Analysis of impact of market liquidity on investor herd formation

Business, Corporate Governance

The data used in this paper primarily consists of daily prices for thirty-one (29) stocks listed on the Nigerian Stock Exchange (NSE), across six sectors. These are: three (3) industries in Agriculture, three (3) industries in building and construction materials, nine (9) deposits money banks, six (6) insurance companies, four (4) industries in petroleum marketing and four (4) conglomerates industries. The data is obtained from the Nigerian Stock Exchange (NSE) and is transformed into a time series of continuously compounded returns Rt, calculated as:

Where, pt and pt-1 are the index values at times t and t-1. The market return is an equally weighted average of individual returns.

This paper uses the methodological approach proposed by Chang, Cheng, & Khorana (2000) and Tan, Chiang, Mason, & Nelling (2008) to test the existence of herding behavior in the Nigerian stock market. This approach is based on the idea that herding is more likely to occur during market turmoil when market participants are more likely to conform to market consensus. Thence, individual returns will tend to cluster around market return thereby reducing dispersions. Rational asset pricing models, on the contrary, suggest that returns dispersions will increase because assets differ in their sensitivity to market returns. Chang, Cheng, & Khorana’s (2000) approach, therefore, proposes the following model of the relationship between market return and its dispersion to detect herd behavior. The model allows for the detection of herding characteristics over the entire distribution of market returns:

Where CSADt is the cross-sectional absolute deviation which is a measurement of the return distribution. It is obtained from the equation:

Where, N-represents the number of observations, is the cross-sectional average return on assets at time t and Ri, t is the return on stock i at time t. Therefore, test for the detection of herding activity is conducted based on the regression specified in equation (2). If the assumptions underlying the rational asset pricing models hold, then the coefficient in equation (2) should be positive and statistically significant implying a linear relationship between and . On the contrary, if is significantly different from zero, two cases arise. In the first case, the coefficient on the nonlinear term is significantly negative indicating the presence of herding behavior. In the second case, the coefficient is significantly positive, suggesting the existence of adverse herding.

Measuring Liquidity

As noted earlier, the influence of asset's liquidity on herding behavior is increasingly being recognized in the herding literature. Studies such as Galariotis, Krokida, and Spyrou (2015) empirically recognizes this by conditioning the Herding Model of Chang, Cheng, & Khorana's (2000) on Karolyi, Lee, & Van Dijk's (2012) measure of illiquidity. They found that this conditioning has improved the model's ability to uncover evidence of herding. The theoretical basis for the inclusion of liquidity is the belief that liquidity help predicts equity returns and that different state of the market environment influence herd behaviour. In general, it is expected that herding thrives better in the condition of high market liquidity.

In this paper, we use a price impact measure, the well-known Amihud's (2002) measure of illiquidity and take into account the elasticity aspect of liquidity. Following Galariotis et al. (2015), therefore, we construct the following variable:

In equation, and are the return, price and trading volume of its stock at time. The average liquidity across stocks is obtained as:

In order to test for the impact of on herd behavior, we follow Galariotis et al. (2015) to augment equation (2) and estimate it in the following form:

In the dummy variable takes the value of 1 if liquidity lies in the upper 25% of the distribution and zero otherwise; dummy variable takes the value of 1 if liquidity lies in the lower 25% of the distribution and zero otherwise. The coefficient captures herding in case of medium liquidity (i. e. liquidity that lies in the region that is not covered by and). Equation allows us to capture herding activity during different liquidity state of the market (high, medium and low market liquidity).

Further Supplementary test

In order to investigate the relationship between average equity market liquidity and return clustering (CSAD) we proceed with the estimation of a Vector Autoregressive (VAR) model and present the results of the variance decomposition (Monte Carlo standard errors, 100 repetitions) of each variable for each sub-period. The paper also tests for the interrelation of reciprocity using the Granger test specifically to address the issue of whether the current value of a variable,, can be explained by past values of the same variable, , and then whether adding lagged values of another variable, , improves the explanation of . As such, the variable y is said to be Granger-caused by x if the coefficients on the lagged values of x are found to be statistically significant. We performed Granger causality tests by using the standard methodology proposed by Granger (1969 & 1986) and Engle & Granger (1987). In order to test for Granger causality among the listed stock trading in an industry, say and, we estimated the following equations and performed an F- test for the joint insignificance of the coefficients and , . For each pair of , say and , we performed two Granger causality tests in order to identify unilateral causation (causes or causes), bilateral causation (causes and causes) or no causation.

The application of the Granger test raises a number of issues that are critical for the significance of the test's results: the number of lags used in the OLS regressions, since the test's results are highly sensitive on this number (Hamilton, 1994; Gujarati, 2004; Wooldridge, 2006) and specification of the Granger causality tests. We addressed the former by relying on the estimation of an autoregressive model for each variable and using various lag length selection criteria while in the later we applied in a standard vector autoregressive (see MacDonald & Kearney, 1987; Lyons & Murinde, 1994).

It is worth noting that the test examines how much current and lagged values of CSAD (Liquidity) are explained by current and lagged values of Liquidity (CSAD). It does not suggest that one variable is the effect of the other; it merely indicates that one variable contains information about the other.