and decision accuracy. The study explained that hasty decisions stemmed from laziness, inadequate skills and an irrational belief of investors that profit prospects could be lost from time expended to substantiate information. As a result, investors with a hasty attitude at the time of investment tend to herd by following the decisions made by the majority.

For the period 2010 to 2014, Nyamute, Lishenga and Oloko (2015) sampled 385 individual investors to assess how investor behavior affected portfolio performance at NSE. The study considered overconfidence, disposition effect and herding as predictor variables and effectively employed a multiple regression model to find how they associated with the portfolio performance of an investor. Data was sourced through questionnaires and from investors' statements. Overconfidence was found to negatively impact portfolio performance whereas the impact of herding and disposition effect were found to be heavily positive. The study asserted that though this was the case, a good cue was needed to herd.

Orayo (2016) investigated herding behavior at NSE and whether it contributed to stock market volatility. Monthly data for the the NSE 20 share index together with its constituent firms were employed for the years 2009 to 2015. Graphical analysis, the CSSD method and random effects model were respectively used to evidence occurrence of volatility, test the presence of herding and for estimation purposes. Volatility was shown to exist and in addition sizeable evidence backing the presence of herding was found which they stated could be used to explain the volatility observed.

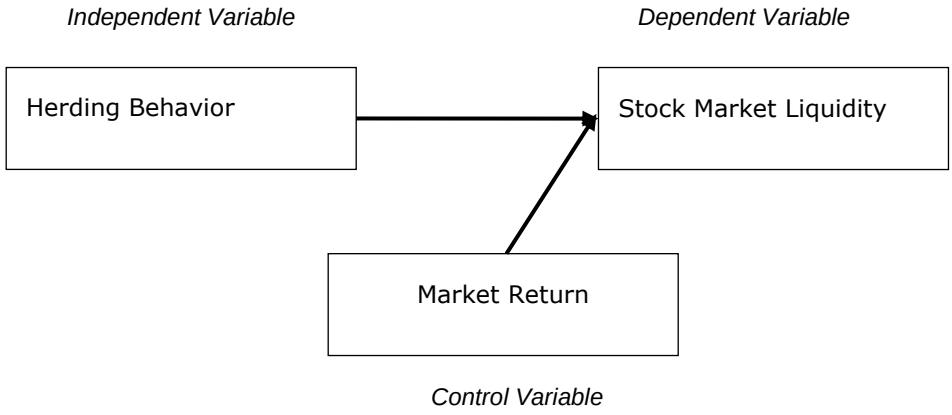
Cherono, Nasieku, and Olweny (2017) examined how herding behavior affects stock market reaction in Kenya using a sample of 48 out of 67 target companies listed at NSE, stock data from 2004 to 2016 and random effects model for estimation. The study reported a considerable positive impact of herding, measured by CSAD, on stock market reaction and explained that it triggered departure of stock prices from their true value generating abnormal returns which represented stock market reaction.

Ayuko (2015) studied for the period 2001 to 2014, the effect of herding on stock returns at NSE. Out of 61 targeted companies, the study sampled 20 firms constituing NSE 20 index and adopted a descriptive research design. The CSAD model was employed to examine herding behavior for full sample and specific sub-periods. No herding was found for the entire period or for sub-periods 2001-2007, 2008-2010 and 2011-2014. The study interpreted this to mean that herding had no effect on NSE's stock returns.

Conceptual Framework

This is a visual display of variables under study and the relationships being investigated (Swaen & George, 2022). Given the aim is to investigate the effect of herding behavior on stock market liquidity at NSE, the independent variable, is herding behavior whereas the dependent is stock market liquidity. The study chooses to control for market return since in any market, returns are a good indicator of market performance and various studies have found that market returns significantly affect market liquidity (Muktiyanto, 2015; Tayeh, 2016 among others). Usually, control variables are added to an econometric model to separate the independent variable's effect on the dependent and though relevant, it should be noted they are not the key focus of the study (Frost, 2023).

Figure 1: Conceptual Framework



RESEARCH METHODOLOGY

Research Design

According to Singh (2023), research design is an organized procedure employed by a researcher to perform a study. It helps guide the research including collection and analysis. Descriptive design was employed as it is objective and can be used to infer how one variable

affects another by employing statistical tools and deductive reasoning to describe data, analyze and interpret it (Singh, 2023).

Study Population

Population refers to the total collection of all subjects under study (Bhandari, 2020). The study population for this research was all 65 firms currently listed at NSE.

Sample and Sampling Technique

A sample is a section of the population for which data is specifically gathered and analyzed to make conclusions for the entire population (Bhandari, 2020). The study sampled firms that consistently appeared in the NSE 20 index between January 2017 and December 2022. The sample choice was based on the fact that the index is well-established given it has existed for over two decades (NSE, 2023). Its composure is based on 20 of NSE's most liquid and largest firms and reflects market trends (African Financials, 2023). Given its informative ability, investors are highly likely to trail the performance of the index hence, it is prone to herding. Studies by Vo and Phan (2016), Galariotis, Krokida, and Spyrous (2016) found that herding was exhibited in high to medium liquidity stocks which further provided reason for the choice of sample. The sampling technique was thus purposive. Purposive sampling is used to select samples based on individual judgement and is informed by attributes the researcher finds optimal to achieve research objectives (Nikolopoulou, 2022).

Data Collection

Data collection means gathering information from suitable sources in order to answer research questions (Simplilearn, 2023). Secondary data was collected from NSE for the period January 2017 to December 2022 as shown in the data collection sheet in Appendix 2. Specifically, the study collected monthly data on NSE's equity turnover and market capitalization to compute stock market liquidity while monthly price data for NSE 20 index and its constituent firms was collected to compute market returns and construct the herding measure.

Christie and Huang (1995) as well as Chang, Cheng, and Khorana (2000), Galariotis, Krokida, and Spyrou (2016) postured that herding is heightened in conditions of uncertainty as people feel safe in such times when they are part of the majority group. For this reason, the period of study was considered appropriate as it had been marked by highly uncertain conditions stemming from political, economic and health issues. For instance, due to political uncertainty, Kenya held two general elections in 2017 alone. Another election was held in 2022. In addition, COVID-19 abruptly arose and spread rapidly around the world resulting in numerous

unexpected deaths. Russia invaded Ukraine, and as a result, global supply chains of food and energy commodities were adversely affected leading to high inflation in the country. The study considered the data for the period after and before an election.

Data Analysis

Data analysis is a systematic procedure that uses statistical techniques to evaluate data in order to draw useful insights (Alusa, 2021). To facilitate data analysis, this section presented the analytical model and defined what each variable in the model represented. It then operationalized all the variables and showed how they were measured. It concluded by describing the significance test used and diagnostic tests performed.

Analytical Model

The following linear regression model was be used by the study.

$$Y_t=B_0+B_1X_{1t}+B_2X_{2t}+e_t \quad (1)$$

Where:

$\mathbf{Y_t}$ = Stock market liquidity at time t

$\mathbf{X_{1t}}$ = Herding index at time t

$\mathbf{X_{2t}}$ = Market return at time t

$\mathbf{B_0}$ = Constant term

$\mathbf{B_1}$ = Coefficient of the herding index

$\mathbf{B_2}$ = Coefficient of market return

$\mathbf{e_t}$ = Error term at time t

Operationalization of Study Variables

Operationalization is a procedure that communicates how a research measured the variables under study and which proxies will be employed if direct observation is unavailable (Muktiyanto, 2015). Operationalization was as follows:

Table 1: Operationalization of Study Variables

Variable	Type	Indicator (s)	Source
Stock market liquidity	Dependent	Turnover ratio	Jepkemei (2012)
Herding Behavior	Independent	CSSD	Christie and Huang (1995)
Market Return	Control	NSE 20 index returns	Ayuko (2015)

Turnover Ratio

Turnover ratio was used to measure stock market liquidity. It is computed as follows.

$$\text{Turnover Ratio} = \frac{\text{Equity Turnover}}{\text{Market Capitalization}} \quad (2)$$

CSSD Measure

Herd Behavior was measured using CSSD, developed by Christie and Huang (1995). The authors explained that since herding leads individual returns to converge towards the market return hence, return dispersion reduces. CSSD is calculated as follows:

$$\text{CSSD}_t = \sqrt{\frac{\sum_{t=1}^{n}(R_{i,t} - R_{m,t})^2}{N-1}} \quad (3)$$

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (4)$$

$$R_{m,t} = \frac{\sum_{i=1}^{N} R_{i,t}}{N} \quad (5)$$

Where:

$CSSD_t$ = Cross Sectional Standard Deviation at time t

$R_{i,t}$ = Return of stock i at time t

$R_{m,t}$ = Cross-section average of N returns in the portfolio

N = Number of stocks in the portfolio

$P_{i,t}$ = Closing price of stock **i** at time t

$P_{i,t-1}$ = Closing price of stock **i** at time time (t-1)

Market Return

Market return was proxied by the returns of NSE 20 index and computed as follows:

$$\text{Market Return} = \ln\left(\frac{P_{m,t}}{P_{m,t-1}}\right) \quad (6)$$

Where:

$P_{m,t}$ = Price of market index at time t

$P_{m,t-1}$ = Price of market index at time (t-1)

Significance Test

To establish significance, the p-value method was used. At 5% significance level, if p-value was less than or equal to 0.05, the null hypothesis implying no significance was rejected. P-values were also used when interpreting results of diagnostic tests.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 2 represents descriptive statistics for the monthly turnover ratio, CSSD and NSE 20 returns. The sample has 71 monthly observations. The results show that, between January 2017 to December 2022, the liquidity of NSE was on average 0.005 (0.5%) as indicated by the mean turnover ratio. The minimum turnover ratio was observed to be 0.002 (0.2%) while the maximum turnover ratio was observed to be 0.009 (0.9%). These statistics show that the liquidity of NSE based on turnover ratio is very low.

For the CSSD, the mean value is 0.076. This mean is much closer to the minimum value of 0.035 than the maximum value of 0.317. Galariotis, Krokida, and Spyrou (2016) explained that CSSD approaches 0 as the distance between individual stock returns and average market returns reduces. As individuals herd, CSSD is expected to reduce (Christie & Huang, 1995). For the NSE 20 index, the mean return is observed to be negative (– 0.7%). Mean negative returns indicate that over the sample period, NSE experienced down market conditions on average. The minimum market return was -17.3% whereas the maximum market return was 8.6%.

The standard deviation of the market liquidity measure is 0.002 while that of the CSSD herding measure and NSE 20 market returns is 0.039 and 0.045 respectively. Usually, standard deviation shows how dispersed data points are from the mean (Pannell, 2023). Comparatively, the variable with the highest spread is NSE 20 returns, followed by CSSD. Turnover ratio has the lowest spread.

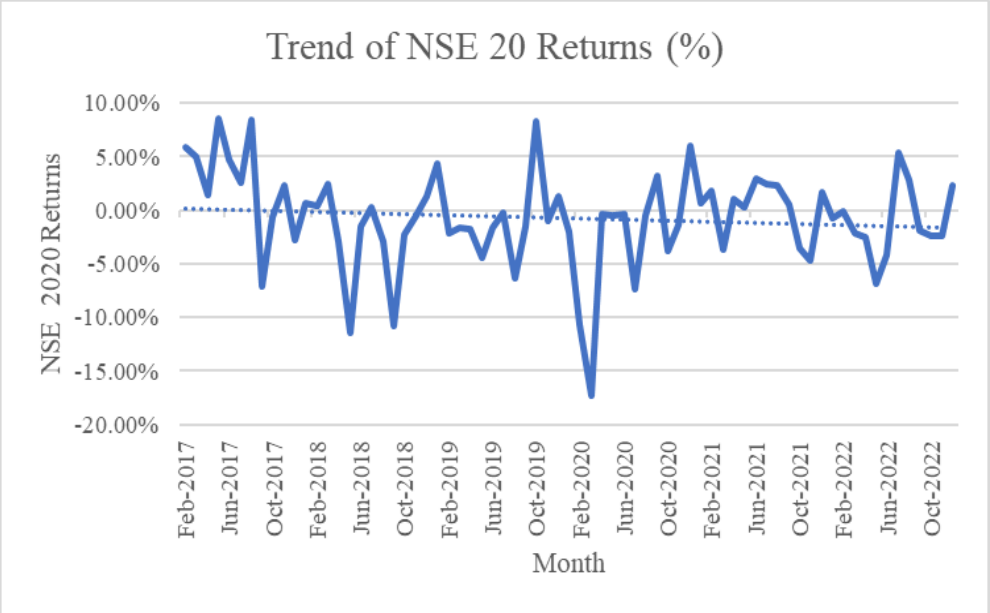
Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Turnover Ratio	71	0.005	0.002	0.002	0.009
CSSD	71	0.076	0.039	0.035	0.317
NSE 20 Returns	71	-0.007	0.045	-0.173	0.086

Trend of NSE 20 Returns

Figure 2 shows the trend of NSE 20 returns between 2017 and 2022. The trend line gradually slopes downwards, indicating that over time, NSE 20 returns have been gradually declining. The lowest return was recorded around March 2020 which is when COVID-19 was detected in Kenya (Mwangangi, 2020). Shortly after, NSE 20 returns are observed to have improved, though they continue to fluctuate up and down over time.

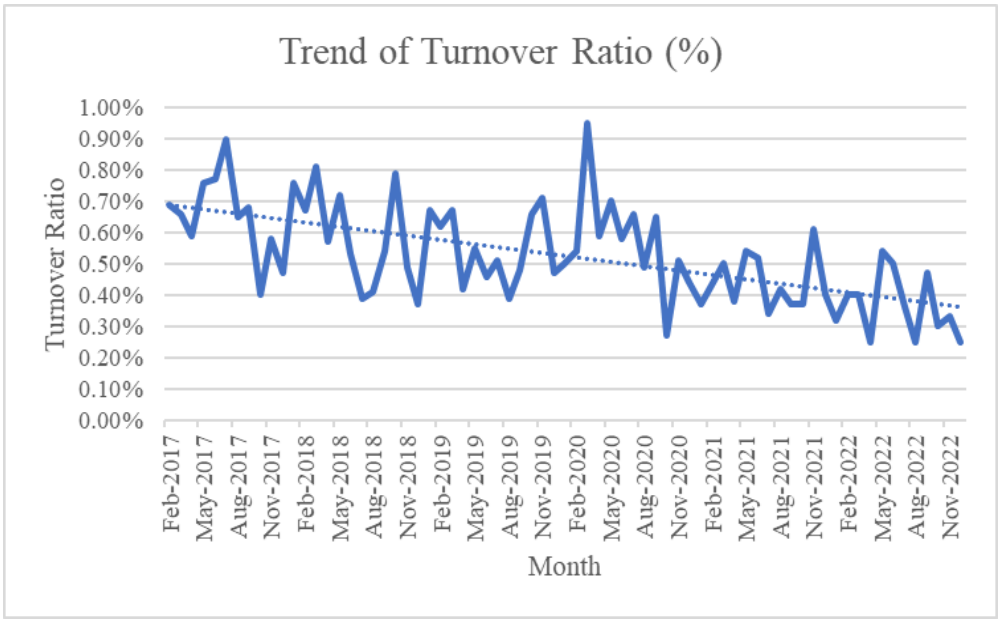
Figure 2: Trend of NSE 20 Returns



Trend of Turnover Ratio

Figure 3 is the trend of turnover ratio between 2017 and 2022. The trend line of turnover ratio slopes downloads which indicates that over time, the turnover ratio and therefore market liquidity at NSE has on average been declining.

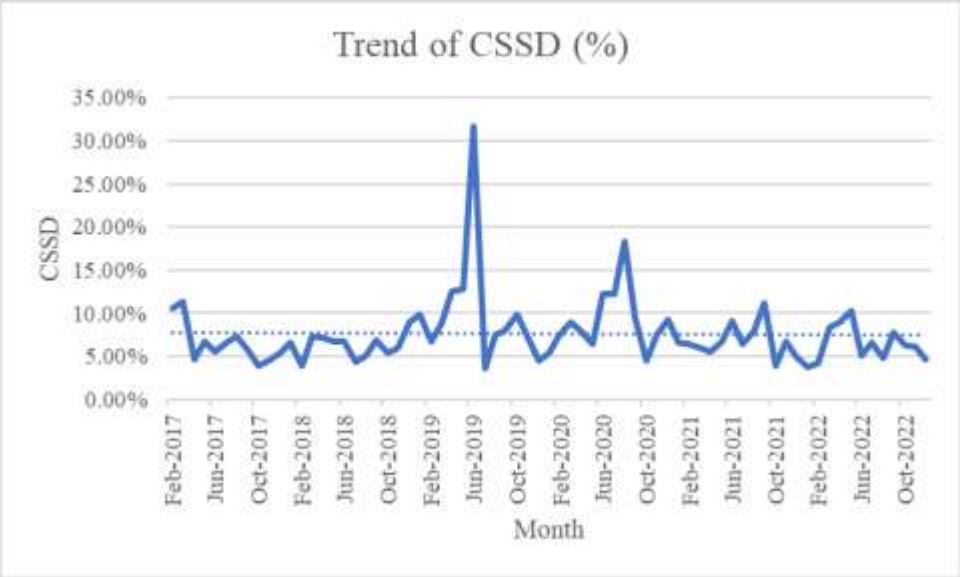
Figure 3: Trend of Turnover Ratio



Trend of CSSD

Figure 4 shows the trend of CSSD between 2017 and 2022. The study observes that between 2017 and 2018, CSSD values were generally stable and did not sharply increase or decrease. However, between February 2019 and June 2019, a sharp increase in CSSD was observed. Subsequently, a sharp decrease in CSSD ensued in July 2019. Rational asset pricing models envisage that an increase in dispersion of returns around the mean is induced by heightened uncertainty in the market (Christie & Huang, 1995). In January 2019, there was a terrorist attack in Nairobi at the Dusit D2 hotel (Bernado, 2021). Security concerns are a source of fear and uncertainty and this could be the cause of the return dispersion amplification. Christie and Huang (1995) postured that in turbulent periods, people are likely to herd and as a result, herding would reduce the dispersion of returns around the mean.

Figure 4: Trend of CSSD



Correlation Analysis

Table 3 below shows the correlation between turnover ratio, CSSD and NSE 20 returns. The market liquidity measure (turnover ratio) and CSSD herding measure are positively correlated since their correlation coefficient is 0.088. Conversely, market liquidity and market returns are negatively correlated since the correlation coefficient between turnover ratio and NSE 20 returns is -0. 055. Thus, we expect that upon regression, a positive link will exist between turnover ratio and CSSD while a negative one will exist between turnover ratio and NSE 20 returns.

Table 3: Matrix of Correlations

Variables	Turnover Ratio	CSSD	NSE 20 Returns
Turnover Ratio	1.000		
CSSD	0.088	1.000	
NSE 20 Returns	-0.055	-0.021	1.000

Regression Analysis

Table 4 below displays the results of linear regression. The coefficient of the CSSD herding measure is 0.004 and its p-value is 0.474. At 5% significance level, the null hypothesis inferring a coefficient is insignificant is rejected if its p-value is equal to or below 0.05. Hence, the null hypothesis that the coefficient of CSSD is zero is not rejected since it is greater than 0.05. This implies CSSD does not significantly impact turnover ratio. Thus, herding behavior insignificantly affects stock market liquidity.

The coefficient of NSE 20 returns (-0.002) is also shown to be insignificant since its p-value (0.663) exceeds 0.05. For the constant coefficient (0.005), since its p-value (0) is less than 0.05, the null hypothesis that the constant coefficient is zero is rejected implying that the constant term is significant. Thus, the fitted regression equation is:

$$\mathbf{Y_t=0.005+e_t} \quad (7)$$

Where:

$\mathbf{Y_t}$ = Stock Market Liquidity at time t

$\mathbf{e_t}$ = Error Term at time t.

The model has an R-squared of 0. 011 which is the coefficient of determination and in this case, it is very low. It means that 1.1% of stock market liquidity (turnover ratio) variation can be explained by the variations in the CSSD herding measure and NSE 20 market returns. The F-statistic has a p-value of 0.698 which is greater than 0.05. Hence, the null hypothesis that the coefficients of both CSSD and NSE 20 market returns is zero is not rejected. This means that jointly, CSSD and NSE 20 market returns do not significantly affect turnover ratio (stock market liquidity).

Table 4: Linear Regression

Turnover Ratio	Coefficient	Standard Error	t-value	p-value	95% Confidence Interval		Sig
CSSD	0.004	0.005	0.72	0.474	-0.006	0.013	
NSE 20 Returns	-0.002	0.004	-0.44	0.663	-0.01	0.007	
Constant	0.005	0	11.96	0	0.004	0.006	***

Table 4….

Mean dependent var	0.005	SD dependent var	0.002
R-squared	0.011	Number of obs	71
F-test	0.362	Prob > F	0.698
Akaike crit. (AIC)	-709.761	Bayesian crit. (BIC)	-702.973

*** p<.01, ** p<.05, * p<.1

CONCLUSION

Following the findings of this study, the study concludes that herding behavior has no effect on stock market liquidity at NSE. Additionally, the study finds that Market Returns, used by the study as a control variable also has no effect on stock market liquidity at NSE.

Recommendations for Policy and Practice

As this study finds herding behavior and market returns were insignificant predictors of market liquidity, this study recommends that measures implemented at NSE to boost market liquidity should be more informed by those factors found to significantly affect the bourse's liquidity. For instance, NSE should focus more on the effects of inflation rate, exchange rate and interest rate as these factors were found to significantly affect market liquidity at NSE by Jepkemei (2012) and Ochenge, Ngugi, and Muriu (2020).

Limitations of the Study

The study scope was limited by cost constraints since data from NSE is not available for free. The purchase cost increased as the number of years and frequency of observations for which data is needed increased. Taking this into consideration, the study opted for monthly data and a reasonable time period for analysis in order to achieve the research objective.

Additionally, to calculate CSSD, considerable time was taken to organize the company data received as the format in which it was provided was not suitable for computing the values of CSSD. This made the initial process of data analysis to be tiresome.

Another limitation is the fact that studies assessing the impact of herding behavior on stock market liquidity are scant in literature. This limited the ability of the study to effectively make comparisons based on the results previous authors had found when they assessed the variables in unison.

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